The London School of Economics and Political Science

From individual to system change and back again: Sufficiency-oriented consumer and citizenship behaviour for a transformative path toward degrowth

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Abstract

To avoid climate catastrophe, the IPCC has called for system-level transformations, such as equitable downscaling of production through degrowth, as well sufficiency-oriented behaviour change to reduce aggregate consumption. However, these approaches remain mostly separate within academic literature. This thesis aimed to address this disconnect between reduced consumption behaviours at the individual level and a degrowth agenda at the system level, as neither mitigation strategy alone will adequately deliver the scale and speed of emissions reductions required. Three empirical research projects investigated how sufficiency within a degrowth agenda might be facilitated through institutional change. **Project 1** used sufficiency-promoting marketing and deep framing to promote consumption reduction and degrowth, finding that deep framing in non-commercial settings was more effective for promoting degrowth values. **Project 2** investigated how a human needs approach might inform government regulations on consumption in the context of chemical pollution, finding that people considered functional products more essential than experiential products, though this depends on the level of risk and one's subjective status. **Project 3** connected the general public's engagement in sufficiency behaviours with their support for eco-social degrowth policy proposals, finding a complex relationship between these factors which varies by individual characteristics. Lastly, a commentary is included on how environmental psychologists can engage with system-level processes. By focusing on consumption reduction and applying insights from psychological and behavioural science using experimental methods, this thesis aimed to make the degrowth agenda more concrete to increase its relevance and accessibility to the general public.

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Chapter 1 – General Introduction

A common barrier to climate mitigation[1] and adaptation,[2] which has blocked any genuine sense of urgency in enacting solutions for many years, was the notion that the consequences of climate change were far off in the future – intangible at worst, and uncertain at best (Spence et al., 2012). However, we are now entering an era during which the effects of climate change are devastatingly tangible all around the world (IPCC, 2022a). With just 1.1° C of warming, droughts, severe heat, floods, wildfires, storms, and many other detrimental climate effects damaged populations and natural environments across the globe (IPCC, 2022a). Unfortunately, it was the Global South and the least affluent countries of the world who bore the first brunt of these consequences, exacerbating global inequality (Hickel, 2020a). Average temperatures in 2023 reached above 1.5° C for the first time (Poynting, 2024), a threshold above which scientists warn of additional severe climate disruptions (IPCC, 2018). These catastrophes are now increasingly being felt by affluent nations, the same nations that have generated most carbon emissions and extracted resources from the Global South (Martínez-Alier, 1997). And while climate mitigation has ostensibly been a global policy concern for decades (United Nations, 2024), the escalating frequency and intensity of natural climatic disasters exposes the grave inadequacy of existing approaches. Climate change is an urgent problem that requires more radical solutions.

In the latest report by the Intergovernmental Panel on Climate Change (IPCC) published in February 2022, the Sixth Assessment presented a definitive tone on the systemic causes of climate change and the need for immediate global action on mitigation and adaptation to avoid environmental catastrophe (IPCC, 2022a). Not only did it call for behavioural and lifestyle changes, as previously addressed in their Fifth Assessment from 2014 (IPCC, 2014b); the authors also suggested that *transformations* and structural changes

[1] Mitigation actions seek to reduce greenhouse gas emissions, through supply and demand-side decarbonisation efforts and enhancing greenhouse gas sinks (e.g., greening neighbourhoods, afforestation) (Brügger et al., 2015; IPCC, 2014b).

[2] Adaptation actions seek to prepare for climate change impacts, including strategies to protect and safeguard individuals and the environment from the negative consequences of climate change (e.g., building flood defences) and take advantage of new opportunities from climate change (e.g., transitioning to agriculture crops which are heat tolerant) (Brügger et al., 2015; IPCC, 2014a).

would be necessary to achieve adequate mitigation and adaptation. They define transformation as "a change in the fundamental attributes of a system including altered goals or values" (IPCC, 2022a, Chapter 1). It is not just human behaviours that have caused climate change, but rather the systems within which humans operate, as well as the values and goals that underpin such systems. Appropriate solutions must target these systems and promote new societal values to facilitate alternative actions.

The task of mitigation, particularly in affluent nations, is insurmountable without an upheaval to the way their systems' function. Whether warming is capped at 1.5° C as the IPCC has urged (IPCC, 2018, 2022a), or below 2° C as conceded under the Paris Agreement (Welch & Southerton, 2019), the window of time for decarbonisation is rapidly narrowing. To offset historical emissions inequities (Hickel, 2020b), the scale of emissions reductions required is enormous – some estimates suggest up to 90% reductions in the per capita rates of consumption within affluent nations (Trainer, 2021, 2024). None of these reductions can be achieved in a growth-oriented or even growth-neutral economy, as it is simply not possible given the scale of production and consumption (Parrique et al., 2019). While a major scientific breakthrough to accelerate decarbonisation is possible, this remains wishful thinking. Instead, a viable solution that is already being envisioned to achieve required mitigation goals is a planned and deliberate degrowth of the economy.

Accordingly, the IPCC's 6th Assessment report introduced the concept of degrowth to the main stage of climate communications, citing the word "degrowth" seven times in the body of the Mitigation report (IPCC, 2022a), and another 15 in the Adaptation report (IPCC, 2022a). Degrowth targets the unsustainable and inequitable system of production and consumption, calling for a planned and democratic downscaling of throughput[3] focusing on the most harmful industries of the Global North, whilst prioritizing human welfare and raising living standards across the globe (Schmelzer et al., 2022). Degrowth seeks to maintain an economic system within the operating space of an ecological ceiling and a social floor (Khan et al., 2023; Raworth, 2015).

While the IPCC's recognition of a system-level approach to sustainability marks a decided shift in the sustainable consumption landscape, their latest report still links mitigation to demand-side reductions at the individual level, i.e., through sufficiency. Done

[3] Defined as "energy and resource flows in and out of an economy" (Kallis et al., 2018, p. 292).

voluntarily or through regulatory means, sufficiency entails reducing consumption to fit within planetary boundaries whilst ensuring a minimum living standard for all (Jungell-Michelsson & Heikkurinen, 2022; Sandberg, 2021). The IPCC's warnings suggest that individual and system-level changes must happen simultaneously and in tandem. However, these two concepts remain largely independent in academic literature on sustainability.

Given the sense of urgency and calls for a multi-level approach, it is more pressing than ever before to develop a better understanding of how people's everyday behaviours, attitudes, and values might fit into a broader agenda for transforming society, such as degrowth. However, there is an interdependent and somewhat paradoxical relationship between reducing consumption and degrowth for mitigation purposes, which has not been given adequate academic attention. Reduced consumption and degrowth are not just related topics but rather inherently linked, as sufficiency governance is a pre-requisite of degrowth, and yet sufficiency governance will require societal acceptance of degrowth to be attainable (Lorek & Fuchs, 2013).

This thesis will address the disconnect in the literature, integrating deconsumption behaviours and lifestyles on the individual level with a coordinated degrowth agenda at the system level for a more comprehensive evaluation of sustainability solutions. It takes a psychological and behavioural approach to make degrowth more relatable to individuals' daily lives and to enhance scientific understanding of perceptions and attitudes toward degrowth. This approach sought to understand how these two mechanisms of change relate, and whether focusing on individual consumption behaviour can enhance or undermine degrowth's objectives for societal transformation. In the following sections, I outline my research focus further, identifying research questions and summarizing each of the research projects included in this thesis.

1. Research Gap and Questions

Sustainable consumption[4] (hereafter, "SC") discourse has advanced from its initial preoccupation with clean and efficient production in the 1990s, followed by a focus on "greener" consumption choices through educational campaigns and 'nudging'[5] interventions in the 2000s (Cohen, 2020). It has become increasingly clear that most individual behaviour change agendas have failed to make any meaningful difference in reducing emissions levels or applying pressure to pass comprehensive climate policies (Jackson, 2009; Lorek & Fuchs, 2013; Wynes & Nicholas, 2017). Primarily following the 2008 financial crisis, there have been increasing appeals in the SC literature for structural approaches to tackle consumerism and reduce overall levels of consumption as a crucial means of adequately addressing the environmental consequences of consumer behaviour (e.g., Abson et al., 2017; M. J. Cohen, 2020).

This shift has led to two broad strands of scholarship around sustainability, which currently remain disconnected: first, individual-level approaches to reducing consumption can mostly be found in the psychological and behavioural sciences literature, within the frameworks of barriers and behaviour change (Chater & Loewenstein, 2022; Schmitt et al., 2020); second, systemic approaches that focus on institutional barriers and transformations dominate the literature on heterodox and ecological economics as well as political economy (Buch-Hansen, 2018; Kallis et al., 2018; Schmelzer, 2022).

The absence of integrated work on reduced consumption and degrowth does not necessarily reinforce a false dichotomy between them (e.g., Sniehotta et al., 2017), but is likely a symptom of different disciplinary and ideological approaches. Psychology often claims to espouse a value-neutral and apolitical approach, yet by doing so, it reinforces dominant neoliberal values and influences (Adams et al., 2019). Given that neoliberalism champions individualisation and human freedom through free market competition (Birch, 2015), it is perhaps no surprise that disciplines concerned with human minds and behaviours would lean toward voluntary behaviour changes in consumption over structural or institutional approaches (Andreas & Jabakhanji, 2023; Gane, 2021; Gurtner & Moser, 2024).

[4] In low and middle income countries: "where there are often insufficient accessible resources to meet basic needs, sustainable consumption would target more efficient use of resources, thereby effectively expanding the resource base to meet human needs" (Cohen et al., 2009). In affluent countries: "where resource use is more excessive, wasteful and inefficient, the emphasis is on altering consumption patterns to achieve reduced overall material and energy use, as well as reduced intensity per unit of functional utility" (Cohen et al., 2009).

Meanwhile, system-level change has emerged as a central focus in disciplines that are explicitly critical of capitalism and neoliberalism, calling out ideological barriers that may impede meaningful change. If capitalism and neoliberalism individualise the climate crisis and proposed solutions (Fremstad & Paul, 2022; Riedy, 2020), it logically follows that these counter-hegemonic disciplines would not endorse solutions that could be perceived as placing responsibility individuals. However, this means that the role of the individual, behaviour, and even consumption is rarely confronted in the home disciplines generating research on degrowth (Buch-Hansen & Nesterova, 2023; Trainer, 2024). Ironically, it is as if degrowth as a paradigm deeply critical of capitalism, and the neoclassical economic models that propagate it, falls into the same trap as its adversary of neglecting to model real human behaviour.

This divide results in two gaps – a lack of critical work in psychological and behavioural science targeting societal transformation (e.g., Gurtner & Moser, 2024), and a lack of degrowth scholarship focusing on consumption behaviours and the role of individuals in driving change (e.g., Trainer, 2024). It is essential to integrate these alternative approaches to bridge both gaps, overcoming disciplinary divides through interdisciplinary research. Neither a purely individual nor systems-oriented mitigation strategy alone will adequately bring about the scale and speed of emissions reductions required (Brownstein et al., 2022; Cairns, 2003; Spangenberg, 2014).

Taking a psychological and behavioural perspective is uniquely suited for this task (Krpan & Basso, 2021), especially given degrowth's ostensible commitment to bottom-up modes of change. Most conceptual literature on degrowth asserts the importance of democratic processes, participatory values, reclaiming the commons and public spaces, and engaging in community-oriented initiatives such that civil society can drive change (Cosme et al., 2017; Deriu, 2012; Euler, 2019; Kallis et al., 2020). However, I argue that any viable bottom-up approach to realising societal transformation necessitates an understanding of values, behaviours, and relational processes, both as they are currently and how they might need to evolve for the desired end goal. Therefore, consumption behaviour cannot be ignored as a relevant bottom-up process, given that everyone must consume a minimum amount to satisfy needs (Gough, 2015; Jackson et al., 2004), and the negative environmental impacts of excessive consumption patterns (IPCC, 2014b, 2022b). It also acts as a relevant

starting point for integrating individual and system level approaches, given the shared focus on aggregate reductions. However, bottom-up organising also suggests that citizenship behaviours and values are equally relevant, as will be explored further in this thesis.

To enact the bottom-up approaches desired by many advocates, the degrowth paradigm must first establish what role individuals are to play in the transition. Instead of focusing solely on the means of production, degrowth must also contend directly with consumption, given the nature of our consumer society (Trainer, 2021, 2024). I argue that degrowth must make the role of consumption reduction more concrete in order to make the agenda more relevant and accessible to the general public. This approach can help to clarify that degrowth is not merely voluntary simplicity or asceticism, which can make it less popular amongst the working class (e.g., Huber, 2023; Nineham & Huber, 2023), but rather about the interplay between institutional change and behaviour.

As such, this thesis is focused on improving scientific understanding of attitudes and perceptions regarding institutional changes that may facilitate consumption reduction within degrowth. Such institutional changes include marketing and persuasive communications, government regulations on consumption, and eco-social policy proposals. From a review of the relevant literature, as detailed in the **Literature Review (Chapter 2)**, three research projects were designed with each addressing one or more the following research questions:

1. a) How does degrowth relate to individual consumption practices? b) What are the behavioural responses to information about degrowth as a form of societal transformation?
2. a) How does the public respond to environmental risk regulation aiming to reduce consumption of products? b) Do perceptions about the essential nature of consumption change by the level of risk and product domain?
3. a) Is there public support for degrowth policies, and b) does sufficiency behaviour act as a pathway to increasing support? c) How does support for these policies differ by individual characteristics?

At the individual level, consumption reduction includes “behaviors that provide either less of a good or service, or a qualitatively different good or service, than consumption-intensive behaviors but with lower environmental impact” (Brooks & Wilson, 2015, p. 109). Even in recognizing that we need to reduce consumption at a societal level, the individual approach still mostly employs voluntary behaviour change, as regulations on consumption

are often viewed as constraining individual liberties and therefore politically unfavourable (e.g., Faure et al., 2022; Fremstad & Paul, 2022).

What sets degrowth apart from more mainstream sustainability strategies in the Global North is that it simultaneously addresses ecological and social crises, seeking to bring about a more just world for both people and the planet (Polewsky et al., 2024; Sandberg et al., 2019). Beyond reducing the environmental impact of economic activity, the agenda also seeks to alleviate the burdens of consumerism and excessive consumption on well-being, bolstering community and conviviality for affluent societies whilst raising the standard of living among those less affluent societies and groups (Demaria et al., 2013). It further aims to decolonise global production and consumption systems by ending extractive and unjust practices in North-South trade (Hickel, 2021; Lang, 2024). It envisions a reorientation of society with utopian influences of what might be achievable not just for environmental preservation, but human flourishing (Kallis & March, 2015).

These individual and system level approaches appear to have complementary drawbacks, creating a potentially symbiotic relationship (Brownstein et al., 2022). Deconsumption offers a bottom-up approach to sustainability that could significantly reduce the impacts of consumption on the environment (Sandberg, 2021), and more immediately than national policies and energy transformations (Wynes & Nicholas, 2017). However, structural barriers constrain the amount of emissions reduction that can be achieved without the facilitation of institutional or policy actors (Lorek & Fuchs, 2013; Verfuerth et al., 2019). On the other hand, what degrowth offers in institutional change for downscaling consumption and production as a more impactful emissions reduction strategy, it lacks in approachability and attractiveness (e.g., van den Bergh, 2011). Degrowth's demonstrably utopian vision might make people feel uneasy about upsetting the status quo and uncertain of its political feasibility, slowing the pace of potential enactment (Kongshøj, 2023; van den Bergh, 2011). Additionally, it is missing a coherent bottom-up approach for enacting change (Cosme et al., 2017). As such, deconsumption requires a more comprehensive and transformative scale to be impactful, whilst degrowth requires a more accessible and implementable mechanism for adoption. Integrating these two avenues for sustainability could also tackle the profound and interlinked social crises – e.g., reducing inequality and improving global living standards.

However, it is also possible that these two levels of change might not be perfectly harmonious. For example, personal motivations for consumption reduction practices may be quite different than those motivations mobilizing efforts toward changing our economic system, creating a disconnect between intervention points (Iyer & Muncy, 2016). What's more, informing people of the scale of change required for a degrowth transformation might demotivate seemingly inadequate individual actions (e.g., Brownstein et al., 2022). As such, a more thorough investigation of the interplay between individual and system level agendas is critical.

2. Overview of research agenda

This thesis specifically examined how institutional inputs at the system level relate to individual-level consumption reduction in three domains: via marketing, regulating consumption, and through eco-social policy reforms. Each of the three empirical projects entailed an institutional shift that moved increasingly further toward enabling societal transformations, starting by operating within the current economic system. These projects also aimed to practically connect degrowth to the real world. This process started by working with industry practitioners, to operationalise degrowth in relation to consumer demand (**Project 1**). Transitioning to the realm of citizenship, we collaborated with policymakers to explore the process of building regulations related to consumption (**Project 2**). Finally, we incorporated direct input from the general public in constructing democratically agreed upon eco-social policy packages (**Project 3**). **Table 1** summarises the research questions addressed in each project and their contributions.

Table 1 – Outline of Each Empirical Research Project

Project Title	RQs Addressed	Main Contributions
Project 1 - *Translating the two tales of system-level change to individuals: Experimental evidence on avenues to communicate about degrowth and green growth*	RQ1a RQ1b RQ3a RQ3c	1) Applying a critical lens to the sufficiency-promoting marketing agenda 2) Uncovering distinctions between communicating about degrowth in both commercial and non-commercial contexts 3) Exploring the connection between individual behaviours and system-level sustainability agendas
Project 2 – *Do I need a rain jacket? Exploring human needs and essential use with a PFAS case study*	RQ2a RQ2b	1) Connecting 'essential use' framework for chemical regulations to human needs theories in psychology 2) Developing a hierarchy of consumption types relevant for regulating environmental risk, based on needs theories 3) Exploring public perceptions and attitudes toward consumption (and its potential regulation) in the face of environmental risk
Project 3 - *Public support for degrowth policies and sufficiency behaviours in the United States: A discrete choice experiment*	RQ1a RQ1b RQ3a RQ3b RQ3c	1) Systematically measuring public support for degrowth policies in a high emitting and understudied country 2) Investigating whether sufficiency behaviour can enhance degrowth policy support 3) Exposing the limitations to the link between sufficiency and degrowth, in terms of the types of policies and individual characteristics

In **Project 1**, we explored whether institutional processes within the current system could promote degrowth and drive voluntary changes to consumption patterns, using tools from sufficiency-promoting marketing. The paper conducted three experimental studies,

comparing degrowth and green growth framing, to test whether consumers could distinguish between messages promoting increased consumption and those advocating reduced consumption within market and non-market contexts. These studies were designed in collaboration with an emerging startup, building on their brand positioning and promotional materials to make our stimuli more realistic and the findings both theoretically and practically relevant. When using mock ads in Studies 1 (N = 502) and 2 (N = 969), results showed that the difference in the effect of green growth versus degrowth messages was not discernible on consumption intentions or behaviours. We surmised that marketing might not effectively promote voluntary consumption reduction, even among environmentally conscious individuals, as the practice typically stimulates demand under capitalist modes of production and consumption. This raised doubts about the effectiveness of commercial institutions in the private sector advocating degrowth without transforming our economic system.

Therefore, Study 3 (N = 933) shifted focus to non-marketing communications by promoting a free carbon footprint calculation app. This study also experimentally varied the role of individuals as ‘citizens’ versus ‘consumers’ and employed a deeper approach to framing the two sustainability paradigms. The results indicated that while there were no significant differences in behavioural engagement, degrowth framing contributed to more critical appraisals of the role of economic growth in protecting the environment. These findings suggest that while the degrowth narrative was not effectively translated in the consumer sphere, it appeared more relevant for promoting growth critical values in a citizenship context. As such, the public sector appeared to have greater potential for further exploring institutional changes related to consumption reduction.

Next, **Project 2** concentrated on government regulations regarding consumption, to overcome limitations of voluntary behaviour change. Using the case study of PFAS (per- and polyfluoroalkyl substances), it explored how the concept of "essential use" employed for regulating chemical applications might be informed by human needs theories to guide regulations on environmentally damaging consumption. This project also explored how individual human needs satisfaction related to societal level functioning. We again collaborated with practitioners outside of academia, this time the U.K.'s Department for Environment, Food and Rural Affairs. The research aimed to identify what types of

consumption might be prioritised for drafting regulation in the face of risk to human health and environmental safety. As with **Project 1**, this collaboration ensured that the research was both theoretically and practically relevant. We categorised products as functional (serving practical needs or uses) or experiential (serving psychological needs or desires). The study conducted two online experiments across the United Kingdom (N = 965) and United States (N = 389) to gauge perceptions on the necessity and regulation of PFAS-containing products and how the level of risk affected these opinions.

Compared to experiential products, functional products were generally considered more essential, needed, and worthwhile to consume given potential risks. High-risk scenarios lowered the perceived value of products, while significantly increasing the perceived need for regulation. Additionally, perceptions of essentiality and anticipated harm differed more between the two product types under low-risk situations compared to high-risk scenarios. Interactions between perceived status, product type, and risk indicated that individuals with lower perceived status anticipated more harm from losing experiential products when risk was high compared to low. While there appeared some overlap between what humans need on an individual level and what is required for society to function properly, qualitative analysis suggested that these differ in part given the different scale, scope, and level of complexity. As such, the societal scale of "essential use" may be less relevant for regulating individual uses of consumer products. Findings from this project highlight i) the importance of democratic and transparent policymaking which takes into account the lived experiences of the general public at each step; and ii) the need for a more comprehensive policy package over directly regulating consumption as a more equitable means of shifting consumption patterns without unduly burdening those with lower status.

Finally, **Project 3** investigated support for such a proposal of degrowth policies and how individual sufficiency behaviours might facilitate policy support using a discrete choice experiment. It therefore examined the interplay between voluntary behaviour change and institutional reforms. Conducted in the United States (N = 1,012), this experiment measured preferences for four degrowth policies: work-time reductions, limits on advertising, restrictions on fossil fuel production, and access to public healthcare. The selected policies were not only designed to reduce consumption and production but also to expand social support and improve quality of life, transforming our economic system away from a growth-

oriented paradigm. The proposals were framed either around system-level change given the limits to economic growth, or neutrally. Findings revealed substantial support on average for nearly all policies in the U.S. across the representative sample, especially fossil fuel caps and universal healthcare. Despite the negative reactions that the degrowth agenda can elicit (Drews & Antal, 2016; Tomaselli et al., 2021), our insignificant framing results suggest that the degrowth narrative neither amplified nor hindered policy support.

Sufficiency-oriented individuals significantly preferred some degrowth policies to the status quo, though not consistently across specifications and contexts. Fossil fuel restrictions followed by universal healthcare were the most consistently popular across specifications. However, the link between sufficiency engagement and policy support was more robust for ecological policies, and not as relevant for more socially oriented policies (e.g., work time reductions). Additionally, dividing participants into latent classes, the group who practiced sufficiency and favoured more degrowth policies displayed more socio-economic privilege than the other group that only backed fossil fuel restrictions. The results suggest that promoting sufficiency lifestyles could be an avenue for engendering support for degrowth policies amongst affluent, highly educated and progressive groups, and for coalescing support around fossil fuel restrictions. However, other strategies will be needed to garner broader support for the eco-social policy agenda, especially outside of the movement's existing base.

In addition to these empirical chapters, I have included a commentary proposing ways in which environmental psychologists can engage with system-level transformations. Environmental psychologists must not be tied down by the individually oriented research focus that has dominated the discipline and limited the scope of impact (Gurtner & Moser, 2024; Nielsen et al., 2024). Instead, this chapter outlines specific roles that researchers may occupy, such as being a liaison with other disciplines and a catalyst for facilitating democratic participation, to break disciplinary norms. This chapter further serves to reflect upon the interdisciplinary position of the thesis research conducted.

This thesis contributes to the academic literature in several ways. First, it connects the degrowth agenda as a system-level approach to individual consumption behaviours and practices using psychological and behavioural science, which has so far been understudied (Krpan & Basso, 2021). Second, it identifies and tests the acceptability of concrete policies

and actions people can take to bring about a more sufficiency-oriented economic system, for which empirical evidence is lacking (Polewsky et al., 2024). Systematically measuring support for these policies also provides more rigorous data on the public acceptability and political feasibility of degrowth, which is necessary for advancing policy agendas (Buch-Hansen, 2018; Kongshøj, 2023). Third, it examines how to motivate sufficiency behaviours through interventions and policies that are favourable for a range of socio-demographic groups, which has not been adequately explored in the literature on degrowth policy (Kongshøj, 2023; Schmelzer et al., 2022). Fourth, it contributes to the theoretical debate on individual versus system-level approaches (e.g., Brownstein et al., 2022) by identifying tension between these strategies whilst offering practical implications for policymakers to engage at this interface. The focus on paradigm change toward degrowth overcomes the i-frame and s-frame divide (Chater & Loewenstein, 2022), by not just targeting structural shifts that alter the 'rules of the game', but by transforming the system entirely. Fifth, it addresses disciplinary divides whilst promoting specific means through which environmental psychologists can tackle the complexity of the socio-ecological crises of our time. Finally, working with a startup (**Project 1**) and policymakers (**Project 2**) forced the research to address real-world questions and generate findings that were not merely theoretical. This approach is especially important in the context of research on degrowth, which to date lacks adequate focus on operationalising or practically implementing theories and research findings (Polewsky et al., 2024).

3. Motivation and Importance

Before delving deeper into the relevant literature on consumption and degrowth, it is worth highlighting other inspirations for this topic to further establish its importance. As noted, this thesis was motivated by the incoherence of bottom-up mechanisms for change in degrowth literature. Cosme et al. (2017) analyse different degrowth policy proposals, categorising them as either top-down, i.e., strategies pursued at the system level, or bottom-up, i.e., strategies based on local or regional components (Cairns, 2003). Despite the bottom-up values degrowth was founded upon, most degrowth policy proposals involve top-down and state-led interventions to enact change (Cosme et al., 2017). They argue that while some proposals may seek to indirectly influence bottom-up action, such as work-time

reductions, institutional changes are required before they can be feasible for the general public. I would further argue that those institutional changes will not come about until such actions are viewed as democratically desirable and possible, which requires an examination of people's attitudes and perceptions more broadly.

Further, exploring the role of individual consumption within degrowth is not about reasserting consumer blame, but rather systematically addressing how individuals and their daily consumption practices fit within the broader agenda. Here it is important to differentiate between sustainable consumption and green consumerism. Consumption is defined as the action of using up resources[5] such as food, water or goods that provide safety, security, and meaning (Jackson, 2005). Therefore *sustainable* consumption requires doing so in a way that reduces environmental impacts and protects future generations (Jackson, 2007). There is no explicit indication of purchasing or market-based activities within sustainable consumption. Alternatively, green consumerism involves the "production, promotion, and preferential consumption of goods and services on the basis of their pro-environment claims" (Akenji, 2014, p. 13), which focuses on buying behaviour and commercial activity. The objective was not to understand how green consumerism could fit within degrowth, but rather explore the role of essential and non-essential patterns of consumption, within and outside of the market. This approach considered how systemic forces of capitalism have influenced consumption behaviour, and whether voluntary changes can enhance or undermine transformations. Simply put, one cannot comprehend how to change the production and consumption system without understanding its impact on the individuals within that system.

Understanding the human psyche and motivations for consumption is also pivotal for degrowth, as consumerism and overconsumption are direct outcomes of the weaponization of psychology. Edward Bernays, known as the founder of public relations, recognized the importance of consumption in maintaining mass production for economic growth, suggesting that "supply must seek to create its corresponding demand" (Bernays, 1928, as cited in Higgs, 2014). To achieve this, Bernays used psychological insights from his uncle Sigmund Freud to suggest that consuming goods could be symbolic of deeper psychological desires such as social position. Thus, continuous, and insatiable demand can be generated by linking

[5] Oxford Languages definition ("Consumption," n.d.).

material consumption of unnecessary goods with psychological fulfilment. A prime example is Bernays's campaign to promote smoking amongst women as a symbol of their fight against male power (Held, 2009). If psychology was pivotal in the origin of mass consumption to sustain economic growth, any degrowth strategy must adequately comprehend the underlying processes that were exploited in the first place.

Applying an individual lens can also empower the role of citizens, especially by focusing on the link between consumption and policy. The vast majority of literature on sustainable consumption is limited to green consumerism, which restricts individuals to the role of consumers (Akenji, 2014; Fischer et al., 2021; Nielsen et al., 2024). Humans inhabit a variety of other roles, including citizens, organizational participants or workers, and family members (Nielsen et al., 2021; Raworth, 2017). Treating individuals as mere consumers can instil materialistic values and maintain consumeristic tendencies (Bauer et al., 2012). The lack of focus on citizenship practices may also be symptomatic of the neoliberal influence in the psychological and behavioural sciences (Adams et al., 2019; Andreas & Jabakhanji, 2023), shifting values from the democratic to the economic (Brown, 2015). Alternatively, the degrowth paradigm would imply that people are citizens before being consumers (Fournier, 2008). Accordingly, this thesis sought to address the gap in the SC literature on the role of citizens (Fischer et al., 2021) by addressing the link between consumption and policy in all three empirical projects. What's more, extracting individual-level insights is instructive for evaluating ostensibly structural changes like degrowth policies, which still require support from citizens of a variety of identities to be enacted (Brownstein et al., 2022).

Additionally, many definitions of degrowth include a downscaling of both production and consumption (Hickel, 2020a; Schmelzer et al., 2022; Schneider et al., 2010), indicating that consumption is likely to change under a degrowth future (Krpan & Basso, 2021) whether it is through top-down or bottom-up means. If so, adopting practices that involve consuming fewer resources sooner could make the transition easier, and even enable transformative change (Kallis et al., 2020). Of course, as expanded upon in the **Literature Review (Chapter 2)**, a multitude of institutional barriers make meaningful consumption reduction or even ethical consumption impractical for most people under capitalism (Carrington et al., 2016; Sanne, 2002). However, it is highly unlikely that any habitable future involves the level of consumption marked by the world's most affluent, sometimes referred to as the 'imperial

mode of living' (Brand & Wissen, 2021; Wiedmann et al., 2020). Despite the vast rates of decline in per capita consumption required to realise degrowth's vision (Trainer, 2021, 2024), the degrowth literature often ignores just how materially simple lifestyles will need to be to prevent climate catastrophe, side-lining the importance of consumption (Trainer, 2024).

This logic relates to prefigurative politics, which entails how activists practice the kind of world they envision on a smaller and more personal scale (Breines, 1989). While individual's should not be held responsible for mitigation (e.g., Fremstad & Paul, 2022), prefiguring the world we want to live in might also mean resisting the various influences to overconsume. These sorts of lifestyle changes have been conceptually noted in the literature on degrowth, suggesting that changing behaviours and daily practices can encourage alternative values and shift culture, lead to greater support of degrowth policies, and ultimately build the political momentum needed to transform society (Kallis et al., 2020). However, systematic and empirical exploration of this pathway is still needed.

Finally, applying a psychological and behavioural lens to degrowth can generate a more granular understanding of the heterogeneity in responses, perceptions, and applications of degrowth to everyday life. A prominent critique of degrowth concerns the lack of exploration with respect to race, class, or any other socio-demographic differences within the Global North (Rodríguez-Labajos et al., 2019; Schmelzer et al., 2022). This implicitly assumes a somewhat homogenous population in civil society, other than distinguishing the affluent who are the target of many policies, such as wealth taxes or maximum income ratios. Explicitly engaging with racial and especially class dynamics is pivotal in understanding and facilitating strategy for garnering support for a transformational movement like degrowth in the Global North (e.g., Löwy et al., 2022). To date, degrowth appears mostly supported by white, middle class progressives in academic institutions. As this thesis will highlight, the same level of support is not guaranteed in other socio-demographic groups, especially for the more ambitious eco-social policy reforms. For a degrowth transition to take shape, a powerful social movement comprising a coalition of diverse interests and perspectives is necessary (Buch-Hansen, 2018; Fitzgerald, 2022). Measuring perceptions along socio-demographic and psychographic dimensions can point toward weaknesses in the agenda and identify segments for which new strategies must be developed to win support. It can also ensure that degrowth's utopian vision is democratically

representative of all citizens, and not merely those with expertise, status, or authority (e.g., Kongshøj, 2023; Stirling, 2008).

The rest of this thesis is structured as follows. **Chapter 2** develops an in-depth review of the relevant literature to problematize consumption and economic growth, as well the solutions proposed via sufficiency and degrowth. It further suggests the overlaps between these two concepts and formalizes the gaps addressed through empirical research. **Chapters 3 - 5** detail the three empirical projects undertaken to answer the research questions outlined above. **Chapter 6** includes the commentary on engaging with system level processes. **Chapter 7** develops research implications further, identifying limitations and suggesting areas of future research to conclude.

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Chapter 2 - Literature Review

To build a broad base of support in the Global North and improve the bottom-up vision for societal transformation, the degrowth paradigm must first establish what role individuals are to play in the transition. This thesis focuses specifically on the role of consumption within the degrowth agenda, as a means of making degrowth more relatable to the general public. Economic growth, capitalism, and consumption are inherently linked, so any meaningful change to consumption will require combatting growth and the economic system that produces it (IPCC, 2022; Jackson, 2009; Saitō, 2024), and not just reducing waste or decoupling. Economic growth is the materialisation of the capitalist system and its process of accumulation that dominates much of the world, in particular the Global North (Schmelzer et al., 2022). Capitalism is an economic and political system that champions private ownership and profit maximization, but it is the necessity for economic growth, under all circumstances and for its own sake, that truly distinguishes capitalism from other economic systems (Hickel, 2020a). While efficiencies can be gained from generating improvements in areas such as material inputs, technological innovations, and labour productivity, there is a ceiling to how much these factors can improve profitability. However, consumption is one of the most productive sources of growth in the capitalist system, as it provides the opportunity for seemingly limitless profit accumulation (Jackson, 2009, 2021; Stuart et al., 2020).

There is a strong tradition of critiques of overconsumption, which often suggest solutions at the individual level, whilst degrowth sets forth an agenda for societal transformation of consumption and production at the system level. In this chapter, I first delve deeper into the literature on consumption, including motivations and influences at the individual, social and societal levels. I then outline the literature on deconsumption and sufficiency, which aims to combat excessive consumption through psychological and behavioural solutions. Highlighting the limitations of this approach, the chapter will clarify the degrowth agenda and its policy proposals that target institutional influences and barriers. The final section of this chapter will develop overlaps between these two concepts based on existing literature and specify the gaps that this thesis aims to address. Ultimately, this chapter aims to show that the link between individual consumption behaviours and

degrowth's system-level approach has not yet been formalized in the literature. Bridging this gap is the central objective of my thesis.

1. Literature on Consumption

Downscaling of consumption and production relies on an understanding of both current volumes of consumption and the domains of consumption that are more or less necessary for human functioning. A consideration of human needs is especially pivotal given the importance of social justice and equity in degrowth (Gabriel & Bond, 2019), such that a good quality of life should be guaranteed for all (e.g., Fournier, 2008; Schmelzer et al., 2022). Koch et al. (2017) explicitly call for reprioritizing objective human needs satisfaction as opposed to subjective assessments in degrowth. In the following sections, I first outline the role of human needs satisfaction in consumption, tracing the theories commonly applied to sustainable consumption, as well as other motivations for consumption that do not originate in needs satisfaction. This foundation provides context for the literature on interventions and modes of reducing consumption by targeting individual attitudes, values, and behaviours.

1. Needs, Satisfaction, and Consumption

In order to envision a new social and economic order that prioritizes human welfare and builds a social floor, we can start by identifying the core necessities that humans need to survive and thrive (Brand-Correa & Steinberger, 2017; Vogel et al., 2021). While "needs-based" consumption is commonly discussed in the literature on sustainable consumption (SC), sufficiency and even degrowth, there is no single definition of human needs or a consensus regarding what types of consumption can be considered necessary.

There are three common definitions of a need: 1) internal influences that motivate action, which are non-negotiable and will cause harm if not met, 2) an environmental or external prerequisite to achieve a goal, and 3) rationale for performing some behaviour (Gasper, 1996; Jackson et al., 2004). The first definition is widely used in the field of psychology, as it relates to motivations (Jackson et al., 2004). The second lends itself to subjective assessment, such as how individuals feel about their needs being met (Jackson et al., 2004). The last definition relates to a moral or ethical standing of particular social

attributes, for example, related to autonomous behaviour (Doyal & Gough, 1991; Jackson et al., 2004). The first definition appears the most pertinent for determining needs-based consumption within degrowth through a psychological and behavioural lens, given prior work connecting motivation to degrowth (Krpan & Basso, 2021a) and the emphasis on objective needs assessment for degrowth (Koch et al., 2017).

Much of the literature on needs satisfaction, that is, theoretically exploring what humans require for life to determine some set of human needs, comes out of development economics and related fields. These needs theories were born from the perspective of ensuring that citizens in less affluent nations can achieve a high quality of life and adequate well-being instead of merely focusing on economic expansion (e.g., Max-Neef et al., 1991). However, these theories appear to use affluent nations of the Global North as the reference point for well-being. There are stark inequalities between Global North and Global South countries derived from growth imperatives, the imperial mode of living normalised in the Global North, and unequal exchange of resources (Alvear & Vandana, 2023; Brand & Wissen, 2021; Gräbner-Radkowitsch & Strunk, 2023; Hickel, 2020). Applying these needs theories to the Global South risks propagating an imperialist agenda explicitly against the degrowth objective of decolonisation (Gabriel & Bond, 2019; Hickel, 2021). This preface is to say that thoughtful consideration is required when applying needs theories for the purpose of "developing" other nations. If these theories are instead used to elicit information about what constitutes needs within high income countries themselves, they may be slightly biased in favour of upholding a capitalist ideology (e.g., Koch et al., 2017), but there is likely less concern regarding imperialist or colonialist objectives.

Different theories have been developed to classify the multitude of needs that humans experience, with two prominent contributions made by i) Ian Gough and Len Doyal and ii) Manfred Max-Neef, Martín Hopenhayn, and Antonio Elizalde. Wants are considered subjective, depending on attitudes and preferences (Doyal & Gough, 1991; Max-Neef et al., 1991). However, these theories classify needs as *objective*, in that they depend on physiological requirements and facts of the world (Gough, 2015). Given that needs are derived from biological, physiological and psychological foundations, they are relevant to all human beings and accordingly *universal* (Cruz et al., 2009; Gough, 2015). If a need is not met, an individual will experience serious harm of some objective nature (Gough, 2015).

However, there may be some cultural and contextual specifications leading to such needs being experienced at varying degrees (Cruz et al., 2009). Additionally, the extent to which an individual's need is satisfied may involve a subjective evaluation.

Other notable contributions have been made by Amartya Sen and Martha Nussbaum, who argue for the capabilities approach to needs satisfaction that encompasses both the means and ends of achieving well-being (Nussbaum, 2003; Sen, 1999). Needs have also been conceptualised within self-determination theory, focusing on psychological needs of autonomy, competence, and relatedness (Deci & Ryan, 2000; Ryan & Deci, 2000). In this section, I will focus primarily on the work of Max-Neef et al. and Gough & Doyal, which have been applied to SC research more readily (Gough, 2015; Guillen-Royo, 2020; Jackson et al., 2004; Khan et al., 2023; Lee et al., 2023) and are considered the most systematic approaches by some (e.g., Koch et al., 2017). I will also present some other hierarchical theories related to needs (Kenrick et al., 2010; Maslow, 1943) which will be further developed in **Project 2**, for the context of regulating consumption.

Max-Neef et al. (1991) constructed a human needs framework, the Human-Scale Development (H-SD) approach, centring human well-being and quality of life over economic expansion in human development. H-SD identifies nine core needs that are finite and classifiable: subsistence, protection, affection, understanding, participation, idleness (i.e., leisure), creation, identity and freedom (Max-Neef et al., 1991). This conception of needs is non-hierarchical. Instead, needs are interdependently connected and satisfied, creating a system of needs (Cruz et al., 2009; Max-Neef et al., 1991). Further, needs do not change across time and cultures, but what does change are the ways in which those needs are met (or not fully met), known as satisfiers (Max-Neef et al., 1991). Satisfiers represent the means through which needs are satisfied, which relate to the four dimensions of i) *being* (i.e., personal or collective characteristics), ii) *having* (i.e., norms, institutions, tools or mechanisms), iii) *doing* (i.e., personal or collective actions) and iv) *interacting* (i.e., locations, times, relation to one's environment) (Cruz et al., 2009). These satisfiers must also interact to adequately satisfy needs. While needs are fixed, satisfiers are culturally and contextually specific (Cruz et al., 2009). Satisfiers themselves are not material goods. Instead, there is a three-dimensional relationship in the H-SD between needs, satisfiers, and

if necessary for satisfaction, material goods. There are five types of satisfiers according to the H-SD: synergistic, singular, destructive, inhibiting, and pseudo-satisfiers[6].

Doyal and Gough (1991) set forth an alternative framework called "A Theory of Human Need," (THN) which provides many parallels with the H-SD and a few distinctions. The main difference is that the THN is hierarchical, with basic needs of health and autonomy, which must be met before intermediate needs can be reasonably satisfied (Doyal & Gough, 1991; Gough, 2015). In the THN, there is also the explicit universal goal of participation in some form of life without serious arbitrary limitations, which the H-SD does not necessarily state. There are 11 total intermediate needs, also known as universal characteristics of needs satisfiers, which are more specific and concrete than the conceptual nature of the H-SD needs. These include nutritional food and clean water, protective housing, non-hazardous living and work environments, among others[7]. The THN follows the H-SD in characterising needs satisfiers as distinct from needs. These universal satisfier characteristics are considered to be "properties of goods, services, activities, and relationships that enhance physical health and human autonomy in all cultures" (Gough, 2015, p. 1200). There are additionally culturally specific satisfiers, as well as societal pre-conditions for supporting needs satisfaction.

Prior works have empirically examined the role of needs in consumption, for example in the context of carbon emissions. Vita et al. (2019) used the H-SD as a framework to understand which needs were associated with the highest emissions levels across various countries. They tested two theories to determine which better characterised their needs-based emissions data – i) modernisation theories on sustainability and quality of life, advocating for economic growth and increasing consumption, or ii) the "treadmills of production" theory, which finds economic growth incompatible with environmental sustainability (Knight & Rosa, 2011; York et al., 2003). The latter suggests that initial

[6] *Synergistic*: "Are those which, by the way in which they satisfy a given need, stimulate and contribute to the simultaneous satisfaction of other needs." *Singular*: "Aiming the satisfaction of targeted single needs, this kind of satisfier is neutral regarding the satisfaction of other needs." *Destructive*: "Elements of paradoxical effect. Applied under the pretext of satisfying a given need, they do not only annihilate the possibility of its satisfaction, but they also render the adequate satisfaction of other needs impossible. (Sometimes specially related to the need of protection)." *Inhibiting*: "Are those which by the way in which they satisfy (generally over-satisfy) a given need seriously impair the possibility of satisfying other needs." *Pseudo-satisfier*: "These are elements which stimulate a false sensation of satisfying a given need. Though they lack the aggressiveness of destructive, they may, on occasion, annul, in the medium and long term, the possibility of satisfying the need they were originally aimed at." (Cruz et al., 2009; Max-Neef, 1991).

[7] The other intermediate needs according to the THN: appropriate healthcare, security in childhood, significant primary relationships, physical security, economic security, safe birth control and childbearing, and basic education.

increases in carbon emissions may be associated with enhanced quality of life, but beyond a particular threshold, there is no longer a positive link. Increasing emissions may even start to degrade quality of life if it causes more detriment than improvement (Knight & Rosa, 2011). In other words, some level of consumption and resulting emissions (under our current energy system) is needed to sustain life, but there are limits to the benefits of growth, echoing the principles of degrowth.

A different approach to theorizing needs considers the difference between spiritual and utilitarian needs. This distinction by Chen et al. (2020) is underpinned by Maslow's hierarchy (1970), which has been criticized as overly simplistic and motivated by material wealth (Cruz et al., 2009; e.g., Jackson et al., 2004). However, a later update to this theory by Kenrick et al. (2010) provides a more complex and nuanced approach. This hierarchical branch of needs theories differentiates between immediate physiological needs which are necessary for survival and social motivations of love, affection and belonging, which are not necessarily. Spiritual needs are defined as making meaning in life, e.g., respect, belonging, love and internal satisfaction (Chen et al., 2020). These elements might relate to the HS-D needs of affection, understanding, participation, identity, leisure, and freedom. Hedonic consumption can be undertaken to satisfy these spiritual needs, that is to fulfil feeling, entertainment, and fantasy (Chen et al., 2020). Considering that capitalism has exploited such desires for the sake of increased purchasing (Bernays, 1928; Higgs, 2014), it is questionable whether hedonic consumption is a sufficient satisfier of these needs, or whether it leaves consumers constantly desiring more (e.g., Jackson et al., 2004).

Additionally, while 'spiritual' needs are fundamental parts of life, providing excitement and pleasure, they do not necessarily enable everyday functioning in the way that so called 'utilitarian' needs do – defined as physiological needs, safety, and other forms of external satisfaction (Chen et al., 2020). These needs may relate to the HS-D needs of subsistence and protection most directly, and perhaps creation, as well as the THN's basic needs of health and autonomy. Utilitarian consumption, seeking to satisfy utilitarian needs, instead focuses on objective use value and essential functions. Synthesizing these categories and other needs theories outlined above, **Project 2** will further develop a hierarchy of consumption based on fundamental needs to inform regulations on consumption of goods that pose risk to humans and the environment.

2. Other Psychological Motivations for Consumption

Outside of satisfying needs, there are other psychological processes that relate closely to consumption motivations. This section is not meant to be exhaustive, but rather to illustrate traditional psychological approaches to diagnosing excessive consumption. As I will note in later sections, these individual consumption motivations are not necessarily derived from intrinsic human nature but are rather instilled and reinforced through social and institutional pressures to consume (Brand-Correa et al., 2020; Gurtner & Moser, 2024; Sanne, 2002). This multi-layered view of consumption dovetails with warnings from critical psychology that focusing solely on psychological barriers to climate inaction (e.g., not taking sustainable consumption behaviours) ignores the interplay between psychology, social relations and structural barriers (Schmitt et al., 2020).

One primary psychological driver of excessive consumption is materialism, defined as "the value placed on material wealth and possessions," (Richins, 2004, p. 232). Three sub-components to materialism have been identified – envy, non-generosity, and possessiveness – where each trait relates to a different conceptual domain of consumption (R. W. Belk, 1985). For example, envy refers to a desire for other people's belongings; non-generosity entails an opposition to sharing goods; and possessiveness is about ownership or control over one's own objects or property (R. W. Belk, 1985). Materialistic values have been associated with lower pro-environmental orientation, attitudes and behaviours (Hurst et al., 2013). Trading intrinsically-oriented goals for materialistic beliefs, values, and goals, which are largely inescapable in consumeristic societies, has particularly damaging effects to well-being, civility, and ecological behaviour (Arndt et al., 2004; Kasser, 2002). There is rich literature on the psychological damage associated with materialism (Arndt et al., 2004; Bauer et al., 2012; Kasser, 2002, 2017; Richins, 2004). According to self-determination theory, the incompatibility between materialism and well-being derives partially from a failure to satisfy needs for security, competence, relatedness, and autonomy (Arndt et al., 2004; Kasser, 2002). Materialism is a core value under capitalism that drives profit accumulation and growth (e.g., Kasser, 2017). Given the psychological, cultural, and environmental ramifications associated with this value, degrowth explicitly seeks to shift values away from materialism (Buch-Hansen & Nesterova, 2023).

Another motivation for consumption is novelty-seeking, defined as "the need to experience something not previously experienced or deviates from everyday routine" (González-Cutre et al., 2016, p. 159). Novelty is considered within positive psychology as an important motivational force in exploring the pursuit of meaning, self-discovery, and even personal growth (González-Cutre et al., 2016; Kashdan et al., 2009). As goods and possessions are considered part of our extended self, people can pursue self-discovery through purchasing products that reflect who they are or want to be (R. W. Belk, 1988). Despite being considered as a basic 'need' by some (González-Cutre et al., 2016), this desire is likely insatiable and requires continual acquisition. Therefore, it is unlike the fundamental or basic human needs outlined above (Chen et al., 2020; Doyal & Gough, 1991; Kenrick et al., 2010; Max-Neef et al., 1991) which are finite and thus can be satiated (Cruz et al., 2009; Jackson et al., 2004). A craving for novelty could be satisfied through purchasing second-hand clothing, or through a circular economy[8] approach to sustainability which extends a products life cycle. However, substantial shifts in consumption patterns to reduce the overall quantity consumed are constrained when institutional factors encourage novelty and self-enhancement (Jackson, 2009).

3. Social Influences on Consumption

Whilst average consumption levels of affluent societies are strikingly unsustainable, consumption itself is not inherently damaging. However, consumption today serves much more than basic functioning, instead representing a means of cultural and social expression (R. W. Belk, 1988). Consumerism encompasses a fulfilment of wants and desires through consuming goods above and beyond what is needed for functioning and survival (Kozinets & Handelman, 2004; Micheletti & Stolle, 2012; Sklair, 1991). By having possessions, humans can gain a better understanding of who they are and consequently express that identity to others, inherently linking 'having' and 'being' (R. W. Belk, 1988; Sartre, 1943). As such, after basic needs are met, humans consume to convey an ideal self-image to position themselves socially and acquire status, reinforcing class distinctions (R. W. Belk, 1988; Bourdieu, 1984; Hirsch, 1995).

[8] Defined as an economic system that replaces the 'end-of-life' concept with reducing, alternatively reusing, recycling, and recovering materials in production/distribution and consumption processes (Kirchherr et al., 2017, p. 229).

Veblen (1899) originated the concept of conspicuous consumption, or spending to emulate the upper classes, in his work *The Theory of the Leisure Class*. This theory encompasses two ways to show wealth – extensive leisure activities and extravagant spending on goods and services, where both involve substantial waste (Trigg, 2001; Veblen, 1899). In less tight-knit societies, consumption of goods and services has become a more common way of displaying wealth. Veblen believed each class felt pressure to keep up with the consumption patterns of the class above them, creating a habitual process of consuming expensive products outside of what was required to satisfy needs. Two significant dimensions of conspicuous consumption are visibility, how easily the product is viewed by others, and superfluity, how wasteful or unnecessary the product is (James, 1987; Veblen, 1899). Some argue superfluity is more essential to conspicuous consumption (James, 1987; Veblen, 1899), meaning that wastefulness itself becomes an ideal to signal wealth. Considering the importance of waste for signalling status, consumption for social comparison poses a direct threat to environmental protection, making it a relevant domain for sustainable governance.

However, conspicuous consumption is not necessarily a conscious process, but rather a desire to live up to a certain "standard of decency" that may manifest in conspicuous purchasing of positional goods that are not "visible" by nature, such as kitchen utensils and undergarments (Trigg, 2001; Veblen, 1899). Some have criticized this theory for not being specific enough on the distinction between conscious and unconscious conspicuous consumption (e.g., O'Cass & McEwen, 2004), while others consider this as a well-established yet often ignored element of his theory (Trigg, 2001). Regardless, any acknowledgement of the unconscious nature of conspicuous consumption exemplifies the invisible social forces dictating the way people consume.

Social norms, defined by how others behave and what others deem acceptable (Cialdini & Goldstein, 2004), also influence consumption decisions. Descriptive norms comprise perceptions of others' behaviour, while injunctive norms entail perceptions of what others approve or disapprove of (Cialdini & Goldstein, 2004). Associated with conformity bias, consumption norms suggest that people may conform to the consumption decisions of most relevant others in their social group (Gsottbauer & van den Bergh, 2014; Henrich & Boyd, 1998). Consumption norms can dictate not only which goods are appropriate to consume, but also the frequency or quantity of consumption (T. Wiedmann et al., 2020).

Additionally, while social norms cannot influence what humans require to function, i.e., basic needs, they can strongly bias how these needs are fulfilled or satisfied, e.g., through material consumption versus non-material consumption (Richters & Siemoneit, 2019; Rosa, 2013).

4. Institutional Influences on Consumption

While individual or social influences may lead to excessive or wasteful consumption, consumption is ultimately shaped by a system of institutions, structures, and incentives (Brand-Correa et al., 2020; Gurtner & Moser, 2024a). In particular, conspicuous consumption is encouraged by institutional and societal forces, locking in the excess that continues to degrade our environment (Sanne, 2002; T. Wiedmann et al., 2020). Capitalist logic provides the source for this inherent compulsion to consume, as uncovered in the theory of consumer capitalism (e.g., Stiegler, 2006). The 'hedonic treadmill', a term for the cycle of constant desire without ever being truly satiated (Brickman & Campbell, 1971), symbolizes the relationship that postmodern consumers have with the acquisition and ownership of goods under capitalism. Though a cycle of desire may be considered a fundamental human process (e.g., Maslow, 1970), present consumer society uniquely exploits this desire in the form of hyper-consumption of goods and services (Jackson, 2005). Capitalism not only demands but thrives upon this interminable cycle, as profit-maximizing firms rest on the assumption that consumers will continually demand and purchase new goods.

Excessive consumption at the individual level can also be motivated by societal growth imperatives, or "mechanisms that require economic growth to keep the economy functioning and are hard to circumvent for individuals, firms, or nation states" (Richters & Siemoneit, 2019, p. 126). To maintain such steady exponential growth, the economy relies on people constantly striving to purchase the next best thing (Higgs, 2014; Jackson, 2009; Schumpeter, 1942). The fact that this systemic force is not overtly obvious to consumers makes it even more powerful and produces an incredible amount of anxiety in society, which further drives consumption (e.g., Kasser, 2017). In affluent societies where one would expect basic needs should be met for the vast majority, satisfaction of these needs may be eroded by certain societal pressures and institutional reinforcements around consumption (James, 1987; Veblen, 1899). Consumption behaviour of this sort is not symptomatic of

individual irrationalities, but rather a system prioritizing economic growth and wealth of the few at the expense of everyone else's quality of life. There is a pervasive notion that capitalism and economic growth are necessary for ensuring human well-being, and that growth is intrinsically tied to human progress (Hickel, 2020; Schmelzer et al., 2022). Instead, capitalism can be viewed as imposing 'false needs' upon humans, alienating individuals and removing any real sense of freedom from choice (Fromm, 1955; Jameson, 1991; Marcuse, 1964). This constrained freedom is evidenced through the violent inception of capitalism during the enclosure period (Hickel, 2020a), ecologically unequal exchange and colonial extraction of resources in the Global South (Hickel, 2021), and those feeling compelled to buy status goods in place of necessities (James, 1987).

Marketing campaigns further promote the idea that life fulfilment can be achieved through purchasing goods, especially those that imbue status, to accelerate consumer demand (Bylok, 2017; Fromm, 1955; Latouche, 2009). Marketing and related communications disciplines were founded on the creation of wants as opposed to needs satisfaction (Galbraith, 1958; Higgs, 2014). While needs-based consumption was satisfiable and therefore constrained, consumption based on wants and desires was considered boundless, especially when those desires are unlikely to be satisfied through material consumption. As previewed in the **Introduction (Chapter 1)**, Bernays (1928) applied post-war propagandist strategy to the new field of public relations (PR), exploiting the human psyche to make consumption a symbolic exercise (Higgs, 2014). Instead of purchasing a product for its use-value, Bernays recognized the power in promoting products for their symbolic meanings, connecting consumption with deeper human desires, for example, of social comparison, meaning, or identity. Bernays explicitly acknowledged that PR was the result of powerful elites moulding the tastes of the general public (Ewen, 1996; Higgs, 2014). It is therefore not inherent in human nature to consume excessively and conspicuously, but a unique feature of capitalist consumption that was conceived of and is maintained by institutional forces for the sake of economic growth. **Project 1** develops this relation further.

Product design can also influence the process of consumption through planned obsolescence (PO). Firms will often create products of lower quality that are intentionally less durable and long-lasting (Rivera & Lallmahomed, 2016). Originally conceived of as a solution to depression era unemployment, Bernard London (1932) proposed giving products a

defined lifetime after which they would cease to be viable. This process would require purchasing a new product to replace it, ensuring continual demand for production and therefore mass employment. Ironically, this plan was designed to reduce inequality and empower workers, but perhaps at a time when the finite nature of resources and environmental impacts were not yet well understood. PO continues today not for the sake of mass employment, as many production processes have been automated, but for stimulating demand as an end in itself (Elsner et al., 2012; Kenton, 2022). This ultimately drives economic growth. PO comes in the form of both functional obsolescence, or the rapid degrading of quality, but also psychological obsolescence, in which a product is intended to fall out of fashion or become irrelevant before the functional obsolescence even occurs (Higgs, 2014; Packard, 1960). Circular economy approaches are often discussed as the solution to planned obsolescence, by extending product lifecycles (Maitre-Ekern & Dalhammar, 2016). However, the circular economy focuses on the reduction of waste whilst still maintaining current patterns of economic growth (Murray et al., 2017). Circular economy approaches are unlikely to mitigate other factors, such as marketing campaigns, which hasten (especially psychological) obsolescence, and may even justify them (Wieser, 2016). Additionally, as only a fraction of the economy can be made circular, there is still an imperative for downscaling alongside ending planned obsolescence (Hickel & Kallis, 2020).

Finally, the neoliberal ideology also reinforces capitalist logic onto individuals and contributes to excessive consumption. Neoliberalism arose in the early 1980s, marked by the values of individualization and freedom through the promotion of unregulated, free-market activity (Adams et al., 2019; Birch, 2015; Brown, 2015; McDonald et al., 2017). While neoliberalism endorses economic growth directly via market deregulation, it also promotes excessive consumption levels to maintain growth through more subtle individual and psychological pathways. In espousing that maximizing individual fulfilment can only be achieved through freedom, neoliberalism has influenced social psychology to adopt growth imperatives (Adams et al., 2019). This is evident for example by research on personal growth for optimizing well-being (Ryff et al., 2007) as well as the growth mindset, promoting an entrepreneurial and hard-working self to enhance one's limited mental or physical capacities (Dweck, 2006). Further, the economisation and commercialisation of human life (Brown, 2015) means that individuals must consider themselves as commodities to achieve success

(McDonald et al., 2017). This commodification likely results in heightened consumption to define one's identity through the products and brands one wears (e.g., R. W. Belk, 1988), as opposed to being engaged politically (Brown, 2015). Finally, the neoliberal construction of happiness, dictated by high arousal positive affect, compounded with the use of subjective well-being as a measure of societal progress, justifies excessive levels of consumption without consideration of environmental or social consequences (Adams et al., 2019; Koch et al., 2017).

5. Implications for Deconsumption and Degrowth

There are several important takeaways from the individual, social, and institutional influences on consumption for the purpose of this thesis. To start, satisfiers may change across time and context, and may be influenced by societal structures or social conditions of an era (Cruz et al., 2009). As such, satisfiers are intrinsically linked to and shaped by the social, political, and economic system of a particular society. For example, while the need for identity is fundamental to human beings across time, the means of expressing one's identity through purchasing luxury products is a satisfier shaped by capitalism. This notion also implies that while some needs, such as protection and subsistence, may require material consumption for generating satisfaction, it is not clear that other needs, such as affection, participation, and freedom, necessitate such material consumption (Jackson, 2005; Vita, Hertwich, et al., 2019). Further, not all the means for satisfying a given need will be equally successful at doing so (Jackson et al., 2004), and might even undermine the satisfaction of other needs (e.g., destructive satisfiers, Cruz et al., 2009). Finally, from a reduced consumption perspective and to practically engage in degrowth, it is crucial to uncover which needs can be satisfied without generating (high) material throughput. However, needs-based consumption is not likely to be the main source of environmental degradation given the satisfiable nature of needs. Instead, it is conspicuous or status-driven consumption and the intentionally limited lifespan of products that drives purchasing and GDP ever upward.

Further to the point of maintaining dissatisfaction, needs and the consumption undertaken to satisfy them can be finite (Bain & Bongiorno, 2022; Hornsey et al., 2018), as opposed to the insatiability of human demand assumed under neoclassical economics

(Jackson et al., 2004). A fundamental assumption of consumer demand in traditional economic models is that human desire is generally insatiable. Human needs are rarely distinguished from wants. Rather, utility is employed as a measure of well-being (Jackson et al., 2004). People have a particular set of preferences for certain goods, and may even derive less value from consuming such preferred goods above a certain threshold (i.e., diminishing marginal utility) (Frank, 2014). However, if given the option in this model, they would consume the goods they prefer indefinitely. It is merely the allocation of scarce resources, e.g., income, that limits people's consumption (Frank, 2014). Under this model of insatiability, one can never be truly satisfied, instead embarking on an endless 'treadmill' ride in search of more and more (Higgs, 2014; Jackson et al., 2004). Utilitarianism of early needs theories (e.g., Maslow, 1943), follows this model by implying that more is better to maximize individual happiness (Cruz et al., 2009).

Fundamental needs theories alternatively take the perspective that well-being is linked to satisfying one's needs (Gough, 2015), which apply to all people regardless of their preferences. When well-being is tied to 'needs' as opposed to 'wants', well-being can be achieved within a finite set of resources and satisfaction becomes possible (Jackson et al., 2004). The idea that not all consumption, and especially not boundless consumption, contributes to human well-being is a stark departure from neoclassical economics, suggesting instead that limits to growth may be more consistent with human satisfaction (e.g., Bain & Bongiorno, 2022).

It is worth briefly noting that this thesis is not about well-being, but this concept is relevant to needs satisfaction and thus often features in the literature on individual needs and consumption. Well-being is characterised as an outcome of needs satisfaction, that is, optimal well-being can be achieved only once a person has had their needs met (Brand-Correa & Steinberger, 2017; Doyal & Gough, 1991). Well-being incorporates hedonic (i.e., pleasure over pain) or eudaimonic (i.e., functioning and self-realisation) dimensions (Ryan & Deci, 2001). It can be measured either subjectively, through feelings and affective assessments, or objectively, through data on needs satisfaction, for example. Research on subjective well-being, often measured through happiness or life-satisfaction, is influenced by neoliberal values of individualization (Adams et al., 2019). Subjective well-being suffers from a variety of biases including hedonic adaptation (Frederick & Loewenstein, 1999) and

cultural differences that make it difficult to use as a universal measure across time and cultures (Gough, 2015; Koch et al., 2017). Accordingly, focusing on subjective well-being or happiness as a societal goal may be incompatible with degrowth (Koch et al., 2017). Instead, while I may use the term "well-being" and refer to impacts that consumption behaviours or policy initiatives might have on it, this thesis focuses on sufficiency or consumption in line with degrowth as the main outcome of interest.

2. Literature on Deconsumption & Sufficiency

Given the compounding influences on individuals to consume more and more, there are accordingly a variety of theories and approaches for enabling lower levels of consumption. While I focus on the core concept of 'deconsumption' for my research agenda, this "less is more" pattern of behaviour (e.g., Bylok, 2017) is informed by a variety of other concepts or academic areas of interest. **Table 2** includes these terms and their definitions. Most closely linked is *sufficiency*, also referred to as *strong sustainable consumption* (Jungell-Michelsson & Heikkurinen, 2022; Lorek & Fuchs, 2013; Spangenberg, 2014; Spangenberg & Lorek, 2019). There is also *anticonsumption* (Balderjahn et al., 2020; Seegebarth et al., 2016; Zavestoski, 2002) and *political consumerism* (Stolle et al., 2005), which are often motivated by avoidance or approval of certain brands or business practices. There is also the *sharing economy*, sometimes referred to as *collaborative consumption*, (R. Belk, 2014), though this form of consumption is criticised for being easily co-opted by corporate entities and less likely to be sustainable (e.g., Schor, 2014). *Ethical and responsible consumption* may be considered the super-category subsuming SC (Davies & Gutsche, 2016; Harrison et al., 2005).

Deconsumption behaviours may also be adopted as part of certain lifestyles and consumer movements, also included in **Table 2**. *Voluntary simplicity* (VS) is a conscious lifestyle that may be motivated by both personal or spiritual motivations as well as environmental (Boujbel & d'Astous, 2012; Etzioni, 1999). *Downshifting* is one element of VS, which is often linked to working less (Etzioni, 1999; Hamilton, 2003). *Minimalism* is also related to VS, focused on eschewing acquisitiveness (Bertolini, 2000; Boutroy, 2020). *Frugality* is typically more motivated by consumers pleasure from saving (Khamis, 2019;

Kropfeld et al., 2018; Lastovicka et al., 1999).[9] *Mindful consumption* may instead be motivated by shifting values and associated psychological benefits (Sheth et al., 2011).

Although they all have distinct motivational and behavioural components, these concepts are all incorporated under the umbrella of "deconsumption" here, as they often result in a reduction in the overall level or quantity an individual consumes. This is of course not guaranteed, for example in the case of the sharing economy (e.g., Schor, 2014). Further, they may reduce one's environmental burden, though there is an important distinction to be made between intention (i.e., motivation) and outcome. Sustainability may not be the intention, e.g., for frugality, and even when intended, may not always be the outcome (Kropfeld et al., 2018). This will be further discussed in the **General Discussion (Chapter 7)**. A substantial number of articles have explored attitudes, motivations, and barriers toward adopting deconsumption behaviours, discussed below.

[9] The list of related concepts and movements may not be exhaustive but rather includes the terms most often encountered in the relevant literature on SC.

Table 2 - Behavioural Concepts Related to Deconsumption

Behavioural Concept	Definition	Motivations	Sources
Sufficiency (Strong Sustainable Consumption)	The need to restrict consumption within planetary boundaries whilst ensuring at least minimum levels of social protection are met to provide all humans a good quality of life	Justice, equality, and environmental protection	(Jungell-Michelsson & Heikkurinen, 2022; Lorek & Fuchs, 2013; Spangenberg, 2014; Spangenberg & Lorek, 2019)
Anticonsumption	A resistance, resentment, distaste, or rejection of consumption, which may arise due to concerns about consumption's effects on one's own well-being or impact on the world	Consumer empowerment, autonomy, sustainability	(Zavestoski, 2002; Balderjahn et al., 2020; Seegebarth et al., 2016)
Sharing Economy / Collaborative Consumption	An exchange of goods or services without transferring ownership for temporary and access-based use only, either run through a community or owned and controlled by a corporate entity	Desire for access over ownership	(R. Belk, 2014; Schor, 2014)
Ethical and Responsible Consumption	A practice based on religious, political, spiritual, environmental, social or other motivations for selecting specific products, which may be considered the super-category subsuming SC	Oftentimes more egoistic (e.g., self-satisfaction, health, social pressure) than altruistic values	(Harrison et al., 2005; Davies & Gutsche, 2016)
Voluntary Simplicity	A conscious lifestyle characterized by the values of material simplicity, self-sufficiency, ecological awareness, and social responsibility as well as some elements of spirituality in the hopes of leading a good and fulfilling life	Desire for fulfilment of psychological needs, non-material life	(Boujbel & d'Astous, 2012; Etzioni, 1999)
Downshifting	A practice of VS whereby otherwise affluent individuals consciously reduce their income or spending to live with less	More time for personal fulfilment, e.g., through family time or for health	(Etzioni, 1999; Hamilton, 2003)
Minimalism	A deliberate approach to consumption characterized by a detachment from material needs and acquisitions, incorporating elements of deconsumption, sustainability, and waste avoidance	Freedom from material accumulation and waste, sustainability	(Bertolini, 2000; Boutroy, 2020)
Frugality	A type of resourceful consumption and waste avoidance, voluntarily limiting acquisition of, creatively utilizing, and responsibly disposing of economic resources and services.	Pleasure from saving, resourcefulness, fulfilment of long term goals	(Lastovicka et al., 1999; Khamis, 2019; Kropfeld et al., 2018)
Mindful Consumption	A mindset of consciousness about the consequences of consumption and behaviour characterised by temperance	A sense of compassion for oneself, community, and nature	(Sheth et al., 2011)
Political Consumerism	A consumer's deliberate choice to avoid ('boycott') or purchase ('buycott') specific products and brands based on political and/or ethical considerations	Desire for social change, but mistrust in traditional institutions Belief in effectiveness of individual actions	(Stolle et al., 2005)

Note: This table was inspired by Gossen et al. (2019) who laid out behavioural concepts related to sufficiency. This table includes many of the terms they use, as well as others they do not include (e.g., Political Consumerism). The motivations come from the source texts as opposed to the descriptions in Gossen et al. (2019).

Amongst a considerable body of work within psychological and behavioural science, only a small proportion[10] explicitly reference the broader degrowth paradigm in the text. Rather, they typically focus on how individual consumption reducing behaviours can achieve the main end goals of either climate mitigation or improving individual well-being. Those that do specify links with degrowth tend to portray it as a lifestyle movement rather than an agenda for societal transformation (e.g., Joyner Armstrong et al., 2016; Colombo et al., 2023). Whether arising from a desire to maintain scientific impartiality, a disagreement with the political agenda, or something else altogether, it is this disinclination by psychologists and behavioural scientists to engage with system-level processes that this thesis aims to overcome (Sabherwal & O'Dell, 2023). This approach is also in contrast with ecological economics articles, which will discuss lifestyles such as anticonsumption and sufficiency in tandem with degrowth (Buch-Hansen & Nesterova, 2023; Corlet Walker et al., 2021; Heindl & Kanschik, 2016; Rodríguez-Labajos et al., 2019). However, consumption is typically mentioned in passing, and rarely from a psychological or behavioural perspective.

A review of the literature on and adjacent to deconsumption also elucidates a conceptual gap regarding what exactly constitutes deconsumption from a behavioural perspective. The related literature on sufficiency has made strides in specifying certain behavioural implications, in particular with the four types of consumption changes toward sufficiency outlined in a review by Sandberg (2021). These include i) absolute reductions in the quantity consumed, ii) modal shifts toward less resource-intensive consumption, iii) extending product longevity, and iv) sharing practices (Sandberg, 2021). All four categories of sufficient consumption may not be relevant to every domain, e.g., absolute reductions in nutrition or mobility present challenges (Sandberg, 2021). Consumers are less commonly studied in the literature on sufficiency, however there is an important need to address both individual and structural barriers to adopting these behaviours (Sandberg, 2021; Spangenberg, 2014; Verfuerth et al., 2019). Jenny (2016) also propose i) purchasing fewer resource intense goods, ii) opting for smaller or lower capacity goods, or iii) reducing frequency of use for resource-intense goods and services as other sufficiency behaviours.

[10] Notable exceptions include Kropfeld et al. (2018), Sandberg (2021), Spangenberg & Lorek (2019), Verfuerth et al. (2019), and Meissner (2022).

Alternatively, Fournier (1998) frames anticonsumption as a continuum of i) avoidance behaviours (of specific brands or products), to ii) minimization behaviours to iii) active rebellion, i.e., consumer boycotts (Kuanr et al., 2020). Deconsumption seems most compatible with the second pillar of minimization. One might characterize the concept of deconsumption as stuck between the literature on sufficiency, anticonsumption, and a constellation of other loosely related concepts of psychology (e.g., materialism), consumer behaviour (e.g., sufficiency-promoting marketing), and ecological economics (e.g., degrowth). In particular, no clear distinction was uncovered between the terms 'deconsumption' and 'sufficiency', except that sufficiency is more often connected to a broader "strong sustainable consumption" agenda (Lorek & Fuchs, 2013; Sandberg, 2021; Spangenberg & Lorek, 2019).

Given that this thesis is concerned with reducing consumption in line with degrowth, I continue to use the terms 'sufficiency' and 'deconsumption' somewhat interchangeably throughout. However, I characterise the distinction as follows: sufficiency implies the specific motivations of adhering to planetary boundaries for the sake of equity and justice (Jungell-Michelsson & Heikkurinen, 2022); meanwhile deconsumption may characterise the same behaviours but does not imply any specific motivational pattern. While the terms may not be perfectly interchangeable, sufficiency could be seen as a type of deconsumption. And although sufficiency may be more consistent with degrowth's values, deconsumption behaviours produce the same outcome from an environmental impact perspective, which is the main lens of interest here. This distinction will also be further reflected upon in the **General Discussion (Chapter 7)**.

2.1. Research on Deconsumption Behaviours & Values

Much of the psychological and behavioural research on deconsumption focuses on attitudes, drivers, and barriers toward adopting these behaviours, without any connection to system-level or institutional changes. Among deconsumption behaviours, buying altogether fewer products demonstrates a committed political position, whereas buying goods with less packaging relates to less committed 'green consumption' activities (Whitmarsh et al., 2017). Some Americans supported adopting deconsumption behaviours, however, they may assume

others are not interested in consumption reduction (Markowitz & Bowerman, 2012). As such, there is a gap in understanding how social norms for deconsumption can be conveyed. Frick et al. (2021) employed a social norm intervention related to reduced consumption in their study on sufficiency-promoting marketing, which will be further explicated in **Project 1**. However, their research found that using peer endorsement to promote norms for reduced consumption did not significantly influence consumption. Personal norms significantly predicted intentions to reduce consumption, for example in the context of clothing consumption, though intentions only weakly predicted behaviours (Joanes et al., 2020). Additionally, Polish consumers appear to be partly aware of the ills of overconsumption and benefits of a simplified life, but would need a greater incentive or a financial loss to change behaviour (Burgiel et al., 2015; Burgiel & Zrałek, 2015). Furthermore, reduced income is a notable driver of deconsumption, either by choice or necessity (Dugar, 2017; Wu et al., 2013). Political ideology, in particular a rejection of capitalism and consumerism, may be strong drivers for some more radical consumers (Kozinets, 2002; Kozinets & Handelman, 2004). However, others fear reputational penalties for purposefully going against social norms (Burgiel & Zrałek, 2015). Despite the emphasis on individual factors, deconsumption behaviours vary across societal contexts, with evidence pointing to their higher prevalence in collectivist societies (e.g., Brazil) compared to individualistic ones (e.g., U.K.) (Whitmarsh et al., 2017).

Peer perception and status concerns appear to inhibit deconsumption behaviours (Brooks & Wilson, 2015; Sekhon & Armstrong Soule, 2020; Whitmarsh et al., 2017), in line with conspicuous consumption literature (Bourdieu, 1984; Veblen, 1899). However, information conveying that a consumption-reducing behaviour was performed by choice instead of financial necessity resulted in higher perceived status (Brooks & Wilson, 2015). Other personal barriers to deconsuming include resource constraints, in particular time, effort, self-control, and knowledge (Brooks & Wilson, 2015; Perchla-Włosik & Raciniewska, 2017; Steg, 2015). Habitual purchasing patterns, materialism, and impulsive buying can also inhibit consumption reduction (Seegebarth et al., 2016; Singh & Giacosa, 2018; Whitmarsh et al., 2017). The multifaceted nature of this evidence reveals a need for more empirical work measuring attitudes and motivations toward consumption reduction behaviours beyond self-

reports, including experimentation for causal identification (Frick et al., 2020; Whitmarsh et al., 2017).

Different values seem to motivate the various consumption-reducing behavioural patterns. Though environmental concerns may be involved, motivations for voluntary simplicity include regaining control over personal challenges and goals, as well as lifestyle, social, economic, and financial issues (Wu et al., 2013). Others suggest VS is often driven by self-transcendent values, whereas collaborative consumption is instead motivated by self-enhancement values (Hüttel et al., 2020). Intrinsic values and goals that are primarily focused on inner satisfaction are more compatible with deconsumption than extrinsic values and goals, and also promote higher levels of well-being (Kasser, 2017). Mindfulness has also been found to associate with both well-being and SC, i.e., through mindful consumption (Kasser, 2017). Collectivist values positively influenced VS and brand avoidance behaviours, but individualistic values also indirectly influenced these behaviours (Kuanr et al., 2020). These values, particularly collectivism, self-transcendence, intrinsic motivation and inner satisfaction, are also reflective of the societal goals proposed under degrowth.

The well-being benefits associated with reduced consumption have also been well explored, often incorporating a psychological or behavioural lens (Brown & Kasser, 2005; Claborn & Brooks, 2019; Furchheim et al., 2020; Hüttel et al., 2020; Seegebarth et al., 2016). The most relevant concepts for the degrowth context include i) improved well-being due to control over one's consumption desires (Boujbel & d'Astous, 2012), ii) reducing materialism and increasing generosity (Brown & Kasser, 2005), and iii) stress that can arise for environmentally conscious consumers in materialistic societies (Furchheim et al., 2020). Studies suggest the well-being impacts of reduced consumption may be greater for certain groups, e.g., those with higher social capital and better work-life balance (Claborn & Brooks, 2019). I include these findings to note the importance of further investigating the precise ways in which downscaling might disparately appeal to or impact disadvantaged groups (L. Paulson & Büchs, 2022), especially when situating these consumption practices within a degrowth transformation. This angle will be explored further in **Projects 2** and **3**.

The relationship between performing deconsumption behaviours and one's ecological impacts has been further addressed in academic literature, incorporating psychological determinants such as values and motivations. One study compared lifestyle impacts of

environmental concern (EC) versus anticonsumption values, including voluntary simplicity, tightwadism[11], and frugality (Kropfeld et al., 2018). Both VS and tightwadism, which are not necessarily motivated by sustainability, were associated with lower environmental impacts than EC alone (Kropfeld et al., 2018). Another study similarly found that attitudes toward sufficiency outperformed a measure of EC in predicting lower carbon lifestyles (Verfuerth et al., 2019). This relationship was strongest for food and mobility but not present for heating, which is limited by structural constraints. However, there does not appear to be work relating support for degrowth with one's ecological impact. This relates to the broader dearth in understanding how an individual's adoption of deconsumption behaviours on the micro-level connects to support for degrowth at the macro-level.

Finally, research on consumption corridors most closely approaches degrowth's principles, integrating both ecological and justice concerns in line with sufficiency. These corridors chart a *minimum* level of consumption for securing a decent quality of life, whilst also imposing a *maximum* consumption standard to ensure others can meet the minimum standard in the face of finite resources (Di Giulio & Fuchs, 2014; Fuchs et al., 2021). This concept was tested amongst the general public in Switzerland, where participants exhibited some openness to endorsing it (Defila & Di Giulio, 2020). With relatively low levels of political polarisation, the authors suggest the corridors concept may be a promising avenue for building consensus around consumption governance.

2.2. Toward a More Comprehensive Demand-side Approach

This section has covered literature on deconsumption behaviours and lifestyles, which all entail voluntary behaviour change. Voluntary measures of consumption reduction alone are unlikely to bring about the scale of climate mitigation required to stay within 1.5 degree warming (Kallis et al., 2020). This is because, as outlined in **Sections 1.3** and **1.4**, consumers often have little agency in changing their consumption patterns under capitalism (Carrington et al., 2016). Beyond those noted, a plethora of structural constraints, including urban infrastructure (Sanne, 2002), spatial constraints in rural and peri-urban areas (e.g., inadequate cycle paths, lack of public transportation), and limited housing stock (Verfuerth

[11] Tightwadism is a consumption characteristic whereby spending money causes pain (S. Rick, 2008; S. I. Rick et al., 2008).

et al., 2019) mean that many individuals are locked into high consuming and emitting lifestyles. What's more, voluntary sufficiency implies that individuals have a choice to consume in excess, which requires a certain level of affluence (Heindl & Kanschik, 2016). While there is undeniable potential associated with sufficiency (Millward-Hopkins et al., 2020; Vita, Lundström, et al., 2019), especially amongst affluent individuals (T. Wiedmann et al., 2020), there are too many structural constraints for voluntary behavioural shifts to deliver the requisite emissions reductions on their own under existing infrastructure and economic systems. What's more, these sufficiency behaviours may cause rebound or negative spillover effects, producing even more emissions, if enacted in isolation or without wholistic consideration for emissions reductions in other domains (Sorrell et al., 2020).

These behaviour change agendas fit within the realm of demand-side approaches to climate mitigation. Such approaches are aimed at altering demand of goods and services through the means of influencing consumption choices and behaviours, embracing technology, and shifting lifestyles, as well as targeting production-consumption systems and structures (Creutzig et al., 2018, 2022). Advocates of demand-side strategies often criticise the system transformation literature for focusing too heavily on supply-side mechanisms and controversial technologies (e.g., carbon-dioxide removal) (Mundaca et al., 2019). While stringent demand-side measures have been declared as pivotal for reaching the Paris Agreement target (IPCC, 2014, 2022), they often appear to focus too narrowly on lifestyle shifts instead of tackling the mechanisms and infrastructure which dictate production and consumption systems. However, some incorporate more systemic approaches with policy and institutional changes (Mundaca et al., 2019). I argue for more comprehensive demand-side approaches, including sufficiency, which situate behaviours and lifestyles within existing systems, and identify the institutional changes needed to facilitate adequate emissions reductions (Heindl & Kanschik, 2016; Spangenberg, 2014).

A review of the deconsumption literature, especially research that indicates the limitations of pro-environmental attitudes like environmental concern on low-carbon lifestyles, illuminates the importance of promoting and structurally facilitating lifestyles of sufficiency to adequately reduce environmental impacts. It further amplifies the role of policy and institutional changes in line with degrowth. The traditional focus of SC research, which often entails encouraging EC values and changing behaviour voluntarily, is simply not adequate for the task at hand.

3. Literature on Degrowth

Instead of focusing on individual levers for sufficiency, degrowth aims to reduce current levels of consumption via system-level transformations. Degrowth has been defined as:

> "the democratic transition to a society that – in order to enable global ecological justice – is based on a much smaller through of energy and resources, that deepens democracy, and guarantees a good life and social justice for all, and that does not depend on continuous expansion" (Schmelzer et al., 2022, p. 4).

Georgescu-Roegen's landmark piece The Entropy Law and Economic Process (1971) is often credited with the inception of degrowth, though others credit French thinkers like Andre Gorz (1980) with formalizing the topic (e.g., S. Paulson, 2017). Georgescu-Roegen's work was a response to the environmental degradation caused by the growth mandate of neoclassical economics. He claimed that classical economics both ignores the material realities of natural resource constraints, but also degrades humans to merely economic consumers and producers. Still others point out that degrowth draws on a much longer history of growth critiques, including the Club of Rome, the Luddite movement, and feminist critiques, dating back to the 18th century (Schmelzer, 2022).

Degrowth has primarily targeted affluent countries, mostly in the Global North. Typical proposals do not suggest that low- and middle-income countries of the Global South should be forced to limit growth. Instead they advocate for improving quality of life on par with the rest of the world, whilst providing opportunity for decolonisation and self-sufficiency outside traditional "development" trajectories (D'Alisa et al., 2015; Gabriel & Bond, 2019; Martínez-Alier, 2012; Muraca & Schmelzer, 2017). However, others suggest that some discussion of degrowth must be present in Global South countries as well to avoid inevitably reproducing destructive growth trajectories, given existing growth imperatives (Alvear & Vandana, 2023; Lang, 2024).

Degrowth rests on certain fundamental ideals that directly challenge the principles underpinning capitalism. First, infinite growth is incompatible within a finite planet, given well-established planetary boundaries and resources (e.g., Higgs, 2014; Jackson, 2009). Second, a downscaling of consumption and production is the only means of achieving the

necessary emissions reductions to avoid ecological breakdown (Hickel, 2020; Hickel & Kallis, 2020; Kallis, 2020). Finally, the economy must be restructured around environmental preservation, human well-being, and social equity (Rosa & Henning, 2018; Sandberg et al., 2019). Given the Global North's reliance on extracting resources Global South (Hornborg & Martinez-Alier, 2016), downscaling consumption and production is therefore explicitly about decolonising resource extraction (Hickel, 2021).

This agenda deprioritises Gross Domestic Product (GDP), along with capitalism's embedded structures such as profit maximisation and privatisation, which rely on commodity accumulation (Marx, 1867). GDP is heralded as the marker of progress under a capitalist global economy. It primarily measures the volume and monetary value of economic activity, produced through paid employment (Schmelzer et al., 2022). Critics point out that GDP measures many activities that have negative effects on society, such as catastrophic medical expenses or waste (Costanza et al., 2009). It simultaneously undervalues or makes invisible many activities such as unpaid care work which have a positive effect on society. Degrowth calls for abandoning this indicator as a societal goal instead of deliberately reducing GDP, though GDP reductions are a potential side effect (Hickel et al., 2022).

Degrowth has garnered interest among social and environmental sciences, with a particular focus on the societal and environmental pitfalls of economic growth at the system level (Jackson & Victor, 2019; Kallis, 2011; Saitō, 2024; van den Bergh & Kallis, 2012; Videira et al., 2014). Research on degrowth often encompasses a multidisciplinary approach to sustainability, inspired by and closely associated with activism and other social movements like environmental justice (Demaria et al., 2013; Kallis et al., 2018). Much of the academic research on degrowth centres around the transdisciplinary work of ecological economics. This discipline takes a fundamentally system-level approach, considering how "the economic system is embedded within a social system, which is in turn embedded within an ecological system (the biosphere)" (Cosme et al., 2017, p. 323). Research on degrowth has also incorporated contributions from history, political economy, economics, political science, anthropology and social sciences (Kallis et al., 2018). In a comprehensive review of degrowth research, there is no mention of the field of psychology and barely a reference to individual behaviour (Kallis et al., 2018). Krpan & Basso (2021b) highlight how individual psychological and behavioural implications associated with degrowth and reduced consumption require more academic attention. Buch-Hansen & Nesterova (2023) also posit the importance of

integrating multiple planes of social being (Bhaskar, 1986, 1993) into research on degrowth. They note how the inner being, most relevant to psychology, is often neglected.

3.1. Degrowth Policies & the State

To enact the kind of societal transformations needed to downscale the economy, degrowth advocates have developed a set of policy proposals and objectives. These policies are conceived of as "non-reformist reforms" (Gorz, 1967), which seek to win immediate gains for a movement through existing institutions, whilst making space for more radical transformative changes to come (e.g., Schmelzer et al., 2022). Though previously criticised for its lack of specific or well-developed policy provisions, the degrowth literature is now rich in conceptual discussions and detailed proposals. And while research on degrowth has generally gained momentum in the last decade, papers specifically addressing policies have also become increasingly popular (Fitzpatrick et al., 2022). A recent review of literature on degrowth policies identified an outstanding 100 policy objectives and 340 instruments (Fitzpatrick et al., 2022). For simplicity, I have synthesised a list of commonly discussed policy areas in **Table 3**. The three main goals of degrowth policy proposals can be summarised as 1) minimising the ecological impact of human activities, 2) wealth redistribution within and between countries, and 3) transforming societal values, for example from materialistic and individualistic ones to a conviviality and participation (Cosme et al., 2017).

Given their relevance to the research included in **Projects 2 and 3**, I will further expand upon a few policies. Regulations on consumption entail a range of factors, from direct restrictions on consumption through flying quotas or resource caps, to disincentives such as progressive taxes on consumption or excise taxes on ultra-luxury products (Fitzpatrick et al., 2022a). Given that direct restrictions on high emissions goods such as meat and dairy products, cars, or flights are at odds with the neoliberal notion of individual freedom of choice under the market (e.g., Faure et al., 2022; Fremstad & Paul, 2022), direct regulations on consumption are challenging to study in the context of climate change. However, restrictions on consumption in other domains may be easier to study, such as in the context of direct human or more immediate environmental harm (e.g., alcohol, tobacco, or toxic chemicals). This regulation will be further explored in **Project 2**. Other key policies that will be developed in **Project 3** are: restrictions on fossil fuels, such as caps or

moratoriums on drilling (Kallis & Martinez-Alier, 2010); work time reductions, such as a 4-day work week (Kallis et al., 2013); limits to advertising, such as banning advertising of high emissions goods in public spaces (Stuart et al., 2020; Videira et al., 2014); and finally, universal basic services, or the public provisioning to cover basic needs, including healthcare, education, and transport (Portes et al., 2017).

Table 3 - Degrowth Policy Provisions

1. A global cap of key resources such as oil and carbon emissions, and phasing out of fossil fuels
2. Caps on individual resource consumption
3. Work-sharing programs and/or reduction of working hours, e.g., to 3 or 4 days maximum
4. Universal basic services, i.e., public provisioning or expansion of social support systems
5. Improving access to public goods and promoting a 'commons' or a shared use of resources
6. Jobs guarantee (i.e., opportunity for socially and ecologically beneficial employment)
7. Universal basic income or care income (compensating for currently unpaid care work)
8. Reducing income inequality, via increased taxes, income[a] caps, and/or wealth[b] caps
9. Taxing energy, materials, and capital instead of labour
10. 'Public money', i.e., state issuing of debt-free financing to pay for public needs
11. Restrictions on advertising, especially for the following types: i) emissions-related products (e.g., fossil fuels, airline flights, etc.), ii) status goods, iii) in public spaces, and iv) targeting children
12. Expansion of renewable capacities without increasing (and ideally decreasing) total energy use
13. Reparability and durability requirements for products (e.g., banning planned obsolescence)

Note: Policies were sourced from Kallis (2017); ven den Bergh & Kallis (2012); Ahvenharju (2020); Buch-Hansen & Koch (2019); Cosme et al. (2017); Hickel (2020a); Kallis et al. (2013); Stuart et al. (2020); van Parijs & Vanderborght (2017); Videira et al. (2014); Fitzpatrick et al. (2022).

[a] Income includes the earnings a person receives from work, investments and land (Buch-Hansen & Koch, 2019).

[b] Wealth includes everything owned by a person with monetary or exchange value, less any debts (Buch-Hansen & Koch, 2019).

When considering degrowth policies, evaluating the role of the state has important implications for policy implementation. Although degrowth scholars advocate for bottom-up approaches to drive change, most policy proposals related to degrowth appear to be top-down measures to be implemented by the state (Cosme et al., 2017). However, Fitzpatrick et al. (2022b) push back on claims about the overreliance on top-down policies. They suggest that policymaking does not require statecraft but instead often relies on other actors, including community-driven direct action campaigns, before policies are enacted.

The discrepancy over state versus non-state driven policy initiatives may derive from diverging views on the role of the state in a degrowth future. Kallis & D'Alisa (2020) pinpoint and develop this gap in state formulation, inspired by Gramsci's theory of the integral state (Gramsci, 2007). They propose that more thinking must be done to realise how exactly degrowth's radical practices and policy changes can be brought to bear. Following Gramsci's incorporation of civil and political society, they argue for a combination of grassroots and institutional actions to bring about new hegemonic ideals and values. While they do not explicitly address the role of individual consumption, and grassroots actions likely signifies a more political form of engagement, their work nonetheless echoes the importance of integrating different levels of action, i.e., at the individual or local and system level (Brownstein et al., 2022; Buch-Hansen & Nesterova, 2023). Others believe Gramsci's integral state concedes too much social activity within the state, advocating instead for anarchist or non-state strategies of anti-capitalist resistance (Segal et al., 2023). These anarchist currents further critique the overreliance of state-led policies in favour of more direct forms of democracy (Demaria et al., 2013), to maintain consistency with the goal of democratic deliberation. A Marxist critique might further suggest that the state primarily serves the interests of the ruling class (Marx & Engels, 1848), as electoral politics are bounded by the power of capital (Saitō, 2024), which would pit the state entirely at odds with the transformative changes required for degrowth.

While the ideal political system for degrowth is outside the scope of this thesis, I include this debate to suggest that the tension between top-down and bottom-up approaches may be a symptom of the larger problem related to degrowth's disengagement with the individual level. The mechanisms for implementing policy, whether led through the

state or more horizontal democratic means, require an informed and engaged public to fight for such initiatives. To strengthen these policy proposals and mitigate concerns surrounding top-down statecraft, it is pivotal that the degrowth agenda establish a clear role for individual citizens to play in the transition. I will return to this point in **Section 4.1** on public perceptions.

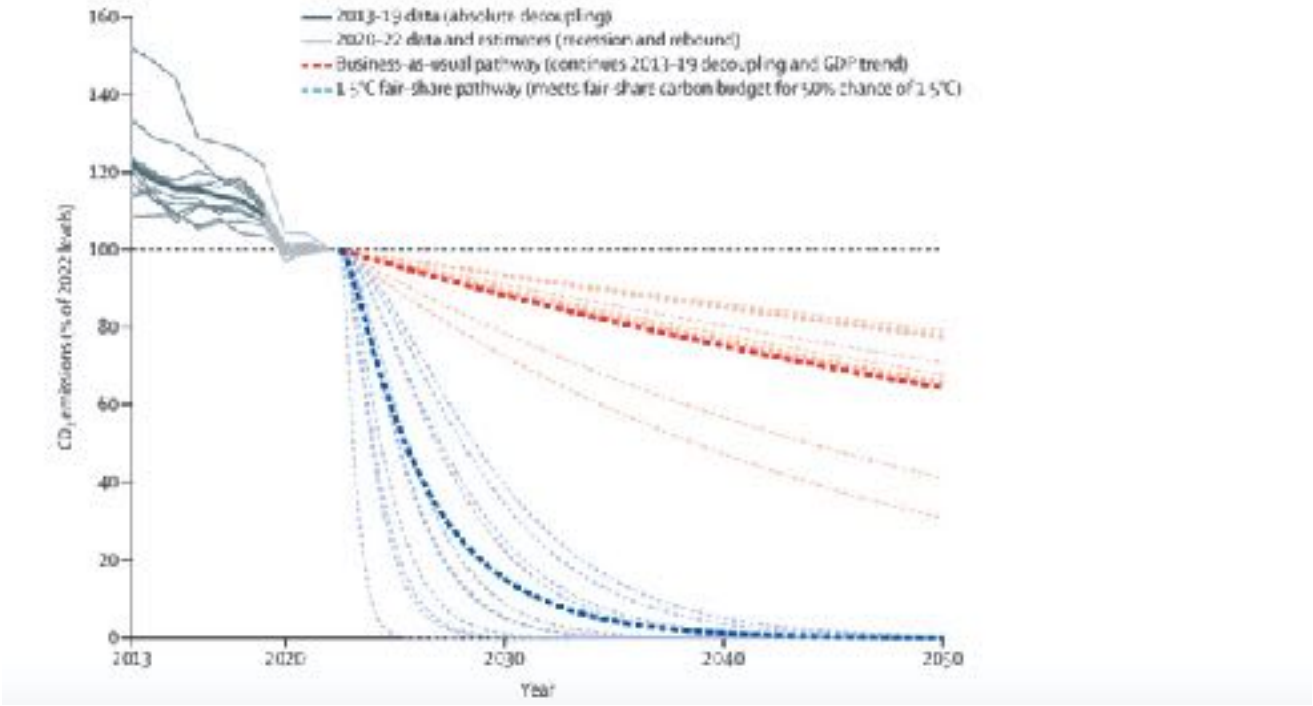
3.2. Other Growth Alternatives

In developing the degrowth agenda, it is important to situate it alongside other paradigms addressing the growth-versus-environment debate, i.e., the compatibility between protecting the environment and maintaining economic growth. Degrowth is contrasted with the mainstream sustainability agenda of "green growth," which is typically considered more palatable by policymakers, business-leaders, and citizens around the world (Polewsky et al., 2024). The idea of green growth rests on the assumption that environmental preservation and economic growth are compatible goals, i.e., of relatively equal priority (Sandberg et al., 2019). The idea of a win-win is often used to describe the potential benefits that green growth strategies can provide both to the environment and the economy (Kenis & Lievens, 2015; Sandberg et al., 2019). Green growth is operationalised mostly through the process of decoupling, that is, removing the economy's reliance on natural resources and resulting emissions for GDP growth (Jackson & Victor, 2019). Relative decoupling is achieved when GDP rises faster than carbon emissions. Absolute decoupling, which is required for achieving truly sustainable growth (Haberl et al., 2020), occurs when rising production and GDP is no longer associated with a rise in carbon emissions. Two other fundamental assumptions of green growth advocates are that absolute decoupling is achievable and that it will occur at a rate fast enough to prevent dangerous ecological breakdown, that is, that it can be done in an appropriate time frame to prevent 1.5° (which has already been surpassed, Poynting, 2024)[12] or 2°C warming (Hickel & Kallis, 2020; Parrique et al., 2019). Despite this optimism about absolute decoupling, there is little evidence that it will occur soon enough or at the scale required for the mitigation task at hand (Hickel & Kallis, 2020; Jackson & Victor, 2019; Parrique et al., 2019), at least without adopting sufficiency strategies (Haberl et al., 2020). Recent work analysing 11 high-income

[12] From February 2023 - January 2024, global average temperatures rose 1.52°C above pre-industrial levels.

countries that have achieved absolute decoupling in the last decade suggests that the none of these countries have accomplished a level of emissions reduction anywhere near their fair-shares of the 1.5°C global carbon budget (see **Figure 1**) (Vogel & Hickel, 2023). As such, there is no evidence to suggest green growth strategies will be sufficient for meeting Paris Agreement target.

Figure 1 – Absolute Decoupling Scenarios in 11 High Income Countries



Note: This chart is sourced from Vogel & Hickel (2023), showing different absolute decoupling scenarios for 11 high-income countries that achieved absolute decoupling from 2013 – 2019 - Australia, Austria, Belgium, Canada, Denmark, France, Germany, Luxembourg, the Netherlands, Sweden, and the UK. The thick red line shows the cross-country average projected decoupling trajectory based on business-as-usual strategies, whereas the thick blue line indicates the decoupling trajectory necessary for securing a 50% chance of limiting global warming to 1.5°C, using fair share principles (i.e., population-proportionate shares of remaining carbon budget). Each of the thin dotted lines represents an individual country. The difference between the red and blue lines shows that emission reductions achieved in high-income countries through recent absolute decoupling are highly insufficient.

Another concept contrasted with degrowth is agrowth, describing a growth-neutral agenda that supports abandoning the GDP indicator as opposed to growth per se. Jeroen van den Bergh is a prominent advocate of agrowth, recognizing the need to challenge the growth paradigm of capitalism whilst contending that degrowth is not the most suitable way to do so (J. C. J. M. van den Bergh, 2011). Degrowth, he argues, has various interpretations that

make it less coherent, and questions its effectiveness and efficiency (J. C. J. M. van den Bergh, 2011). Instead, it is better to ignore the imperfect measure of GDP and alternatively focus on more robust social and environmental indicators for progress. Additionally, being indifferent to growth might be more politically feasible and achievable in a shorter time frame than being deliberately anti-growth (J. C. J. van den Bergh, 2017). Realistically, agrowth and degrowth are more aligned than in opposition, as agrowth could be viewed as one step along the path to degrowth (e.g., Lehmann et al., 2022). However, agrowth may be considered more amenable for neoclassical economists. A recent article took a behavioural (economics) approach by charting the various biases that influence climate policy support and concerns over economic growth, from the perspective of a variety of stakeholders (e.g., scientists, policymakers, citizens) (J. van den Bergh, 2023).

'Post-growth' is arguably the closest growth critical agenda to degrowth, making the task of defining its distinct characteristics more difficult. Tim Jackson is one of the main voices of the post-growth movement, outlining the limitations of growth and proposing alternative prospects for economics and society in his book *Prosperity without Growth* (Jackson, 2009). To some extent, post-growth could be used as a term to encompass a set of ideas and agendas critiquing the dependence on growth, including degrowth itself. However, there have been some distinctions noted between the two concepts as well, which in part stem from the extent to which economic reasoning is maintained by the agenda (Mastini, 2019). In an interview for the Centre for Understanding Sustainable Prosperity (CUSP), Jackson and Giorgos Kallis, a prominent degrowth scholar, deliberated over the two topics. While they conceded much overlap in the critiques of capitalism and need for societal transformation, they disagreed on how exactly to go about such fundamental changes. Jackson believed that degrowth rejected economics too firmly, and that some amount of economic thinking would be required, advocating for reforming as opposed to abandoning the current economic structures (Mastini, 2019). Kallis added that the term degrowth is more analytically consistent, given the reductions required for decarbonisation. It also proclaims a conflict with the ideology of growth, which is required for dismantling the deeply held association between economic growth and prosperity (Mastini, 2019). However, Kallis conceded that in certain contexts, terms like "prosperity without growth" might be more politically tactful. This approach is evidenced by the success of a recent ERC grant for

“Post-Growth Deals” to fund research by Kallis and other prominent degrowth scholars, who chose the more sanguine term for their project (Barlow & Kallis, 2022).

For the sake of this thesis, I use the word degrowth to signal the specific agenda and set of policy objectives generated to enact it, as well as the extent of societal transformation it espouses. However, I chose not to use the term itself in any participant-facing experimental stimuli given its controversial nature. I concede that this choice is evidence of the challenges associated with the word, which I outline in the following section. However, Jason Hickel, another prominent degrowth scholar, has suggested only using the term degrowth in academic circles, and focusing on “the benefits of community decision making, and the benefits for human health and wellbeing” for other audiences (Inman & Bartholomew, 2023). My approach broadly aligns with this suggestion.

3.3.Critiques of Degrowth

Given degrowth’s radical and contentious spirit, scholars within and adjacent to the movement have been vocal about their criticisms. A key reproach of degrowth stems from the name, suggesting that the term ‘degrowth’ engenders negative reactions (e.g., Krpan & Basso, 2021b). Specifically, the term can signal austerity or recession, and might be too abstract, politically polarising, or even counterproductive in reinforcing the focus on growth (Drews & Antal, 2016; Raworth, 2015; Tomaselli et al., 2021; J. C. J. van den Bergh, 2017). Ultimately, these critiques are often superficial in nature, as people who debate the term on the political left often agree with many fundamental principles of the agenda. As such, they are more aligned with degrowth than hegemonic views on prioritising economic growth. More fundamentally, degrowth policies are often criticised for not being specific enough (e.g., J. C. J. M. van den Bergh & Kallis, 2012) and for not addressing the means of achieving these outcomes politically (Natale et al., 2016). As stated previously, some consider the concept too radical given current economic realities and institutions, leading some scholars to instead focus on a “post-growth” ideology (Jackson, 2009; Mastini, 2019).

There are also plenty of progressive scholars who challenge the agenda’s fundamental assumption about growth. News articles and blogposts have condemned the approach, suggesting that any reduction of economic growth will exacerbate inequality (Milanovic, 2017; Naudé, 2023; Piper, 2021; Roser, 2021). Another reproach is that degrowth proponents

ignore the qualitative nuances of economic growth, unduly lumping all growth together as unsustainable (Schwartzman, 2022). Other socialist scholars like Matt Huber suggest that degrowth is unfavourable for workers and that a politics of 'less' will never win them over (Huber, 2022; Nineham & Huber, 2023). He argues instead for planning and public provisioning, with an emphasis on democratic decision-making. Still others critique degrowth as being akin to population control (i.e., Malthusian), or eco-Thatcherism requiring austerity (e.g., Phillips, 2019). A close reading of these critiques might suggest that it is often the misperceptions surrounding degrowth that are criticised, rather than the fundamental characteristics of the agenda themselves. These misperceptions exemplify the disconnect between a system-level degrowth agenda and the political and psychological nuances it entails at an individual level.

More derisive critiques of degrowth come from neoclassical economists and those further right on the political spectrum. For example, the Economist published an article following the Beyond Growth Conference in Brussels in 2023 (The Economist, 2023). However, it mostly side-lined degrowth as a "lefty European" movement, likening its policy objectives to the Soviet era's more stringent policies. So-called techno-optimists also oppose degrowth. They instead believe that technology will emancipate us, allowing for environmental protection through resource efficiency whilst maintaining or even accelerating economic growth (Thierer, 2019; Thierer & Crawford, 2022). These narratives reinforce support of green growth in mainstream discourse and politics and even exacerbate aspirations of growth's potential.

At a deeper level, many of these critiques, at least from those on the left, reflect concerns that a blanket approach to degrowth is unviable. As noted, I believe these critiques are often misinterpretations stemming from incoherent communications around the degrowth agenda. The role of individuals, especially working class or disadvantaged people in the Global North, has often been avoided in the literature (Löwy et al., 2022; Schmelzer et al., 2022). This omission leaves ample room for onlookers to assume that degrowth will imply painful reductions, burdening those who already lack adequate resources. While proponents of degrowth value reductions in inequality as much as reductions in emissions, global inequality is often spotlighted over within country inequalities (Buch-Hansen & Nesterova, 2023).

One way to combat these criticisms is to undertake more research on perceptions, values, and attitudes toward the agenda, especially with respect to personal consumption. Negative reactions against degrowth often appear to stem from an aversion to imposing restrictions on consumption (Huber, 2022; Nineham & Huber, 2023), as evidenced in Huber's "politics of less." These critiques miss the institutional changes through which degrowth seeks to reduce aggregate production and consumption of the entire system, instead of draconian limits on individual consumption. However, as I have set forth in this thesis, not enough empirical work has been conducted to understand the role of individual consumption reduction within the broader degrowth agenda. It is especially important to involve working class and minority perspectives (L. Paulson & Büchs, 2022; Schmelzer et al., 2022) to design more inclusive policies, which focus more on the redistributive and social support elements of the agenda than any personal restrictions on consumption. I will explore these issues further in **Projects 2 and 3.**

4. Integrating Deconsumption and Degrowth

In drawing out the limitations between deconsumption and degrowth, I have sought to develop the potential complementarity of these approaches and the need for a more systematic integration between two mostly isolated bodies of academic literature. In the following section, I suggest avenues for their potential assimilation. Specific gaps in the literature are further identified, which build the foundation for my thesis projects as worthy points of intervention.

4.1. Degrowth Research on Perceptions

Despite the strongly held belief that the agenda's main objectives and policies should be achieved through democratic deliberation (Buch-Hansen & Koch, 2019; D'Alisa & Kallis, 2020; Gabriel & Bond, 2019; Gunderson & Yun, 2017; Sekulova et al., 2013), very few academic studies have asked the public their opinion of degrowth policies (e.g., Kongshøj, 2023). There is even some contestation over whether degrowth and democracy could ever be compatible (Romano, 2012). However, it is clear that societal transformation is unlikely to occur without adequate political will (Buch-Hansen, 2018; Hickel et al., 2022; Kongshøj, 2023).

Polling results through market research and trade unions indicate support for certain degrowth policies, such as work time reductions (Trades Union Congress, 2018; YouGov, 2019). Academic researchers reference such polling to demonstrate the viability of degrowth policies (Hickel et al., 2022; Li et al., 2023). However, polling data on public policy has been shown to lack a more nuanced perspective, especially with regards to conflicting or ambivalent perspectives (Foad et al., 2021). As degrowth is still unknown to many, and misperceptions may arise from uncertainty around the topic, it is especially important to measure more granular reactions and perceptions. However, this broader range of responses can likely only be gleaned from data ascertained through more comprehensive research agendas.

A few recent studies have attempted to fill this gap in policy perceptions by measuring support for certain policies amongst the general public in the UK and Sweden (Khan et al., 2023; Lee et al., 2023; Thorman et al., 2020). They used Likert Scale responses to generalize policy objectives such as reducing working hours or taxing the wealthy. While these contributions are valuable for establishing baselines, or in empowering the role of citizens in policy debates (as we do in **Project 1**) their approach does not provide information on the trade-offs between these policies and desired levels of transformation, for example, people's optimal hours of work in a week or the desired tax bracket for a wealth tax. Another study measured support for sufficiency policies using an alternative approach – using content analysis to analyse the results of citizens assemblies across 10 European countries and the EU (Lage et al., 2023). While they do not explicitly address degrowth in the paper, using citizen assembly data provided insights on certain degrowth policies (e.g., advertising limits) whilst prioritising democratic deliberation.

Additionally, though the policy provisions outlined above have strong implications for individual lives (e.g. work-hour limits, social support expansion, taxes, and resource use reductions) very little academic research includes a direct consideration of behavioural uptake or implementation problems at the individual level. The notable exception is research by Lee et al. (2023) who asked participants to rate support for a list of policies that were initially formulated through a citizen forum in Sweden. Participants of this forum were asked to consider alternative needs satisfiers (using the framework from Max-Neef et al., 1991), which were then used to generate eco-social policies that satisfied needs whilst maximising social and environmental protection. Their results suggest that respondents were

more supportive of policies that ensure a minimum level of needs satisfaction, e.g., universal basic services, than those imposing a maximum level of satisfaction, e.g., limiting living space. More research that uses a bottom-up approach to inform policy, considering individual needs satisfaction and everyday consumption patterns, is needed.

A more substantial body of work has been devoted to examining public opinion regarding the growth-versus-environment debate and the trade-off between these broad ideological factors (Drews et al., 2018; Drews & van den Bergh, 2016; Lehmann et al., 2022; Tomaselli et al., 2019). Degrowth, agrowth, and post-growth all share the view that economic growth is not compatible with environmental preservation. Drews & van den Bergh (2016) polled the Spanish population on the growth-versus-environment debate, finding that the majority of respondents considered the two compatible (green growth), though one third of respondents either chose to ignore growth (agrowth) or explicitly stop growth (degrowth). Drews et al. (2018) further examined public opinion data from several European countries and the United States, finding that people prioritised the environment over growth if given the choice, though the extent of this varied by country. Again, they found most people viewed environmental protection and growth as compatible but had little knowledge regarding historical GDP growth rates. Respondents also tended to lack an adequate understanding of the definition and implications of economic growth. Tomaselli et al. (2019) studied this debate amongst the Canadian public, segmenting the sample into the *Assured*, comprising 41.1% who support the techno-optimist view in favour of indefinite growth; the *Ambivalent*, 36.3% who did not have strong opinions either way; and the *Concerned*, comprising 22.6% who exhibited greater environmental concern and doubted indefinite growth. More recently, Lehmann et al. (2022) compared the prevalence of four prominent positions on the relationship between growth and the environment - green growth, agrowth, post-growth and degrowth – among environmental protection specialists in Germany. They found these specialists primarily held growth-critical views, of which agrowth and post-growth are most favoured, and that greater knowledge of the topic increased the likelihood of being growth critical. Finally, Paulson and Büchs (2022) found majority support for post-growth values amongst 34 European countries. However there was less support amongst lower income, less educated, and not formally employed individuals.

These studies suggest a critical insight: the fact that knowledge about economic growth and environmental sustainability appears to be an important factor separating

growth-critical experts from green-growth supporters in the general public further underscores the importance of engaging directly with the public on these debates. As the degrowth literature has progressed in formulating policy solutions to reduce dependence on growth and material consumption, academics should shift attention toward inquiring into public opinion on the matter. It is also important to understand responses across all relevant countries and demographic characteristics, especially disadvantaged groups (e.g., L. Paulson & Büchs, 2022), as the general public is not a uniform block. Heterogeneity in interests, values, and demographics are further explored in **Project 3**. It is also important to use a variety of methodological tools to ensure robustness and disciplinary perspectives to build a comprehensive body of evidence. What's more, understanding what segments of the public may be more or less inclined to accept the various degrowth policy proposals provides evidence for strategic communication endeavours (Khan et al., 2023; L. Paulson & Büchs, 2022; Thorman et al., 2020). The viability of degrowth acceptance may well hinge on a clear understanding of audience segments and individual policy popularity.

Further, in order to build a social mandate around degrowth between citizens and the state, it is necessary to develop more research around public perceptions and support of specific degrowth policies (Thorman et al., 2020). Research on public appetite for policy change can foster a social mandate, "where society offers support to another actor (e.g. government) to take action to protect our collective well-being" (Howarth et al., 2020, p. 1108). These social contracts are especially relevant for policies linked with behaviour change, as in the case of degrowth, whereby policy changes can help facilitate shifting consumption behaviour to new norms of sufficiency. Such behaviours will be difficult to adopt or sustain without institutional changes, but institutional changes are unlikely without pressure on governments to enact them. As these mandates are generally backed by broad support from the general public given the way they are generated, policy change would be driven democratically from a bottom-up consensus as opposed to top-down provisioning, as was common during COVID-19 (Howarth et al., 2020). This pathway is much more amenable to a degrowth transition than academics pushing top-down policies upon policymakers without intervention or input from citizens. Given the scale of change implied by sufficiency and degrowth for people's everyday lives, garnering public support will also be necessary to ensure these policies may be properly implemented without unintended consequences (Heindl & Kanschik, 2016; Lage et al., 2023). However, it is only through researching policy

perceptions that empirical evidence on public opinion can be presented to policymakers (Howarth et al., 2020; Thorman et al., 2020).

4.2. Degrowth and Consumption Reduction

One pathway through which degrowth aims to achieve consumption reduction is via public provisioning. While many view capitalism as an economic system of abundance, it is actually a system that functions by producing (mostly artificial) scarcity (Saitō, 2024). Instead of consuming goods and resources publicly to satisfy needs, which would accessible for everyone and therefore abundant, most of our consumption is done through the private market (e.g., Olk et al., 2023). The main difference between these modes of provisioning is scarcity (Saitō, 2024), as goods are commodified in private markets, imposing an artificial scarcity to ensure profitability of goods and services (Olk et al., 2023).

Instead, degrowth calls for a return to the commons, i.e., "living systems through which groups of people manage and share resources," (Kallis et al., 2020, p. 17) to eliminate such artificial scarcity and decommodify needs satisfaction through public provisioning of goods and services. Provisioning systems are systems designed to facilitate the connection between biophysical resource use and human needs satisfaction (O'Neill et al., 2018; Vogel et al., 2021). These include both physical systems, such as infrastructure and technologies, as well as social systems, such as markets, government institutions, and communities (O'Neill et al., 2018). As these systems involve all elements for provisioning goods and services, provisioning systems dictate the extent to which an individual must consume (or not) to satisfy their needs, and the energy or resource level required to do so.

Vogel et al. (2021) explored provisioning factors that expand needs satisfaction whilst reducing energy use, which is inherently connected to sufficiency. Public service quality, including public and civil services as well as policy implementation, was identified as a key beneficial provisioning factor. This finding suggests expanding public access to goods and services can lead to higher needs satisfaction with whilst reducing energy consumption (Vogel et al., 2021). Other beneficial provisioning factors identified include low levels of income inequality, democracy, and access to electricity. They echo many of the issues outlined in previous sections as main obstacles to reducing energy use, including energy-intensive lock-in, luxury and unequal consumption levels, planned obsolescence,

overproduction, and overconsumption. As such, policies such as universal basic services could help to overcome institutional barriers to reducing energy and material consumption, whilst more effectively satisfying needs.

However, more empirical research is needed regarding the interplay between enacting degrowth policies and adopting individual sufficiency behaviours. Vitally, a sustainable degrowth agenda must facilitate a reduction in consumption (and production) levels to downscale the economy to fit within planetary boundaries. While institutional changes that enable lower-consumption lifestyles are needed, these institutional changes might still require shifting behavioural patterns and adopting new modes of consumption (Spangenberg, 2014; e.g., Thorman et al., 2020). Many degrowth policy proposals theoretically imply a reduction in consumption and/or production (Kallis et al., 2018; Sandberg et al., 2019; Sekulova et al., 2013) but fall short of explicitly addressing this impact on individuals or measuring support for it. Tomaselli et al. (2019) asked Canadian participants about the need to reduce overall material consumption, for which they found 68% - 80% support. However, the items included did not go into detail about how consumption reduction might be implemented or offer any formal policy proposals. This study also failed to ask participants whether they practiced consumption reduction at the moment of inquiry or merely believed it was a desirable goal. It is challenging to forecast or predict how these policies might realistically influence behaviour before they are implemented. This presents somewhat of a paradox, as the policies will not be implemented until they are seen as politically feasible and are proven to have real mitigation potential.

Modelling results are useful for projecting the technical components of the relationship between a degrowth transition and reducing aggregate consumption. Modellers have found negative growth can technically achieve a degrowth transformation of energy and emissions, especially at lower consumption levels (Li et al., 2023). Further, low consumption levels in line with global energy use from the 1960s could provide decent living standards for all humans worldwide by 2050 (Millward-Hopkins et al., 2020). Finally, a recent model suggests it is possible to meet basic needs for all without transgressing any planetary boundary when considering sufficiency scenarios (e.g., fossil-free system, global vegan diet), with high levels of confidence (73% - 81%) (Schlesier et al., 2024). As such, there is mathematical support behind the theoretical notion that degrowth could lead to consumption reduction whilst reducing inequality and ensuring welfare for all. Yet empirical

evidence for the claim that enacting specific degrowth policies will enable lower consumption lifestyles will be challenging to collect before such policies are implemented. For now, more intensive work is needed to sketch out degrowth mitigation scenarios, especially regarding the link between specific policies and consumption reduction (Keyßer & Lenzen, 2021; Li et al., 2023; Millward-Hopkins et al., 2020).

Understanding the inverse relationship, i.e., how voluntary reduced consumption behaviour may trigger a degrowth transition, has nascent theoretical and empirical support in the literature. As touched upon in the **Introduction (Chapter 1)**, Kallis et al. (2020) conceptualised a relationship between individual daily behaviours and policy support through what I will refer to as the 'behaviour-to-transformation' pathway. It declares that changing behaviours, e.g. adopting lifestyles associated with sufficiency, can influence values through a re-evaluation of what is meaningful in one's life. This shift might politicise people by recognising the need for institutional changes given the limitation of behaviour-change approaches and structural barriers. It may further inspire support for degrowth policies, or for direct action and organising to enable such institutional changes. This momentum around policy support and the heightened political appetite for degrowth can then enable the necessary preconditions for societal transformation.

Relatedly, Heikkinen (2015) used a dynamic equilibrium model to connect voluntary simplicity to aggregate equilibrium welfare. They showed more voluntary simplifiers in the population translates to a faster zero-growth rate as a result of the degrowth transition. While this research provides mathematical evidence that the pathway is possible, it does not provide much empirical insight into the viability from a behavioural or value-based perspective. The connection between consumption reduction and degrowth policy acceptance or adoption is thus still a clear gap in the literature and will require a psychological and behavioural approach to elucidate further, as explored in **Project 3**.

While the behaviour-to-transformation pathway is certainly a more integrated view of how degrowth relates to people's lives than offered previously in the literature, Kallis et al. (2020) focus more on the communal nature of people's lives in promoting conviviality and re-establishing the commons (e.g., Euler, 2019). They do not engage as critically with the sufficiency aspect of degrowth, positing that mitigation effects from individual-level change (e.g., eating less meat) are minuscule. They also assert that lifestyle change is not about individual choice, which is how behaviour change is characterised in much of the SC

literature (Gwozdz et al., 2020; e.g., Verplanken, 2018). Institutional barriers to change as well as “internalised worldviews and ideologies” may ultimately prevent individuals from taking action (Kallis et al., 2020, p. 50). They believe the best way to motivate engagement in new lifestyles and to bring about the changes needed is to focus on the commons, bringing people together in collaboration to support collective action. Despite the promise of these claims, the implications for consumption of goods and services, even within a commons framework, appears missing from the discussion.

4.3. Pro-Environmental Behaviour & Policy Support

A central focus of this thesis is the relationship between sufficiency or reduced consumption behaviours and degrowth policy support, for which I have argued there is little empirical evidence. A recent article further supports this notion, suggesting that while green growth is supported by empirical research methods, degrowth is primarily built upon theoretical and conceptual research to date (Polewsky et al., 2024). Adjacent literature on the relationship between pro-environmental behaviour (PEBs) and environmental policy support also accentuates the need for more research in this domain.

Sufficiency in sustainable consumption is often manifested as individual behaviour change, which could be considered a subset of pro-environmental behaviour focused on moderation (Jungell-Michelsson & Heikkurinen, 2022). Further, degrowth policies would fall under the broad category of environmental policy, although these policies also incorporate other priorities such as social justice and reducing inequality.

Conflicting evidence has emerged on the link between PEBs and environmental policy support, which may portend a complicated relationship. Some findings suggest a negative relationship, such that engaging in PEBs was associated with a lower level of environmental policy support. Either individuals felt they had already done enough (Noblet & McCoy, 2018) or that government regulation was less necessary (Werfel, 2017). Other investigations indicate a positive relationship, such that engaging in PEBs and environmental policy support helps to maintain a pro-environmental self-image (Nilsson et al., 2017). Both perspectives addressed how PEBs can change one’s self-perceptions and focused on a causal link from behaviour to policy support. A third perspective considers the role of intrinsic pro-environmental motivation that leads to both PEBs and policy support, determining a weak

direct relationship between the two (Sharpe et al., 2021). Thus, there is no clear consensus from this literature to extend to the present context, further warranting **Project 3**'s investigation of the link between practicing sufficiency and supporting degrowth policies.

4.4. The Role of Psychology in Degrowth

A small body of research has begun to apply a psychological lens to degrowth specifically, not just deconsumption or sufficiency. At least two studies examine perceptions and responses to degrowth. In one study involving participants from the United States and United Kingdom, Regulatory Focus Theory (e.g., Higgins, 1998) was used to understand how best to name and define degrowth to improve public perceptions (Krpan & Basso, 2021b). Although using a more positive name ("Rebirth") did not influence attitudes in a representative U.K. sample, it worked among the U.S. sample. Participants also reported greater support for degrowth when framed using a promotion focus of achieving positive consequences rather than a prevention focus (Krpan & Basso, 2021b). In another study, Avery and Butera (2022) explored the role of emotions around degrowth framing, finding that after being exposed to counter-normative degrowth policies from a minority group, people respond with mostly negative emotions such as anger, avoidance, sadness, and fear. Their study also highlights the important role that psychology can play in examining heterogeneity in responses, as men exhibited greater anger, linked with heightened perceptions of control. Others point out how a psychological perspective, especially through critical psychology (Fox et al., 2009), can equip scholars with "visions and practices for the implementation of strategic actions aimed at individual and social well-being" (Natale et al., 2016, p. 47). Degrowth's values, especially decolonisation of the imaginary, reciprocity and conviviality, and environmental sustainability, may be informed and enhanced by Critical Community Psychology's goals of conscientisation, reflexivity, collectivism, and environmental justice (Natale et al., 2016).

Many gaps remain in this budding research agenda, including understanding and empirically measuring how attitudes toward degrowth as a socio-economic system or ideology relate to everyday deconsumption behaviours. Krpan & Basso (2021b) call for future research in framing other activities related to degrowth and expanding the application of psychology to degrowth research. There is significant opportunity in applying psychology to

degrowth to gain better insight into people's perceptions of the movement whilst also increasing the relatability and personal relevance of the agenda. Psychology can also play a key role in understanding resistance to change (Gurtner & Moser, 2024b). Given degrowth's bottom-up objective, there is an advantage to psychology's focus on the individual in providing deeper, more granular, and more intricate insights, especially along socio-demographic as well as psychological and behavioural dimensions (Avery & Butera, 2022).

Examining the wider body of psychological research reveals other relevant psychological processes that can further bolster the discipline's role in degrowth research. While not exhaustive, a few key processes have been included here to illustrate how these theories might inform and overcome various obstacles that degrowth advocates face.

First, given the dichotomy of scarcity versus abundance of provisioning under capitalism (Saitō, 2024), exploring the influence of scarcity and its effect on decision-making can be instructive for understanding barriers to degrowth support. While capitalism may produce an "artificial scarcity" (Olk et al., 2023; Saitō, 2024), it is inadequate at meeting human needs outside the market, which imposes a genuine scarcity of resources for many. As previewed above, degrowth can be negatively perceived when it appears to imply forced austerity or significant reductions in the availability of goods and resources, especially amongst disadvantaged groups (Nineham & Huber, 2023; L. Paulson & Büchs, 2022; Piper, 2021). This aversion may stem in part from the adaptive, i.e., contextually responsive, impacts scarcity can have on the human mind. Instead of being viewed as a source of sub-optimal behaviour (e.g., Mullainathan & Shafir, 2013), more nuanced work suggests that navigating contexts characterised by resource scarcity can prompt individuals to shift priorities toward more proximate and concrete objectives, e.g., to secure an immediate economic shortfall (Daly & Wilson, 2005; Sheehy-Skeffington, 2020). Under capitalism, there is a perceived abundance of choice and consumption opportunities, but the system actually imposes scarcity of access to goods and services, especially those that satisfy needs (e.g., O'Neill et al., 2018; Saitō, 2024). As such, those experiencing financial scarcity might plausibly be focused on satisfying needs for themselves and their families. Scarcity, along with uncertainty and low perceived status that stem from financial adversity, can also heighten one's focus toward information about money whilst guarding against framings that manipulate value perceptions (Mullainathan & Shafir, 2013; Shah et al., 2018; Sheehy-Skeffington, 2020). Such specialized strategies may make people who have experienced

poverty more sceptical or untrusting of the degrowth agenda, whereas higher income observers might find hope in its message.

Under degrowth, there may be a perceived decrease in the number of available choices for consumption (i.e., private sufficiency), but there would be abundance of provisioning for basic needs (i.e., public abundance) (Vogel et al., 2021). In this public provisioning strategy, people would be liberated from solely focusing on meeting needs, freeing up attention, time, and energy for other activities and higher-order aspirations. However, attention may also shift toward the diminished options available for consumer choice, which some may perceive as "scarcity", redirecting focus on the goods and services that can no longer be consumed as freely (Goldsmith et al., 2020). A more careful consideration of scarcity might inform the appropriate academic and political strategy for gaining support from financially vulnerable and working-class people in the Global North who are integral to the movement (Löwy et al., 2020).

Relatedly, psychological theories surrounding loss and reductions can explain and potentially overcome immediate negative responses to degrowth. In light of the ideological and systemic influence of growth (Hickel, 2020a; Kallis et al., 2020), there is also research suggesting humans are biased to prefer additive transformations compared to subtraction or simplification solutions (Adams et al., 2021). This bias might explain preferences for green growth and techno-optimist solutions that herald improving efficiency by advancing technological capabilities. The idea of transforming society through downscaling is likely difficult to process cognitively and may even be counter intuitive. This notion connects to work on spatial metaphors, dictating how "good is up" and "down is bad" metaphors are integral to our conceptual system (Lakoff & Johnson, 1980, 1999; Meier & Robinson, 2004; Gottwald et al., 2015). Loss aversion also dictates that people get more dissatisfaction from losing an object than the satisfaction they gained from obtaining it (Kahneman et al., 1991). People may not value their high-carbon lifestyles adequately, but having to give up these luxuries would likely feel painful.

Degrowth represents a future in which there will be less of certain goods and services, especially those that are carbon-intensive or socially destructive. However, it also heralds the opportunity for *more* of other sorts of consumption and experiences, such as place-based activities and time for community engagement (Buch-Hansen & Nesterova, 2023). The types of consumption and activities enhanced under degrowth may even be better and more

synergistic needs satisfiers (e.g., Lee et al., 2023). To overcome biases associated with loss and reductions, degrowth strategy can focus on what people stand to gain such as, for example, more free time for community engagements and meaningful activities. Further, it might be better to characterise any losses in relation to improving global equality, such as less resource use amongst affluent people in the Global North can make space for other less affluent people, especially in the Global South, to consume more. However, further considerations with respect to in-group identification and out-group resource allocation (e.g., Sidanius et al., 1994) may be needed ensure such messaging does not backfire.

Research on psychology and neoliberalism can also provide insight into ideological forces impressed upon individuals, to dismantle them and encourage new paradigms to emerge. Seminal research from behavioural scientists suggests humans suffer from status quo bias, i.e., that people prefer their current state to any alternatives (Kahneman et al., 1991; Samuelson & Zeckhauser, 1988). However, more critical work would suggest neoliberalism is particularly adept at reinforcing the status quo by delegitimising alternatives from people's imaginations (Mannheim, 1979; Türken et al., 2016). In the context of climate solutions, it is likely that preferences for the status quo are not intrinsic to humans but rather a symptom of the ideological conditions within which we live. Others diagnose how deregulation, decentralization of democracy, and defunding of public investment under neoliberalism have thwarted meaningful climate action, despite citizen support for mitigation policies (Fremstad & Paul, 2022). What appears to be a preference for the status quo of a work-and-spend lifestyle might be yet another symptom of institutional lock-in (Sanne, 2002). And while self-interest is conceived of as inherent to human beings, it is more likely reinforced by the neoliberal narrative around free-market competition as the means of achieving personal liberties (Adams et al., 2021). To enable a degrowth transition and support more sufficiency and community-oriented lifestyles, scholars can start by identifying counter-hegemonic ways to combat the notion that an extractive, entrepreneurial and commodified self is intrinsic to human nature (e.g., Riedy, 2020).

5. Summary of Literature and Gaps

This review of the literature has spanned individual and system-level approaches to reducing consumption (and production) as a means of climate mitigation. Traversing the

various individual, social, and institutional influences on consumption helped delineate the source of problematic and excessive consumption, as consumption to satisfy needs is bounded and therefore less likely to be in excess. It also served to establish the complicated web of drivers for consumption and the difficulty in overcoming the more insidious forces, in particular growth imperatives, marketing campaigns, and planned obsolescence. Importantly, this section on consumption sought to correct the psychological and behavioural lens of individual responsibility, which often leads to the advocacy of individualised solutions and behaviour change approaches. Such an approach, which rests on voluntary behavioural modifications, is limited in its mitigation potential without a more systematic approach to sufficiency that targets institutional barriers.

Turning to the research on degrowth suggests a much more ambitious and potentially impactful means of climate mitigation, along with other important objectives to combat the social and ecological crises of our time. The degrowth policies outlined above further indicate a concrete means of achieving institutional change that makes space for transforming society. Such a comprehensive strategy is necessary for meaningful consumption reduction to occur, overcoming structural lock-in of high consumption lifestyles (Sanne, 2002; Wiedmann et al., 2020). However, what degrowth promises in revolutionary and utopian spirit (Kallis & March, 2015), it appears to lack in public approachability and speed of enactment, given the opposition it faces.

Further, there is still a missing link in understanding how ordinary people should organise their lives to fit within a degrowth agenda. What do everyday consumption decisions look like under degrowth? Alexander and Yacoumis (2018) suggest simpler lifestyles can “help create the cultural conditions needed for politics and macroeconomics of degrowth to emerge” by outlining ‘low-tech’ living options (e.g., solar shower bags, cycling, etc.) (p. 1840). This echoes the approach of the Simpler Way movement, which argues for localised and self-sufficient economies that are controlled through cooperative and participatory local governance (Trainer, 2020). As such, direct emissions reduction may not be the only goal of pursuing lifestyle changes toward sustainable and reduced consumption.

The act of engaging in deconsumption in whatever way is feasible under current institutions can allow one to resist the force of capitalism and its growth imperative, activating people to rethink priorities and spark new and more fulfilling values or societal goals (Kallis et al., 2020). The lifestyle movements of voluntary simplicity and minimalism

offer concrete examples of this pathway (Bertolini, 2000; Boujbel & d'Astous, 2012; Boutroy, 2020; Etzioni, 1999). While degrowth is often misinterpreted as solely encompassing these lifestyle movements (Bartholomew, 2023), it in fact entails a much larger and more comprehensive political project. However, in connecting degrowth with reduced consumption behaviours, degrowth can start from within us, becoming personally relevant and more easily imagined as a feasible alternative once we downscale our own lives. As Buch-Hansen & Nesterova (2023) pinpoint, the downscaling of our material lives provides more opportunities for expanding our immaterial lives to better satisfy our needs, make deeper connections with others, and become better environmental stewards. This thesis will further explore whether these preconditions might then motivate policy support and institutional changes toward degrowth (Lorek & Fuchs, 2013).

I have outlined several potential areas in which the two independent approaches to sustainable consumption, deconsumption and degrowth, might be joined in future research. These include i) the application of psychological research methods to degrowth, ii) research on public perceptions of degrowth policies for more democratic deliberation, iii) empirical research on the behaviour-to-transformation pathway (Kallis et al., 2020), especially focusing on how sufficiency behaviours link to degrowth policy support, and iv) more broadly reflecting on psychological processes that may inhibit or explain adverse reactions to degrowth in hopes of overcoming these obstacles.

In the following chapters, empirical research is presented to explore the relationship between human needs, reduced consumption, and degrowth, applying a psychological and behavioural lens to a burgeoning field of sustainability research. This research was conducted alongside a startup (**Project 1**) and policymakers (**Project 2**), as well as involving citizen engagement on policy proposals (**Project 3**), to generate findings that are both theoretically and practically relevant.

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Chapter 3

Translating the two tales of system-level change to individuals: Experimental evidence on avenues to communicate about degrowth and green growth

Abstract: The Intergovernmental Panel on Climate Change (IPCC) has called for transformations to our economic system to adequately address the climate crisis. One alternative is degrowth - reorganizing affluent societies by downscaling production and consumption, while guaranteeing a good life for all. Yet it is unclear how degrowth's system-level focus can be translated to individual consumption and behaviour change. Our research investigated ways of communicating about degrowth by translating two sustainability agendas – green growth versus degrowth – into consumer-relevant messages. We conducted two online experiments collected on U.K. samples (N = 502; 969) using tools from sufficiency-promoting marketing. Results indicate little difference in consumption attitudes and behaviours between our treatment conditions, despite some small significant differences compared to the Control. Commercial messengers appeared ill-equipped at promoting reduced consumption or degrowth, given the inherent link between marketing and increased consumption. In Study 3, we explored whether using strategic communications outside of marketing – framed as Degrowth or Green Growth - may promote civic-oriented values and policy support. Among a U.K. sample (N = 933), Green Growth framing garnered higher environmental policy support, even for degrowth policies. However, Degrowth framing increased the likelihood of choosing degrowth or a-growth positions in the growth-versus-environment debate. Participants seemed to differentiate less between the two paradigms with respect to consumer behaviour change, but for citizen- and policy-oriented outcomes, they were more discerning. Our findings reflect psychological barriers to processing system-level issues that may inhibit large-scale change – i.e., degrowth's system-level focus may undermine mobilisation efforts, disengaging individuals from fighting for change.

Keywords: Degrowth; sufficiency-promoting marketing; sustainable consumption communications

Pre-registrations:

Study 1
Study 2
Study 3

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The date of submission was 15/08/2023. Revisions were received on 27/11/2023 and resubmitted 27/02/2024, after incorporating feedback from three reviewers and the editor. The journal version is targeted at a business ethics audience, and thus diverges from the version included below in the extent to which it cites scholars from the Journal of Business Ethics. This thesis version also includes more methodological details and justifications. The introduction and literature review below have been streamlined to avoid redundancy with thesis Chapters 1 & 2. In the journal article, I was responsible for the design (with support from Fred Basso and Ganga Shreedhar), the analysis, and writing the original draft. Fred Basso and Ganga Shreedhar assisted with editing the journal article. Additionally, for Study 1, I received assistance on design and analysis from Francesca Johnston, an MSc Behavioural Science student during the 2020-2021 academic year, who also used this study for her MSc dissertation. This project was funded in part by a grant scheme through LSE Generate, partnering researchers with industry practitioners.

1. Introduction

The IPCC's Sixth Assessment emphasized that transformations and structural changes to our economic, social and ecological systems must underline efforts to address the climate crisis (IPCC, 2022). Transformative changes require action not just from the public sector, such as states and local government, but also from the private-sector and individuals (Linnenluecke et al., 2017). Transformation thus implies drastic changes to both how and what goods are produced, as well as people's consumption and lifestyles. As there are limits to how much consumption patterns can change within the confines of capitalism (Carrington et al., 2016), the economic system must be a key site of transformation.

One way of approaching transformative change is through the framework of degrowth (IPCC, 2022), by shifting the priorities from economic growth to improving quality of life within planetary boundaries (Hickel, 2020; Kallis et al., 2020; Schmelzer et al., 2022). From an individual's perspective, this may include the need to cut excessive consumption (e.g., purchase fewer goods, reduce meat consumption), as opposed to just consuming 'greener' products and technologies, which has an important impact on business activities (García-de-Frutos et al., 2018). Despite degrowth's rising prominence amongst scientists (Hickel et al., 2022; IPCC, 2022; King et al., 2023), policymakers and businesses alike have tended to focus on green growth, i.e., "greening" economic growth, for example through technological innovation and market incentives (European Environment Agency, 2021; World Bank, 2012).

The green growth and degrowth paradigms offer different routes to address climate change through production and consumption systems. While there are certain overlaps between viewpoints, for example regarding the need for renewable energy, degrowth and green growth are largely perceived as two distinct approaches to sustainability (Sandberg et al., 2019). Degrowth focuses on building independence from economic growth especially within production systems (Schmelzer et al., 2022), offering a "less is more" approach (Sandberg et al., 2019). Green growth focuses on production and consumption to make growth cleaner and more efficient, allowing for a "win-win" approach (World Bank, 2012). While the green growth versus degrowth debate is widely discussed at policy and societal levels (e.g., see **Table 4**), there is rising interest in how to translate these system-level paradigms into frames of communication that can persuade people to undertake more sustainable consumption (Fitzpatrick et al., 2022).

Extant literature lacks adequate evidence to understand how these divergent paradigms relate to individuals' consumption decisions or daily practices (García-de-Frutos et al., 2018). Past studies in this area largely involve self-reported support and perceptions of certain phrases or concepts, rather than how these concepts may influence people's intentions and behaviours to consume more sustainably (Drews & Reese, 2018; Krpan & Basso, 2021; Tomaselli et al., 2021). Other research suggests using the word 'degrowth' can backfire, for example by activating and strengthening the growth frame in people's minds (Drews & Antal, 2016; Raworth, 2015). Prior research has not explored how degrowth or green growth relate to people's daily consumption behaviours, especially consumer and citizen decision making.

Therefore, this chapter examines whether green growth or degrowth framing affects an individual's intentions, values, and behaviours to act more sustainably, without explicit reference to these terms. Specifically, we sought to test whether these abstract, system-level paradigms could be translated in meaningful ways that influence concrete consumer- or civic-oriented decisions in line with each paradigm's objectives. We applied tools from sufficiency-promoting marketing (SPM) (Gossen et al., 2019), as marketing typically aims to achieve an individual-level response, yet SPM literature has linked directly to degrowth's system level agenda in justifying its focus on consumption reduction (e.g., Gossen & Heinrich, 2021). SPM, or commercial branding activities to promote reduced consumption (Frick et al., 2021; Gossen et al., 2019), provides a potential platform for communicating about degrowth's agenda without having to name it. We explored thesis RQ1*a: How does degrowth relate to individual consumption practices?* and RQ1b: *What are the behavioural responses to information about degrowth as a form of societal transformation?* Three online experimental studies were conducted in the United Kingdom to compare the causal effect of degrowth and green growth framing on consumer and citizen intentions and choices. In Study 3, policy-oriented outcome variables were included to further explore RQ3a: *Is there public support for degrowth policies?* as well as RQ3c: *How does support for degrowth policies differ by individual characteristics?*

This article contributes to the academic literature on degrowth and SPM in the following ways. First, we contribute to the literature on degrowth by translating the green growth vs. degrowth paradigms into consumer (and citizen)-oriented messages. We tested whether our framing of these opposing sustainability agendas disparately influenced

attitudes and intentions related to consumption. Second, we critically reflect upon whether SPM could be compatible with a degrowth agenda, which has not been challenged in the literature. Third, we contribute to cross-disciplinary literature on deconsumption and degrowth by exploring whether brands can influence consumer's decisions in line with degrowth. Determining the appropriate scope of institutional change for climate mitigation involves assessing the extent to which for-profit institutions might advocate for change or undermine it (Bastini et al., 2023). Fourth, we compare how messaging around degrowth versus green growth influences individual's behaviours, values and policy preferences, the latter of which is especially understudied in degrowth (Kongshøj, 2023). Finally, we contribute to the literature by examining effects across both commercial (consumer) and non-commercial (citizen) decision settings, given the importance of both settings (Carpini et al., 2004; Nielsen et al., 2024). Comparing these contexts helps to assess whether private or public sector institutions would be best suited for communicating about and promoting degrowth. We present the first empirical evidence suggesting that people's tendency to perceive the nuances between green growth and degrowth might depend on the decision context, implying the public sector is a more promising arena.

2. Literature Review

2.1. Implications of Degrowth and Green Growth for Consumer Behaviour

Although there is growing consensus that some adjustments must be made to the way affluent societies consume and produce to avoid further environmental damage (IPCC, 2022), proposed solutions vary substantially (Vazquez-Brust & Plaza-Úbeda, 2021). The degrowth and green growth agendas take opposing positions regarding societal dependence on economic growth (Polewsky et al., 2024). **Table 4** provides an overview of the debates and differences between the two paradigms.

Table 4 – An Overview of the Distinctions between Green Growth and Degrowth

	Green Growth	Degrowth
Fundamental assumptions & main mechanisms for mitigation	• Economic growth and environmental sustainability are compatible • Mitigation should occur through decoupling resource use and GDP growth (Sandberg et al., 2019)	• Continuous economic growth is incompatible with planetary boundaries • Mitigation in the Global North should occur through an equitable downscaling of production and consumption, in the most harmful industries (Sandberg et al., 2019)

Implications for behaviours and lifestyles	• Using renewable energies, at current or greater levels of energy use • Adopting energy efficient consumer products and technologies (e.g., electric vehicles) • Increasing current levels of consumption (i.e., quantity of goods consumed) to continue economic growth (O'Neill, 2020) • Purchasing smart energy meters and appliances • Enhanced focus on green *consumerism* • Supporting green finance with sustainable investing (OECD, 2017a) • Retrofitting and insulating homes • Purchasing carbon offsets for high-carbon activities, e.g., flying • Expanded access to 'green jobs' and service industries (Bowen, 2012) • Maintaining status quo where possible	• Using renewable energies, but ideally without increasing energy use • Where necessary, adopting energy efficient consumer products and technologies (e.g., electric vehicles) • Reducing excess and wasteful consumption, especially amongst higher income and wealth groups • Less time in paid work, more time for care work and community-oriented activities (e.g., D'Alisa & Cattaneo, 2013) • Enhanced focus on green *citizenship* • Expanded access to "commons"[1] • De-commodifying needs satisfaction (e.g., free or affordable access to healthcare, basic income, housing, transportation, etc.) • Expanded access to locally produced food (e.g., from community gardens) • Redesigned cities to prioritize walking and cycling over car use • Using community currencies instead of private banking • Slow and more local leisure travel, e.g., via trains instead of flights

Types of policies	• Expansion of renewable energy capabilities (D'Alessandro et al., 2020; O'Neill, 2020) • Subsidies for environmentally-friendly activities (Serres et al., 2010) • Subsidies for research and innovation of resource and energy efficient technologies (Serres et al., 2010) • Green infrastructure (e.g., transportation) (e.g., Liberalesso et al., 2020) • Carbon taxing or cap and trade (D'Alessandro et al., 2020; Gunderson & Yun, 2017) • Investment in and deployment of negative emissions technologies (e.g., carbon capture & storage) (Serin et al., 2021) • Investment in 'green jobs,' e.g., in industries associated with environmental benefits (Bowen, 2012)	• Work-time reductions (Cosme et al., 2017; van den Bergh & Kallis, 2012) • Caps on resource use and emissions (Alcott, 2010; Kallis & Martinez-Alier, 2010) • An expansion of the social safety net, e.g., a universal basic income and/or job guarantee (Cosme et al., 2017; van Parijs & Vanderborght, 2017) • Maximum income caps or restrictions (Ahvenharju, 2020; Buch-Hansen & Koch, 2019) • Taxing energy, materials and capital as opposed to labour (Cosme et al., 2017; van den Bergh & Kallis, 2012). • Restrictions to advertising, e.g., of emissions related products, status goods, advertising in public spaces (Ahvenharju, 2020; Gunderson, 2018; Stuart et al., 2020; Videira et al., 2014)

Criticisms	• The evidence of absolute decoupling on a global scale is lacking (Jackson & Victor, 2019) • Absolute decoupling in the timeframe needed for 1.5 degree warming scenario is highly unlikely while growth continues (Hickel & Kallis, 2020) • Efficiency gains in energy production, needed for decoupling, often lead to rebound effects of increasing overall consumption (e.g., Alcott, 2005) • Most green growth scenarios assume deployment of negative emissions technologies, which threaten other environmental constraints (Hickel & Kallis, 2020) • Maintains unequal balance of energy use in the Global North, suppressing emissions in the Global South (Hickel, 2020) • Material use reduction, which is necessary to avoid biodiversity loss, will not be sufficient under green growth scenarios (Hickel, 2020)	• Fails to capture the qualitative aspects of economic growth (Schwartzman, 2022) • GDP is positively correlated with many positive outcomes related to progress (Piper, 2021; Roser et al., 2013) • An expansion of social support and income redistribution will not be possible under degrowth (Petschow et al., 2020) • Growth needed in countries of the Global South to reduce global poverty will mean that some net growth is still needed (Roser, 2021) • Degrowth as a word and idea is unpalatable among the general public, who will lack politic will to support it (Krpan & Basso, 2021; Raworth, 2015) • Support for degrowth amongst policymakers is highly infeasible (van den Bergh, 2011) • Focus on reducing consumption is against the working class in affluent societies, who still need more, not less (Huber, 2019)
Overlaps	• Recognition of anthropogenic greenhouse gas emissions as main cause of climate change • Normative ideal for environmental preservation (Sandberg et al., 2019) • Adoption of energy efficient and renewable technologies (Sandberg et al., 2019)	

Note: Where an explicit reference is not included in the section on implications for behaviours and lifestyles, the degrowth ideas are broadly inspired by Kallis et al. (2020), and the green growth ideas were inspired by OECD reports on behavioural insights (OECD, 2017b).

[1] Kallis et al. define commons as "living systems through which groups of people manage and share resources," which can take the form of e.g., urban spaces, knowledge, and digital tools (Kallis et al., 2020, p. 17).

Green growth rests on the fundamental assumption that economic growth and environmental preservation are compatible, upholding economic growth as a main policy objective (Sandberg et al., 2019). Economic prosperity and environmental protection are both core values (Sandberg et al., 2019). Green growth's primary mechanism for mitigation is absolute decoupling, when an increase in GDP is associated with a fall in emissions or resource use (Jackson & Victor, 2019). Policy proposals include, e.g., an expansion of renewable energy capabilities, individual adoption of renewables and efficient products, and subsidies for research and innovation of efficiency-improving technologies (Bowen, 2012; D'Alessandro et al., 2020; Gunderson & Yun, 2017; Liberalesso et al., 2020; O'Neill, 2020; Serres et al., 2010).

Meanwhile, degrowth scholars assert that infinite growth is incompatible with planetary boundaries and environmental preservation (e.g., Hickel & Kallis, 2020). Its core values include protecting the environment, social equity, and human well-being (Sandberg et al., 2019). Equitable downscaling of consumption and production is the main mechanism of achieving emissions reductions (Hickel, 2020; Schmelzer et al., 2022; Schneider et al., 2010). Policy proposals include work-time reductions, expanding social support programs, and restricting certain types of advertising (Ahvenharju, 2020; Cosme et al., 2017; Fitzpatrick et al., 2022; Stuart et al., 2020).

As outlined in the **Literature Review (Chapter 2)**, degrowth is related to sufficiency, or restricting consumption within planetary boundaries whilst ensuring minimum levels of social protection are met for a good quality of life for all (Lorek & Fuchs, 2013; Spangenberg, 2014; Spangenberg & Lorek, 2019). While sufficiency research has incorporated psychology and behavioural science (e.g., Tröger et al., 2021; Verfuerth et al., 2019), these individual-level insights have less commonly been applied to degrowth research given its focus on production (Drews & Antal, 2016; e.g., Krpan & Basso, 2021; Natale et al., 2016). The present project targets this gap in degrowth literature related to empirical

psychological and behavioural research by focusing on communications to influence individual-level consumption and citizenship decisions.

Table 4 also provides some unique implications that degrowth and green growth have on an individual's behaviours and lifestyles choices. Green growth preserves growth as a societal goal. Growth can only continue if consumption levels do not decrease (Higgs, 2014b). For individuals, it implies an expansion of 'green' consumerism, increasing access to sustainable alternatives while maintaining status quo in purchasing volumes. As green growth is a paradigm adopted under neoliberal capitalism, it perpetuates the individualistic, entrepreneurial, and free-market values that dominate current economic logic (Watson, 2014). This is exemplified in solutions such as individual adoption of more efficient technologies, which take an "i-frame" or individual approach to climate solutions (Chater & Loewenstein, 2022). Degrowth alternatively requires a profound departure from the status quo, attributing our environmental crises to the capitalist system of accumulation (e.g., Mastini et al., 2021). In light of the systems-thinking approach (Abson et al., 2017), a degrowth economy goes beyond merely targeting institutions (i.e., "s-frame" from Chater & Loewenstein, 2022), instead epitomizing a radical alteration of the values, goals, and worldviews that underpin the system of institutions in developing climate solutions. For instance, degrowth emphasizes values like (social and climate) justice, inspiring redistributive policies, and sufficiency, rather than just those promoting efficiency. For individuals, it implies consumption to satisfy needs, not wants or desires (Koch et al., 2017), less time in paid work and deriving meaning outside of consumption. In short, green growth would imply mostly consumption as usual with direct substitutions, while degrowth would mean fundamentally new ways of consuming and living (e.g., Buch-Hansen & Nesterova, 2023).

To our knowledge, no work has endeavoured to translate these broader paradigms of degrowth and green growth into consumption-oriented messages to understand their persuasive implications on consumer behaviour, or individual decision-making more broadly. The relationship between the macro-level agendas of degrowth and green growth and individual lifestyle choices is accordingly the focus of this paper.

2.2. Reducing Consumption via Marketing

When marketing literature incorporates sustainability, it has historically focused on increased purchasing of more sustainable products or waste management, not consumption reduction (Peattie & Peattie, 2009). This is likely due to the fact that marketing arose under capitalism, aiming to stimulate demand to maintain economic growth (Higgs, 2014). The 'Theory of Responsible Consumption' (Fisk, 1973) takes into account both societal welfare and the interests of businesses and consumers. However, it has mostly been ignored or co-opted into green marketing (e.g., Chang et al., 2015; Grimmer & Woolley, 2014; Groening et al., 2018; Iyer & Reczek, 2017; Osburg et al., 2017; Reczek et al., 2018; Segev et al., 2015), which promotes green consumerism (e.g., Akenji, 2014) instead of reduced consumption.

More recently, marketing scholars have asserted that businesses bear responsibility to quell rampant consumerism and propose sufficiency-promoting marketing as a viable means to do so (Gossen et al., 2019). This responsibility derives from the fact that profit-seeking business models have stimulated excessive consumption levels in affluent societies, especially through marketing. Given recent calls for private-sector actors to move beyond growth imperatives in order to tackle social and ecological crises (Böhm et al., 2022), marketing presented an important intervention point for our research agenda, as a direct source of communication and influence on consumption. However, no prior work on SPM has critically examined the inherent paradox – that the objective of reducing consumption could be achieved using the same tools that proliferated consumption, without altering the underlying economic system. Instead, prior works have mostly taken the ability for SPM to contribute to meaningful consumption reduction at face value (Frick et al., 2021; Gossen & Heinrich, 2021). One motivation for this project was to probe this paradox, by systematically reflecting upon the theoretical and ideological compatibility between SPM and degrowth.

The notion that commercial marketing can promote sufficiency via SPM draws on ideas from other marketing sub-disciplines. For instance, green demarketing (GD) is a brand strategy in which environmental appeals are used to encourage a reduction in consumption at the category level, by purchasing products from the given brand (Armstrong Soule & Reich, 2015). Patagonia's "Don't Buy This Jacket" ad[13] created for Black Friday 2011 is a

[13] The ad featured a standard Patagonia fleece jacket with the words "Don't Buy This Jacket" at the top with information on the environmental impact of its production, including the phrase "REDUCE: WE make useful gear that lasts a long time. YOU don't buy what you don't need." (Patagonia, 2011)

prominent example, which garnered significant consumer attention and generated substantial profits (Armstrong Soule & Reich, 2015; Hwang et al., 2016). Importantly, green demarketing is primarily focused on promoting brand equity over reducing societal consumption.

SPM also draws on social marketing, which applies commercial marketing techniques to pursue social goals, e.g., smoking cessation (Peattie & Peattie, 2009). Social marketing (SM) is considered appropriate for stopping or promoting well-defined individual-level behaviours (Corner & Randall, 2011; Peattie & Peattie, 2009). However, social marketing has been criticised for lacking theoretical grounding (Hastings, 2007). Because it is focused on the immediate the behavioural objectives (e.g., less consumption), these tactics may be in conflict with or inhibit progress for broader goals and outcomes (e.g., degrowth or sufficiency) (Corner & Randall, 2011).

While SPM draws on these two sub-disciplines of marketing, it is considered distinct given its focus "on voluntary behaviour change, the contribution to sustainability through consumption reduction, and the fact that the sender is a commercial actor" (Frick et al., 2021, p. 6). Additionally, given its ostensible aim to promote broader consumption reduction lifestyles, SPM offers a potentially greater mitigation impact. However, it is unclear whether SPM is still focused on brand equity (like GD) or may undermine broader societal objectives toward transformations (like SM).

The fact that SPM involves a commercial sender implies a profit-motive that may further impede any transformative objectives. These marketing tactics have produced more positive brand attitudes than standard green appeals for luxury products (Vilasanti da Luz et al., 2020), and for institutional appeals, which highlight brand identity or position instead of specific products (Reich & Armstrong Soule, 2016). Green demarketing was shown to enhance a firm's perceived trustworthiness, market orientation, and environmental concern, which can influence behaviour change among consumers (Ramirez et al., 2017).

Despite potential brand benefits, these marketing strategies might not work for all firms. GD can improve perceived environmental motives for brands with good environmental reputation but backfire for those with poor environmental reputation (Armstrong Soule & Reich, 2015). Marketing reduced consumption is better for luxury brands than mass-market ones (Vilasanti da Luz et al., 2020). Consumers may also be sceptical of a firm's genuine

environmental concern when promoting a specific product over brand-level ads, which appear less directly linked to profit (Reich & Armstrong Soule, 2016).

Moreover, it's important to consider the economic model that underpins such commercial activities. Marketing focuses on the stimulation of demand, so consumers may perceive that marketing has one main purpose – to persuade them toward purchasing (Gossen et al., 2019; Muncy & Eastman, 1998). Accordingly, SPM is likely to provoke some sort of consumption-orientation, making it difficult for consumers to determine the intended goal of the message. Marketing is a discipline created to maintain and support a growth-centric economic paradigm. Any form of marketing, even social marketing, will use tactics that "sell" and reinforce the dominant political and economic agendas of that paradigm (Corner & Randall, 2011). These economic rationalities include individualisation of climate solutions and growth-based objectives (Corner & Randall, 2011). Even marketing narratives seeking to reform capitalism, e.g., by promoting ethical consumption behaviours, only further reinforce this economic model (Carrington et al., 2016; Soper, 2020). If marketing techniques are only as sustainable as the economic model they uphold, they are unlikely to be suitable tools for transforming that economic model.

Finally, SPM claims to focus on satisfying 'needs' by only selling what the customer requires at the moment (Bocken et al., 2020; Frick et al., 2021). This approach is implicitly underpinned by theories about human needs, for example those outlined in the **Literature Review (Chapter 2)** (e.g., Doyal & Gough, 1991; Max-Neef, 1991). These theories suggest i) satisfaction is achievable and not insatiable as in neoclassical economics, and ii) needs can be satisfied using finite resources, challenging the need for endless growth (Jackson et al., 2004). Meanwhile, marketing was devised to stimulate demand for non-necessities, the consumption of which did not require persuasion but was seen as less profitable (Bernays, 1928; Galbraith, 1958; Higgs, 2014). These foundational tensions call into question whether marketing's traditional objectives (i.e., generating desires for the sake of growth) can be reformed enough toward SPM's intended aim (i.e., needs-based consumption), if no other institutional-level changes are enacted.

2.3. Framing Techniques

To communicate a message effectively, one must activate frames or schema consistent with the intended message (Lakoff, 2010). Climate communications often activate unsuitable frames (e.g., market fundamentalism), or are missing appropriate frames (e.g., of humans as part of nature), leading to inaction or counterproductive responses (Lakoff, 2010). A marketing message activates a well-engrained schema of consumption in the brain, signalling the roles of the brand as seller and the viewer as buyer. Considering Lakoff's theory on framing, using techniques aimed at promoting reduced consumption by activating consumption-oriented framing (i.e., marketing) could backfire. There is an inherent tension between the mental schema (more consumption) and ultimate goal (less consumption). These marketing frames are also highly normative, with implications for social and political realities and alternatives (Moosmayer et al., 2019). Therefore, it is unclear whether brands are the appropriate senders to communicate the intended behaviour of reduced consumption toward sufficiency or degrowth, or whether degrowth might be co-opted as a communications strategy to promote further profit accumulation (e.g., Barlow et al., 2022).

Corner and Randall (2011) suggested the use of deep framing as an alternative or supplemental strategy to social marketing in their critique of the discipline. Instead of surface level or "shallow framing" shifts that are typical in marketing materials, deep framing connects communication strategies to a set of deeper values and principles (Corner & Randall, 2011; Lakoff, 2004). The importance of values has been showcased in the literature on system change in order to implement interventions at a deep level (e.g., Abson et al., 2017). Considering the extant literature, it is unlikely that marketing techniques can achieve the type of deep framing needed to successfully translate the degrowth and green growth paradigms. While these agendas relate to fundamental values regarding environmental protection, social justice, and economic priorities, marketing's preoccupation with increasing consumption and sales may block these deeper connections in individuals' minds (Rees et al., 2022).

2.4. Consumer and Citizen Mindsets and Behaviour

Given the potential limitations of using marketing to communicate about sufficiency and degrowth (Corner & Randall, 2011), there is also a need to incorporate strategic

communications outside of the product marketing setting. A non-commercial context could be helpful to understand how these communication frames work outside of business settings. Alternative settings may be especially important since degrowth seeks to transform existing institutions, and to allow for the use of "deeper" framing techniques (e.g., Abson et al., 2017; Corner & Randall, 2011). To do so, we aimed to characterise the sustainability agendas more directly and make the goals and values of each paradigm explicit.

This approach required not only shifting the context and outcomes to civic duties in the public sphere, but also explicitly addressing the role of individuals as citizens, instead of merely focusing on consumer identity. **Chapters 1** and **2** have outlined the importance of empowering citizenship in the context of degrowth. Citizens are considered individuals who act out of altruistic motivations, whereas consumers act based on individualistic concerns from economic incentives (Berglund & Matti, 2006). While humans occupy both of these roles (Nielsen et al., 2021), most literature on sustainable consumption communication is focused on the role of consumers (Fischer et al., 2021).

Prior literature indicates that heightening individuals' citizenship-orientation may be compatible with more radical transformations such as degrowth. Berglund & Matti (2006) outline how capitalist economies, which reinforce the consumer role, have embedded policies and institutions that resist societal change. Instead, they argue a strong sense of citizenship, collective action, and focus on common good must be cultivated to solve environmental crises. Harbo et al. (2017) find that the main predictors of green citizenship behaviours included intrinsic satisfaction from frugality and a connectedness to nature, whereas pro-environmental attitudes and intrinsic satisfaction from helping predicted green consumerism. Consequently, green citizenship appears to be more consistent with consumption reduction, and those identifying as green citizens may accept more radical approaches to environmental stewardship outside of the consumer realm (Harbo et al., 2017). As such, framing aimed at citizens could be more persuasive for civic duties and could even enhance openness to consumption reduction and degrowth policies. Pepermans & Rousseau (2021) also suggest that making citizen identity salient could lead to a more public-oriented response, while priming consumer identity may lead to more private and individual considerations. In the present research, we consider how targeting citizenship may be a bridge between strictly individual or system-level frames for communicating about degrowth (García-de-Frutos et al., 2018).

2.5. Three-study Outline

Against this background, this project sought to investigate the relationship between framing degrowth and green growth and individual-level consumption. Specifically, we wanted to translate these paradigms into consumer-oriented messages, to test whether these messages might disparately influence pro-environmental beliefs, intentions, and behaviours. We explored two alternative contexts – commercial and non-commercial – across three studies. In the first two studies, we partnered with a sustainable toiletries startup, selling bath and beauty products. We designed social media marketing messages that translated green growth and degrowth ideals into consumer-relevant branding communications. Though they never ended up launching, the brand intended to offer a consumer platform to purchase sustainable products that were at minimum plastic-free and sourced from the U.K. or France. Given their focus on sustainable consumption in general, and their promotion of products that were specifically designed to reduce consumption of plastic in particular, we were able to experimentally vary the framing of their offerings to fit the different sustainability agendas of interest. We attempted to replicate the main findings from Study 1 in Study 2, along with some extensions. In these studies, we also explored what system-level agendas mean from a commercial institutions perspective – in the context of marketing – if the goal is to address sustainability through influencing voluntary consumer behaviour within our existing economic system.

Study 3 endeavoured to explore how these frames may be perceived outside of a commercial context, given the paradox of using profit-driven marketing to promote reduced consumption. This study promotes the use of a (hypothetical) carbon footprint app encouraging sustainable lifestyle choices. We attempted to further disentangle the influence of market-orientation by including an additional experimental manipulation – consumer versus citizen positioning of the app. All three studies were pre-registered using OSF and received ethical approval.

3. Study 1 & 2

3.1. Study 1 Hypotheses

Study 1 was focused primarily on how different message frames related to sustainability in commercial communications might influence several outcome variables

related to the brand and pro-environmental behaviour more broadly. There were three conditions for message framing, including Green Growth, Degrowth, or reducing single use plastics (hereafter 'Neutral Green'). Instead of a strict control, the last condition in this study drew directly from the start-up's communications strategy and was intended to be the most realistic in terms of a sustainable brand's positioning. The first two outcome measures related to the brand, i.e., purchase intentions and willingness to donate additional time (WDT), were chosen to understand the consumer decision to purchase products as well as broader affinity toward the brand. The second two, intention to consume less (i.e., interest in sufficiency-oriented lifestyles) and support for degrowth, were included to broaden SPM research beyond marketing objectives, connecting directly to the degrowth agenda. We also chose these variables to complement intentions with revealed behavioural measures, as WDT and support for degrowth measured whether participants took an action.

Given the mixed results from previous GD and SPM studies (Frick et al., 2021; Reich & Armstrong Soule, 2016; Vilasanti da Luz et al., 2020), and the lack of prior research comparing consumer-facing messages related to green growth and degrowth, we pre-registered[14] the following non-directional hypotheses:

H1a: There will be an observed difference between the three conditions (Neutral, Green Growth, and Degrowth) in terms of *interest in the brand* (i.e., purchase intentions and WDT).

H1b: There will be an observed difference between the three conditions (Neutral, Green Growth, and Degrowth) in terms of *interest in reducing consumption*.

H1c: There will be an observed difference between the three conditions (Neutral, Green Growth, and Degrowth) in terms of *behavioural support for degrowth*.

To provide further perspective on the boundary conditions of SPM, we also tested the influence of two psychological constructs – prevention and promotion orientation, based on Regulatory Focus Theory (RFT) (Higgins, 1998). Promotion orientation is associated with approaching positive results or 'ideal' states (Higgins, 1998) often associated with gain frames (Krpan & Basso, 2021). Prevention orientation alternatively focuses on avoiding negative consequences, motivated by 'ought' states (Higgins, 1998), and may be

[14] Full pre-registration is located here: https://osf.io/b6h92

characterized by a loss frame (Krpan & Basso, 2021). These orientations have both trait and state components. Participants previously reported greater support for degrowth when framed using a promotion focus of achieving positive consequences rather than a prevention focus (Krpan & Basso, 2021). We aimed to extend the application of RTF into degrowth research by testing for moderation effects of chronic prevention and promotion. Given the loss and gain associations of each, we proposed the following:

H2a: Among participants with a promotion-orientated regulatory focus, the green growth framing will be more persuasive than the degrowth framing or the neutral framing.

H2b: Among participants with a prevention-orientated regulatory focus, the degrowth framing will be more persuasive than the green growth framing or the neutral framing.

3.2. Method

Study 1 was designed as an online between-participants experiment, testing the effect of three environmental frames within the context of a mock Instagram ad, via Qualtrics. Participants were randomly assigned to receive one out of three possible conditions – Neutral Green, Green Growth, or Degrowth.

1. Sample

The sample was recruited through Prolific Academic and paid a fair wage for their time. Participants were required to: i) reside in the U.K.; ii) use social media (Instagram) at least once per month; iii) speak English fluently; and iv) be aged 25-40 (i.e., the brand's target market of millennials, born approximately 1981 – 1996). We piloted the study on Prolific Academic obtaining a sample of N = 87 participants. Following the pilot, we made adjustments to reduce ambiguity and participant burden. We also obtained a heavy male-skew to the pilot data (nearly 84%), and accordingly released the main study in two separate waves by gender to ensure an even balance.

The planned sample from Prolific was 550 participants (275 men and 275 women). Power analysis using G*Power resulted in a minimum sample of N = 207 for the main effects models. This figure was obtained by selecting test family = F tests, Statistical test = "ANOVA: Fixed effects, omnibus, one-way", a medium effect size (f = 0.25), alpha = 0.05, Power = 0.9, and Number of groups = 3. A medium effect size was selected, as a small effect size would have resulted in a minimum sample of N = 1,296, which was out of our budget. ANOVA

was used for the main effects calculation instead of a linear regression model in order to account for the multiple experimental treatment groups, and given the close relation between the two models. However, OLS regressions were used for analysis in all studies to employ robust standard errors, and in order to directly interpret the magnitude and direction of the experimental effects. For the moderation analyses, a minimum sample size of N = 485 was obtained by selecting test family = F tests, Statistical test = "Linear multiple regression: Fixed model, R2 increase," a small effect size (f^2 = .02), alpha = 0.05, Power = 0.8, tested predictors= 2, and total predictors = 15, with covariates.

The final sample consisted of N = 502 participants, recruited in July 2021. N = 650 participants accessed the survey, but N = 94 did not consent, N = 6 were excluded for not completing the survey, and another N = 6 were excluded for failing a seriousness check. N = 41 participants failed the attention check, and N = 1 participant was missing a Prolific ID. Of the final sample, only N = 471 reported income and N = 464 reported political ideology. The missing data derives from the choice to refrain from answering these two questions, based on pilot feedback about people's preferences toward sharing this information[15]. Thus, we also ran versions of each covariate analysis with multiple imputation (see **Appendix Q**) to utilize the full N = 502 for these analyses.

None of the three conditions differed significantly with respect to race, x^2 (8) = 9.57, p = .296, age, F(2) = .82, p = .442, gender, x^2 (6) = 2.68, p = .848, or annual income, F(2) = 0.67, p = .510. Education differed only at the 10% significance level, x^2 (8) = 14.08, p = .080. The groups also differed significantly at the 5% level with respect to social media time, x^2 (10) = 19.44, p = .035, and social media purchasing history, x^2 (4) = 10.70, p = .030, and at the 10% level with respect to social media frequency, x^2 (10) = 17.59, p = .062. The characteristics of the final sample are described in **Table 5.**

[15] This also accounts for one participant who recorded age = 3, which we kept in the sample but set age to missing.

Table 5 - Summary Statistics - Study 1

Baseline Characteristic	Neutral Green N = 170				Green Growth N = 166				Degrowth N = 166				Full Sample N = 502			
	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%
Age	31.54	4.31	-	-	31.11	4.49	-	-	31.69	4.09	-	-	31.45	4.30	-	-
Gender	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Female	-	-	79	46%	-	-	85	51%	-	-	82	49%	-	-	246	49%
Male	-	-	88	52%	-	-	79	48%	-	-	81	49%	-	-	248	49%
Non-binary/ Prefer not say	-	-	3	2%	-	-	2	1%	-	-	3	2%	-	-	8	2%
Education	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GCSE	-	-	12	7%	-	-	14	8%	-	-	17	10%	-	-	43	9%
High school diploma	-	-	31	18%	-	-	34	20%	-	-	28	17%	-	-	93	19%
Some undergraduate	-	-	15	9%	-	-	22	13%	-	-	11	7%	-	-	48	10%
Bachelor's	-	-	82	48%	-	-	54	33%	-	-	66	40%	-	-	202	40%
Post-graduate	-	-	30	18%	-	-	42	25%	-	-	44	27%	-	-	116	23%
Income (£)	30,181	16,527	-	-	29,764	16,486	-	-	31,558	16,507	-	-	30,344	16,292	-	-
Race & Ethnicity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asian	-	-	11	6%	-	-	17	10%	-	-	16	10%	-	-	44	9%
Black	-	-	10	6%	-	-	2	1%	-	-	4	2%	-	-	16	3%
White	-	-	144	85%	-	-	138	83%	-	-	138	83%	-	-	420	84%
Mixed	-	-	3	2%	-	-	7	4%	-	-	6	4%	-	-	16	3%
Not otherwise listed	-	-	2	1%	-	-	2	1%	-	-	2	1%	-	-	6	1%
Green Scale	5.17	0.90	-	-	5.14	1.00		-	5.00	1.01	-	-	5.10	0.97	-	-
Political Ideology	4.07	1.92	-	-	3.50	1.98		-	3.85	1.98	-	-	3.81	1.97	-	-
Trust	7.82	1.96	-	-	7.77	2.02		-	7.80	1.83	-	-	7.79	1.93	-	-

Scepticism	3.50	1.21	-	-	3.44	1.21	-	3.51	1.13	-	-	3.48	1.18	-	-
SM Purchasing	1.45	0.60	-	-	1.46	0.57	-	1.61	0.59	-	-	1.51	0.59	-	-

Note: Mean and standard deviation (SD) are listed for all continuous variables, while count (n) and percent (%) are listed for categorical variables.

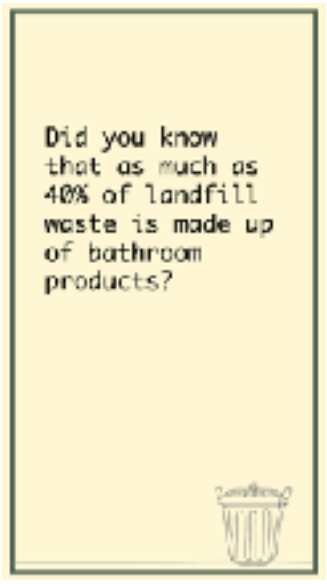
2. Material

The experimental stimuli consisted of three mock Instagram Story imprints. Participants had to click through three separate pages promoting the bath and beauty startup brand. See **Figure 2** for the experimental stimuli. We designed the ads to be brand-oriented as opposed to product-specific, given the success of institutional green demarketing ads focusing on overall brand narrative (Reich & Armstrong Soule, 2016). Given that the startup never ended up launching, it was nearly impossible that participants would have encountered them before. The neutral green frame utilises the company's original brand positioning but was also inspired by traditional green marketing appeals (e.g., Groening et al., 2018). The green growth frame utilizes the 'win-win' concept (Hasselmann et al., 2013), focused on expanding choices without compromising between environmental values and consumption desires. Finally, the degrowth frame focused on a 'less is more' approach of living well by consuming less (Hickel, 2020; Jackson, 2005).

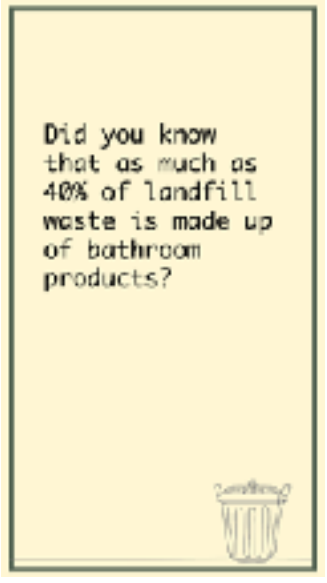
Figure 2 - Experimental Stimuli: Studies 1 and 2

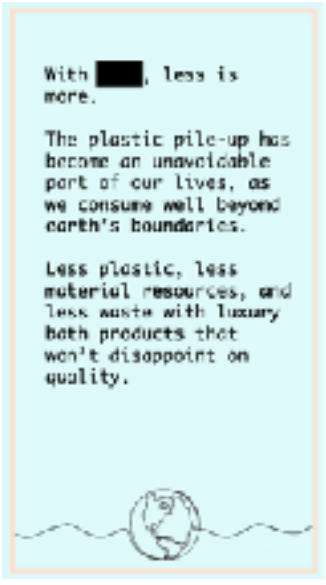
Condition 1 – Neutral Green

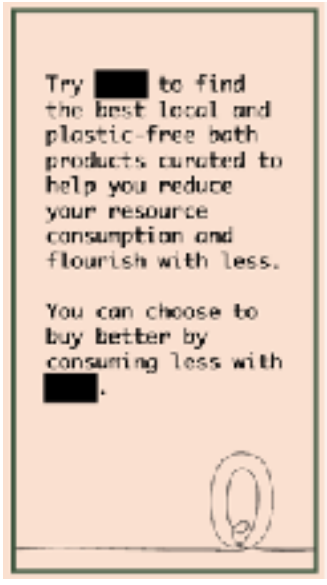
Condition 2 – Green Growth



Condition 3 – Degrowth







Note: In Study 1, each participant was randomly placed into one of these three conditions and viewed the associated images in the order they appear here. Participants saw one image at a time. The company name has been redacted.

3. Procedure

After entering the survey, participants were provided with an informed consent document outlining the purpose of the study, their rights, and contact details if they had any questions or concerns. They were then randomly allocated into one of the three conditions. All participants were provided the same introductory text about the brand: "Its product line includes solid toiletries, such as shampoo and conditioner bars, among other products. One standard sized bar provides as many uses as two 250ml plastic bottles (i.e., 1 shampoo bar = 2 shampoo bottles)." This introduction was mainly meant to legitimate the claims about reducing consumption in the Degrowth condition. However, it was considered relevant background for all conditions, as solely providing this text to the Degrowth condition would have made it impossible to distinguish the effect of the ad without an additional treatment arm. After viewing all three imprints, participants responded to the manipulation check, outcome measures, personal characteristics, demographics, and finally the optional willingness to donate time measure, all discussed in the following section. The average duration was around 8 minutes.

4. Measures

Details of the items from all measures used can be found in **Appendix A**. Unless otherwise specified, items were assessed using a 7-point Likert Scale, to improve variability in treating it as a continuous variable (Robitzsch, 2020). Where multi-item scales are used, the order of statements was randomized. The first dependent variable, self-reported purchase intentions, was measured using a 4-item scale adapted from White et al. (2012) and Lee et al. (2017). Willingness to donate extra time to the brand (WDT) was used as a behavioural proxy adapted from Mortensen et al. (2019). The self-reported intention to reduce consumption was measured using a 3-item scale adapted from Borusiak et al. (2021). Behavioural support for degrowth was measured using a link to an existing petition via Change.org[16], which urged the U.K. government to end its dependency on growth and pursue a degrowth economy. An existing petition sourced from Change.org was preferred over designing a purpose-made one, to improve the credibility and ecological validity of the

[16] https://www.change.org/p/theresa-may-mp-demand-that-the-british-government-begin-switching-immediately-to-a-degrowth-economy

decision to sign up. It was assessed as a binary variable for clicking (1), or not clicking (0) the link.

We also measured several covariates to check the robustness of our experimental treatment, as well as for moderation analyses. Promotion and prevention were measured through the 10-item Chronic Regulatory Focus scale (Haws et al., 2010), in which the two concepts are treated as independent, comprising five items each. Green consumption values were measured via the 6-item Green Scale (Haws et al., 2014) to control for the individual's underlying tendency toward sustainable consumption. Political ideology was measured using the question from Whitmarsh and Corner (2017), given that support for degrowth or post-growth is often associate with more left-wing political ideology (e.g., Khan et al., 2023; Paulson & Büchs, 2022). Consumer brand-based trust was measured using a 10-point semantic differential scale with three items (e.g., "low integrity" = 1 to "high integrity" = 10) adapted from Sirdeshmukh et al. (2002). Perceived brand trust of a new company might influence respondents' engagement. Consumer scepticism was measured using a 4-item scale related to green advertising, adapted from Mohr et al. (1998). Scepticism was included to control for greenwashing concerns, as consumers attributed less genuine environmental motives to green demarketing ads than traditional green ads, though this was more prevalent for product ads (Reich & Armstrong Soule, 2016). Socio-demographics including age, gender, race/ethnicity, income, and education were asked. There is mixed evidence on the role of demographics in environmental concern and consumption (e.g., Sargisson et al., 2020), though green consumption values were found to be higher for older, more highly educated and higher income participants (Haws et al., 2014). Support for degrowth or post-growth also tends to be higher for higher income and more highly educated people, but also younger people (O'Dell et al., 2024; Paulson & Büchs, 2022). Time spent on social media and frequency of usage, adapted from Du et al. (2020), were included to check if the social media pre-screening was appropriate and groups were balanced. Social media purchasing history was also requested to account for past behaviour, given its influence on future behaviour (Ouellette & Wood, 1998).

All participants received a manipulation check regarding each ad's main message (i.e., neutral green: "Go plastic free", green growth: "More sustainable options are better" and degrowth: "Less is more") and were asked to select the most relevant for their condition. We also included an attention check, adapted from Oppenheimer (2009) as well as

a check for whether they took the survey seriously, adapted from Musch & Klauer (1999). Participants were excluded if they did not pass the attention or seriousness checks.

3.3. Results

To reduce the number of tables included in the main text, tables that are not associated with the main effects regression analyses have been included in the Appendix.

3.3.1.Manipulation Check and Reliability of Scales

In the Neutral Green condition, 100% of respondents chose the correct manipulation check option, 99.4% chose correctly for Green Growth, and 97% for Degrowth. We also assessed the reliability of pre-validated scales in our sample using Cronbach's alphas. The covariate scales for green values (α = 0.90), trust (α = 0.91), and scepticism (α = 0.84) were highly reliable in our sample. The two dependent variables using scales, purchase intentions (α = 0.86) and intention to consume less (α = 0.90) also exhibited high reliability. Promotion was on the low end of reliability (5 items, α = 0.64), and prevention performed rather poorly (5 items, α = 0.45), calling into question the legitimacy of any associated results.

3.3.2.Main Effects Results

For all analyses, an alpha level of 0.05 was used as the significance criterion.

Table *6* provides a summary of the regression results from Study 1, broken down by hypothesis. Covariate analyses are mostly robust[17] to multiple imputation for missing values, included in **Appendix Q**.

[17] For a description of where the analyses are not robust, see **Section 7** on Transparent Changes from the Pre-registration.

Table 6 - Summary of Study 1 Results

Hypothesis	Dependent Variable	Comparison between Conditions	Significance Level	Support for Hypothesis?
H1a. Main Effect	DV: Purchase intentions	NG > GG > DG	Main effect at 10% level (p = .066) between NG and DG	Yes, marginally, between DG and NG
	DV: Willingness to donate time	DG > GG > NG	Main effect at the 5% level (p = .049) between DG and NG	Yes, between DG and NG
H1b. Main Effect	DV: Intention to consume less	NG > GG > DG	None	None
H1c. Main Effect	DV: Support for degrowth	GG > DG > NG	None	None

Note: DV stands for dependent variable. In all hypotheses, the independent variable is the treatment group, where NG stands for Neutral Green condition, GG for Green Growth condition, and DG for Degrowth condition. Analyses reported in this table do not include covariates.

3.3.2.1.Main Effects - Linear Regressions

Table 7 reports the results from an OLS regression for each outcome in H1a and H1b. The Degrowth condition was marginally significantly lower than the Neutral Green condition (β = -0.19, p = .066) for the self-reported purchase intentions (H1a) only at the 10% significance level. When including covariates, significance disappeared. There was also no statistically significant difference between Degrowth and Green Growth conditions, F(1) = 1.26, p = .261.

Testing H1a with the alternative outcome, WDT, suggested a significantly greater willingness to donate time to the brand following the Degrowth than Neutral Green ad conditions (β = 0.66, p = .049) at the 5% significance level. However, there was no statistically significant difference between Degrowth and Green Growth conditions, F(1) =

0.38, p = .53. When covariates were included, the difference between the Neutral Green and Degrowth conditions persisted but only at the 10% level (β = 0.60, p = .085). Thus, there is some evidence to support H1a when using both the self-reported and behavioural measures, though in opposite directions.

The OLS results for the intention to consume less (H1b) in **Table 7** suggest that both the Green Growth and Degrowth conditions were less persuasive than the Neutral Green condition, though no statistically significant differences emerged. There is no evidence in support of H1b.

Table 7 – Main Effects (OLS) – Study 1

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**Purchase Intentions**	**Purchase Intentions**	**Willingness to Donate Time**	**Willingness to Donate Time**	**Intention to Consume Less**	**Intention to Consume Less**
Green Growth	-0.07	0.02	0.46	0.45	-0.04	-0.09
	(0.11)	(0.10)	(0.34)	(0.36)	(0.11)	(0.08)
Degrowth	-0.19*	-0.06	0.66**	0.60*	-0.15	-0.10
	(0.10)	(0.10)	(0.33)	(0.35)	(0.10)	(0.08)
Scepticism		-0.15***		-0.02		-0.07**
		(0.04)		(0.13)		(0.03)
Trust		0.09***		0.08		0.01
		(0.03)		(0.08)		(0.02)
Past SM Purchasing		-0.10		-0.14		0.03
		(0.07)		(0.25)		(0.05)
Green Scale		0.48***		0.40**		0.65***
		(0.05)		(0.16)		(0.05)
Political Ideology		0.07***		0.04		-0.04
		(0.02)		(0.08)		(0.02)
Age		0.00		0.06*		0.00
		(0.01)		(0.03)		(0.01)
Income		0.00		0.00		0.00

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time	(5) Intention to Consume Less	(6) Intention to Consume Less
		(0.00)		(0.00)		(0.00)
Education						
High school diploma		-0.11		-0.41		-0.12
		(0.16)		(0.53)		(0.14)
Some undergraduate		-0.06		-1.09*		-0.30*
		(0.19)		(0.64)		(0.17)
Bachelor's degree		-0.21		-0.82		-0.25*
		(0.15)		(0.51)		(0.14)
Post-graduate degree		-0.32*		-1.21**		-0.24
		(0.16)		(0.58)		(0.16)
Gender						
Male		-0.03		-0.48		-0.26***
		(0.09)		(0.31)		(0.07)
Non-binary		-0.26		-0.52		-0.59**
		(0.27)		(1.42)		(0.24)
Constant	4.91***	1.92***	4.82***	1.15	5.66***	2.74***
	(0.07)	(0.55)	(0.25)	(1.78)	(0.07)	(0.48)
Observations	502	442	502	442	502	442
R-squared	0.01	0.34	0.01	0.06	0.00	0.51

Note: Coefficients are displayed, with robust standard errors below in parentheses. Columns (2), (4) and (6) display the results including covariates. The dependent variable is listed at the top of the column. The Neutral Green condition is the omitted reference category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

A main assumption of OLS is that the dependent variable's residuals are normally distributed. To assess whether our data met this assumption, we ran a (numeric) Shapiro-Wilk test as well as a (visual) standardized normal probability (P-P) plot of the residuals for

each linear dependent variable. See **Appendix B** for the P-P plots of each variable's residuals. Purchase intentions, $W(502) = 0.99$, $p < .001$, and intention to consume less, $W(502) = 0.93$, $p < .001$, both failed the numeric test, for which the null hypothesis is a normal distribution. However, the visual tests were less conclusive. Given the relatively large sample size, and the use of robust standard errors to help mitigate issues with non-normality (Knief & Forstmeier, 2021), we used OLS as our main specifications. We also included non-parametric analyses to check for robustness in **Appendix E**. However, willingness to donate time could not reasonably be treated as continuous, as it took on a mostly binary format wherein most respondents answered either none or all the additional questions. It failed the numeric test $W(502) = 0.70$, $p < .001$, and the visual test was quite conclusive. Therefore, we also included logit specifications below for WDT in addition to the non-parametric analyses in **Appendix E**.

3.3.2.2.Main Effects - Logit Regressions

For H1c regarding support for degrowth, a binary logit regression was used to compare treatment effects on people's engagement with a petition. The results in **Table 8** suggest that there is no statistically significant difference between any conditions[18] with or without covariates, providing no evidence in support of H1c.

Given the binary nature of the willingness to donate time measure, a logit regression appeared better suited for modelling the effect of condition on WDT. The results in column (3) and (4) of **Table 8** confirm findings from OLS regressions (in **Table 7**), at the 10% significance level.

[18] Comparing Green Growth and Degrowth directly: $x^2(1) = 1.09$, $p = .30$.

Table 8 – Main Effects Results (Logit) – Study 1

VARIABLES	(1) Petition Click-Through	(2) Petition Click-Through	(3) WDT (Binary)	(4) WDT (Binary)
Green Growth	1.41	1.19	1.39	1.46
	(0.43)	(0.38)	(0.34)	(0.42)
Degrowth	1.03	0.80	1.59*	1.56
	(0.33)	(0.28)	(0.40)	(0.43)
Scepticism		0.98		0.98
		(0.11)		(0.10)
Trust		1.01		1.06
		(0.07)		(0.06)
Past Social Media Purchasing		1.12		0.90
		(0.28)		(0.17)
Green Scale		0.97		1.36**
		(0.16)		(0.18)
Political Ideology		0.88*		1.03
		(0.06)		(0.06)
Age		0.98		1.05*
		(0.03)		(0.03)
Income		1.00		1.00
		(0.00)		(0.00)
Education				
High school diploma		0.57		0.61
		(0.33)		(0.39)
Some undergraduate		0.90		0.36
		(0.58)		(0.24)
Bachelor's degree		0.69		0.44
		(0.35)		(0.26)
Post-graduate degree		0.65		0.31*
		(0.35)		(0.20)
Gender				
Male		1.13		0.67

VARIABLES	(1) Petition Click-Through	(2) Petition Click-Through	(3) WDT (Binary)	(4) WDT (Binary)
		(0.33)		(0.17)
Non-binary		1.07		0.64
		(1.12)		(0.59)
Constant	0.16***	0.45	2.27***	0.18
	(0.04)	(0.70)	(0.38)	(0.26)
Observations	502	442	502	442

Note: Odds ratios are displayed, with robust standard errors below in parentheses. Columns (2) and (4) display the results including covariates. The dependent variable is listed at the top of the column. The Neutral Green condition is the omitted reference category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

3.3.3.Prevention and Promotion Moderations

The following two sections describe the results of the pre-registered moderations with chronic promotion and prevention. However, given the lower reliability scores of promotion and especially prevention, these results should be interpreted with caution. Results tables can be found in **Appendix C**.

3.3.3.1.Promotion

H2a hypothesized that the Green Growth framing would be more persuasive for promotion-orientated participants than the Degrowth framing or Neutral Green framing. As such, we assessed two relationships – i) the Neutral Green v. Green Growth conditions and ii) the Green Growth v. Degrowth conditions. The promotion score has been standardized, with a mean of 0 and standard deviation of 1.

The first of these moderation analyses includes purchase intentions as the dependent variable as shown in **Appendix Table 20** and **Table 21**. For relationship i), we did not find a significant interaction effect comparing the Green Growth and Neutral Green conditions. For relationship ii), there was again no significant interaction comparing the Green Growth and Degrowth conditions. Though not significant, the difference between the Degrowth and Green Growth conditions was directionally consistent with our hypothesis H2a, while the

direction of the difference between the Neutral Green and Green Growth conditions opposed our hypothesis.

The second of these moderation analyses includes willingness to donate time as the dependent variable, shown in **Appendix Table 24** and **Table 25**. For both relationship i) and ii), we did not find a significant interaction. Despite a lack of significance, these results were at least somewhat directly consistent with hypothesis H2a. The third moderation included intention to consume less as the dependent variable, found in **Appendix Table 22 a**nd **Table 23**. For relationship i) and ii) there were no statistically significant interactions. Taken together, there is some directional support for hypothesis H2a across the three outcome variables, but no statistically significant relationships were uncovered.

3.3.3.2.Prevention

H2b hypothesized that the Degrowth condition would be more appealing to prevention-oriented individuals compared to the Green Growth or Neutral Green conditions. We again assessed two relationships – i) Neutral Green v. Degrowth and ii) Green Growth v. Degrowth conditions.

The first of these moderation analyses includes purchase intentions as the dependent variable as shown in **Appendix C Table 20** and **Table 21**. For relationship i) there was no statistically significant interaction effect. For relationship ii), the interaction between the Degrowth condition and the prevention measure was statistically significant at the 10% level (β = -0.24, p = .095). These results, though either insignificant (H2bi) or weakly significant (H2bii), were counter to our hypothesis.

The second moderation analysis included the willingness to donate time as the dependent variable, shown in **Appendix C Table 24** and **Table 25**. For relationship i), the Degrowth condition had a positive and marginally significant main effect when including the prevention variable and interaction term as covariates (β = 0.65, p = .05), and the interaction term when comparing the Neutral Green and Degrowth conditions was marginally significant (β = -0.50, p = .099), both at the 10% level. For relationship ii), the Degrowth and Green Growth conditions did not differ significantly, nor was there a significant interaction. Again, these results opposed our hypothesis.

The last moderation includes the intention to consume less as the dependent variable, displayed in **Appendix C Table 22** and **Table 23**. For relationship i), the Degrowth condition had an insignificant main and interaction effect. For relationship ii), though there was no significant main effect between the Degrowth and Green Growth conditions, the interaction between Degrowth and the prevention score is statistically significant at the 5% level (β = -0.28, p = .04). These results were the opposite of what we hypothesized in H2b, but consistent with the direction of the effects for the other two outcome variables. Taken together, our results did not confirm our hypothesis H2b, suggesting instead that the Green Growth condition was more persuasive for prevention-oriented individuals in our study. However, given the weak reliability of this measure, it is difficult to attribute much meaning to these results.

3.3.4.Further Analyses and Robustness Checks

See **Appendix D** for exploratory moderations including green consumption values and political ideology. We also ran robustness checks to probe the main effects results, using non-parametric methods given that the normality of the residuals was inconclusive. Kruskal-Wallis tests[19] and non-parametric kernel regressions[20] for our main effects models are included in **Appendix E**, which largely confirmed the results reported above.

3.4. Discussion

Study 1 tested how three message frames – Neutral Green, Green Growth, and Degrowth – influenced participants pro-environmental attitudes and behaviours in a marketing context. Our outcome measures included self-reported intentions as well as revealed behaviours. Purchase intentions were marginally lower for the Degrowth condition than the Neutral Green condition at the 10% level, but this did not meet our 5% significance criterion. The effect size was also small at Cohen's f = .08. There appeared no significant difference between the Degrowth and Green Growth conditions. The result for purchase intentions is consistent with Hwang et al. (2016), who found that consumers who view an

[19] The Kruskal-Wallis test is a one-way ANOVA on ranks using non-parametric methods to determine whether samples originate from the same distribution. A significant p-value suggests a statistical difference between groups.

[20] The non-parametric kernel regression estimates the mean outcome for a given set of covariates without being prone to misspecification error, as it is agnostic to functional form.

anticonsumption related ad, i.e., Patagonia's "Don't Buy this Jacket," exhibited lower purchase intentions and lower attitude toward buying the jacket than those who viewed a traditional ad.

On average participants who received the Degrowth framing reported a higher willingness to donate time than those who received the Neutral Green framing significant at the 5% level when treated as continuous, and the 10% level as a binary outcome. The effect size of the linear model was small, f = .09. Reich & Soule (2016) similarly find slightly better brand attitudes in their green demarketing condition for brand-level messages, suggesting viewers perceive heightened environmental concern inferences of the brand when marketing reduced consumption. As our study teases out attitudes by distinguishing between purchase intentions and a measure of brand evaluations, Study 1 suggest that the Degrowth framing might enhance positive brand evaluations (i.e., willingness to donate time), but not necessarily persuade toward a purchase. The Degrowth framing also did not influence broader objectives in line with sufficiency (i.e., intention to consume less) or degrowth (i.e., clicking on petition link).

The lack of significant main effects between the Green Growth and Degrowth conditions across all outcome variables is noteworthy, given the starkly different values of the two agendas, as well as implications for consumption and broader lifestyle choices. We will discuss this point in further detail following Study 2. Additionally, the moderations with prevention suggest that the Green Growth condition was more persuasive than the Degrowth condition for prevention-oriented individuals in our study, for both purchase intentions and intentions to consume less. This is counter to our hypothesis but may be indicative that the prevention score ($\alpha = 0.45$) was not reliably measuring the prevention construct.

3.5. Study 2 Hypotheses

Study 2 was conducted first and foremost as a replication with a larger participant pool to test the findings of Study 1. As such, we used the same experimental stimuli for the Green Growth and Degrowth conditions and nearly all the same measures. The main departures from Study 1 are i) using a strict control with no ad instead of the Neutral Green condition, to establish a baseline of showing any ad and ii) pre-registering green consumption values and political ideology as moderators. We implemented a strict control as

our primary interest was in the main effects between green growth and degrowth (or lack thereof), and not the significant differences with the Neutral Green framing found in Study 1. To further probe our comparison of interest, we wanted to test if our focal treatment conditions would perform significantly better than no ad, just by virtue of being ads.

From those pre-registered in Study 1, we only pre-registered[21] two confirmatory hypotheses for Study 2 based on the previous results:

H1a. Purchase intentions will differ across the three conditions (Control, Green Growth, or Degrowth), such that the Degrowth condition will be associated with significantly lower purchase intentions.
H1b. Willingness to donate time will differ across the three conditions (Control, Green Growth, or Degrowth), such that the Degrowth condition will be associated with significantly higher willingness to donate time.

We pre-registered hypotheses based on the exploratory moderation analyses from Study 1 (see **Appendix D**):

H2a. Green consumption values will moderate the effect of the condition on purchase intentions, such that stronger green values will result in reduced purchase intentions after viewing the Degrowth ad (compared to the Green Growth and Control conditions), but weaker green values will result in greater purchase intentions following the Degrowth ad (compared to the Green Growth and Control conditions).

H2b. Green consumption values will moderate the effect of the condition on willingness to donate time, such that stronger green values will result in enhanced willingness after viewing the Degrowth ad (compared to the Green Growth and Control conditions), but weaker green values will result in reduced willingness following the Degrowth ad (compared to the Green Growth and Control conditions).

H3a: Political identity will moderate the effect of the condition on purchase intentions, such that left-leaning participants will report similar purchase intentions after the three conditions, but right-leaning participants will result in greater purchase intentions following the green growth ad than the degrowth ad or control.

H3b. Political identity will moderate the effect of the condition on willingness to donate time, such that left-leaning participants will report greater willingness after viewing the degrowth compared to the green growth ad or control, but right-leaning participants will report greater willingness after viewing the green growth ad compared to the degrowth ad or control.

[21] Full pre-registration is located here: https://osf.io/96rhe

We finally also registered as exploratory hypotheses H1b (intention to reduce consumption) and H1c (support for degrowth) from Study 1 given the lack of significant differences from Study 1.

3.6. Method

3.6.1.Sample

The sample was again drawn from Prolific Academic and paid a fair wage for their time. Participants were required to meet the same inclusion criteria as in Study 1. We again released the main study in two separate waves by gender. The planned sample from Prolific was 1,100 participants (550 men and 550 women). All the main effect sizes achieved in Study 1 were small, ranging from f = .06 (intention to consume less) to f = 0.09 (WDT). Power analysis using G*Power with the same parameters as Study 1, except a small effect size f = 0.1, resulted in a minimum sample of N = 969 required for the main effects models. We used the same power analysis for moderation as in Study 1, resulting in a minimum total sample size of 485.

The final sample consisted of N = 969 participants, recruited in late October 2021. N = 1,240 participants accessed the survey, but N = 136 did not consent to take the survey, an additional N = 5 were excluded for failing to pass the seriousness check. N = 125 failed the attention check, and another N = 5 were missing Prolific IDs. Of those 969, only N = 920 reported income and N = 847 reported political ideology, given the same options to refrain as in Study 1, for consistency. Thus, we only had covariate data for N = 816 participants, making main effects analyses with covariates slightly under powered to determine a small effect size. We again included versions with multiple imputation (see **Appendix P**) to utilize the full N = 969 for covariates analyses.

The three conditions did not differ significantly with respect to race, x^2 (8) = 8.37, p = .398, age, F(2) = 0.18, p = .835, gender, x^2 (6) = 6.05, p = .418, income, F(2) = 0.87, p = .420, education, x^2 (8) = 6.76, p = .563, or social media frequency, x^2 (10) = 11.95, p = .288. The characteristics of the final sample are described in **Table 9**.

Table 9 - Summary Statistics - Study 2

Baseline Characteristic	No Ad Control N = 322				Green Growth N = 322				Degrowth N = 325				Full Sample N = 969			
	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%
Age	31.74	4.26	-	-	31.75	4.29	-	-	31.92	4.30	-	-	31.81	4.28	-	-
Gender	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Female	-	-	163	51%	-	-	162	50%	-	-	165	51%	-	-	490	51%
Male	-	-	157	49%	-	-	159	49%	-	-	160	49%	-	-	476	49%
Non-binary/ Prefer not say	-	-	2	1%	-	-	1	0%	-	-	0	0%	-	-	3	0%
Education	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GCSE	-	-	34	11%	-	-	22	7%	-	-	31	10%	-	-	87	9%
High school diploma	-	-	76	24%	-	-	75	23%	-	-	72	22%	-	-	223	23%
Some undergraduate	-	-	36	11%	-	-	27	8%	-	-	36	11%	-	-	99	10%
Bachelor's	-	-	119	37%	-	-	128	40%	-	-	129	40%	-	-	376	39%
Post-graduate	-	-	57	18%	-	-	70	22%	-	-	57	18%	-	-	184	19%
Income (£)	29,404	15,633	-	-	30,223	14,823	-	-	28,661	13,709	-	-	29,423	14,729	-	-
Race & Ethnicity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asian	-	-	25	8%	-	-	20	6%	-	-	18	6%	-	-	63	7%
Black	-	-	12	4%	-	-	11	3%	-	-	6	2%	-	-	29	3%
White	-	-	274	85%	-	-	274	85%	-	-	284	87%	-	-	832	86%
Mixed	-	-	9	3%	-	-	10	3%	-	-	14	4%	-	-	33	3%
Not otherwise listed	-	-	2	1%	-	-	7	2%	-	-	3	1%	-	-	12	1%

Green Scale	4.93	1.01	-	-	5.00	1.02	-	4.96	0.93	-	-	4.96	0.99	-	-
Political Ideology	3.83	1.88	-	-	3.75	1.99	-	3.93	2.14	-	-	3.84	2.01	-	-
Ethicality	5.30	0.89	-	-	5.83	0.82	-	5.82	0.87	-	-	5.65	0.89	-	-
Scepticism	3.88	1.06	-	-	3.60	1.09	-	3.53	1.17	-	-	3.67	1.12	-	-
SM Frequency	3.15	1.16	-	-	3.27	1.19	-	3.02	1.09	-	-	3.15	1.15	-	-

Note: Mean and standard deviation (SD) are listed for all continuous variables, while count (n) and percent (%) are listed for categorical variables.

3.6.2.Material

The same stimuli presented as Instagram ads from Study 1 for Degrowth and Green Growth were used, along with a strict Control condition. This control included the introduction to the company but excluded any ad.

3.6.3.Procedure

The procedure for Study 2 largely followed that of Study 1. The Chronic Regulatory Focus measures of prevention and promotion were also excluded given their low reliability. We also dropped the social media time and purchasing questions to slightly streamline the questionnaire. The average duration was around 6 minutes and 35 seconds.

3.6.4.Measures

All the same dependent variables from Study 1 were included in Study 2 for replication purposes. We used all the same measures for covariates except for trust. Given that brand trust could be more difficult to assess in the No Ad condition, we measured perceptions of brand ethicality instead, adapted from Brunk (2012) and Magnier and Schoormans (2015). We included the same manipulation check, substituting “I did not view an ad” for the Control condition, and the same attention and seriousness checks from Study 1.

3.7. Results

3.7.1.Manipulation Check and Reliability of Scales

In the No Ad condition, 94% of respondents chose the correct manipulation check option, while 99% in the Green Growth and 98% in the Degrowth condition chose correctly. The Cronbach’s alpha for green consumption values ($\alpha = 0.90$), ethicality ($\alpha = 0.89$), and scepticism ($\alpha = 0.83$) were highly reliable in our sample and consistent with Study 1. The two dependent variables using scales, purchase intentions ($\alpha = 0.88$) and intention to consume less ($\alpha = 0.90$) also exhibited very high reliability.

3.7.2.Main Effects Results

Table 10 provides a summary of the results from Study 2, broken down by hypothesis. Covariate analyses are mostly robust[22] to multiple imputation for missing values, included in **Appendix Q**. The main effects results tables comparing just the Green Growth and Degrowth conditions are included below, whilst the full set of results comparing all three conditions are included in **Appendix G**.

[22] For a description of where the analyses are not robust, see **Section 7** on Transparent Changes from the Pre-registration.

Table 10 - Summary of Study 2 Results

Hypothesis	Variables	Comparison between Conditions	Significance level (p-value)	Support for Hypothesis?	Consistent w/ Study 1
H1a. Main Effect	DV: Purchase intentions	DG > GG > C	Main effect at the 1% level (p <.001) comparing C with DG and C with GG	Opposite direction as hypothesized	No
H1b. Main Effect	DV: Willingness to donate time	GG > DG > C	None	Not significant and opposite direction as hypothesized	No
H2a. Moderation Effect	DV: Purchase intentions M: Green consumption values	High in green values: DG > GG > C Low in green values: C > GG > DG	Interaction effect at the 1% level (p < .001) comparing DG and C Interaction effect at the 1% level (p = .007) comparing GG and C Interaction effect at the 5% level (p = .039) comparing DG and GG	Opposite direction as hypothesized	No
H2b. Moderation Effect	DV: Willingness to donate time M: Green consumption values	High in green values: DG > GG > C Low in green values: GG > C > DG	None	None	No
H3a. Moderation Effect	DV: Purchase intentions M: Political ideology	Left leaning: DG > GG > C Right leaning: C > GG > DG	Interaction effect at the 10% level (p = .064) comparing GG and C Interaction effect at the 5% level (p = .043) comparing DG and C	Opposite direction as hypothesized	No
H3b. Moderation Effect	DV: Willingness to donate time M: Political ideology	Left leaning: GG > C > DG Right leaning: DG > GG > C	None	None	No
EH4. Main Effect	DV: Intention to reduce consumption	DG > GG > C	Main effect at the 10% level (p = .08) comparing DG and C, and at the 10% level (p = .09) comparing DG and GG	Weak support	No

Note: DV stands for dependent variable, and M stands for moderating or interacting variable. In all hypotheses, the independent variable is the treatment group, where C stands for Control condition, GG for Green Growth

condition, and DG for Degrowth condition. EH indicates hypotheses that were pre-registered as exploratory. Analyses reported in this table do not include covariates.

3.7.2.1.Main Effects - Linear Regression

Appendix G Table 33 shows the comparison of all three conditions, while **Table 11** directly compares Degrowth and Green Growth to provide more detail on our focal comparison. **Appendix G Table 33** shows that the Green Growth (β = 0.45, p <.001) and Degrowth (β = 0.46, p <.001) conditions were associated with significantly greater purchase intentions compared to the Control condition at the 1% significance level, and the effect remained significant after including covariates. The overall effect size for the purchase intentions variable is small to medium (f = .21). In **Table 11**, the Degrowth ad was associated with slightly higher purchase intentions than the Green Growth ad, but the difference was not statistically significant, with or without covariates. Counter to H1a, these results suggest that after including an ad, there was no incremental difference between the two ads on purchase intentions. For the OLS regression with willingness to donate time, there was no statistically significant difference between any conditions, shown in **Appendix G Table 33** and **Table 11**. Intention to consume less was marginally significantly higher (10% level) following the Degrowth framing, compared to the Green Growth framing (β = 0.14, p = .092) and the Control condition (β = 0.15, p = .076). Both exhibited small effect sizes (f = .06 and f = .07, respectively).

Table 11 - Main Effects Results (OLS), Green Growth & Degrowth Only - Study 2

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Purchase Intentions	Purchase Intentions	Willingness to Donate Time	Willingness to Donate Time	Intention to Consume Less	Intention to Consume Less
Degrowth	0.01	0.00	-0.25	-0.32	0.14*	0.13*
	(0.08)	(0.07)	(0.23)	(0.25)	(0.08)	(0.07)
Scepticism		0.00		0.05		-0.01
		(0.03)		(0.12)		(0.04)
Brand Ethicality		0.43***		0.13		0.17***
		(0.05)		(0.17)		(0.05)
Green Scale		0.48***		0.42***		0.66***
		(0.05)		(0.15)		(0.04)
Political Identity		-0.01		0.09		-0.00
		(0.02)		(0.06)		(0.02)
Age		0.02**		0.09***		0.01
		(0.01)		(0.03)		(0.01)
Income		-0.00		-0.00**		-0.00
		(0.00)		(0.00)		(0.00)
Education						
High school diploma		-0.25*		0.02		0.15
		(0.13)		(0.51)		(0.13)
Some undergraduate		-0.59***		-0.11		-0.06
		(0.16)		(0.59)		(0.16)
Bachelor's degree		-0.45***		-0.13		-0.06
		(0.12)		(0.48)		(0.13)
Post-graduate degree		-0.20		-0.21		0.12
		(0.12)		(0.52)		(0.14)
Gender						
Male		-0.02		-0.39		-0.26***
		(0.07)		(0.26)		(0.07)
Prefer not to say		-2.11***		-5.77***		-1.16***

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time	(5) Intention to Consume Less	(6) Intention to Consume Less
		(0.14)		(0.50)		(0.12)
Constant	4.83***	-0.19	5.41***	0.13	5.39***	1.00*
	(0.06)	(0.48)	(0.16)	(1.79)	(0.06)	(0.51)
Observations	647	546	647	546	647	546
R-squared	0.00	0.42	0.00	0.06	0.00	0.47

Note: Coefficients are displayed, with robust standard errors below in parentheses. Columns (2), (4) and (6) display the results including covariates. The dependent variable is listed at the top of the column. This table only includes results for comparing the Green Growth and Degrowth conditions. The Green Growth condition is the omitted category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

To assess whether our data met the normality of residuals assumption, we again ran the Shapiro-Wilk test and generated P-P plots of the residuals for each linear dependent variable. See **Appendix F** for the P-P plots. Purchase intentions, $W(969) = 0.979$, $p < .001$ and intention to consume less, $W(969) = 0.934$, $p < .001$, both failed the numeric test. However, the visual tests were less conclusive. Given the relatively large sample size and robust standard errors, we again treated these two variables as continuous. The distribution for willingness to donate time was again mostly binary, failing both the numeric test $W(502) = 0.664$, $p < .001$, and visual tests. We again included logit analysis of WDT in **Appendix G**, which was consistent with the linear specification, along with exploratory logit analysis of support for degrowth. Non-parametric analyses have also been included for all outcomes in **Appendix J**.

3.7.3.Moderation Analysis

See **Appendix I** for results associated with the political ideology moderations, which do not indicate any significant interaction effects comparing the Green Growth and Degrowth conditions.

3.7.3.1.Green Consumption Values

Appendix H Table 36 shows the comparison of all three conditions, while **Table 12** directly compares Degrowth and Green Growth. For purchase intentions shown in **Appendix H Table 36**, there was a statistically significant difference between Green Growth and Control on the interaction term (β_{GG} = .43, p < .001; $\beta_{GGxgreen}$ = .20, p = .007) at the 1% level. There was also a statistically significant interaction when comparing the Degrowth and Control conditions (β_{DG} = -.45, p < .001; $\beta_{DGxgreen}$ = 0.38, p < .001) at the 1% level of significance. Both effects maintain significance with the inclusion of covariates (β_{GG} = .22, p = .003; $\beta_{GGxgreen}$ = .182, p = .020; β_{DG} = .22, p = .003; $\beta_{DGxgreen}$ = .36, p < .001). Compared to the control condition, those with higher than average green consumption values in either treatment condition exhibited greater purchase intentions.

Table 12 - Green Consumption Values Moderation, Green Growth & Degrowth Only - Study 2

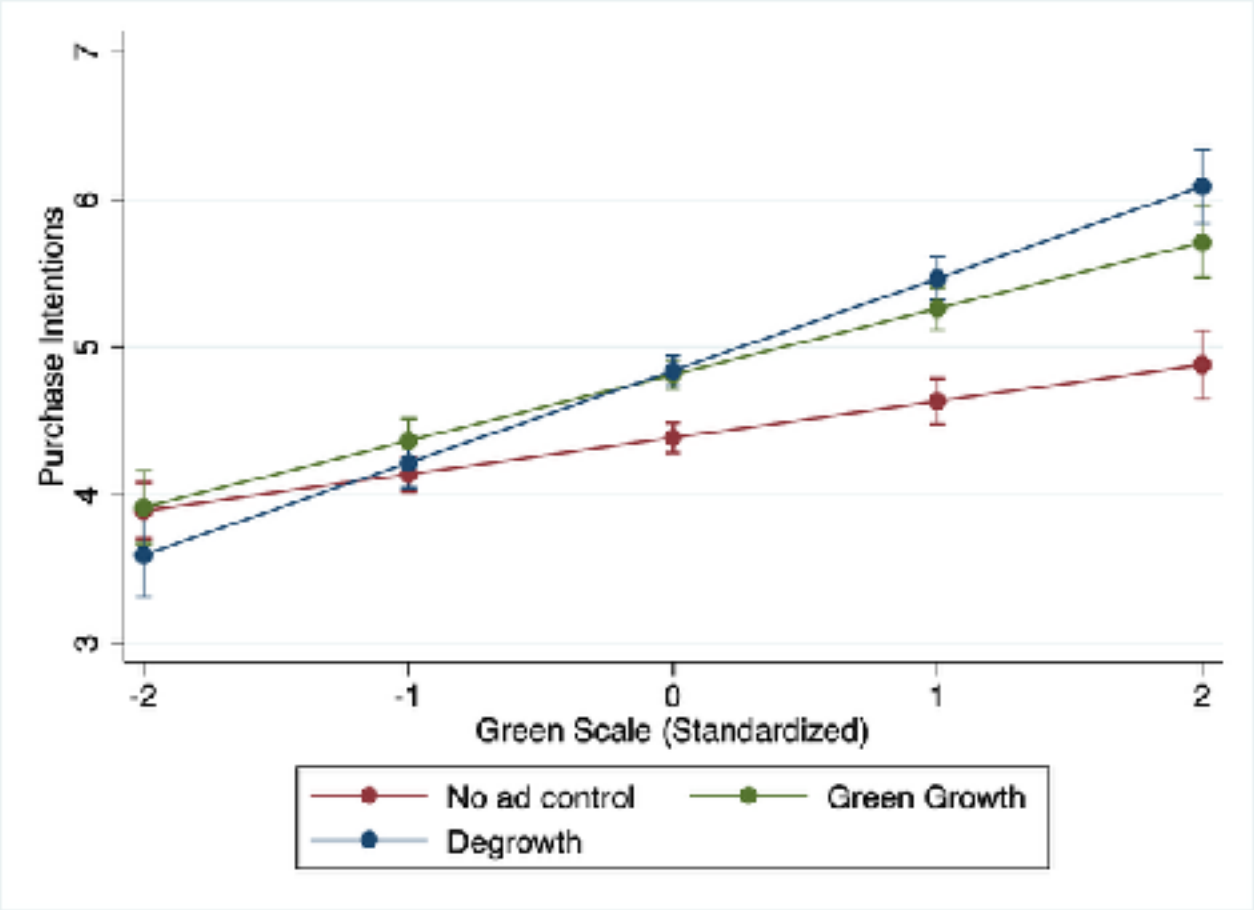
VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
Degrowth	0.03	-0.00	-0.23	-0.32
	(0.07)	(0.07)	(0.23)	(0.25)
Green Scale (Standardized)	0.45***	0.39***	0.32*	0.38**
	(0.06)	(0.06)	(0.17)	(0.19)
DG x Green Scale	0.18**	0.18**	0.21	0.05
	(0.08)	(0.09)	(0.25)	(0.28)
Scepticism		0.00		0.05
		(0.03)		(0.12)
Brand Ethicality		0.43***		0.13
		(0.05)		(0.17)
Political Ideology		-0.01		0.09
		(0.02)		(0.06)
Age		0.02**		0.09***
		(0.01)		(0.03)
Income		-0.00		-0.00**
		(0.00)		(0.00)
Education				
High school diploma		-0.25**		0.02
		(0.12)		(0.51)
Some undergraduate		-0.58***		-0.11
		(0.16)		(0.59)
Bachelor's degree		-0.44***		-0.12
		(0.12)		(0.48)
Post-graduate degree		-0.18		-0.20
		(0.12)		(0.52)
Gender				
Male		-0.01		-0.39

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
		(0.07)		(0.26)
Prefer not to say		-2.03***		-5.75***
		(0.14)		(0.51)
Constant	4.81***	2.24***	5.40***	2.20
	(0.05)	(0.46)	(0.16)	(1.71)
Observations	647	546	647	546
R-squared	0.26	0.43	0.02	0.06

Note: This table contains the results of moderation analyses where condition is the independent variable and green consumption scale is the moderator. Columns (2) and (4) display the results including covariates. The dependent variable is listed at the top of the column. This table only includes results for comparing the Green Growth and Degrowth conditions. The Green Growth condition is the omitted category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

There was also a significant interaction when comparing the two ad conditions (β_{DG} = .03, p = .703; $\beta_{DGxgreen}$ = .18, p = .039) in **Table 12**, significant at the 5% significance level, which remained significant with covariates (β_{DG} = -.004, p = .947; $\beta_{DGxgreen}$ = .18, p = .038). **Figure 3** shows that for lower than average green consumption values, the Green Growth condition was associated with higher purchase intentions than the Degrowth condition. Above the mean, the trends reverses. These results oppose H2a and exploratory results from Study 1, instead suggesting that amongst green consumers, the Degrowth condition persuaded consumption more than the Green Growth or Control conditions. The overall effect size for the interaction is between small and medium (f = .17).

Note: This chart displays the predicted values of purchase intentions from the moderation analysis involving condition as the independent variable, purchase intentions as the dependent variable, and green consumption scale as the moderator. The chart plots these predicted values over a range of -2 to +2 standard deviations



from the mean of green consumption values, which has been standardized. Each line represents a corresponding condition, with the 95% confidence interval of each predicted value.

For the moderation analysis for WDT, shown in **Appendix H Table 36** and **Table 12**, there were no significant interaction effects across the three conditions.

3.7.4.Robustness Checks

We ran robustness checks to probe the main effects models using Kruskal-Wallis tests and non-parametric kernel regressions for our main effects models, included in **Appendix D**. The results for purchase intentions and willingness to donate time appeared robust. However, the marginally significant difference between Green Growth and Degrowth for intention to consume less dropped below the 10% level using non-parametric methods, suggesting this effect lacked robustness.

3.8. Discussion

The purpose of Study 2 was to replicate the results found in Study 1, using a strict control. Evidently, the Neutral Green ad in Study 1, which meant to serve as a 'control' given its foundation in an existing brand strategy, was in fact not a control, as it performed very differently to our No Ad control condition in Study 2. In Study 2, we found that purchase intentions under the Degrowth and Green Growth conditions were significantly higher compared to the No Ad condition, and statistically indistinguishably from each other. Predictably, showing any ad provides more context about the firm, likely improving legitimacy and value. Ads are persuasive messages intended to convince consumers toward a purchase (e.g., Higgs, 2014), so our ads worked from a traditional marketing perspective. These results are consistent with findings from Reich & Armstrong Soule (2016), that brand-oriented green demarketing ads performed statistically similarly and directionally better than standard environmental ads. We additionally included a purchase intentions outcome to build upon their attitude measures. From a marketing perspective, our results could be interpreted as extending prior literature in favour of using messaging promoting consumption reduction in brand-oriented communications.

Across Studies 1 and 2, we saw little compelling evidence of a significant difference between Degrowth and Green Growth ads. While intentions to consume less were marginally significantly higher for Degrowth than Green Growth in Study 2 (but not Study 1), these results were not robust, suggesting our Degrowth ad did not stimulate interest in sufficiency. The interaction between condition and green consumption values was significant for purchase intentions. However, the sign of this interaction switched between the two studies. Among green consumers, the Degrowth ad was significantly more persuasive for purchase intentions than the Green Growth ad in Study 2. These opposing results exemplify how intended behaviour suggested by reduced consumption ads, to purchase or not to purchase, is unclear even among environmentally-concerned individuals (Hwang et al., 2016).

These results reflect the inherent contradiction in profit-oriented firms promoting sustainable consumption, i.e., in encouraging people to buy more sustainable goods, when they ultimately need to buy fewer goods overall (Carrington et al., 2021; Soper, 2020). It begs the question – is it socially desirable for SPM ads to persuade purchase intentions the same amount or even *more* than ads promoting excessive consumption, even for sustainable

products? It is especially worrying if an increase in purchase intentions for the brand is not paired with greater intentions for sufficiency. Taken to its extreme, one might imagine a rebound effect of SPM incentivizing even more consumption (e.g., Sorrell et al., 2020). Whether through moral licensing (e.g., Dütschke et al., 2018) or a genuine desire to support a brand consistent with their values, buying more goods from a brand who is publicising "reduced consumption," is unlikely to translate to substantial reductions in overall consumption under the current economic system.

The results further suggest that the Green Growth and Degrowth conditions performed more similarly to each other than to either Control condition across the two studies. It is possible that translating green growth and degrowth as macro-level agendas into consumer-relevant messages flattened the distinction between the two, or at least our messages did not adequately convey their unique positions. Further, people may believe in reducing consumption at the societal level to mitigate environmental degradation, but this attitude may not translate to their personal consumption practices (Iyer & Muncy, 2016). However, these two paradigms encompass vastly different visions of the world, solutions for the climate crisis, and implications for how people organise their lives (Sandberg et al., 2019). Perhaps we needed to make this distinction stronger in our ads.

Alternatively, perhaps despite these nuances, the marketing context may have overridden the philosophical differences between the two concepts. Fiske's (1992) theory on social relations is instructive on the clear directive to purchase associated with SPM. Fiske posited the existence of four relational models people use to generate social interactions: communal sharing, authority ranking, equality matching, and market pricing. In the market pricing (MP) model, people attend to rates and proportionality, using a standard of value (e.g., price) for weighing costs and benefits. Brand communications invoke this model, presenting products in terms of marketing considerations over other social values or costs (Fiske, 1992). It cannot be excluded that we inadvertently imposed the MP model in Studies 1 and 2 by using marketing messages, within a Western society dominated by the market pricing model (Fiske, 1992). This coincidence might have obstructed participants' ability to view the brand as an effective messenger promoting a societal goal (Rees et al., 2022).

Degrowth appears fundamentally at odds with MP, instead promoting a commons and community-oriented way of life, more consistent with the communal sharing (CS) model. The inherently CS relational elements of degrowth messaging were probably harder to decipher

when communicated via a marketing technique which explicitly invoked MP in respondents' minds. Any form of marketing from a brand, even when endorsing reduced consumption, is still marketing toward a purchase (Frick et al., 2021; Stoeckl & Luedicke, 2015). It appears likely that our Degrowth treatment, representing a form of shallow as opposed to deep framing (Corner & Randall, 2011), did not activate the proper frames or schema associated with the intended message (Lakoff, 2004, 2008). Since marketing has become ubiquitous in daily life (e.g., Higgs, 2014), even a marketing message endorsing reduced consumption conveys a well-engrained schema of consumption in the brain, revealed through purchase intentions. As such, we might speculate that Degrowth looked more like Green Growth under an MP relation, essentially reduced to 'green marketing'.

Our results might suggest that using any degrowth framing in a marketing message might be perceived more like a consumption-promoting message than an urge to consume less. In reality, capitalist consumers have little agency to change consumption, despite the promotion of consumer sovereignty and responsibility (Carrington et al., 2016). Indeed, while Frick et al. (2021) found that SPM lead to higher uptake of a sufficiency behaviour, their results only provide evidence toward short-term effects in an immediate context. Our results supporting the success of SPM via degrowth messaging either did not meet the significance criteria or did not replicate across studies. Further, this messaging did not consistently or robustly influence the outcomes more relevant to societal transformation, i.e., sufficiency intentions or support for degrowth. Based on ours and prior studies, it does not appear that SPM can effectively make degrowth values relevant to individuals, nor promote widespread consumption reduction.

4. Study 3

Despite the apparent conflict between degrowth messaging and marketing techniques emerging from the first two studies, expressing a degrowth frame may still be useful for communicating to individuals outside the market. Study 3 examined the case of a personal carbon footprint app, whilst also incorporating civic-oriented outcome variables, including information seeking for sustainable lifestyle choices and policy acceptance. We did so to amplify the role of individuals as citizens, not just consumers, in climate mitigation (Fischer

et al., 2021; Nielsen et al., 2024). Incorporating both private and public behaviours can also advance a multi-level approach to social change (Gurtner & Moser, 2024).

People make daily decisions outside of what to purchase that have direct implications on society's material impact (Harbo et al., 2017). These involve both individual-level behaviours (e.g., shower length, transportation mode, etc.) as well as collective behaviours (e.g., join an environmental group, attend a march, support a policy, etc.). In addition to lifestyle choices and levels of material impact that differ under degrowth and green growth, the policy agendas needed to support such transitions also diverge, especially when considering the extent to which they uphold current systems. Living degrowth includes civic engagement such as rethinking society, acting political, and creating alternatives, which all point toward transformational policy ideas (Brossmann & Islar, 2020). Meanwhile, living green growth implies maintaining many of the behaviours and values already exhibited in affluent societies.

Visions of degrowth constitute a concrete utopia (Kallis & March, 2015), meaning that individual propensity to utopian thinking and action might influence the extent to which an individual is open to the degrowth agenda (Basso & Krpan, 2022). Degrowth has also been criticized amongst the political left for its politics of 'less' that is considered out of touch with workers and lower status groups (Huber, 2022). Generally, degrowth research is missing on the role of class (Schmelzer et al., 2022). As such, we included measures of utopian impulse and perceived status as covariates in Study 3.

As the shallow framing used in our marketing stimuli appeared insufficient in enabling consumers to differentiate between green growth and degrowth, we pursued a deep framing strategy in Study 3 (Abson et al., 2017; Corner & Randall, 2011). As has been outlined already, marketing is unlikely to achieve deep framing, as it is bounded by the main objective of product sales and the dominant logics of the current economic system (Carrington et al., 2021; Corner & Randall, 2011; Muncy & Eastman, 1998). To pursue deep framing, we instead focused on the substance of the two sustainability agendas, detailing their objectives, communicating underlying values, and explicitly addressing the growth-versus-environment debate. We also incorporated deeper outcomes, including policy support and worldviews related to economic growth.

Ultimately, we conducted Study 3 to gauge if the distinction between green growth and degrowth was more evident when participants were not being marketed a product, but

rather persuaded toward civic responsibilities. We sought to explore if citizenship-orientation may be a means of connecting individual-level actions to system-level agendas (e.g., García-de-Frutos et al., 2018), making degrowth more relevant to everyday practices. We also endeavoured to understand whether the persuasive communication techniques employed in sufficiency promoting marketing could i) be utilised by a non-profit actor (instead of a for-profit brand) and ii) would influence civic behaviours as opposed to purchasing behaviours. Our experiment utilized a 2 (Degrowth v. Green Growth) x 2 (Citizen v. Consumer) between-subjects design.

4.1. Hypotheses

Given the non-commercial context, we chose citizen-oriented outcome variables. Engagement with a carbon footprint calculator was used as a behavioural proxy for information seeking toward a sufficiency-oriented lifestyle, as they have been used previously to measure consequential pro-environmental behaviour of individuals (Berger & Wyss, 2021). We also asked participants to rate their acceptance of various environmental policies, encompassing proposals from both green growth and degrowth. This approach allowed us to test the effect on climate policy in general and each agenda's policies specifically. The engagement with carbon footprint calculation and policy acceptance (overall, green growth, and degrowth) were pre-registered as our main pro-environmental outcomes.[23]

While there was a clear theoretical foundation for aligning citizenship with greater uptake of pro-environmental behaviours (e.g., Harbo et al., 2017), the direction of effects for green growth and degrowth framing were less obvious from the extant literature. For example, degrowth framing may make people more concerned about reducing consumption, but green growth may be more persuasive about taking personal action and responsibility given its appeal to neoliberal values (Sandberg et al., 2019; Watson, 2014). Degrowth's focus on the system may even disincentivize personal action by uncovering structural constraints to any contributions they may make (Carrington et al., 2021; Verfuerth et al., 2019). While the effect of Green Growth and Degrowth conditions was unclear based on prior literature, we reasoned that it was more likely for any difference to be uncovered outside of the

[23] Full pre-registration is located here: https://osf.io/mced2

commercial marketing context, especially for consumption-oriented outcomes. Accordingly, we pre-registered the following:

H1. Pro-environmental outcomes will differ between the Green Growth and Degrowth framing treatments.
H2. Pro-environmental outcomes will be higher under the citizen framing compared to the consumer framing.

Given the factorial design, we also explored the interaction between our two experimental manipulations. Based on past literature and our prior experiments, the degrowth narrative appears to be confusing in a market-oriented context (e.g., Lakoff, 2010). The lack of congruence between message and setting may make it difficult for people to understand the real purpose of the message and the implied behavioural response. However, there appears a natural congruence between degrowth framing and citizenship orientation. Citizenship and democracy are key components of the degrowth agenda (Buch-Hansen, 2018; Deriu, 2012; Fournier, 2008), involving more citizen-oriented behaviours (e.g., engaging in cooperatives, care work) than market-based behaviours (e.g., buying green products). Green growth and the consumer mindset also appear congruent, focusing on market-based solutions and individual purchasing as promoted under neoliberalism (Andreas & Jabakhanji, 2023; Watson, 2014). Pepermans & Rousseau (2021) explicitly used consumer versus citizen framing in a stated preference experiment, finding that emphasizing the role of consumers in a citizen-oriented policy setting reduced willingness to pay for wind farm policy attributes. Their work further implies the importance of message congruence in promoting pro-environmental behaviour. Accordingly, we hypothesized the following:

H3. There will be an interaction effect between mindset framing (Citizen v. Consumer) and environmental framing (Green Growth v. Degrowth) for all outcomes, i.e., congruence between the frames (Degrowth + Citizen, Green Growth + Consumer) will result in higher levels of engagement as compared to the noncongruent conditions (Degrowth + Consumer, Green Growth + Citizen).

We also pre-registered an exploratory analysis using position choice from Lehmann et al. (2022) and Drews et al. (2019). This measure provides respondents with four statements

about the growth-versus-environment debate, which implicitly represent positions ranging from 'growth at all costs' to 'degrowth.' We used this measure to test whether our framing conditions influenced participants' views and values related to growth and environment protection. We explored the following:

EH4a. Participant's position choice (i.e., implicit preference for growth at all costs, green growth, a-growth, or degrowth) will significantly differ, such that the Degrowth framing will be associated with less growth-oriented positions (degrowth and a-growth) than the Green Growth framing.

EH4b. Participant's position choice (i.e., implicit preference for growth at all costs, green growth, a-growth, or degrowth) will significantly differ, such that Citizenship framing will be associated with less growth-oriented positions (e.g., degrowth and a-growth) than the Consumer framing.

4.2. Method

4.2.1.Sample

We again used Prolific Academic to recruit our sample, paying participants a fair wage for their time. Participants were required to meet most of the same inclusion criteria as Studies 1 and 2, though Instagram usage was dropped from the inclusion criteria, as it was no longer relevant. We piloted the survey amongst a small, convenience-sample (N = 19), and then shortened the survey to reduce respondent burden and cost. We again released the main study in two waves by gender for consistency with prior studies.

The planned sample from Prolific was 1,000 participants (500 men and 500 women). Power analysis using G*Power for the main effects models resulted in a minimum sample of 787. This figure was obtained by selecting Test family = "F tests" and Statistical test = "ANOVA: Fixed effects, omnibus, one-way," a small effect size (f = .1), alpha = 0.05, Power = 0.8, numerator df = 1, and Number of groups = 4. Power analysis for the moderations resulted in a minimum sample size of 395. This was obtained by selecting Test family = "F tests" and Statistical test "Linear multiple regression: Fixed model, R2 increase," a small effect size, alpha = 0.05, Power = 0.8, tested predictors= 1, and total predictors = 12. Finally, for our binary dependent variable (footprint calculator), power analysis for a logistic regression resulted in a minimum sample size of 873. This was obtained by selecting Test

family = “z tests” and Statistical test = “Logistic regression,” tails = Two, Odds ratio = 0.149, Pr(Y = 1|X=1) H0 = 0.45, alpha = 0.05, Power = 0.8, R^2 other X = 0.1, X distribution = “Binomial” and X parm p = 0.5.

The final sample consisted of N = 933 participants, recruited in March 2022. N = 1,122 participants accessed the survey, but N = 100 did not consent to take the survey. N = 43 did not complete the survey, whilst an additional N = 15 failed to pass the seriousness check. N = 52 participants failed the attention check. Of those 933, only N = 889 reported their income and N = 845 reported their political ideology, making up a total of N = 811[24] participants for covariate analyses. This made the logistic analyses with covariates slightly under the required power level. We included additional versions of covariate analyses with multiple imputation of these variables[25] (see **Appendix Q**).

In terms of demographic balance, the four conditions did not differ significantly with respect to race, x^2 (12) = 9.74, p = .639, age, F(3) = 0.38, p = .767, gender, x^2 (6) = 2.88, p = .823, income, F(3) = 0.34, p = .798, education, x^2 (12) = 14.18, p = .289. The characteristics of the final sample are described in **Table 13.**

[24] This also accounts for two individuals who reported ages of 3 and 8, which we assume to be errors, given that you must be 18 to have a Prolific account. While we kept the participants in the sample, we set the ages to missing.

[25] N = 2 observations are also missing for position choice in Study 3, but we did not use multiple imputation on this outcome measure.

Table 13 - Summary Statistics - Study 3

Baseline Characteristic	GG + Consumer N = 238				GG + Citizen N = 231				DG + Consumer N = 227				DG + Citizen N = 237				Full Sample N = 933			
	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%
Age	32.61	4.67	-	-	32.69	4.43	-	-	32.91	4.63	-	-	33.01	4.91	-	-	32.81	4.66	-	-
Gender	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Female	-	-	119	50 %	-	-	122	53 %	-	-	118	52 %	-	-	116	49 %	-	-	475	51 %
Male	-	-	119	50 %	-	-	109	47 %	-	-	108	48 %	-	-	120	51 %	-	-	456	49 %
Prefer not say	-	-	0	0 %	-	-	0	0 %	-	-	1	0.4%	-	-	1	0.4%	-	-	2	0.2%
Education	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GCSE	-	-	22	9 %	-	-	18	8 %	-	-	28	12 %	-	-	25	11 %	-	-	93	10 %
High school diploma	-	-	39	16 %	-	-	52	23 %	-	-	44	19 %	-	-	48	20 %	-	-	183	20 %
Some undergraduate	-	-	17	7 %	-	-	24	10 %	-	-	17	7%	-	-	25	11 %	-	-	83	9%
Bachelor's	-	-	105	44 %	-	-	93	40 %	-	-	78	34 %	-	-	83	35 %	-	-	359	38 %
Post-graduate	-	-	55	23 %	-	-	44	19 %	-	-	60	26 %	-	-	56	24 %	-	-	215	23 %
Income (£)	29,604	16,494	-	-	30,277	15,982	-	-	28,940	15,626	-	-	29,004	15,648	-	-	29,456	15,927	-	-
Race & Ethnicity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asian	-	-	7	3 %	-	-	15	6 %	-	-	14	6%	-	-	13	5%	-	-	49	5%
Black	-	-	10	4 %	-	-	7	3 %	-	-	8	4%	-	-	13	5%	-	-	38	4%
White	-	-	216	91 %	-	-	202	87 %	-	-	194	85 %	-	-	201	85 %	-	-	813	87 %
Mixed	-	-	4	2 %	-	-	5	2 %	-	-	8	4%	-	-	6	3%	-	-	23	2%
Not otherwise listed	-	-	1	0 %	-	-	2	1 %	-	-	3	1%	-	-	4	2%	-	-	10	1%

Green Scale	5.05	0.96	-	-	4.94	0.98	-	4.88	1.08	-	-	4.87	1.07	-	-	4.93	1.02	-	-
Political Identity	3.58	2.02	-	-	3.83	1.95	-	3.97	2.03	-	-	4.00	2.13	-	-	3.84	2.04	-	-
Utopian Impulse	4.98	0.88	-	-	4.85	0.85	-	4.82	0.96	-	-	4.85	0.90	-	-	4.87	0.90	-	-
Message Credibility	5.30	1.04	-	-	5.33	0.92	-	5.33	0.99	-	-	5.39	1.02	-	-	5.34	0.99	-	-
Perceived Status	5.66	1.61	-	-	5.69	1.63	-	5.64	1.54	-	-	5.62	1.60	-	-	5.65	1.59	-	-

***Note**: Mean and standard deviation (SD) are listed for all continuous variables, while count (n) and percent (%) are listed for categorical variables.*

4.2.2.Material

The study materials comprise four conditions of persuasive communications, each consisting of three pages of descriptive text. Given that this was not a branding context, we opted for a plain text description as opposed to creatively designed stimuli, as in Studies 1 and 2. The stimuli followed a problem, cause, solution format advocated by other climate communicators (Fløttum & Gjerstad, 2017; Whitmarsh & Corner, 2017). See **Appendix K** for the full experimental stimuli. The first page introduced the climate crisis (i.e., the problem) and suggested the main cause of the problem, framed either for green growth ("people") or degrowth ("the system"). The second page offered a general overview of solutions to the climate crisis, again framed either for green growth ("decoupling") or degrowth ("downscaling"). In the Green Growth condition, decoupling was defined in a pop-up box as "the idea that increasing production (e.g., Gross Domestic Product) would no longer be associated with a rise in environmental pollution or resource use." In the Degrowth condition, downscaling was defined as "reducing the scale of production and consumption, likely lowering Gross Domestic Product." These first two pages did not vary by mindset framing. The third page varied by both environmental and mindset framing, such that there were four total versions. This last page suggested how individuals, either as consumers or citizens, could help by understanding and reducing their environmental impact, and offered the "Green Citizen App" v. "Green Consumer App" as a solution. In addition to the goal of reducing their impact, it also included further framing on broader societal goals inspired by degrowth (e.g., "working toward a new economic system") or green growth (e.g., "support economic growth").

4.2.3.Procedure

After entering and consenting to the survey, participants were randomly allocated into one of the four conditions. After reading the stimuli, they were prompted with manipulation checks, followed by outcome measures, personal characteristics, and demographics. The average duration was just over 9 minutes.

4.2.4.Measures

See **Appendix L** for details on all new measures. The first dependent variable measure was engagement with the carbon footprint calculator. Participants were asked "Would you like to trial the app by calculating your carbon footprint?" with a binary yes/no response option. Those who consented proceeded to the 11 carbon footprint questions, which used a proprietary methodology from Finnish carbon impact software company Sequest, based primarily on financial spending in a variety of domains (e.g., transportation, food, home energy, consumer goods). Though participants received their real carbon footprints based on this methodology, we merely assessed whether they received any footprint (i.e., they completed the footprint calculator). This resulted in a binary dependent variable for completing or not completing the calculator. Participants who opted out were asked to share reasons for doing so. There is some debate over the merits of carbon footprints, citing their creation by the fossil fuel industry to individualise mitigation efforts (Kaufman, 2020). Nevertheless, they offer a useful metric for determining inequities in emissions by group, such as socio-economic status or country-level differences (Chancel, 2022). Carbon footprints are therefore relevant for a degrowth agenda, which is explicitly concerned with reducing inequalities along these dimensions.

We also constructed a set of environmental policies, incorporating 5 popular policies often associated with each of the degrowth (e.g., "Reduction in the work week to a 4-day maximum") and green growth (e.g., "Pricing CO2 emissions through taxes and carbon trading") agendas. Including these policies served two functions, i) to prioritize civic-oriented behaviours over consumer-oriented behaviours in psychological research (e.g., Nielsen et al., 2024), which fit with the non-market setting, and ii) to fill the gap in the literature on measuring preferences and attitudes toward degrowth policies from the general public, which at the time of designing this study in 2021, no prior study had explicitly attempted to do.[26] The full set of environmental policies are included in **Table 14**. After compiling a range of social,

[26] Thorman et al. (2020) measured policy acceptance of low-consumption governance approaches, which was closely related, but without reference to degrowth.

economic, and technologically oriented policies from both agendas, these specific policies were selected to include a mix of consumer-oriented and organization or firm-directed policies, as well as a balance of those targeting social issues (at least for degrowth) with more ecological and economically driven proposals.

Responses ranged on a 7-point Likert scale, from “Not at all acceptable” to “Very acceptable” (e.g., Tobler et al., 2012). Scores were averaged to obtain an overall policy acceptance measure with all 10 policies, as well as degrowth and green growth subscales. While the Cronbach’s alpha for green growth policies was quite high (a = 0.81), there was less internal consistency for degrowth policies (a = 0.66).

Table 14 - Environmental Policies Included for Policy Acceptance Measure

Degrowth Policies M = 5.08 SD = 1.03 a = 0.66	1. Reduction in the work week to a 4-day maximum 2. An income tax of 100% above a certain threshold of excessive earnings 3. Ban on new fossil fuel plants and rapid phase out of existing fossil fuel uses 4. Restricting advertising of emissions related products, e.g., fossil fuels, flights, etc. 5. Universal basic income (UBI), e.g., all citizens receive unconditional earnings outside of employment
Green Growth Policies M = 5.74 SD = 0.86 a = 0.81	6. Pricing CO2 emissions through taxes and carbon trading 7. Mandatory eco-labelling, and phasing out of less efficient technologies 8. Subsidies to firms toward research and innovation of more efficient technologies 9. Subsidies for green consumer technologies (e.g., electric cars) 10. Rapid expansion of renewable energy capacities

Note: All participants received all 10 policies, in a randomized order. These policies were adapted from the literature on degrowth related policies (Ahvenharju, 2020; Buch-Hansen & Koch, 2019; Cosme et al., 2017; Hickel, 2020; Kallis et al., 2013; Stuart et al., 2020; van den Bergh & Kallis, 2012; van Parijs & Vanderborght, 2017; Videira et al., 2014) as well as literature on green growth related policies (Gunderson & Yun, 2017; Serres et al., 2010; Vazquez-Brust & Plaza-Úbeda, 2021). Mean (M), standard deviation (SD) and Cronbach’s alpha (a) are included for each sub-group of policies. When combining all 10, M = 5.4, SD = 0.85, and a = 0.82.

Lastly, to measure position choice (Lehmann et al., 2022), participants were asked which of four positions on the relation between economic growth and the

environment in rich industrialized countries was closest to their own opinion. The four options implicitly represented growth at all costs, green growth, a-growth (as outlined in the **Literature Review, Chapter 2**), and degrowth. See **Appendix L** for full statements. Lehmann et al. (2022) used this measure for merely descriptive purposes, to gauge the views of a group of climate scientists on the debate. Given the nascent field of experimental psychological work related to perceptions of degrowth as outlined in **the Literature Review**, we sought to build on Lehmann et al. (2022) by testing if this measure could be influenced by our Degrowth versus Green Growth treatments.

As covariates, we included perceived status measured via the MacArthur scale of subjective social status (Adler & Stewart, 2007) to control for potential differences in degrowth perceptions by class, message credibility adapted from Appelman and Sundar (2016) and Jäger and Weber (2020), utopian impulse (Krpan & Basso, 2021), which has been shown to predict support for degrowth, and the same measures of green consumption values, political ideology, and demographics as used in Studies 1 and 2.

We included two manipulation checks for each of the mindset and environmental framing variables, related to the name of the app ("Green Consumer" v. "Green Citizen") and the main cause of the problem in the text ("people's behaviour" v. "the system"), respectively. We utilized the attention and seriousness checks from our prior studies.

4.3. Results

4.3.1.Manipulation Check and Reliability of Scales

Table 15 shows the manipulation check pass rates for each condition. While the two Green Growth conditions exhibited high rates of recognition, the Degrowth and mindset framing manipulations were less commonly recognised.

Table 15 - Manipulation Check Results

Condition	Environmental Framing	Mindset Framing
C1 – GG + consumer	97%	75%
C2 – GG + citizen	93%	86%
C3 – DG + consumer	75%	69%
C4 – DG + citizen	74%	86%

Note: This table displays the percent of participants within each condition who passed the manipulation checks for environmental framing (second column) and mindset framing (third column).

The covariate scales of green values (α = 0.89), utopian impulse (α = .91), and message credibility (α = 0.90) were highly reliable in our sample. The overall policy acceptance (α = .82) and green growth policies (α = 0.81) also exhibited good reliability, while the degrowth policies (α = 0.66) exhibited fair reliability.

4.3.2.Main Effects Results

Table 16 provides a summary of the results from Study 3, broken down by hypothesis. All covariate analyses are robust to multiple imputation for missing values, included in **Appendix Q.**

Table 16 - Summary of Study 3 Results

Hypothesis	Variables	Comparison between Conditions	Significance level (p-value)	Support for Hypothesis?
H1. Main Effect	DV: Carbon footprint engagement	GG > DG	None	None
	DV: Overall policy acceptance	GG > DG	Main effect of environmental framing at the 10% level (p = .074)	Yes Higher overall policy acceptance under GG than DG
	DV: Green growth policy acceptance	GG > DG	None	None
	DV: Degrowth policy acceptance	GG > DG	None	None
H2. Main Effect	DV: Carbon footprint engagement	Citizen > Consumer	None	None
	DV: Overall policy acceptance	Consumer > Citizen		
	DV: Green growth policy acceptance	Consumer > Citizen		
	DV: Degrowth policy acceptance	Consumer > Citizen		
H3. Moderation Effect	DV: Carbon footprint engagement M: environmental x mindset framing	Consumer: GG > DG Citizen: GG ~ = DG	Main effect of environmental framing at the 10% level (p = .092)	None
	DV: Overall policy acceptance M: environmental x mindset framing	Consumer: GG > DG Citizen: GG > DG	Main effect of environmental framing at the 5% level (p = .044)	Yes (H1) Higher overall policy acceptance under GG than DG
	DV: Green growth policy acceptance M: environmental x mindset framing	Consumer: GG > DG Citizen: GG > DG	None	None

Hypothesis	Variables	Comparison between Conditions	Significance level (p-value)	Support for Hypothesis?
	DV: Degrowth policy acceptance M: environmental x mindset framing	Consumer: GG > DG Citizen: DG > GG	Main effect of environmental framing at the 5% level (p = .017); mindset framing at the 10% level (p = .087) Interaction effect at the 10% level (p = .061) between environmental and mindset framing	Yes There is some evidence of a congruence effect: consumer framing is associated with higher acceptance under GG, whilst citizen framing is associated with (slightly) higher acceptance under DG.
EH4a. Main Effect	DV: Position choice	DG > GG	Main effect of environmental framing at the 1% level (p < .001)	Yes More growth-critical position choices under DG than GG, which remains when including covariates.
EH4b. Main Effect	DV: Position choice	Citizen > Consumer	None	None

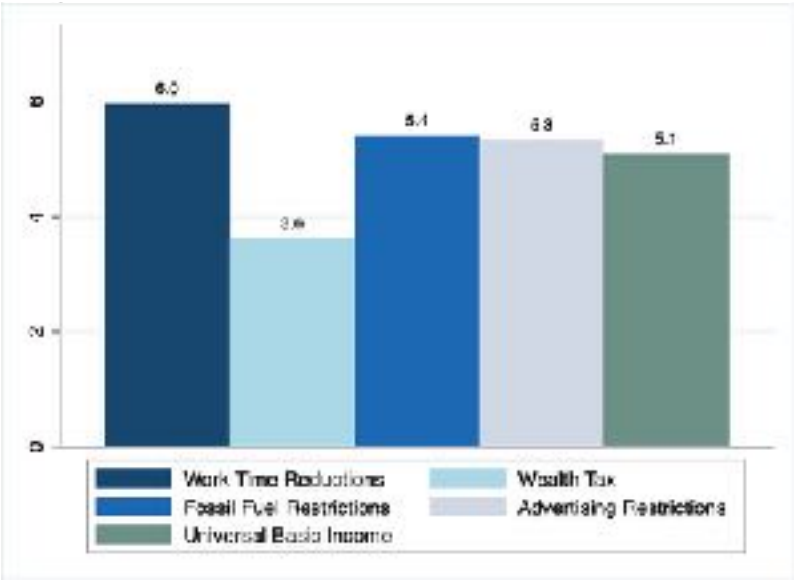
Note: DV stands for dependent variable, and M stands for moderating or interacting variable. In all hypotheses, the independent variables are the two treatment factors, GG stands for Green Growth condition, and DG for Degrowth condition. Citizen and Consumer stand for the two mindset framing conditions. EH indicates hypotheses that were pre-registered as exploratory. Analyses reported in this table do not include covariates.

4.3.2.1.Main Effects - Linear Regressions

Acceptance of the green growth and degrowth policies ranged from M = 3.6 (wealth tax) to M = 6.2 (renewable energy expansion). Work time reductions and expanding renewable energy were the most popular degrowth and green growth policies, respectively. These descriptive results suggest that there is indeed support for at least some degrowth policies, addressing thesis RQ3a.

Note: The mean of each policy acceptance, ranging from 1 (Not acceptable at all) to 7 (Very acceptable) is displayed above the bar.

Figure 5 - Mean Acceptance of Each Degrowth Policy



Note: The mean of each policy acceptance, ranging from 1 (Not acceptable at all) to 7 (Very acceptable) is displayed above the bar.

The results of linear regressions for the policy outcome variables are displayed in **Table 17**. Degrowth framing was associated with a marginally lower average acceptance for the overall environmental policies measure than the Green Growth condition, significant at the 10% level (β = -.10, p = .074). The effect size is small (f = .06), and significance disappeared when including covariates. There were no significant differences for either of the policy subscales. The mindset framing variable was never significant. These regression results lend weak support to H1; meanwhile, no evidence supported H2.

Table 17 – Main Effects Results (OLS) – Study 3

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Overall Policy Acceptance	Overall Policy Acceptance	Degrowth Policy Acceptance	Degrowth Policy Acceptance	Green Growth Policy Acceptance	Green Growth Policy Acceptance
Degrowth	-0.10*	-0.04	-0.11	-0.03	-0.09	-0.04
	(0.06)	(0.05)	(0.07)	(0.06)	(0.06)	(0.05)
Citizen	-0.04	-0.01	-0.04	0.02	-0.05	-0.04
	(0.06)	(0.05)	(0.07)	(0.06)	(0.06)	(0.05)
Message Credibility		0.15***		0.12***		0.18***
		(0.03)		(0.04)		(0.03)
Utopian Impulse		0.28***		0.30***		0.26***
		(0.04)		(0.05)		(0.05)
Perceived Status		-0.00		-0.01		-0.00
		(0.01)		(0.02)		(0.02)
Green Scale		0.16***		0.16***		0.15***
		(0.04)		(0.04)		(0.04)
Political Identity		-0.10***		-0.14***		-0.06***
		(0.01)		(0.02)		(0.01)
Age		0.00		-0.00		0.00
		(0.00)		(0.01)		(0.01)
Income		-0.00*		-0.01***		0.00
		(0.00)		(0.00)		(0.00)
Education						
High school diploma		0.08		-0.01		0.18*
		(0.10)		(0.13)		(0.10)
Some undergraduate		0.12		-0.02		0.27**
		(0.12)		(0.16)		(0.12)

VARIABLES	(1) Overall Policy Acceptance	(2) Overall Policy Acceptance	(3) Degrowth Policy Acceptance	(4) Degrowth Policy Acceptance	(5) Green Growth Policy Acceptance	(6) Green Growth Policy Acceptance
Bachelor's degree		0.23**		0.13		0.33***
		(0.09)		(0.12)		(0.09)
Post-graduate degree		0.31***		0.20		0.43***
		(0.10)		(0.13)		(0.09)
Gender						
Male		0.13***		0.15**		0.12**
		(0.04)		(0.06)		(0.05)
Prefer not to say		0.64***		0.93***		0.35***
		(0.08)		(0.10)		(0.08)
Constant	5.48***	2.74***	5.16***	2.84***	5.81***	2.64***
	(0.05)	(0.31)	(0.06)	(0.39)	(0.05)	(0.33)
Observations	933	811	933	811	933	811
R-squared	0.00	0.43	0.00	0.35	0.00	0.38

Note: Coefficients are displayed, with robust standard errors below in parentheses. Columns (1), (3), and (5) display regression results without covariates, columns (2), (4) and (6) display the results including covariates. The dependent variable is listed at the top of the column. The Green Growth condition is the omitted reference category for environmental framing, while the Consumer condition is the omitted category for mindset framing. For education, GCSE is the omitted category. For gender, Female is the omitted category. Income is in 1,000s. *** p<0.01, ** p<0.05, * p<0.1.

We ran the same numeric and visual tests as in Studies 1 and 2 to assess normality of the residuals for our linear policy outcome variables. See **Appendix M** for the P-P plots. Overall policy preferences, W(933) = 0.969, p <.001, degrowth policy preferences, W(933) = 0.979, p <.001, and green growth policies preferences, W(933) = 0.942, p <.001, all failed the Shapiro Wilk test. However, the overall and degrowth policy preferences variables could reasonably be treated as continuous based on their P-P plots. While the plot for the green growth policies is less conclusive, we have

treated all three as continuous given the relatively large sample size, and used robust standard errors. However, to check for robustness of these specifications, non-parametric analyses are also included in **Appendix P**.

4.3.2.2.Individual Differences in Policy Preference

Column (4) in **Table 17** further addresses whether the public supports degrowth policies (RQ3a), and how this support differs across demographics and values (RQ3c). Controlling for the experimental treatment variables, demographic factors of income (β = -.01, p < .001) and gender (β = 0.15, p = .013) appeared the most significant in predicting degrowth policy support. That is, having lower income and identifying as a man was associated with increased support for degrowth policies. As only one respondent preferred not to disclose their gender, this significance is not interpretable. However, the role of gender may be more nuanced, as the mean support for women (M = 5.09, SD = 0.92), was slightly higher than men (M = 5.07, SD = 1.41) and the medians were equal (Median = 5.2). See **Appendix N** for a histogram comparing the two distributions, which suggests the difference may be derived from a greater dispersion and left skew amongst men. In terms of values, political ideology, green consumption values, and utopian impulse also significantly predicted degrowth policy support. Left leaning (i.e., closer to 0) political ideology (β = -0.14, p < .001) was associated with greater support for degrowth. Additionally, having a greater utopian impulse (β = 0.30, p < .001) and stronger green consumption values (β = 0.16, p < .001) were also associated with greater support for degrowth policies. Political identity (f = .31) and utopian impulse (f = .22) exhibited medium effect sizes, green consumption values (f = .14) and income (f = .13) exhibited small-medium effects, and the rest were considered quite small (i.e., f < .10).

We also ran exploratory OLS regressions for each policy individually, shown in **Table 18**. It appears higher income was only significantly associated with reduced support for wealth taxes (β = -0.02, p < .001, f = .19) and UBI (β = -0.01, p = .001, f= .12), both at the 1% level. Being a man was only positively associated with significantly higher support for wealth taxes (β = 0.49, p < .001, f = .13) at the 1%

level and marginally significant for UBI (β = .19, p = .078, f = .07) at the 10% level. Being older was also associated with reduced support for work time reductions (β = -0.03, p = .001, f = .11), and marginally higher support for wealth taxes (β = 0.03, p =.054, f = .07). Compared to those who completed GCSEs, having a postgraduate degree was associated with significantly greater support for fossil fuel restrictions (β = 0.39, p =.029, f = .13) at the 5% level. Green consumption values positively predicted wealth taxes (β = 0.23, p = .012, f = .09), fossil fuel restrictions (β = 0.31, p < .001, f = .18), and regulating advertising (β = 0.31, p < .001, f = .17), all at the 1% level, but was not significant for work time reductions or UBI. Meanwhile, having a higher utopian impulse and being further to the left politically consistently predicted support for all five policies at the 1% level. Effect sizes for utopian impulse ranged from small (ad restrictions, f = .09) to medium (UBI, f = .21). Effect sizes for political ideology also ranged from small (ad restrictions, f = .11) to medium (UBI, f = .26). Overall, there appears support for at least some degrowth policies, though demographic and especially value-based factors appear to influence acceptance. As this investigation was exploratory, a Bonferroni adjusted significance criteria of .017 was applied (i.e., 0.05 / 3 exploratory analyses), suggesting that certain results (e.g., coefficient for post-graduate education on fossil fuels restrictions) did not meet this stricter threshold, though most did.

Table 18 – Degrowth Policy Preferences (OLS) – by Policy – Study 3

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Work Time Reductions	Wealth Tax	Fossil Fuel Restrictions	Regulate Advertising	Universal Basic Income
Degrowth	-0.06	0.10	-0.02	0.01	-0.20*
	(0.09)	(0.13)	(0.09)	(0.09)	(0.11)
Citizen	0.05	0.03	0.00	-0.04	0.07
	(0.09)	(0.13)	(0.09)	(0.09)	(0.11)
Message Credibility	0.23***	-0.06	0.12**	0.22***	0.07
	(0.06)	(0.08)	(0.05)	(0.06)	(0.06)
Utopian Impulse	0.24***	0.36***	0.20***	0.19**	0.52***
	(0.08)	(0.11)	(0.08)	(0.08)	(0.10)
Perceived Status	0.02	0.01	-0.03	-0.02	-0.01
	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)
Green Scale	0.03	0.23**	0.31***	0.31***	-0.05
	(0.07)	(0.09)	(0.06)	(0.07)	(0.08)
Political Identity	-0.08***	-0.19***	-0.14***	-0.07***	-0.21***
	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)
Age	-0.03***	0.03*	-0.00	-0.00	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Income	0.00	-0.02***	-0.00	-0.00	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Education					
High school diploma	0.30	-0.15	-0.02	0.04	-0.24
	(0.19)	(0.27)	(0.19)	(0.18)	(0.23)
Some undergraduate	-0.00	-0.32	-0.07	0.29	-0.01
	(0.22)	(0.31)	(0.21)	(0.21)	(0.27)
Bachelor's degree	0.11	0.07	0.26	0.12	0.09
	(0.17)	(0.26)	(0.17)	(0.17)	(0.22)

VARIABLES	(1) Work Time Reductions	(2) Wealth Tax	(3) Fossil Fuel Restrictions	(4) Regulate Advertising	(5) Universal Basic Income
Post-graduate degree	0.28	0.01	0.39**	0.25	0.06
	(0.18)	(0.28)	(0.18)	(0.18)	(0.24)
Gender					
Male	-0.05	0.49***	0.04	0.06	0.19*
	(0.09)	(0.13)	(0.08)	(0.09)	(0.11)
Prefer not to say	0.48***	2.21***	0.35**	0.46***	1.17***
	(0.14)	(0.23)	(0.15)	(0.15)	(0.18)
Constant	4.46***	1.15	2.75***	2.19***	3.63***
	(0.60)	(0.78)	(0.53)	(0.57)	(0.70)
Observations	811	811	811	811	811
R-squared	0.14	0.16	0.25	0.20	0.20

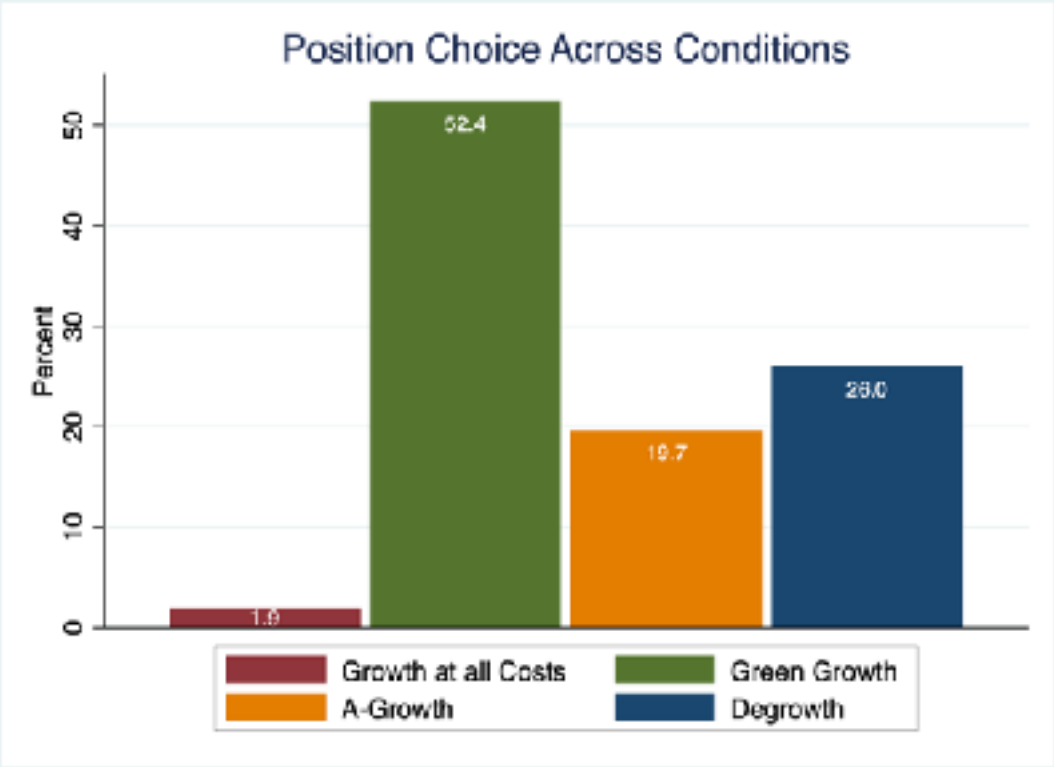
Note: Coefficients are displayed, with robust standard errors below in parentheses. The dependent variable is a specific degrowth policy, listed at the top of each column. The Green Growth condition is the omitted reference category for environmental framing, while the Consumer condition is the omitted category for mindset framing. For education, GCSE is the omitted category. For gender, Female is the omitted category. Income is in 1,000s. *** p<0.01, ** p<0.05, * p<0.1.

4.3.3.Main Effects - Logit Regressions

We used binary logit analyses to determine any significant differences across treatment groups for the carbon footprint outcome, as shown in **Table 19**. Though the majority completed the questionnaire (N = 704 comprising 75.5% of the sample), there were no significant differences between conditions, before or after including covariates. These findings lend no further support to either H1 or H2.

Figure 6 shows the breakdowns of position choice across conditions. Green growth was the most popular choice, with 52% selecting this position across conditions. The second most popular choice was degrowth at 26%. See **Appendix A** for charts by condition.

Figure 6 - Support for Each Position Choice



Note: Each bar represents a position in the growth-versus-environment debate, that is to what extent public policy in rich industrialized countries should pursue economic growth versus environmental protection, adapted from Lehmann et al. (2022). 'Growth at all costs' = "further pursue economic growth in spite of its environmental impacts;" 'Green Growth' = "further pursue economic growth. There are many ways to make economic growth compatible with environmental sustainability;" 'A-Growth' = "ignore economic growth as a policy aim, that is, be completely neutral about growth. This will amplify the policy spectrum to combine well-being and environmental sustainability goals;" and 'Degrowth' = "stop pursuing economic growth. Production and consumption need to be downscaled in an equitable way to achieve environmental sustainability."

Ordinal logit regression results for position choice are shown in

Table 19. The Degrowth framing was associated with a significantly greater support for growth-critical positions than the Green Growth framing (OR = 1.75, p <.001) at the 1% level, equivalent to a small to medium effect size (f = .15). The Degrowth condition increased the probability of selecting the a-growth and degrowth statements and decreased the probability of selecting the growth at all costs and green growth statements. Significance remained with covariates (OR = 2.00, p <.001). Both results met the Bonferroni adjustment criterion of .017, providing evidence in favour of EH4a.

Table 19 - Main Effects Results (Logit) – Study 3

	(1)	(2)	(3)	(4)
	Binary Logit		Ordinal Logit	
VARIABLES	Engagement w/ Carbon Footprint	Engagement w/ Carbon Footprint	Position Choice	Position Choice
Degrowth	0.83	0.98	1.75***	2.00***
	(0.13)	(0.18)	(0.22)	(0.28)
Citizen	1.02	1.09	1.20	1.20
	(0.16)	(0.20)	(0.15)	(0.17)
Message Credibility		1.51***		1.01
		(0.14)		(0.08)
Utopian Impulse		1.82***		1.15
		(0.26)		(0.13)
Perceived Status		0.98		1.03
		(0.05)		(0.05)
Green Scale		0.91		1.43***
		(0.11)		(0.15)
Political Identity		0.94		0.84***
		(0.04)		(0.03)
Age		1.01		1.00
		(0.02)		(0.02)
Income		1.01*		1.00
		(0.01)		(0.00)
Education				
High school diploma		1.52		1.56

		(0.54)		(0.50)
Some undergraduate		1.55		1.23
		(0.66)		(0.44)
Bachelor's degree		2.00**		0.89
		(0.67)		(0.27)
Post-graduate degree		2.16**		0.97
		(0.79)		(0.31)
Gender				
Male		0.62**		0.80
		(0.12)		(0.11)
Constant	3.34***	0.02***		-
	(0.44)	(0.02)		-
Cut 1			0.03***	0.12**
			(0.01)	(0.12)
Cut 2			1.74***	12.09***
			(0.20)	(11.47)
Cut 3			4.22***	33.24***
			(0.53)	(31.66)
Observations	933	810	931	809

Note: Odds ratios are displayed, with robust standard errors below in parentheses. Columns (2) and (4) display the results including covariates. The first two columns use a binary logit regression, while the second two columns use an ordinal logit regression. The dependent variable is listed at the top of the column. The Green Growth condition is the omitted category for environmental framing, whilst Consumer is the omitted category for mindset framing. For education, GCSE is the omitted category. For gender, Female is the omitted category, whilst results for Prefer Not Say were excluded due to lack of variation in the outcome. Instead of one constant for the ordinal logit, cut points 1 – 3 display the thresholds for interpreting a latent continuous variable Y*, for example, in column (3), $Y_i = 1$ if Y^*_i is $\leq$ 0.03 $Y_i = 2$ if $0.03 \leq Y^*_i < 1.74$, and $Y_i = 3$ if $1.74 \leq Y^*_i \leq 4.22$. *** p<0.01, ** p<0.05, * p<0.1.

There were no significant differences in position choice when comparing the Citizen and Consumer conditions in either model shown in **Table 19**, providing no evidence to support EH4b.

4.3.4.Moderation Analysis

In investigating interaction effects between the environmental and mindset framing, we hypothesized a congruence effect (i.e., Degrowth + Citizen and Green Growth + Consumer). There were no significant interaction effects for the overall or green growth policy acceptance variables (see **Appendix O Table 41**). For degrowth policies, there were significant main effects of environmental framing at the 5% level (β = -.24, p = .017), mindset framing at the 10% level (β = -.16, p = .087), and an interaction effect at the 10% level (β = 0.25, p = .061). **Figure 7** shows that when paired with the Consumer framing, acceptance of degrowth policies was higher under the Green Growth framing (M = 5.22) than the Degrowth framing (M = 4.98). The results did not hold with covariates, and all effect sizes are quite small (f < .07). Though these results offer some significant evidence related to H3, the direction of the effect was not as predicted. There appeared to be a congruence effect for the Green Growth + Consumer condition, but not necessarily the Degrowth + Citizen condition.

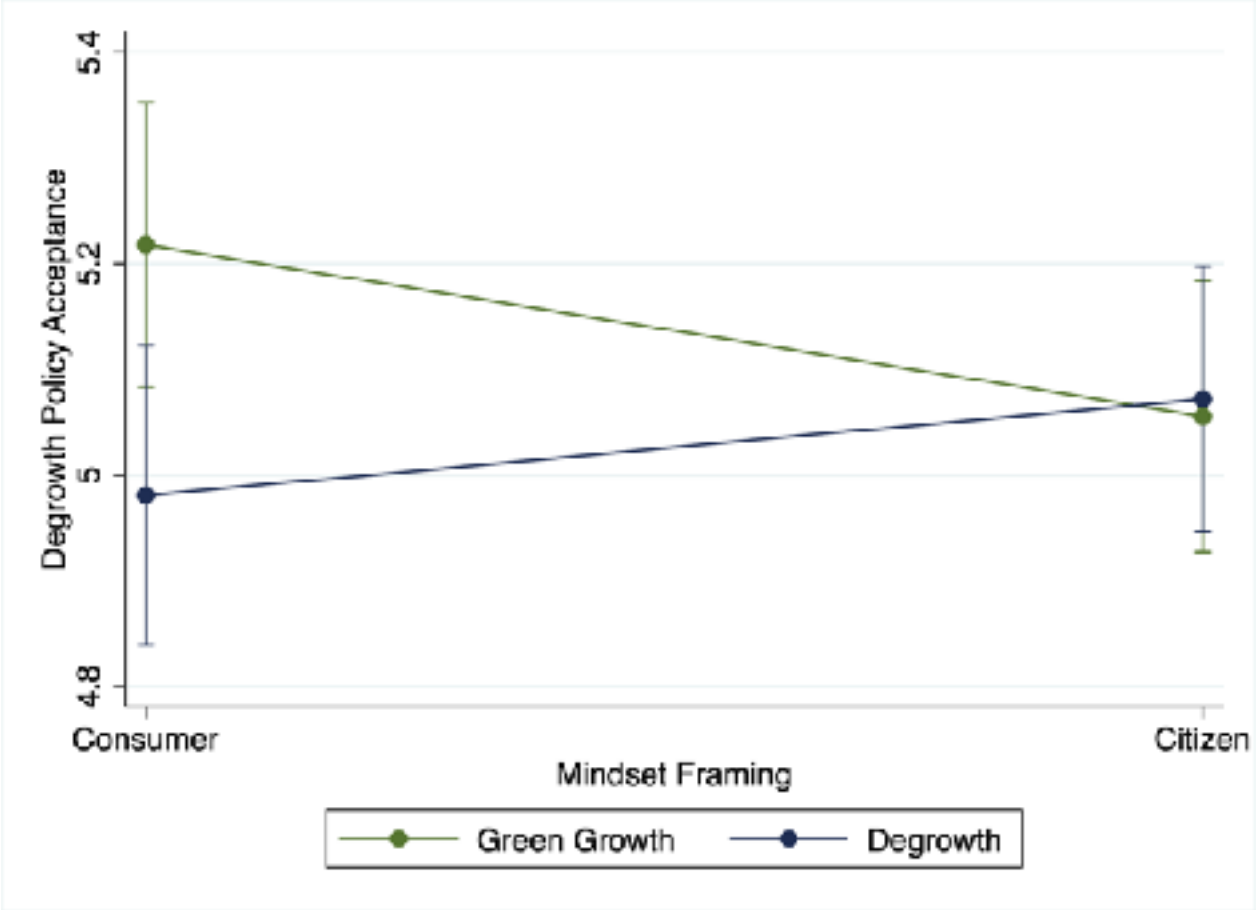
Figure 7 - Interaction between Environmental & Mindset Framing on Degrowth Policy Acceptance

Note: This chart displays the predicted values of degrowth policy acceptance from the analysis interacting environmental framing and mindset framing, shown in column (3) of **Table 41.** The chart plots these predicted values for each of the four conditions, with the 95% confidence interval of the predicted value.

For the carbon footprint variable, we used a logit regression with an interaction term, as suggested in Berry et al. (2010). However, as shown in **Appendix O Table 42** we did not find any significant interaction effects across conditions. The main effect at the 10% significance level (β = .69, p = .092), suggests that the Degrowth condition resulted in lower engagement, offering some directional support in favour of H1 but not H3.

4.3.5.Robustness Checks

Due to the potentially non-parametric nature of our policy acceptance measures, and as robustness checks for the main effects models, we also ran Kruskal-



Wallis tests and non-parametric kernel regressions. See **Appendix P** for the results, which confirm support for H1. Results from the Kruskal-Wallis test suggested a more significant difference ($p = .041$) between Green Growth and Degrowth framing on overall policy acceptance, such that this difference met our significance criteria of $\alpha = 0.05$.

4.4. Discussion

Study 3 shifted focus to explore the use of persuasive communications about degrowth and green growth outside the market setting. Our results suggest that our framing conditions did not influence the behavioural outcome of engagement with a carbon footprint calculator. Additionally, the lack of significant main effects and manipulation check responses for our mindset framing suggests that this intervention was not effective. However, we saw marginally significant differences (at the 10% level) between Green Growth and Degrowth framing in promoting overall environmental policy support, which increased to the 5% level using a non-parametric

Kruskal-Wallis test, lending more robust evidence that the Green Growth account garnered greater policy support. Notably, the difference between the two environmental framing conditions for overall policy support suggests that the Degrowth communications made people less likely to support both degrowth and green growth policies collectively, but there were no significant main effects for the two sub-scales. Further, for beliefs about the growth-versus-environment debate (i.e., position choice), the Degrowth depiction spurred significantly more growth-critical views in favour of degrowth and agrowth.

One explanation for reduced policy support under Degrowth framing is that participants could not imagine any of the policies achieving the type of system-level transformations characterised in this condition. D'Alisa and Kallis (2020) suggest that more thinking must be done to realize how exactly degrowth's sweeping policy changes can be brought to bear. In particular, they pinpoint a weakness in the degrowth literature on any formulation of 'the state', which appears necessary to implement the kind of policy changes advocated. However, such changes may seem unlikely given current government priorities. Lakoff (2010) further asserts that people might lack appropriate frames needed to engage with problems at the system-level, especially given the interconnectivity between issues like the economy and environment. The Green Growth condition may have empowered people to bring about moderate shifts within our current system, which was more familiar and therefore easier to understand than structural transformations via the Degrowth condition. While the unregulated free market contributes directly to environmental and economic problems (Jackson, 2021), Lakoff (2010) emphasizes that the institutionalized frames in public minds reinforce this free market ideology. These schema are only bolstered by media discourse on growth, which serves to maintain the unwavering frame of growth as 'progress' (Lakoff, 2010; Schmelzer et al., 2022).

Existing frames and dominant understandings associated with environmental issues are shaped by our current economic system (Dietz et al., 2003; Murcia & Acosta, 2023). Lakoff (2010) suggests we cannot convey a system-level approach to sustainability by relying on existing industries and institutions (e.g., brands and corporations). Yet as advocates of system-level change work toward shifting institutional structures, we must also work to build up appropriate frames for system-

level thinking to replace existing, growth-oriented frames in public consciousness (Murcia & Acosta, 2023; Rosner, 1995). Even outside the marketing context, our results from Study 3 are consistent with the account of a psychological blind spot in processing information about system-level changes. That is, by framing the climate crisis and solutions around system-level issues, respondents exhibited less support for policies that might in part shift the institutional landscape. Meanwhile, the dominant individualised approach to mitigation expressed in the Green Growth framing likely fit with their understanding of sustainability (Chater & Loewenstein, 2022). How to generate these growth-critical frames may be outside the scope of this research, but it warrants further consideration.

Position choice offered the most statistically significant and intuitive result, providing evidence that communications about degrowth versus green growth do disparately influence values and worldviews, and in the hypothesised direction. While the participant pool favoured green growth the most, the second most popular choice was degrowth, ranging between 20% and 30% depending on condition. Participants who received the Degrowth framing were more likely to choose a position criticising economic growth (i.e., a-growth or degrowth) and less likely to choose the two pro-growth stances. It appears our use of deep framing (Corner & Randall, 2011) to characterise two opposing paradigms on growth and the environment was successful in influencing people's views about macro-level political strategy. This evidence is encouraging for the literature on promoting positive attitudes toward growth-critical stances like degrowth. It also provides empirical justification for the use of persuasive communications outside commercial settings for influencing values and beliefs. However, the disparity between position choice and the other more personally relevant outcome variables is consistent with prior literature that suggests a disconnect between macro and micro consumption attitudes (Iyer & Muncy, 2016). While communicating about degrowth in the public sphere is important for making citizens more open to a growth-critical worldview, it is not yet effective at influencing more active forms of engagement.

5. General Discussion

Across three studies, we have explored the use of persuasive communications related to green growth and degrowth to influence consumption in both a market and non-market context. This research was conducted to answer RQ1a on the relation between individual consumption reduction and degrowth at the system level, RQ1b on behavioural responses to degrowth's system transformation, as well as RQ3a and RQ3c on policy perceptions and heterogeneity, respectively. For RQ1, we attempted to convey degrowth-related ideas without referencing the name, to test what contexts and frames may be successful for communicating about degrowth and its relevance to individuals. In Studies 1 and 2, results from our depictions of Green Growth and Degrowth were mostly indistinguishable from each other, despite some significant differences between these treatments and the Control conditions. In Study 3, although Green Growth framing was significantly more persuasive in promoting environmental policy support, Degrowth framing encouraged significantly more individuals to choose degrowth or a-growth positions within the growth-versus-environment debate. Thus, with respect to RQ1, our findings suggest that this relationship may be context dependent: the nuances of the degrowth paradigm and its departure from green growth are less influential on consumer decisions and behaviours; however, they do appear to influence citizen-oriented values and policy beliefs.

Notably, Studies 1 and 2 show a growing consciousness about reducing consumption. On a 7-point scale, average intention to consume less was significantly above the mid-point of the scale (i.e., 4) in both Study 1 ($M = 5.6$, $t(501) = 36.56$, $p<.001$) and Study 2 ($M = 5.4$, $t(968) = 42.00$, $p <.001$). However, compelling evidence of widespread behaviour change within affluent nations is still lacking, which may reflect the disconnect between attitudes toward consumption at the micro and macro levels (García-de-Frutos et al., 2018; Iyer & Muncy, 2016). Relevant to RQ1, people may believe in reducing consumption at the societal level to reduce environmental degradation, but this attitude may not translate to their personal consumption practices. The dissociation may further explain insignificant differences between Green Growth and Degrowth framing, if participants did not view these societal-level narratives as impacting their individual consumption activity. Perhaps this could be

characterised as an intention-action gap, whereby societal goals toward downscaling do not translate into real-world actions by individuals to consume less.

However, our findings related to SPM link with prior work on the false hope of overcoming intention-action gaps in consumption under capitalism. Carrington et al. (2016) contend that the fixation in the literature on an ethical consumption gap, i.e., the chasm between people's desires to consume ethically and evidence of ethical consumption in the marketplace, reinforces the dominant economic system of capitalism. They argue ethical consumption and capitalism are inherently incompatible, as the priorities of profit accumulation and economic growth will always supersede ethicality. Our investigations in Studies 1 and 2 expose a similar contradiction in using SPM to reduce consumption at scale, given the fundamental contradiction in using marketing to address a problem it originally exacerbated. SPM, like ethical consumption, "promises a solution to a systemic contradiction without challenging the system itself" (Carrington et al., 2016, p. 23). Instead, SPM and related marketing techniques explicitly reinforce profit-orientation and growth by offering firms enhanced brand equity and customer loyalty (Ramirez et al., 2017; Reich & Armstrong Soule, 2016; Vilasanti da Luz et al., 2020). Therefore, efforts to translate more transformative agendas like degrowth into brand-led marketing interventions might reinforce capitalism and excessive consumption (Soper, 2020).

This inherent contradiction has motivated appeals within the marketing and ethical consumption literature for greater regulation toward consumption reduction, as opposed to merely shifting marketing strategy (Carrington et al., 2021; Stuart et al., 2020). Degrowth proposes restrictions on advertising, e.g., of high emissions goods and/or ads located in public spaces (Ahvenharju, 2020; Gunderson, 2018; Videira et al., 2014). Study 3 suggests that on average participants consider these restrictions "Somewhat Acceptable" ($M = 5.3$, $SD = 1.4$). We might advocate for regulating not just the overt campaigns calling for consumers to buy more, but also the more attractive campaigns that purportedly call for reduced consumption. These sorts of regulations may help prevent co-optation of sufficiency-oriented messaging to increase profits.

Even if there is some evidence to suggest that sufficiency-promoting marketing could promote sufficiency behaviours (Frick et al., 2021), the fact that the marketing

toolkit will always reinforce the growth-based economic system makes it fundamentally ill-equipped for promoting a degrowth agenda (Corner & Randall, 2011; Muncy & Eastman, 1998). We cannot just applaud firms for proposing a solution to the climate crisis, but we must evaluate if that solution is consequential (Böhm et al., 2022). This research underscores the importance of such evaluations, as SPM may not just be ineffective at climate mitigation, but may actually undermine it (Corner & Randall, 2011; Lakoff, 2010). In sum, strategies from within the private sector that maintain current institutional processes are unlikely to deliver meaningful consumption reduction without more transformational change in line with degrowth.

Despite the caution surrounding sufficiency-promoting marketing in the commercial context, the results from Study 3 warrant further exploration of using degrowth-related persuasive messaging for promoting growth-critical values and worldviews in citizen-oriented contexts. The significant effect on position choice regarding the growth-versus-environment debate suggests a positive reaction to the degrowth argument, in an explicitly pro-growth atmosphere.[27]

Results from all three studies may also indicate that there is not a clear distinction between green growth and degrowth positions in the minds of the U.K. public. When the dependent variables involved value-based, abstract, or not personally relevant outcomes, participants were more likely to differentiate between degrowth and green growth framing, and in the case of position choice more likely to support alternatives to economic growth. However, when these outcomes were more specific, concrete, and relevant to people's daily lives, as is the case with the consumption-oriented intentions and behaviours, there was little difference between the two framing conditions.

Conflation of the two agendas is surprising given the strong opposition suggested by degrowth literature (e.g., Sandberg et al., 2019) and in media (Phillips, 2019; Roser, 2021). Perhaps these contestations do not reflect the reality of how people perceive them. Cognitive difficulties related to thinking about system-level issues (Lakoff, 2010; Moosmayer et al., 2019) may make it difficult for people to

[27] Both parties of the U.K. government have held firmly to growth-based economic objectives (Kwarteng, 2022; Starmer, 2022). Additionally, Scotland's COP26 summit, held a few months before Study 3 data collection, was mostly characterized by support for green growth (Harrabin, 2021).

relate national-level economic growth to their individual daily actions, blurring the line between green growth and degrowth in people's minds. Although the literature presents them as two theoretically distinct policy-frames (Polewsky et al., 2024; Sandberg et al., 2019), they may be complementary in terms of practical applications in consumption. However, tensions may emerge regarding structural policy changes, as the two agendas offer divergent policy paths that cannot be conflated as easily.

Addressing RQ3a related to degrowth policy support, fossil fuel bans, UBI, limits to advertising, and work time reductions were all considered at least "Somewhat Acceptable" or more on average. Work time reductions were the most favourable, considered "Acceptable" on average ($M = 6.0$, $SD = 1.4$). Meanwhile, wealth taxes received rather low acceptance ($M = 3.6$, $SD = 2.0$) on average. However, addressing RQ3c, preferences were not homogenous. When controlling for message frame, lower income and male participants exhibited greater preferences for the composite of degrowth policies. Examining specific policies, wealth taxes seem most influenced by demographic differences, with greater support amongst lower income, male, and to a lesser extent, older respondents. Prior literature also suggests that higher income groups were less supportive of wealth redistribution or welfare policies (Khan et al., 2023). In terms of values, our results support prior findings about left-wing orientation (Khan et al., 2023) and utopian impulse (Basso & Krpan, 2022), underscoring the importance of value-based predictors of degrowth policy support.

The results related to overall policy support (H1), whereby Green Growth framing was more persuasive, uncover a potential obstacle for degrowth's focus on the system level. The emphasis in our Degrowth account on blaming the system appeared to be less motivating toward tackling systemic problems through public policy, which is one of degrowth's main levers of change (Cosme et al., 2017; D'Alisa & Kallis, 2020). Promoting individual behaviour change alone will not lead to requisite emissions reductions (Kallis et al., 2020; Spangenberg, 2014), but in Study 3 it appeared to mobilise engagement through supporting environmental policies. As scholars urge that garnering degrowth policy support is essential to bring about necessary societal transformations (Kallis et al., 2020; Kongshøj, 2023), individual-level insights such as these are pivotal in understanding barriers to this support (García-de-Frutos et al., 2018).

Construal level theory, whereby psychologically proximal concepts or events are conceptualized more concretely than distant ones (Keller et al., 2022; Trope et al., 2007), may be relevant in explaining the direction of certain effects. Degrowth could appear more distant and abstract along the dimensions of time, personal relevance, and probability. Though abstract construal is more compatible with future-orientation (Reczek et al., 2018) and likely made participants more amenable to growth-critical positions, it may not be as effective in garnering support for specific policies as more concrete construal exhibited by the Green Growth condition.

With respect to RQ1, information about degrowth's system-level agenda may therefore distance or *disengage* individuals from mobilizing, which is further complicated by human difficulty in thinking about system-level changes (Lakoff, 2010). Greater knowledge of capitalism's shortcomings might cause further tension or paralysis in enacting sustainable practices (Longo et al., 2019). These psychological forces might block individuals from adopting sufficiency lifestyles and may further demotivate the necessary policy support to enact system-level changes. While Chater & Loewenstein (2022) posit that behavioural science's focus on individual-level interventions has undermined system-level solutions, we propose the inverse case in which degrowth's system focus could discourage individual agency if we fail to identify the right leverage points.

5.1. Strengths and Limitations of the Research

This research is novel in its translation of macro-level sustainability agendas into consumer-relevant messages. Based on a review of the sustainable consumption communications literature (Fischer et al., 2021), we contribute to this emergent transdisciplinary field in the following ways with three studies: i) we focus on overall consumption reduction, which is understudied (García-de-Frutos et al., 2018); ii) we explore other roles that individuals may play, outside of consumers (Böhm et al., 2022; Carrington et al., 2021); and iii) we focus on a less common domain, outside of food and housing. Our replication attempt in Study 2 makes this research more rigorous, uncovering a lack of stability in the use of degrowth and green growth-related consumer messages, especially among green consumers. Incorporating

multiple contexts (i.e., commercial, and non-commercial) also provides a more comprehensive perspective on the appropriate applications of the messaging strategies we studied. The use of specific policies in Study 3, not just position choice, provides us with richer data on people's degrowth policy preferences, which is still under-researched (Khan et al., 2023; Kongshøj, 2023; Lee et al., 2023).

These studies also have several limitations. Using Qualtrics to promote hypothetical companies and apps may have distanced participants from the true nature of the settings we were studying. The online setting also restricted our ability to use outcome variables related to longer-term behaviors to reduce consumption, as lab or online experimental settings lend themselves more to short-term behaviors (Frick et al., 2021). The lack of significant differences between Consumer and Citizen framings, and the higher failure rate of these manipulation checks, might suggest that our mindset framing manipulation was too subtle. The mediocre reliability of the composite degrowth policies (5 items, $\alpha = 0.66$) in Study 3, coupled with the significant influence of demographics and values in predicting support for each policy, indicates that there may be more heterogeneity in people's degrowth policy preferences than was accounted for by taking the average. However, these findings also justified the exploration in **Project 3** into the individual-level factors predicting degrowth policy support.

While our manipulation checks could detect that individuals were paying attention to our stimuli (Ejelöv & Luke, 2020), more subtle think-aloud protocols (e.g., Ericsson & Simon, 1993) would be necessary to examine the overlaps and differences in participants' thought processes when exposed to our treatments. Finally, many of our significant results do not hold when including covariates. The role of covariates in experimental research design can be considered controversial by some who suggest it inflates Type I error whilst boosting power (e.g., Simonsohn et al., 2014). However, this is only likely to occur when adding covariates that were not pre-registered (Wang et al., 2017), whereas we pre-registered all covariates included. Still, losing significance with the inclusion of covariates indicates a lack of robustness in the experimental effects.

5.2. Future Research

If the role of SPM is to be further researched, practitioners should focus on whether the strategy can support other policy and institutional changes to bring about meaningful reductions in societal consumption, rather than undermining these changes. Field experiments and longer-term outcome measures should be prioritized to understand the broader real-world implications, i.e., the scope for consumption reduction. Perhaps the more challenging consumption changes required to achieve sufficiency for degrowth cannot be adopted immediately, so future endeavours should measure behaviours on longer time scales. Moreover, studying participants from non-Western countries who emit less may shed light on developing appropriate schema via institutions and norms that support consumption reduction (Murcia & Acosta, 2023).

The findings related to policy support from Study 3 demand further investigation of people's degrowth policy preferences to contextualize them. Despite the significant amount of attention placed on formulating degrowth policies in the literature (Fitzpatrick et al., 2022), much less work has been done in understanding how palatable these policies may be. Our results suggest that we need to spend more time evaluating perceptions of degrowth and its policy proposals. Beyond the scope of this thesis, this question should also be investigated through qualitative and deliberative methods (e.g., Ercan et al., 2022). Future research could also explore systems justifications theory (Jost & Banaji, 1994) and other potential mechanisms inhibiting people's ability to process system-level issues. These investigations could be used to directly test the hypothesis that focusing on the system has the unintended consequence of disengaging people from more active forms of participation with degrowth.

5.3. Conclusion

Our research investigated how to make two opposing sustainability agendas, degrowth and green growth, more relevant to people's everyday lives. We explored how these messages would influence intentions, values, and behaviours in both market and non-market contexts. Employing shallow framing when marketing a brand,

we found little difference in purchase intentions following messages that encourage reduced consumption compared to those about not compromising one's consumption. In short, we assert that sufficiency-promoting marketing is unlikely to be successful at changing the system of consumption and production, making it incompatible with any degrowth agenda. We hope these findings direct policymakers and advocates toward promoting regulations on advertising, along with other means of preventing the co-optation of degrowth that would undermine system change (e.g., Barlow et al., 2022). It is only through transforming our economic system, as the IPCC proposes, that meaningful consumption reduction can occur.

When employing deep framing outside of the consumer space, our environmental framing conditions did have significantly different influences on a) people's values and worldviews toward supporting alternatives to economic growth, and b) structural changes via environmental policy support. With respect to RQ1, our evidence shows that consumers do not necessarily differentiate between green growth and degrowth with respect to consumer behaviour change, or at least communicating about these paradigms did not disparately influence their decisions. However, in the sphere of citizenship and structural policy change, Degrowth messaging positively influenced growth-critical worldviews, whilst reducing their support for concrete environmental policy proposals. Further, with respect to RQ3, there was support for most degrowth policies, though preferences differed primarily by income, age, and gender, as well as political ideology, green consumption values, and utopian impulse.

To inspire individuals to adopt new lifestyles in the hopes of engendering more convivial, equitable, and environmentally protective values, persuasive communications related to degrowth may be an avenue worth exploring further. Commercial actors and institutions that uphold capitalism's growth-oriented logic appear to be inappropriate messengers. However, these communication strategies may be employed by non-profits, NGOs, and even growth-critical policymakers to build up suitable mental schema for challenging dominant growth imperatives (Murcia & Acosta, 2023). However, our study uncovers how psychological limitations may restrict degrowth's transformative agenda, making it difficult for individuals to connect economic growth and environmental protection to their own lives. These

issues may obstruct both behaviour change toward sufficiency and broader mobilization through policy support (e.g., Bastini et al., 2023). Ultimately, as the transformations envisioned by degrowth become increasingly necessary to avoid ecological collapse, our results highlight the need for further research into degrowth amongst psychological and behavioural scientists.

6. Appendix

A. Measures Study 1

Outcome Measures

Purchase Intentions:
(Lee et al., 2017; White et al., 2012)

Please report the degree to which you agree with the following statements.

1. *I would be likely to purchase [the company]'s products.*
2. *I would be willing to buy [the company]'s products.*
3. *I would exert a great deal of effort to purchase [the company]'s products.*
4. *I would be likely to recommend [the company]'s product to others.*

Intention to reduce consumption - self-report:
(Borusiak et al., 2021)

Please report the degree to which you agree with the following statements.

1. *I plan to reduce the amount of goods and/or resources I consume.*
2. *I want to reduce the amount of goods and/or resources I consume.*
3. *I will make an effort to consume less.*

There were also three filler statements that replaced the consumption reduction part of the above statements with text about being more organized. These filler statements were not analyzed.

Support for Degrowth (Petition):

Participants were given a brief background on degrowth and given the option to sign a petition. They were also given the opportunity to leave any comments on the degrowth debate or petition. "Degrowth is a movement that seeks to reduce consumption and production levels to meet planetary boundaries, challenging economic growth whilst promoting better quality of life and social support. To learn more and show your support, please consider signing this petition by clicking on the following link: British government must switch to a degrowth economy to avoid ecological collapse

Do you have any comments on this debate or petition?"

Willingness to Donate Time:

(Mortensen et al., 2019)

Part 1: Post-Survey Questions consent

You have now completed the main part of the survey and will be compensated for your time. Would you be willing to devote just a few more minutes (1-2 max) to answering additional questions for [the company]? Your insights would be extremely beneficial to this emerging business.

Response Options: Yes (1) No (0)

Part 2: Post-Survey Questions (Optional)

If they consented above, participants could answer the following 6 questions as a behavioural measure of their interest in [the company]. They could stop answering at any time and end the survey. We designed these questions to be relevant to the ads they viewed, but the content of responses was not analyzed for this study.

1. *After taking this survey, are you more likely to try a shampoo bar instead of a regular bottle of shampoo?*
    a. Yes
    b. No
    c. I am not sure / need more information
2. *Do you think brands should have an active role in educating consumers on how to reduce consumption levels?*
    a. Yes
    b. No
    c. I'm not sure
3. *Do you think sustainable brands are becoming more accessible to everyone?*
    a. Yes
    b. No
    c. I'm not sure
4. *Have you seen any brands promoting a lifestyle of consuming less? If so, please share the name of the brand.*
    a. Brand name [text entry option]
    b. No, I have not seen any brands do this.
5. *In your opinion, the best way to solve the climate crisis is through:*
    a. Technological advances
    b. Reducing consumption and production
    c. Material substitution
    d. Letting nature take its course
    e. Other (please specify)
6. *The length of [the company]'s ad shown to you at the beginning was:*

a. Too short
b. Too long
c. Just right

Covariates

Trust:
(Sirdeshmukh et al., 2002)

Please report the extent to which you agree with the following statements.

1. *Most environmental claims made in advertising are true.*
2. *Because environmental claims are exaggerated, consumers would be better off if such claims in advertising were eliminated.*
3. *Most environmental claims in advertising are intended to mislead rather than to inform consumers.*
4. *I do not believe most environmental claims made in advertising.*

Scepticism:
(Mohr et al., 1998)

Based on the introduction and ad, how do you perceive [company] along the following dimensions?

1. *Undependable - Dependable*
2. *Incompetent - Competent*
3. *Low integrity - High integrity*

There were 10 points between the two differential endpoints.

Green Scale:
(Haws et al., 2014)

Please report the extent to which you agree with the following statements.

1. *It is important to me that the products I use do not harm the environment.*
2. *I consider the potential environmental impact of my actions when making many of my decisions.*
3. *My purchase habits are affected by my concern for our environment.*
4. *I am concerned about wasting the resources of our planet.*
5. *I would describe myself as environmentally responsible.*
6. *I am willing to be inconvenienced in order to take actions that are more environmentally friendly.*

Political Ideology:
(Whitmarsh & Corner, 2017)

In politics people sometimes talk of "left" and "right". Using the scale below, where would you place yourself on the political spectrum? Left = 0, Right = 10

Participants were given a slider bar to select where they lie on the spectrum, with a "Not applicable" option as well.

Chronic Regulatory Focus:
(Haws et al., 2010)

Please indicate to what extent you agree or disagree with the statements below.

1. *When it comes to achieving things that are important to me, I find that I don't perform as well as I would ideally like to do.*
2. *I feel like I have made progress toward being successful in my life.*
3. *When I see an opportunity for something I like, I get excited right away.*
4. *I frequently imagine how I will achieve my hopes and aspirations.*
5. *I see myself as someone who is primarily striving to reach my "ideal self"—to fulfill my hopes, wishes, and aspirations.*
6. *I usually obeyed rules and regulations that were established by my parents.*
7. *Not being careful enough has gotten me into trouble at times.*
8. *I worry about making mistakes.*
9. *I frequently think about how I can prevent failures in my life.*
10. *I see myself as someone who is primarily striving to become the self I "ought" to be—fulfill my duties, responsibilities and obligations.*

Statements 1 - 5 measure promotion-orientation, whilst 6-10 measure prevention-orientation. Participants were asked all 10 statements in a row, with no indication that it is measuring two different concepts.

<u>Social Media Questions</u>

<u>Time:</u>
(Du et al., 2020)

On average, approximately how many minutes per day do you spend on Instagram?

1. 10 minutes or less (1)
2. 11 - 30 minutes (2)
3. 31 - 60 minutes (3)
4. 1-2 hours (4) 2-3 hours (5)

5. 3+ hours (6)

Frequency:
(Du et al., 2020)

On average, how often do you visit Instagram?

1. Less than once a day (1)
2. Once a day (2)
3. 2-3 times a day (3)
4. Once an hour (4)
5. 2-3 times an hour (5)
6. More than 3 times an hour (6)

Purchasing:
Have you ever purchased products using social media?

1. Yes (1)
2. No (2)
3. Not sure (3)

Other Check Variables

Manipulation Check:
After viewing their Instagram ad, the participant will answer the following question:
In this ad, what was [the company]'s main message?

The correct option will be “Go plastic free” (Neutral Green), “More sustainable options are better” (Green Growth), “Less is more” (Degrowth). The other options are “Vegan is better” and “Say ‘no’ to air pollution.”

Attention Check:
(Oppenheimer et al., 2009)

Participants were prompted with the following: “In order to demonstrate that you have read the instructions, please ignore the sports items below. Instead, in the box labelled "Other," please write "I have read these directions." Once you have done so, click the arrow for the next screen. Thank you very much. Which of these activities do you engage in regularly? (click all that apply)

1. Football (0)
2. Basketball (0)
3. Rugby (0)
4. Swimming (0)

5. Other [with text box for answer] (1 – if response is “I have read these directions.”)

Seriousness Check
(Musch & Klauer, 1999)

It would be very helpful if you could tell us at this point whether you have taken part in this study seriously, so that we can use your answers for our scientific analysis, or you were just clicking through without reading the instructions and survey questions? Please answer honestly - you will receive the payment regardless of your answer.

1. I have not taken part seriously, please throw my data away (0)
2. I have taken part seriously (1)

B. Normal Probability Plots for Dependent Variable Residuals - Study 1

Figure 9 – P-P Plot – Purchase Intentions – Study 1

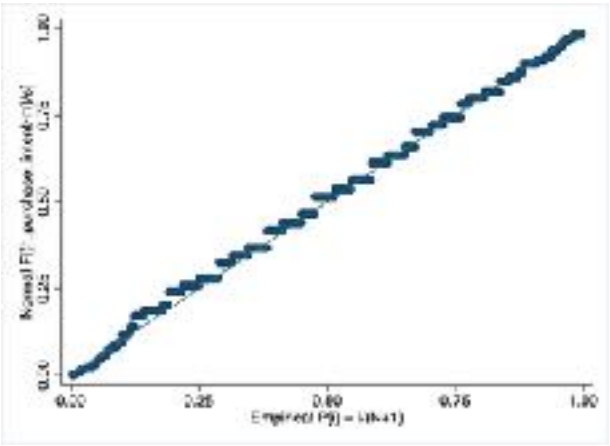
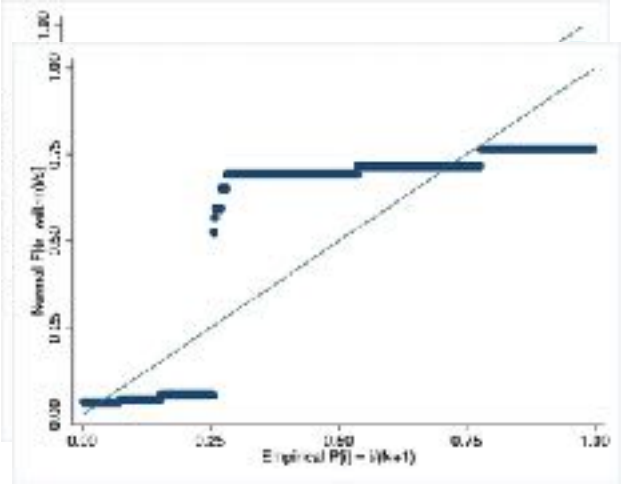


Figure 8 – P-P Plot – Intention to Consume Less – Study 1



Note: Charts display the standardized normal probability plot (P-P plot) of the residuals from a simple OLS regression with each continuous dependent variable, as noted in the title of each figure. Normal probability plots, using the *pnorm* function in Stata, put the focus on the centre of the distribution.

C. Prevention and Promotion Moderation Results – Study 1

Table 20 - Prevention/Promotion Moderation (Purchase Intentions) – Study 1

	(1)	(2)	(3)	(4)
VARIABLES	**Purchase Intentions**	**Purchase Intentions**	**Purchase Intentions**	**Purchase Intentions**
Green Growth	-0.082		-0.068	
	(0.112)		(0.112)	
Degrowth	-0.194*	-0.112	-0.181*	-0.113
	(0.105)	(0.113)	(0.106)	(0.115)
Prevention (Standardized)	0.080	0.280**		
	(0.075)	(0.112)		
GG x Prevention	0.199			
	(0.135)			
DG x Prevention	-0.040	-0.239*		
	(0.117)	(0.143)		
Promotion (Standardized)			0.176**	0.143
			(0.075)	(0.093)
GG x Promotion			-0.033	
			(0.120)	
DG x Promotion			-0.166	-0.133
			(0.105)	(0.118)
Constant	4.908***	4.826***	4.895***	4.827***
	(0.073)	(0.085)	(0.073)	(0.085)
Observations	502	332	502	332
R-squared	0.032	0.038	0.022	0.012
Conditions Included:	C1, C2, C3	C2 & C3 only	C1, C2, C3	C2 & C3 only

Note: This table contains the results of moderation analyses where condition is the independent variable and prevention and promotion are each moderators. The dependent variable is purchase intentions. The Neutral Green condition is the omitted category for columns (1) and (3). In columns (2) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. *** p<0.01, ** p<0.05, * p<0.1.

Table 21 - Prevention/Promotion Moderation (Purchase Intentions) w/ Covariates – Study 1

	(1)	(2)	(3)	(4)
VARIABLES	**Purchase Intentions**	**Purchase Intentions**	**Purchase Intentions**	**Purchase Intentions**
Green Growth	0.016		0.024	
	(0.101)		(0.100)	
Degrowth	-0.058	-0.072	-0.065	-0.087
	(0.098)	(0.101)	(0.099)	(0.100)
Prevention (Standardized)	0.008	0.082		
	(0.074)	(0.092)		
GG x Prevention	0.067			
	(0.119)			
DG x Prevention	-0.091	-0.169		
	(0.111)	(0.124)		
Trust	0.093***	0.094**	0.091***	0.092**
	(0.030)	(0.039)	(0.030)	(0.039)
Scepticism	-0.148***	-0.186***	-0.141***	-0.176***
	(0.043)	(0.053)	(0.042)	(0.053)
Green Scale	0.482***	0.445***	0.498***	0.469***
	(0.049)	(0.059)	(0.050)	(0.060)
Age	0.002	-0.010	0.002	-0.011
	(0.009)	(0.010)	(0.009)	(0.010)
Gender				
Male	-0.027	-0.123	-0.041	-0.142
	(0.088)	(0.109)	(0.087)	(0.109)
Non-binary	-0.281	-0.116	-0.270	-0.073
	(0.263)	(0.171)	(0.272)	(0.202)
Education				
High school diploma	-0.113	-0.038	-0.121	-0.031
	(0.154)	(0.187)	(0.149)	(0.182)
Some undergraduate	-0.074	-0.180	-0.074	-0.166

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Purchase Intentions	(4) Purchase Intentions
	(0.179)	(0.232)	(0.177)	(0.230)
Bachelor's degree	-0.234	-0.338*	-0.216	-0.304*
	(0.144)	(0.175)	(0.137)	(0.168)
Post-graduate degree	-0.345**	-0.422**	-0.334**	-0.399**
	(0.160)	(0.194)	(0.153)	(0.189)
Income	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Past Social Media Purchasing	-0.107	-0.058	-0.101	-0.051
	(0.073)	(0.094)	(0.074)	(0.094)
Political Ideology	0.073***	0.074***	0.072***	0.074***
	(0.021)	(0.025)	(0.022)	(0.026)
Promotion (Standardized)			0.068	-0.005
			(0.067)	(0.082)
GG x Promotion			-0.078	
			(0.100)	
DG x Promotion			-0.176*	-0.097
			(0.091)	(0.105)
Constant	2.052***	2.775***	1.943***	2.602***
	(0.538)	(0.636)	(0.526)	(0.618)
Observations	443	299	443	299
R-squared	0.342	0.358	0.344	0.357
Conditions Included:	C1, C2, C3	C2 & C3 only	C1, C2, C3	C2 & C3 only

Note: This table contains the results of moderation analyses where condition is the independent variable and prevention and promotion are each moderators. The dependent variable is purchase intentions. The Neutral Green condition is the omitted category for columns (1) and (3). In columns (2) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 22 - Prevention/Promotion Moderation (Intention to Consume Less) - Study 1

	(1)	(2)	(3)	(4)
VARIABLES	**Intention to Consume Less**	**Intention to Consume Less**	**Intention to Consume Less**	**Intention to Consume Less**
Green Growth	-0.063		-0.050	
	(0.104)		(0.106)	
Degrowth	-0.143	-0.080	-0.126	-0.076
	(0.103)	(0.108)	(0.102)	(0.110)
Prevention (Standardized)	0.056	0.444***		
	(0.064)	(0.102)		
GG x Prevention	0.387***			
	(0.120)			
DG x Prevention	0.111	-0.276**		
	(0.109)	(0.134)		
Promotion (Standardized)			0.048	0.158*
			(0.076)	(0.089)
GG x Promotion			0.110	
			(0.117)	
DG x Promotion			0.067	-0.043
			(0.102)	(0.113)
Constant	5.666***	5.603***	5.662***	5.612***
	(0.070)	(0.077)	(0.070)	(0.080)
Observations	502	332	502	332
R-squared	0.076	0.103	0.017	0.021
Conditions Included:	C1, C2, C3	C2 & C3 only	C1, C2, C3	C2 & C3 only

Note: This table contains the results of moderation analyses where condition is the independent variable and prevention and promotion are each moderators. The dependent variable is the intention to consume less. The Neutral Green condition is the omitted category for columns (1) and (3). In columns (2) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. *** p<0.01, ** p<0.05, * p<0.1.

Table 23 - Prevention/Promotion Moderation (Intention to Consume Less) w/ Covariates – Study 1

	(1)	(2)	(3)	(4)
VARIABLES	Intention to Consume Less	Intention to Consume Less	Intention to Consume Less	Intention to Consume Less
Green Growth	-0.102		-0.094	
	(0.079)		(0.077)	
Degrowth	-0.103	-0.008	-0.114	-0.030
	(0.080)	(0.087)	(0.079)	(0.086)
Prevention (Standardized)	-0.030	0.207***		
	(0.054)	(0.074)		
GG x Prevention	0.233**			
	(0.092)			
DG x Prevention	0.023	-0.221**		
	(0.084)	(0.101)		
Trust	0.011	0.034	0.012	0.034
	(0.020)	(0.028)	(0.021)	(0.029)
Scepticism	-0.072**	-0.054	-0.066**	-0.042
	(0.032)	(0.042)	(0.033)	(0.043)
Green Scale	0.628***	0.600***	0.668***	0.656***
	(0.047)	(0.061)	(0.048)	(0.062)
Age	0.001	-0.008	0.001	-0.008
	(0.007)	(0.009)	(0.007)	(0.009)
Gender				
Male	-0.236***	-0.269***	-0.267***	-0.318***
	(0.071)	(0.090)	(0.070)	(0.090)
Non-binary	-0.577**	-0.327	-0.587**	-0.300
	(0.236)	(0.251)	(0.240)	(0.244)
Education				
High school diploma	-0.125	0.002	-0.109	0.013
	(0.139)	(0.170)	(0.129)	(0.158)
Some undergraduate	-0.305*	-0.440**	-0.292*	-0.434**

VARIABLES	(1) Intention to Consume Less	(2) Intention to Consume Less	(3) Intention to Consume Less	(4) Intention to Consume Less
	(0.166)	(0.213)	(0.164)	(0.211)
Bachelor's degree	-0.271**	-0.306*	-0.230*	-0.258*
	(0.134)	(0.161)	(0.120)	(0.146)
Post-graduate degree	-0.272*	-0.170	-0.233	-0.130
	(0.155)	(0.177)	(0.142)	(0.165)
Income	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Past Social Media Purchasing	0.015	-0.016	0.020	0.005
	(0.053)	(0.066)	(0.052)	(0.068)
Political Ideology	-0.043*	-0.016	-0.037	-0.010
	(0.023)	(0.028)	(0.023)	(0.029)
Promotion (Standardized)			-0.027	-0.016
			(0.060)	(0.082)
GG x Promotion			0.020	
			(0.102)	
DG x Promotion			-0.076	-0.089
			(0.086)	(0.101)
Constant	2.997***	3.055***	2.729***	2.631***
	(0.440)	(0.570)	(0.450)	(0.590)
Observations	443	299	443	299
R-squared	0.524	0.523	0.516	0.512
Conditions Included:	C1, C2, C3	C2 & C3 only	C1, C2, C3	C2 & C3 only

Note: This table contains the results of moderation analyses where condition is the independent variable and prevention and promotion are each moderators. The dependent variable is the intention to consume less. The Neutral Green condition is the omitted category for columns (1) and (3). In columns (2) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 24 - Prevention/Promotion Moderation (Willingness to Donate Time) – Study 1

	(1)	(2)	(3)	(4)
VARIABLES	**Willingness to Donate Time**	**Willingness to Donate Time**	**Willingness to Donate Time**	**Willingness to Donate Time**
Green Growth	0.445		0.438	
	(0.338)		(0.341)	
Degrowth	0.646*	0.201	0.666**	0.228
	(0.333)	(0.325)	(0.335)	(0.326)
Prevention (Standardized)	0.382*	0.120		
	(0.214)	(0.242)		
GG x Prevention	-0.261			
	(0.323)			
DG x Prevention	-0.500*	-0.239		
	(0.303)	(0.323)		
Promotion (Standardized)			-0.073	0.184
			(0.246)	(0.269)
GG x Promotion			0.258	
			(0.364)	
DG x Promotion			0.152	-0.106
			(0.336)	(0.353)
Constant	4.826***	5.271***	4.822***	5.260***
	(0.245)	(0.234)	(0.247)	(0.235)
Observations	502	332	502	332
R-squared	0.015	0.003	0.010	0.003
Conditions Included:	C1, C2, C3	C2 & C3 only	C1, C2, C3	C2 & C3 only

Note: This table contains the results of moderation analyses where condition is the independent variable and prevention and promotion are each moderators. The dependent variable is the willingness to donate time to the brand. The Neutral Green condition is the omitted category for columns (1) and

(3). In columns (2) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. *** p<0.01, ** p<0.05, * p<0.1.

Table 25 – Prevention/Promotion Moderation (Willingness to Donate Time) w/ Covariates – Study 1

	(1)	(2)	(3)	(4)
VARIABLES	**Willingness to Donate Time**	**Willingness to Donate Time**	**Willingness to Donate Time**	**Willingness to Donate Time**
Green Growth	0.434		0.409	
	(0.353)		(0.360)	
Degrowth	0.597*	0.182	0.601*	0.225
	(0.341)	(0.340)	(0.348)	(0.345)
Prevention (Standardized)	0.521**	0.037		
	(0.234)	(0.247)		
GG x Prevention	-0.576*			
	(0.326)			
DG x Prevention	-0.797**	-0.279		
	(0.321)	(0.332)		
Trust	0.084	0.088	0.084	0.088
	(0.080)	(0.102)	(0.081)	(0.102)
Scepticism	-0.021	-0.143	-0.009	-0.130
	(0.127)	(0.153)	(0.130)	(0.153)
Green Scale	0.406**	0.330	0.402**	0.272
	(0.170)	(0.204)	(0.169)	(0.203)
Age	0.052*	0.063	0.052	0.067*
	(0.032)	(0.040)	(0.032)	(0.040)
Gender				
Male	-0.461	0.119	-0.462	0.136
	(0.306)	(0.382)	(0.307)	(0.377)
Non-binary	-0.775	-2.891	-0.550	-2.836
	(1.456)	(1.899)	(1.432)	(1.817)
Education				
High school diploma	-0.421	-0.028	-0.446	-0.069
	(0.525)	(0.648)	(0.529)	(0.643)

VARIABLES	(1) Willingness to Donate Time	(2) Willingness to Donate Time	(3) Willingness to Donate Time	(4) Willingness to Donate Time
Some undergraduate	-1.176*	-0.179	-1.127*	-0.167
	(0.643)	(0.756)	(0.636)	(0.746)
Bachelor's degree	-0.869*	-0.234	-0.909*	-0.292
	(0.492)	(0.598)	(0.495)	(0.603)
Post-graduate degree	-1.220**	-0.885	-1.328**	-0.972
	(0.562)	(0.689)	(0.572)	(0.697)
Income	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Past Social Media Purchasing	-0.188	-0.294	-0.149	-0.269
	(0.241)	(0.314)	(0.248)	(0.316)
Political Ideology	0.034	0.066	0.034	0.050
	(0.078)	(0.097)	(0.081)	(0.097)
Promotion (Standardized)			-0.144	0.299
			(0.266)	(0.291)
GG x Promotion			0.399	
			(0.379)	
DG x Promotion			0.111	-0.265
			(0.353)	(0.375)
Constant	1.597	1.788	1.522	1.996
	(1.754)	(2.042)	(1.715)	(2.013)
Observations	443	299	443	299
R-squared	0.072	0.065	0.061	0.065
Conditions Included:	C1, C2, C3	C2 & C3 only	C1, C2, C3	C2 & C3 only

Note: This table contains the results of moderation analyses where condition is the independent variable and prevention and promotion are each moderators. The dependent variable is the willingness to donate time to the brand. The Neutral Green condition is the omitted category for columns (1) and (3). In columns (2) and (4), Green Growth is the omitted reference, as the Neutral Green condition has

been excluded from these analyses. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

D. Exploratory Moderation Analyses Study 1 – Green Consumption Values & Political Ideology

a. Green Consumption Values

As the prevention and promotion scales did not exhibit requisite reliability, and the resulting moderation analyses did not yield many meaningful results, we explored another potential moderator – the participant's green consumption values. This variable assesses the extent to which participants seek to protect the environment through purchasing and consumption behavior.

For the purchase intentions variable shown in **Table 26**, the interaction between condition and green values was statistically significant at the 5% level when comparing the green growth and degrowth conditions (β = -0.214, p = .041). **Figure 11** shows that people with weaker green values are more likely to report purchase intentions under the degrowth condition than the green growth condition. This relationship flips for participants with strong green values. However, this interaction effect is no longer present when adding covariates (β = -0.11, p = .311).

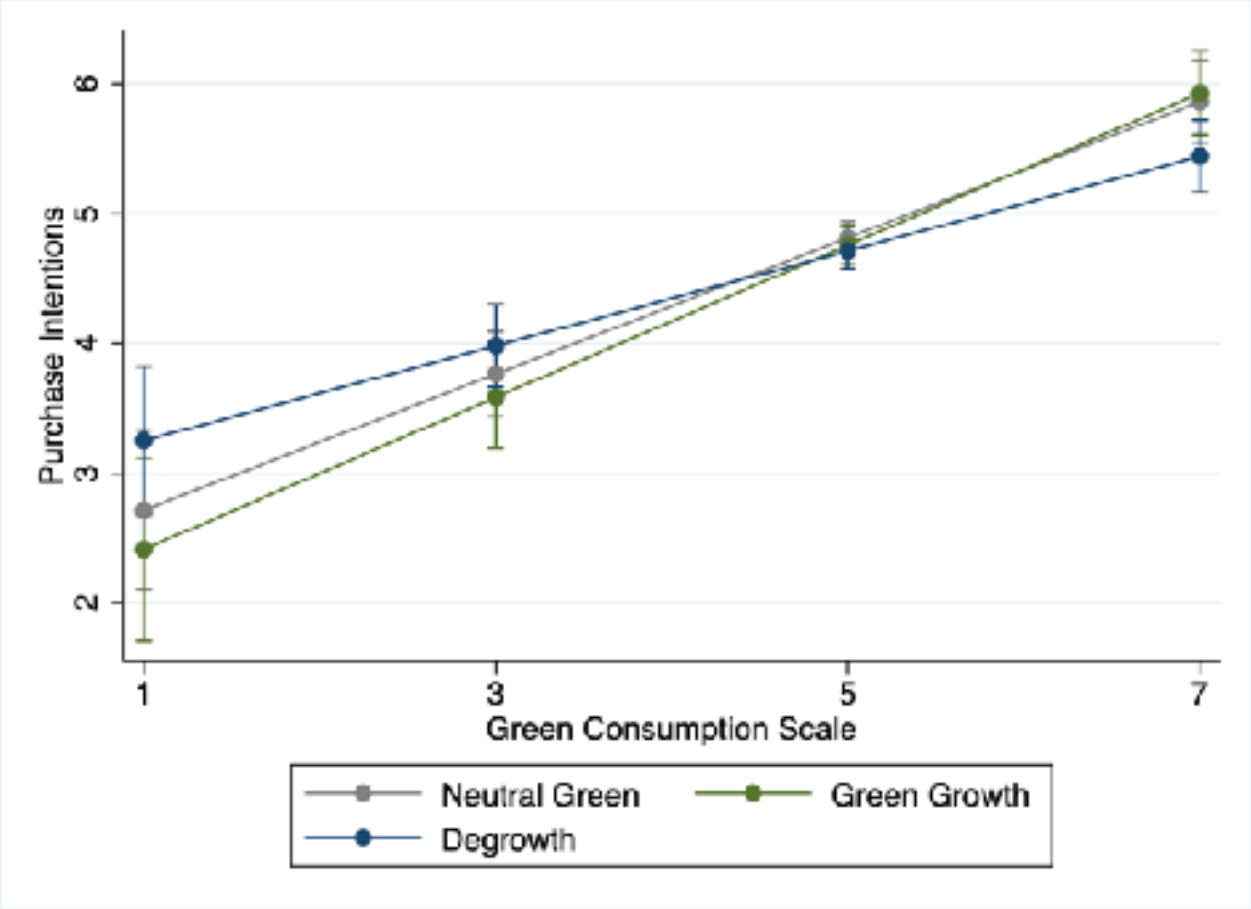
Table 26 - Green Scale Moderation (Purchase Intentions) – Study 1

	(1)	(2)	(3)	(4)
VARIABLES	**Purchase Intentions**	**Purchase Intentions**	**Purchase Intentions**	**Purchase Intentions**
Green Growth	-0.050	0.021		
	(0.097)	(0.102)		
Degrowth	-0.118	-0.064	-0.068	-0.078
	(0.093)	(0.099)	(0.100)	(0.102)
Green Scale (Standardized)	0.510***	0.513***	0.569***	0.492***
	(0.073)	(0.085)	(0.081)	(0.089)
GG x Green Scale	0.060	-0.000		
	(0.109)	(0.119)		
DG x Green Scale	-0.155	-0.115	-0.214**	-0.108
	(0.099)	(0.104)	(0.105)	(0.107)
Scepticism		-0.146***		-0.183***
		(0.042)		(0.053)
Trust		0.093***		0.092**
		(0.031)		(0.040)
Past Social Media Purchasing		-0.102		-0.044
		(0.073)		(0.093)
Political Ideology		0.074***		0.075***
		(0.021)		(0.026)
Age		0.004		-0.008
		(0.010)		(0.012)
Income		0.000		0.000
		(0.000)		(0.000)
Education				
High school diploma		-0.108		-0.042
		(0.156)		(0.194)
Some undergraduate		-0.061		-0.171
		(0.184)		(0.243)
Bachelor's degree		-0.209		-0.322*

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Purchase Intentions	(4) Purchase Intentions
		(0.147)		(0.185)
Post-graduate degree		-0.315*		-0.395*
		(0.161)		(0.204)
Gender				
Male		-0.034		-0.128
		(0.088)		(0.110)
Non-binary		-0.273		-0.094
		(0.264)		(0.195)
Constant	4.869***	4.424***	4.819***	4.954***
	(0.064)	(0.512)	(0.074)	(0.615)
Observations	502	442	332	298
R-squared	0.233	0.341	0.226	0.354
Conditions Included:	C1, C2, C3	C1, C2, C3	C2 & C3 only	C2 & C3 only

Note: This table contains the results of moderation analyses where condition is the independent variable, and the green consumption scale (standardized) is the moderator. Columns (3) and (4) display the results including covariates. The dependent variable is purchase intentions. The Neutral Green condition is the omitted category for columns (1) and (2). In columns (3) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Figure 11 - Green Consumption Values Moderation - Marginal Effects Plot (Purchase Intentions) – Study 1



Note: This chart displays the predicted values of purchase intentions from the moderation analysis involving condition as the independent variable, purchase intentions as the dependent variable, and green consumption scale as the moderator. The chart plots these predicted values over a range of -2 to +2 standard deviations from the mean green consumption score. Each line represents a corresponding condition, and the brackets around each point on the line indicate the 95% confidence interval of the predicted value.

Table 27 – Green Consumption Values Moderation (Intention to Consume Less) – Study 1

VARIABLES	(1) Intention to Consume Less	(2) Intention to Consume Less	(3) Intention to Consume Less	(4) Intention to Consume Less
Green Growth	-0.015	-0.092		
	(0.079)	(0.081)		
Degrowth	-0.029	-0.105	-0.013	-0.018
	(0.075)	(0.079)	(0.081)	(0.088)
Green Scale (Standardized)	0.684***	0.672***	0.711***	0.644***
	(0.062)	(0.059)	(0.078)	(0.091)
GG x Green Scale	0.027	-0.026		
	(0.100)	(0.103)		
DG x Green Scale	-0.056	-0.084	-0.084	-0.055
	(0.094)	(0.094)	(0.105)	(0.112)
Scepticism		-0.069**		-0.049
		(0.033)		(0.043)
Trust		0.013		0.036
		(0.021)		(0.029)
Past Social Media Purchasing		0.026		0.013
		(0.052)		(0.068)
Political Ideology		-0.037		-0.010
		(0.023)		(0.029)
Age		0.003		-0.005
		(0.008)		(0.010)
Income		0.000		0.000
		(0.000)		(0.000)
Education				
High school diploma		-0.126		-0.002
		(0.137)		(0.171)
Some undergraduate		-0.306*		-0.441**
		(0.170)		(0.222)

VARIABLES	(1) Intention to Consume Less	(2) Intention to Consume Less	(3) Intention to Consume Less	(4) Intention to Consume Less
Bachelor's degree		-0.247*		-0.281*
		(0.133)		(0.164)
Post-graduate degree		-0.240		-0.137
		(0.153)		(0.179)
Gender				
Male		-0.264***		-0.306***
		(0.070)		(0.090)
Non-binary		-0.599**		-0.312
		(0.244)		(0.255)
Constant	5.616***	6.088***	5.600***	5.930***
	(0.051)	(0.396)	(0.060)	(0.503)
Observations	502	442	332	298
R-squared	0.471	0.512	0.468	0.506
Conditions Included:	C1, C2, C3	C1, C2, C3	C2 & C3 only	C2 & C3 only

Note: This table contains the results of moderation analyses where condition is the independent variable and green consumption scale is the moderator. The dependent variable is intention to consume less. The Neutral Green condition is the omitted category for columns (1) and (3). In columns (2) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

For the intention to reduce consumption, there was no statistically significant interaction effect for either comparison as shown in **Table 27**.

For the willingness to donate time shown in **Table 28**, there was no statistically significant interaction for any relationships between conditions before adding covariates. When adding covariates, there is a significant interaction effect on condition and green values between the neutral green and green growth conditions (β = -0.79, p = .032) at the 5% level.

Table 28 - Green Consumption Values Moderation (Willingness to Donate Time) – Study 1

	(1)	(2)	(3)	(4)
VARIABLES	**Willingness to Donate Time**	**Willingness to Donate Time**	**Willingness to Donate Time**	**Willingness to Donate Time**
Green Growth	0.493	0.511		
	(0.339)	(0.358)		
Degrowth	0.747**	0.646*	0.254	0.166
	(0.330)	(0.347)	(0.320)	(0.337)
Green Scale (Standardized)	0.559**	0.735**	0.183	-0.004
	(0.269)	(0.289)	(0.230)	(0.244)
GG x Green Scale	-0.376	-0.793**		
	(0.354)	(0.368)		
DG x Green Scale	-0.115	-0.189	0.261	0.573
	(0.356)	(0.388)	(0.328)	(0.348)
Scepticism		-0.013		-0.141
		(0.128)		(0.151)
Trust		0.090		0.095
		(0.079)		(0.100)
Past Social Media Purchasing		-0.157		-0.279
		(0.244)		(0.313)
Political Ideology		0.041		0.062
		(0.079)		(0.096)
Age		0.057		0.083*
		(0.034)		(0.042)
Income		0.000		0.000
		(0.000)		(0.000)
Education				
High school diploma		-0.481		0.041
		(0.538)		(0.663)
Some undergraduate		-1.163*		-0.033

VARIABLES	(1) Willingness to Donate Time	(2) Willingness to Donate Time	(3) Willingness to Donate Time	(4) Willingness to Donate Time
		(0.646)		(0.763)
Bachelor's degree		-0.875*		-0.114
		(0.516)		(0.623)
Post-graduate degree		-1.304**		-0.785
		(0.586)		(0.711)
Gender				
Male		-0.528*		0.074
		(0.309)		(0.377)
Non-binary		-0.530		-2.660
		(1.373)		(1.749)
Constant	4.778***	3.343**	5.270***	2.716
	(0.247)	(1.557)	(0.233)	(1.782)
Observations	502	442	332	298
R-squared	0.027	0.071	0.016	0.074
Conditions Included:	C1, C2, C3	C1, C2, C3	C2 & C3 only	C2 & C3 only

Note: This table contains the results of moderation analyses where condition is the independent variable and green consumption scale is the moderator. The dependent variable is the willingness to donate time to the brand. The Neutral Green condition is the omitted category for columns (1) and (3). In columns (2) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

b. Political Ideology

We also explored whether there was a moderating effect of political ideology on participants responses to the three ads. This measure reflects their identification with the general sides of the political spectrum as opposed to any particular beliefs.

For the purchase intentions variable shown in **Table 29**, there was no statistically significant interaction effect on condition and political ideology between

any of the conditions at the 5% level. These results did not change when including covariates.

Table 29 - Political Ideology Moderation (Purchase Intentions) – Study 1

	(1)	(2)	(3)	(4)
VARIABLES	**Purchase Intentions**	**Purchase Intentions**	**Purchase Intentions**	**Purchase Intentions**
Green Growth	-0.040	0.024		
	(0.120)	(0.102)		
Degrowth	-0.181	-0.056	-0.141	-0.077
	(0.110)	(0.099)	(0.119)	(0.102)
Political Ideology (Standardized)	0.043	0.164**	0.022	0.164**
	(0.073)	(0.068)	(0.095)	(0.074)
GG x Political Ideology	-0.021	-0.014		
	(0.120)	(0.096)		
DG x Political Ideology	-0.085	-0.040	-0.065	-0.032
	(0.102)	(0.090)	(0.118)	(0.097)
Scepticism		-0.147***		-0.183***
		(0.043)		(0.053)
Trust		0.094***		0.094**
		(0.031)		(0.040)
Past Social Media Purchasing		-0.098		-0.043
		(0.073)		(0.094)
Green Scale		0.484***		0.449***
		(0.049)		(0.058)
Age		0.005		-0.008
		(0.010)		(0.012)
Income		0.000		0.000
		(0.000)		(0.000)
Education				
High school diploma		-0.111		-0.050
		(0.158)		(0.195)
Some undergraduate		-0.058		-0.179
		(0.187)		(0.244)
Bachelor's degree		-0.214		-0.334*
		(0.150)		(0.186)

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Purchase Intentions	(4) Purchase Intentions
Post-graduate degree		-0.322*		-0.413**
		(0.165)		(0.206)
Gender				
Male		-0.035		-0.131
		(0.089)		(0.112)
Non-binary		-0.259		-0.069
		(0.275)		(0.195)
Constant	4.878***	2.193***	4.838***	2.950***
	(0.079)	(0.549)	(0.090)	(0.665)
Observations	464	442	311	298
R-squared	0.007	0.338	0.006	0.351
Conditions Included:	C1, C2, C3	C1, C2, C3	C2 & C3 only	C2 & C3 only

Note: This table contains the results of moderation analyses where condition is the independent variable and green consumption scale is the moderator. The dependent variable is purchase intentions. The Neutral Green condition is the omitted category for columns (1) and (3). In columns (2) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

For the intention to reduce consumption in **Table 30**, there was no statistically significant interaction effect on condition and political ideology between any conditions at the 5% level. When adding covariates, the interaction term when comparing neutral green and green growth (β = 0.15, p = .091) became marginally significant at the 10% level.

Table 30 - Political Ideology Moderation (Intention to Consume Less) – Study 1

	(1)	(2)	(3)	(4)
VARIABLES	**Intention to Consume Less**	**Intention to Consume Less**	**Intention to Consume Less**	**Intention to Consume Less**
Green Growth	-0.125	-0.100		
	(0.107)	(0.079)		
Degrowth	-0.216**	-0.116	-0.092	-0.019
	(0.102)	(0.079)	(0.114)	(0.090)
Political Ideology (Standardized)	-0.325***	-0.168***	-0.178*	-0.001
	(0.084)	(0.062)	(0.101)	(0.075)
GG x Political Ideology	0.146	0.150*		
	(0.131)	(0.089)		
DG x Political Ideology	0.124	0.125	-0.023	-0.036
	(0.117)	(0.089)	(0.130)	(0.097)
Scepticism		-0.071**		-0.049
		(0.033)		(0.043)
Trust		0.013		0.037
		(0.021)		(0.029)
Past Social Media Purchasing		0.022		0.013
		(0.052)		(0.067)
Green Scale		0.652***		0.634***
		(0.048)		(0.062)
Age		0.002		-0.005
		(0.008)		(0.010)
Income		0.000		0.000
		(0.000)		(0.000)
Education				
High school diploma		-0.115		-0.006
		(0.139)		(0.176)
Some undergraduate		-0.313*		-0.448**
		(0.172)		(0.225)

Bachelor's degree		-0.260*		-0.290*
		(0.135)		(0.167)
Post-graduate degree		-0.253		-0.147
		(0.155)		(0.183)
Gender				
Male		-0.253***		-0.306***
		(0.070)		(0.089)
Non-binary		-0.567**		-0.296
		(0.228)		(0.242)
Constant	5.727***	2.676***	5.602***	2.665***
	(0.067)	(0.448)	(0.083)	(0.608)
Observations	464	442	311	298
R-squared	0.065	0.515	0.039	0.505
Conditions Included:	C1, C2, C3	C1, C2, C3	C2 & C3 only	C2 & C3 only

Note: This table contains the results of moderation analyses where condition is the independent variable and green consumption scale is the moderator. The dependent variable is the intention to consume less. The Neutral Green condition is the omitted category for columns (1) and (3). In columns (2) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Finally for the willingness to donate time shown in **Table 31**, there was no statistically significant interaction effect on condition and political ideology between the neutral green and each of the other conditions. However, when comparing the green growth and degrowth conditions, the interaction between political ideology and condition was significant at the 10% level (β = -0.57, p = .081). However, the interaction effect loses significance when including covariates (β = -0.51, p = .124).

Table 31 - Political Ideology Moderation (Willingness to Donate Time) – Study 1

	(1)	(2)	(3)	(4)
VARIABLES	Willingness to Donate Time	Willingness to Donate Time	Willingness to Donate Time	Willingness to Donate Time
Green Growth	0.506	0.472		
	(0.352)	(0.356)		
Degrowth	0.622*	0.574*	0.116	0.125
	(0.347)	(0.346)	(0.329)	(0.338)
Political Ideology (Standardized)	-0.146	-0.153	0.398	0.377
	(0.273)	(0.265)	(0.258)	(0.279)
GG x Political Ideology	0.544	0.596		
	(0.376)	(0.371)		
DG x Political Ideology	-0.024	0.066	-0.569*	-0.509
	(0.337)	(0.332)	(0.325)	(0.330)
Scepticism		-0.015		-0.138
		(0.128)		(0.151)
Trust		0.081		0.085
		(0.080)		(0.100)
Past Social Media Purchasing		-0.171		-0.307
		(0.246)		(0.316)
Green Scale		0.404**		0.298
		(0.163)		(0.196)
Age		0.056		0.081*
		(0.035)		(0.043)
Income		0.000		0.000
		(0.000)		(0.000)
Education				
High school diploma		-0.408		0.052
		(0.530)		(0.655)
Some undergraduate		-1.167*		-0.094
		(0.641)		(0.756)
Bachelor's degree		-0.895*		-0.141

VARIABLES	(1) Willingness to Donate Time	(2) Willingness to Donate Time	(3) Willingness to Donate Time	(4) Willingness to Donate Time
		(0.511)		(0.612)
Post-graduate degree		-1.268**		-0.754
		(0.581)		(0.699)
Gender				
Male		-0.430		0.144
		(0.308)		(0.377)
Non-binary		-0.426		-2.666
		(1.343)		(1.641)
Constant	4.869***	1.593	5.375***	1.687
	(0.261)	(1.750)	(0.236)	(2.069)
Observations	464	442	311	298
R-squared	0.016	0.067	0.012	0.072
Conditions Included:	C1, C2, C3	C1, C2, C3	C2 & C3 only	C2 & C3 only

Note: This table contains the results of moderation analyses where condition is the independent variable and green consumption scale is the moderator. The dependent variable is the willingness to donate time to the brand. The Neutral Green condition is the omitted category for columns (1) and (3). In columns (2) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

E. Non-parametric Robustness Checks – Study 1

The Kruskal-Wallis test is a one-way ANOVA on ranks using non-parametric methods to determine whether samples originate from the same distribution. A significant p-value suggests a statistical difference between groups. For the Kruskal-Wallis test on purchase intentions, comparing the three environmental framing conditions yielded an insignificant result, x^2 (2) = 2.67, p = .263. For the Kruskal-Wallis test on intentions to consume less, comparing the three environmental framing conditions also yielded an insignificant result, x^2 (2) = 1.71, p = .425. Finally, the Kruskal-Wallis test for willingness to donate time yielded an insignificant result, x^2 (2) = 3.26, p = .196. However, the test with ties yielded a marginally significant result, x^2 (2) = 5.33, p = .070.

The non-parametric kernel regression estimates the mean outcome for a given set of covariates without being prone to misspecification error, as it is agnostic to functional form. We ran non-parametric regressions for all four outcome variables, as it can be used in place of OLS or logit specifications. For all non-parametric kernel regressions in **Table 32**, we used bootstrapping with 100 reps and specified a seed value of 123 (Stata, n.d.). Using a non-parametric kernel regression specification with purchase intentions as the outcome, there was a significance difference between the Degrowth condition and the Neutral Green condition (β = -.06, p = .037) at the 5% level, consistent with the OLS model, but no difference between Green Growth and Neutral Green, or the two treatment conditions. For the willingness to donate time outcome, the non-parametric regression yields a marginally significant difference between the Degrowth and Neutral Green condition (β = .22, p = .051), consistent with the OLS model, but no difference between Green Growth and Neutral Green, or the two treatment conditions. There is also no significant difference between any conditions for the intention to consume less or the petition click-through outcome variables.

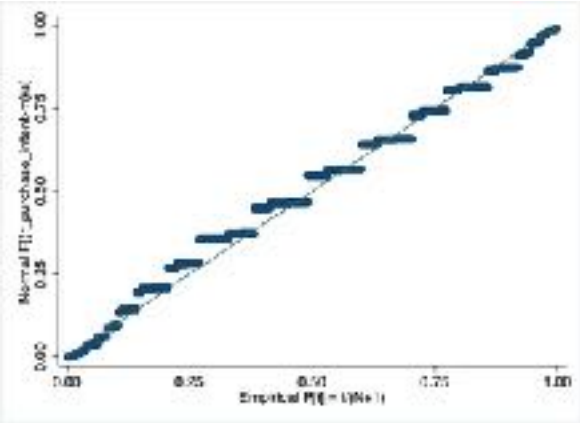
Table 32 - Non-parametric Kernel Regressions - Study 1

	(1)	(2)	(3)	(4)
VARIABLES	**Purchase Intentions**	**Intention to Consume Less**	**Willingness to Donate Time**	**Petition Click-Through**
Green Growth v. Neutral Green	-0.02	-0.01	0.15	0.01
	(0.04)	(0.02)	(0.11)	(0.01)
Degrowth v. Neutral Green	-0.06**	-0.02	0.22*	0.00
	(0.03)	(0.02)	(0.11)	(0.01)
Green Growth v. Degrowth	-0.04	-0.02	0.07	-0.01
	(0.04)	(0.02)	(0.10)	(0.01)
Mean	4.82***	5.60***	5.19***	0.15***
	(0.04)	(0.04)	(0.12)	(0.02)
Observations	502	502	502	502
R-squared	0.01	0.00	0.01	0.00

Note: This table contains results for a non-parametric kernel regression, using bootstrapped standard errors with 100 reps and seed value 123, for all outcome variables in Study 1. Kernel specifies a kernel density function for continuous covariates for use in calculating the local-constant or local-linear estimator. Each coefficient indicates the estimated difference between the two listed conditions, where the second condition (e.g., Neutral Green) is the reference category. Mean represents the observed estimated mean of the outcome variable in each column from the model. The analyses do not include covariates. The dependent variable is listed at the top of the column. *** p<0.01, ** p<0.05, * p<0

F. Normal Probability Plots for Dependent Variable Residuals - Study 2

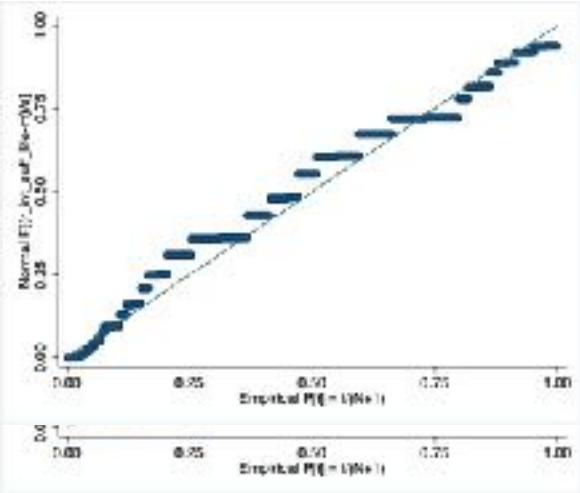
Figure 12 – P-P Plot – Purchase Intentions – Study 2



Note: Charts display the standardized normal probability plot (P-P plot) of the residuals from a simple OLS regression with each continuous dependent variable, as noted in the title of each figure. Normal probability plots, using the *pnorm* function in Stata, put the focus on the centre of the distribution.

We checked whether the dependent variables were normally distributed. Here too, the Shapiro-Wilk tests suggests non-normality for purchase intentions, $W(969) = 0.986$, $p < .001$, intention to reduce consumption, $W(969) = 0.944$, $p < .001$, and willingness to donate time $W(969) = 0.942$, $p < .001$. The normal probability plots for purchase intentions and intention to reduce consumption suggest that these variables

Figure 13 - P-P Plot – Willingness to Donate Time – Study 2



can be reasonably treated as normally distributed. The normal probability plot of

willingness to donate time is consistent with Study 1, suggesting the values are not normally distributed and better suited for a binary logistic analysis. In the following sections, we focus on the results of the linear and logit regressions.

G. Main Effects Results Study 2

Table 33 - Main Effects Results (OLS), All Conditions - Study 2

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Purchase Intentions	Purchase Intentions	Willingness to Donate Time	Willingness to Donate Time	Intention to Consume Less	Intention to Consume Less
Green Growth	0.45***	0.21***	0.34	0.22	0.01	-0.10
	(0.08)	(0.07)	(0.24)	(0.26)	(0.08)	(0.07)
Degrowth	0.46***	0.21***	0.10	-0.09	0.15*	0.02
	(0.08)	(0.08)	(0.24)	(0.26)	(0.08)	(0.08)
Scepticism		-0.02		0.01		0.00
		(0.03)		(0.10)		(0.03)
Brand Ethicality		0.45***		0.24*		0.16***
		(0.04)		(0.13)		(0.04)
Green Scale		0.39***		0.34***		0.66***
		(0.04)		(0.12)		(0.04)
Political Ideology		0.01		0.06		0.00
		(0.02)		(0.05)		(0.02)
Age		0.02**		0.08***		0.01
		(0.01)		(0.02)		(0.01)
Income		-0.00		-0.00**		0.00
		(0.00)		(0.00)		(0.00)
Education						
High school diploma		-0.13		0.07		0.10
		(0.11)		(0.44)		(0.12)
Some undergraduate		-0.40***		0.47		0.07
		(0.13)		(0.49)		(0.14)
Bachelor's degree		-0.27**		0.18		-0.03
		(0.10)		(0.42)		(0.11)
Post-graduate degree		-0.15		0.12		0.08
		(0.11)		(0.45)		(0.12)

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time	(5) Intention to Consume Less	(6) Intention to Consume Less
Gender						
Male		-0.07		-0.41*		-0.30***
		(0.06)		(0.22)		(0.06)
Non-binary		-0.66**		1.52***		-0.11
		(0.26)		(0.52)		(0.29)
Prefer not to say		-1.99***		-5.56***		-1.20***
		(0.12)		(0.43)		(0.11)
Constant	4.38***	-0.14	5.07***	-0.16	5.37***	1.07***
	(0.05)	(0.39)	(0.17)	(1.37)	(0.06)	(0.40)
Observations	969	816	969	816	969	816
R-squared	0.04	0.39	0.00	0.05	0.00	0.44

Note: Coefficients are displayed, with robust standard errors below in parentheses. Columns (1), (3), and (5) display regression results without covariates, columns (2), (4) and (6) display the results including covariates. The dependent variable is listed at the top of the column. The No Ad control condition is the omitted reference category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 34 - Main Effects Results (Logit), All Conditions - Study 2

	(1)	(2)	(3)	(4)
VARIABLES	Petition Click-Through	Petition Click-Through	WDT (Binary)	WDT (Binary)
Green Growth	0.760	0.807	1.288	1.189
	(0.179)	(0.202)	(0.237)	(0.252)
Degrowth	0.821	0.757	1.046	0.915
	(0.190)	(0.195)	(0.187)	(0.190)
Scepticism		1.040		1.010
		(0.105)		(0.083)
Ethicality		0.898		1.196*
		(0.111)		(0.126)
Green Scale		1.215*		1.294***
		(0.136)		(0.122)
Political Ideology		1.103*		1.055
		(0.057)		(0.048)
Age		1.056**		1.068***
		(0.025)		(0.022)
Income		1.000**		1.000**
		(0.000)		(0.000)
Education				
High school diploma		0.640		1.069
		(0.285)		(0.368)
Some undergraduate		0.450		1.528
		(0.265)		(0.630)
Bachelor's degree		1.642		1.169
		(0.642)		(0.378)
Post-graduate degree		1.354		1.115
		(0.582)		(0.388)
Gender				
Male		0.663*		0.704*
		(0.144)		(0.126)

VARIABLES	(1) Petition Click-Through	(2) Petition Click-Through	(3) WDT (Binary)	(4) WDT (Binary)
Constant	0.171***	0.023***	2.744***	0.049***
	(0.027)	(0.029)	(0.346)	(0.053)
Observations	969	813	969	813

Note: Odds ratios are displayed, with robust standard errors below in parentheses. Columns (1) and (3) display regression results without covariates, columns (2) and (4) display the results including covariates. The dependent variable is listed at the top of the column. The Green Growth condition is the omitted category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 35 - Main Effects Results (Logit), Green Growth & Degrowth Only - Study 2

VARIABLES	(1) Petition Click-Through	(2) Petition Click-Through	(3) WDT (Binary)	(4) WDT (Binary)
Degrowth	1.081	0.913	0.812	0.767
	(0.263)	(0.236)	(0.150)	(0.161)
Scepticism		1.043		1.047
		(0.134)		(0.107)
Ethicality		0.937		1.100
		(0.146)		(0.151)
Green Scale		1.220		1.379***
		(0.182)		(0.162)
Political Ideology		1.128*		1.079
		(0.069)		(0.059)
Age		1.048*		1.077***
		(0.030)		(0.028)
Income		1.000***		1.000**
		(0.000)		(0.000)

VARIABLES	(1) Petition Click-Through	(2) Petition Click-Through	(3) WDT (Binary)	(4) WDT (Binary)
Education				
High school diploma		0.555		1.041
		(0.317)		(0.475)
Some undergraduate		0.426		0.924
		(0.327)		(0.472)
Bachelor's degree		1.388		0.902
		(0.691)		(0.381)
Post-graduate degree		1.413		0.848
		(0.746)		(0.383)
Gender				
Male		0.632*		0.691*
		(0.176)		(0.154)
Constant	0.130*** (0.023)	0.025** (0.042)	3.535*** (0.476)	0.058* (0.086)
Observations	647	545	647	545

Note: Odds ratios are displayed, with robust standard errors below in parentheses. Columns (1) and (3) display regression results without covariates, columns (2) and (4) display the results including covariates. The dependent variable is listed at the top of the column. This table only includes results for comparing the Green Growth and Degrowth conditions, as the No Ad condition has been excluded from the analyses. The Green Growth condition is the omitted category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

H. Green Scale Moderation Results Study 2

Table 36 - Green Consumption Moderation, All Conditions - Study 2

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
Green Growth	0.43***	0.22***	0.32	0.22
	(0.07)	(0.07)	(0.23)	(0.26)
Degrowth	0.45***	0.21***	0.09	-0.09
	(0.07)	(0.08)	(0.24)	(0.26)
Green Scale (Standardized)	0.25***	0.20***	0.30*	0.28
	(0.05)	(0.05)	(0.17)	(0.19)
GG x Green Scale	0.20***	0.18**	0.02	0.04
	(0.07)	(0.08)	(0.24)	(0.27)
DG x Green Scale	0.38***	0.36***	0.24	0.12
	(0.08)	(0.08)	(0.25)	(0.28)
Scepticism		-0.01		0.02
		(0.03)		(0.10)
Brand Ethicality		0.45***		0.24*
		(0.04)		(0.13)
Political Ideology		0.01		0.06
		(0.02)		(0.05)
Age		0.02**		0.08***
		(0.01)		(0.02)
Income		-0.00		-0.00**
		(0.00)		(0.00)
Education				
High school diploma		-0.14		0.07
		(0.10)		(0.44)
Some undergraduate		-0.40***		0.47
		(0.13)		(0.49)
Bachelor's degree		-0.26***		0.18
		(0.10)		(0.42)

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
Post-graduate degree		-0.15		0.12
		(0.11)		(0.45)
Gender				
Male		-0.07		-0.40*
		(0.06)		(0.22)
Non-binary		-0.29		1.62***
		(0.27)		(0.60)
Prefer not to say		-2.00***		-5.55***
		(0.13)		(0.45)
Constant	4.39***	1.80***	5.08***	1.52
	(0.05)	(0.38)	(0.17)	(1.31)
Observations	969	816	969	816
R-squared	0.23	0.41	0.02	0.05

Note: This table contains the results of moderation analyses where condition is the independent variable and green consumption scale is the moderator. Columns (1) and (3) display regression results without covariates, columns (2) and (4) display the results including covariates. The dependent variable is listed at the top of the column. The No Ad control condition is the omitted category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 37 - Green Consumption Moderation, Green Growth & Degrowth Only - Study 2

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
Degrowth	0.03	-0.00	-0.23	-0.32
	(0.07)	(0.07)	(0.23)	(0.25)
Green Scale (Standardized)	0.45***	0.39***	0.32*	0.38**
	(0.06)	(0.06)	(0.17)	(0.19)
DG x Green Scale	0.18**	0.18**	0.21	0.05
	(0.08)	(0.09)	(0.25)	(0.28)
Scepticism		0.00		0.05
		(0.03)		(0.12)
Brand Ethicality		0.43***		0.13
		(0.05)		(0.17)
Political Ideology		-0.01		0.09
		(0.02)		(0.06)
Age		0.02**		0.09***
		(0.01)		(0.03)
Income		-0.00		-0.00**
		(0.00)		(0.00)
Education				
High school diploma		-0.25**		0.02
		(0.12)		(0.51)
Some undergraduate		-0.58***		-0.11
		(0.16)		(0.59)
Bachelor's degree		-0.44***		-0.12
		(0.12)		(0.48)
Post-graduate degree		-0.18		-0.20
		(0.12)		(0.52)
Gender				
Male		-0.01		-0.39

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
		(0.07)		(0.26)
Prefer not to say		-2.03***		-5.75***
		(0.14)		(0.51)
Constant	4.81***	2.24***	5.40***	2.20
	(0.05)	(0.46)	(0.16)	(1.71)
Observations	647	546	647	546
R-squared	0.26	0.43	0.02	0.06

Note: This table contains the results of moderation analyses where condition is the independent variable and green consumption scale is the moderator. Columns (1) and (3) display regression results without covariates, columns (2) and (4) display the results including covariates. The dependent variable is listed at the top of the column. This table only includes results for comparing the Green Growth and Degrowth conditions, as the No Ad condition has been removed. The Green Growth condition is the omitted category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

I. Political Ideology Moderation – Study 2

For purchase intentions, there is a significant interaction between the Green Growth condition and the Control (β_{GG} = .46, p < .001; β_{GGxPI} = -.17, p = .064) at the 10% level, and between the Degrowth condition and the Control (β_{DG} = .47, p < .001; β_{DGxPI} = -.20, p = .043) at the 5% level, displayed in **Table 38**. Amongst those identifying with the political left, purchase intentions were significantly higher in the Green Growth and even more so in the Degrowth condition compared to the control. However, among those on the political right, all three conditions performed similarly. Only the interaction with the Degrowth condition holds when including covariates. The direction of the interaction effect is the opposite of H3a, based on Study 1. Consistent with Study 1, there is no statistically significant interaction effect comparing the Green Growth and Degrowth conditions, shown in **Table 39**.

Table 38 - Political Ideology Moderation, All Conditions – Study 2

	(1)	(2)	(3)	(4)
VARIABLES	**Purchase Intentions**	**Purchase Intentions**	**Willingness to Donate Time**	**Willingness to Donate Time**
Green Growth	0.46***	0.22***	0.35	0.21
	(0.08)	(0.07)	(0.25)	(0.26)
Degrowth	0.47***	0.22***	0.09	-0.10
	(0.09)	(0.07)	(0.26)	(0.26)
Political Ideology (Standardized)	0.06	0.12**	-0.13	0.01
	(0.07)	(0.06)	(0.18)	(0.19)
GG x Political Ideology	-0.17*	-0.12	0.15	0.12
	(0.09)	(0.07)	(0.25)	(0.26)
DG x Political Ideology	-0.20**	-0.17**	0.25	0.19
	(0.10)	(0.08)	(0.25)	(0.25)
Scepticism		-0.02		0.02
		(0.03)		(0.10)
Brand Ethicality		0.44***		0.25*
		(0.04)		(0.13)
Green Scale		0.39***		0.34***
		(0.04)		(0.12)
Age		0.02**		0.08***
		(0.01)		(0.02)
Income		-0.00		-0.00**
		(0.00)		(0.00)
Education				
High school diploma		-0.13		0.08
		(0.11)		(0.44)
Some undergraduate		-0.40***		0.48
		(0.13)		(0.49)
Bachelor's degree		-0.26**		0.18
		(0.10)		(0.41)

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
Post-graduate degree		-0.15		0.13
		(0.11)		(0.45)
Gender				
Male		-0.08		-0.40*
		(0.06)		(0.22)
Non-binary		-0.65***		1.51***
		(0.20)		(0.52)
Prefer not to say		-1.98***		-5.56***
		(0.13)		(0.45)
Constant	4.37***	-0.08	5.11***	0.04
	(0.06)	(0.38)	(0.18)	(1.35)
Observations	847	816	847	816
R-squared	0.05	0.39	0.00	0.05

Note: This table contains the results of moderation analyses where condition is the independent variable and political ideology is the moderator. Columns (1) and (3) display regression results without covariates, columns (2) and (4) display the results including covariates. The dependent variable is listed at the top of the column. The No Ad control condition is the omitted category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

For the willingness to donate time, there is no significant interaction effect between political ideology and condition when comparing either treatment conditions with the control as shown in **Table 39**. There is also no significant interaction effect when comparing the Green Growth and Degrowth conditions. The lack of significance remains when including covariates. Thus, there is no evidence to support H3b.

Table 39 - Political Ideology Moderation, Green Growth & Degrowth Only – Study 2

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
Degrowth	0.01	0.00	-0.27	-0.32
	(0.09)	(0.07)	(0.25)	(0.25)
Political Ideology (Standardized)	-0.10*	0.03	0.01	0.15
	(0.06)	(0.05)	(0.17)	(0.18)
DG x Political Ideology	-0.03	-0.07	0.11	0.04
	(0.09)	(0.07)	(0.24)	(0.24)
Scepticism		0.00		0.05
		(0.03)		(0.12)
Brand Ethicality		0.43***		0.13
		(0.05)		(0.17)
Green Scale		0.49***		0.41***
		(0.05)		(0.15)
Age		0.02**		0.09***
		(0.01)		(0.03)
Income		-0.00		-0.00**
		(0.00)		(0.00)
Education				
High school diploma		-0.25*		0.02
		(0.13)		(0.51)
Some undergraduate		-0.59***		-0.10
		(0.16)		(0.59)
Bachelor's degree		-0.46***		-0.12
		(0.12)		(0.48)
Post-graduate degree		-0.21*		-0.20
		(0.13)		(0.52)
Gender				
Male		-0.01		-0.39

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
		(0.07)		(0.26)
Prefer not to say		-2.16***		-5.74***
		(0.15)		(0.52)
Constant	4.83***	-0.23	5.47***	0.48
	(0.06)	(0.48)	(0.17)	(1.76)
Observations	567	546	567	546
R-squared	0.01	0.42	0.00	0.06

Note: This table contains the results of moderation analyses where condition is the independent variable and political ideology is the moderator. Columns (1) and (3) display regression results without covariates, columns (2) and (4) display the results including covariates. The dependent variable is listed at the top of the column. This table only includes results for comparing the Green Growth and Degrowth conditions, as the No Ad condition has been removed. The Green Growth condition is the omitted category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

J. Non-parametric Robustness Checks - Study 2

We use the Kruskal-Wallis test to check the robustness of our OLS results using continuous outcome measures. For the Kruskal-Wallis test on purchase intentions, comparing the three conditions yielded a significant result, x^2 (2) = 53.25, p < .001. For the Kruskal-Wallis test on willingness to donate time yielded an insignificant result, x^2 (2) = 1.91, p = .384. Finally, the Kruskal-Wallis test on intentions to consume less, comparing the three conditions yielded an insignificant result, x^2 (2) = 3.53, p = .171.

We also ran non-parametric regressions for all four outcome variables, shown in **Table 40**. For all non-parametric kernel regressions, we used bootstrapping with 100 reps and specified a seed value of 123. For the model with purchase intentions as the outcome, we found a significance difference between the Green Growth condition and No Ad condition (β = .15, p < .001) at the 1% level, and between the Degrowth and No Ad condition (β = .15, p < .001), consistent with the OLS model. There was also a significant difference between the Degrowth and No Ad conditions for intention to consume less (β = .05, p = .038), at the 5% level, which was insignificant in the OLS

model, and no difference between the Green Growth and No Ad conditions (β = .004, p = .883), which was marginally significant in the OLS model. Willingness to donate time and petition click-through were never significant, consistent with the OLS model.

Table 40 - Non-parametric Kernel Regressions – Study 2

	(1)	(2)	(3)	(4)
VARIABLES	**Purchase Intentions**	**Intention to Consume Less**	**Willingness to Donate Time**	**Petition Click-Through**
Green Growth v. No Ad	0.15***	0.00	0.05	-0.00
	(0.03)	(0.03)	(0.03)	(0.00)
Degrowth v. No Ad	0.15***	0.05**	0.01	-0.00
	(0.03)	(0.02)	(0.03)	(0.00)
Green Growth v. Degrowth	0.00	0.05	-0.04	0.00
	(0.03)	(0.03)	(0.04)	(0.00)
Mean	4.68***	5.43***	5.22***	0.13***
	(0.03)	(0.04)	(0.09)	(0.01)
Observations	969	969	969	969
R-squared	0.04	0.00	0.00	0.00

Note: This table contains results for a non-parametric kernel regression, using bootstrapped standard errors with 100 reps and seed value 123, for all outcome variables in Study 2. Kernel specifies a kernel density function for continuous covariates for use in calculating the local-constant or local-linear estimator. Each coefficient indicates the estimated difference between the two listed conditions, where the second condition (e.g., No Ad) is the reference category. Mean represents the observed estimated mean of the outcome variable in each column from the model. The analyses do not include covariates. The dependent variable is listed at the top of the column. *** p<0.01, ** p<0.05, * p<0.1.

K. Experimental Stimuli – Study 3

Condition 1 – Green Growth + Consumer

Climate change is one of the most urgent issues of our time. Changing weather patterns are leading to several worrying impacts like the loss of wildlife and plants, more extreme events such as droughts and wildfires, and food insecurity due to issues like water scarcity and hotter temperatures.

These various impacts have a common cause: the way people consume and produce. We are buying too many polluting products and wasting them, and the world's living systems cannot bear it. But our failure to consume and produce more responsibly threatens our ability to address this crisis economically and effectively.

The cause of the problem is not with the system, but with people.

How can we solve it?
We need to accept that economic growth and environmental preservation can only be compatible if we adopt greener technologies and products. This requires people to embrace greener technologies and lifestyles to keep us happy.

By decoupling overall production and pollution in industrialized nations, greening economic growth, and adopting responsible lifestyles with less polluting products, not only can we address climate change, but also be better off.

This is the only way to preserve the natural environment for the security of the economy whilst ensuring well-being and economic growth for the future.

As a consumer, you can support decoupling and greening our economy by learning about your own environmental impact. A new app is being developed by a group of UK nonprofits to help.

In the "**Green Consumer App**," you can answer a few simple questions with the emissions calculator to find out your own carbon footprint.

Once you know your current emissions level, you can find advice to **adopt greener lifestyle choices that can support economic growth** and reduce your impact on the environment.

Condition 2 – Green Growth + Citizen

Climate change is one of the most urgent issues of our time. Changing weather patterns are leading to several worrying impacts like the loss of wildlife and plants, more extreme events such as droughts and wildfires, and food insecurity due to issues like water scarcity and hotter temperatures.

These various impacts have a common cause: the way people consume and produce. We are buying too many polluting products and wasting them, and the world's living systems cannot bear it. But our failure to consume and produce more responsibly threatens our ability to address this crisis economically and effectively.

The cause of the problem is not with the system, but with people.

How can we solve it?
We need to accept that economic growth and environmental preservation can only be compatible if we adopt greener technologies and products. This requires people to embrace greener technologies and lifestyles to keep us happy.

By decoupling overall production and pollution in industrialized nations, greening economic growth, and adopting responsible lifestyles with less polluting products, not only can we address climate change, but also be better off.

This is the only way to preserve the natural environment for the security of the economy whilst ensuring well-being and economic growth for the future.

As a citizen, you can support decoupling and greening our economy by learning about your own environmental impact. A new app is being developed by a group of UK nonprofits to help.

In the '**Green Citizen App,**' you can answer a few simple questions with the emissions calculator to learn what your own carbon footprint is.

Once you know your current emissions level, you can find advice to **become part of a community of committed and sustainable citizens working toward greener lifestyle choices** and reduce your impact on the environment.

Condition 3 – Degrowth + Consumer

Climate change is one of the most urgent issues of our time. Changing weather patterns are leading to several worrying impacts like the loss of wildlife and plants, more extreme events such as droughts and wildfires, and food insecurity due to issues like water scarcity and hotter temperatures.

These various impacts have a common cause: the sheer volume of economic activity. We are doing too much of almost everything, and the world's living systems cannot bear it. But our failure to see the whole picture threatens our ability to address this crisis systemically and effectively.

The cause of the problem is not with people, but with the system.

How can we solve it?
We need to accept that infinite economic growth and environmental preservation will never be compatible. This requires people to stop relying on our current economic system and economic growth to make us happy.

By downscaling overall production and consumption in industrialized nations, reducing economic growth and its resulting polluting emissions, and adopting simpler lifestyles with "fewer things", not only can we address climate change, but also be better off.

This is the only way to preserve the natural environment for the security of the planet whilst ensuring well-being and social equity for the future.

As a consumer, you can help transform our economic system to support our planet's living systems by learning about your own environmental impact. A new app is being developed by a group of UK nonprofits to help.

In the "**Green Consumer App,**" you can answer a few simple questions with the emissions calculator to find out your own carbon footprint.

Once you know your current emissions level, you can find advice to **adopt simplified lifestyle choices that can transform our economic system** and reduce your impact on the environment.

Condition 4 – Degrowth + Citizen

Climate change is one of the most urgent issues of our time. Changing weather patterns are leading to several worrying impacts like the loss of wildlife and plants, more extreme events such as droughts and wildfires, and food insecurity due to issues like water scarcity and hotter temperatures.

These various impacts have a common cause: the sheer volume of economic activity. We are doing too much of almost everything, and the world's living systems cannot bear it. But our failure to see the whole picture threatens our ability to address this crisis systemically and effectively.

The cause of the problem is not with people, but with the system.

How can we solve it?
We need to accept that infinite economic growth and environmental preservation will never be compatible. This requires people to stop relying on our current economic system and economic growth to make us happy.

By downscaling overall production and consumption in industrialized nations, reducing economic growth and its resulting polluting emissions, and adopting simpler lifestyles with "fewer things", not only can we address climate change, but also be better off.

This is the only way to preserve the natural environment for the security of the planet whilst ensuring well-being and social equity for the future.

As a citizen, you can help transform our economic system to support our planet's living system by learning about your own environmental impact. A new app is being developed by a group of UK nonprofits to help.

In the "**Green Citizen App,**" you can answer a few simple questions with the emissions calculator to learn what your own carbon footprint is.

Once you know your current emissions level, you can find tailored advice to **become part of a community of committed and sustainable citizens working toward a new economic system** and reduce your impact on the environment.

L. Measures Study 3

Outcome Measures

Opting into carbon footprint calculation:
Participants were asked whether they would like to know their carbon footprint. Response options range from 0 = "No, I would not like to know my carbon footprint" to 1 = "Yes, I would like to know my carbon footprint"
Respondents who choose "Yes" will be given 11 additional multiple-choice questions to calculate their emissions:

1. *What is your diet?*
2. *In a week, how much do you spend on food from restaurants, canteens and takeaways?*
3. *In a week, how much do you as an individual spend on groceries (including all food from supermarket etc, i.e., meat, veg, rice)?*
4. *In a week, on average how much do you spend on fuel?*
5. *In a week, on average how much do you spend on trains (e.g., public transit)?*
6. *In a week, on average how much do you spend on buses?*
7. *In a year, on average how much do you spend on flights?*
8. *Each month, how much do you spend on heating and electricity?*
9. *Is your energy on a green tariff?*
10. *In the past 12 months, have you bought any of these new household items?*
11. *In a typical month, how much do you spend on clothes and footwear?*

Each of the multiple-choice response options for these questions corresponds to a numeric coefficient. These coefficients are combined using a mathematical formula inputted into Qualtrics, to calculate their total carbon footprint. The equation is:

Carbon Footprint = (Q1 ans x Q2 ans) + (Q1 ans x Q3 ans) + (Q4 ans + Q5 ans + Q6 ans + Q7 ans) + (Q8 ans x Q9 ans) + (Q10 ans + Q11)

These questions and coefficients use a proprietary methodology from a carbon impact software company, Sequest. To ensure that the participant completed the questionnaire and received a carbon footprint calculation (which was displayed to them), we used the presence of any carbon footprint calculation to measure engagement (1) or not (0).

If they selected "No, I would not like to know my carbon footprint" then they were given the following free-response question: "Is there any reason you did not want to calculate your carbon footprint? Please provide a few words below."

Environmental policy acceptance:

Participants were provided with a set of 10 policy proposals, incorporating 5 popular policies from each of the degrowth (indicated by "[DG]") and green growth (indicated by "[GG]") agendas. These were adapted from the literature on degrowth related policies (Ahvenharju, 2020; Buch-Hansen & Koch, 2019; Cosme et al., 2017; Hickel, 2020; Kallis et al., 2013; Stuart et al., 2020; van den Bergh & Kallis, 2012; van Parijs & Vanderborght, 2017; Videira et al., 2014) as well as the literature on green growth-related policies (D'Alessandro et al., 2020; Gunderson & Yun, 2017; Hickel & Kallis, 2020; Liberalesso et al., 2020; O'Neill, 2020).

1. *Reduction in the work week to a 4-day maximum [DG]*
2. *An income tax of 100% above a certain threshold of excessive earnings [DG]*
3. *Ban on new fossil fuel plants and rapid phase out of existing fossil fuel uses [DG]*
4. *Restricting advertising of emissions related products, e.g., fossil fuels, flights, etc. [DG]*
5. *Universal basic income, e.g., all citizens receive unconditional earnings outside of employment [DG]*
6. *Pricing CO2 emissions through taxes and carbon trading [GG]*
7. *Mandatory eco-labelling, and phasing out of less efficient technologies [GG]*
8. *Subsidies to firms toward research and innovation of more efficient technologies [GG]*
9. *Subsidies for green consumer technologies (e.g., electric cars) [GG]*
10. *Rapid expansion of renewable energy capacities [GG]*

Participants reported the extent to which they accept each policy, on a 7-point Likert scale, with responses ranging from "Not at all acceptable" to "Very acceptable" adapted from Tobler et al. (2012). Scores were averaged to obtain an overall policy score (across all 10 policies) and sub-scale scores for the degrowth and green growth policies.

<u>Position Choice:</u>
(Drews et al., 2019; Lehmann et al., 2022)

Here are several positions on the relation between economic growth and the environment. Which of them is closest to your own opinion?
'Economic growth' is defined as growth of the Gross Domestic Product (GDP) on this page. The statements refer to rich industrialized countries.

Public policy in rich industrialized countries should…

1. *further pursue economic growth in spite of its environmental impacts.*
2. *further pursue economic growth. There are many ways to make economic growth compatible with environmental sustainability.*

3. *ignore economic growth as a policy aim, that is, be completely neutral about growth. This will amplify the policy spectrum to combine well-being and environmental sustainability goals.*
4. *stop pursuing economic growth. Production and consumption need to be downscaled in an equitable way to achieve environmental sustainability.*

Participants will select one of the options above, corresponding to 1) growth at all costs, 2) green growth, 3) a-growth, and 4) degrowth, respectively.

Covariates

Perceived socio-economic status:
(Adler & Stewart, 2007)

Think of this ladder as representing where people stand in the United Kingdom. At the top of the ladder are the people who are the best off – those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off – those who have the least money, least education, the least respected jobs, or no job. The higher up you are on this ladder (i.e., closer to 1), the closer you are to the people at the very top; the lower you are (i.e., closer to 10), the closer you are to the people at the very bottom.

On the slider below, please select the number corresponding to the rung where you think you stand at this time in your life, relative to other people in the United Kingdom.

Message Credibility:
(Appelman & Sundar, 2016; Jäger & Weber, 2020)

Please report your agreement with the following: How well do you think each of the following words describes the text you read at the start of this survey?

1. *Accurate*
2. *Trustworthy*
3. *Believable*

Respondents report their agreement with these dimensions on a Likert scale ranging from “Describes very poorly” (1) to “Describes very well” (7)

Utopian Impulse:
(Basso & Krpan, 2020)

Please report the extent to which you agree with the following statements.

1. *One of the most important driving forces in my life is to develop ideas that could contribute to a better world in which nothing is missing for all human beings.*
2. *I often participate in conversations whose purpose is to come up with potential solutions to the biggest social ills of our time.*
3. *I frequently have the impulse to help transform the current society into a new world where the biggest issues of our age are extinct.*
4. *I feel that there are many alternative social and economic activities that could resolve current social issues if they were widely adopted.*
5. *I often feel that there are new ways of living that would create social and economic justice for everyone.*
6. *I often get the impression that the future of our society could be better if some existing solutions to transform economic and social reality were scaled up.*
7. *I get excited when I encounter ideas that changed the world for the better by enabling social and economic progress.*
8. *I feel excited when I come across propositions that could overcome our past and present economic, social, and environmental failures.*
9. *I am thrilled when I come across already existing solutions that could improve the circumstances of people who are underprivileged if they were more widely adopted.*
10. *Whenever I have the choice, I choose products and services that can help fix the social and environmental problems resulting from our malfunctioning economic system.*
11. *Current examples of social and economic inequality motivate me to choose ethical products that counter exploitation and injustice.*
12. *My everyday choices of products and services can help transform the economic and social life of the workers in these industries.*

Responses will be recorded on a 7-point Likert scale, ranging from "Strongly disagree" to "Strongly agree"

Manipulation Check Variables

Mindset framing check:

What was the app called?

1. "Green Citizen App" (for the Citizen condition)
2. "Green Consumer App" (for the Consumer condition)
3. "Green App" as a filler

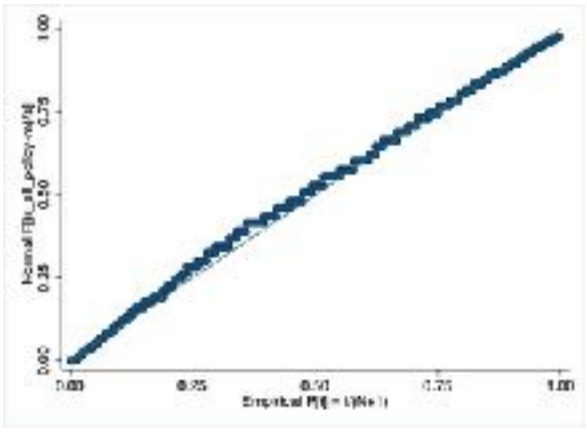
Environmental framing check:

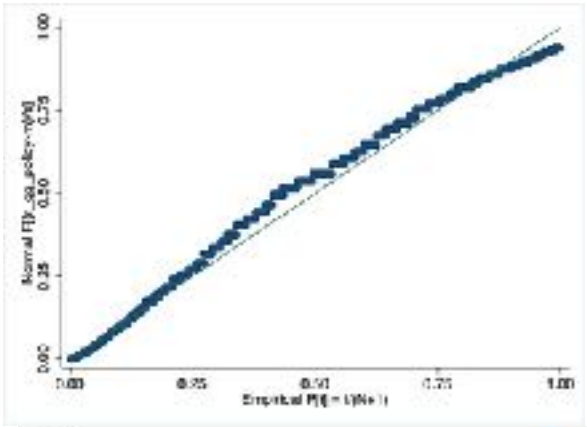
In the text, what was the main cause of the problem?

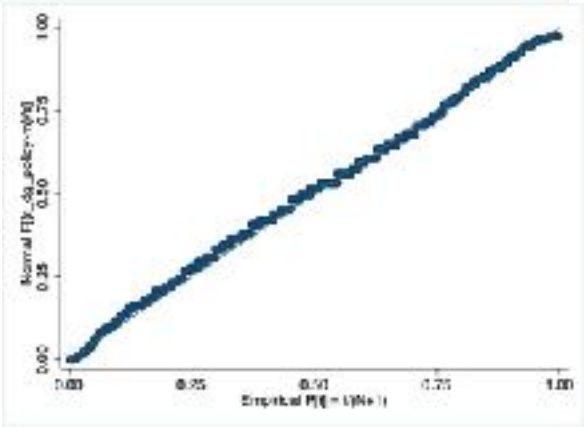
1. "The system" (for the Degrowth condition)
2. "People's behaviour" (for the Green Growth condition)

3. “Hot temperatures” as a filler

M. Normal Probability Plots for Dependent Variable Residuals - Study 3



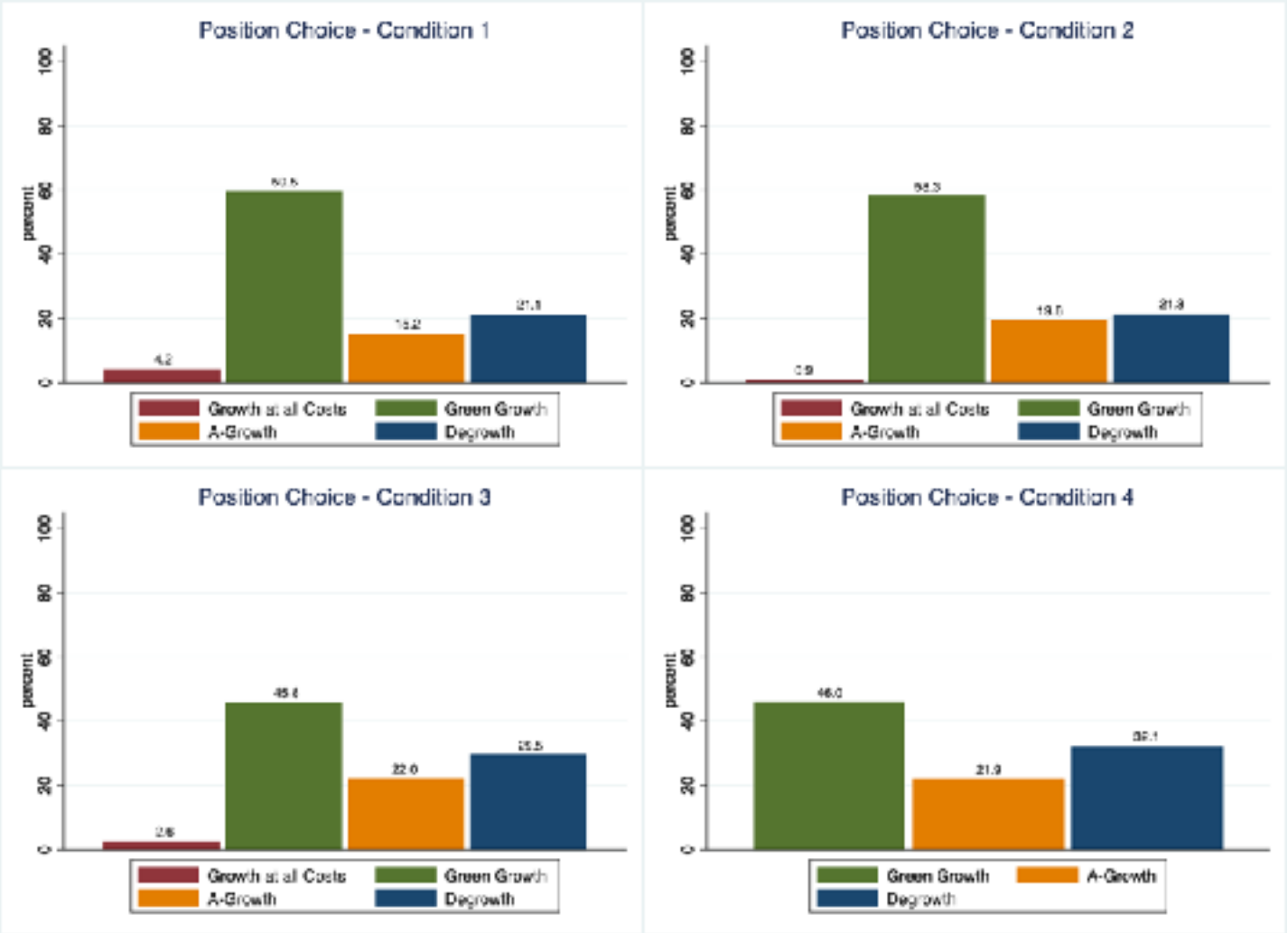




Note: Charts display the standardized normal probability plot (P-P plot) of the residuals from a simple OLS regression with each continuous dependent variable, as noted in the title of each figure. Normal probability plots, using the *pnorm* function in Stata, put the focus on the centre of the distribution.

A. Position Choice by Condition

Figure 18 – Percent of Selected Position Choice by Condition



N. Histograms for Male and Female Support of Degrowth Policies

Figure 19 - Distribution of Degrowth Policy Support amongst

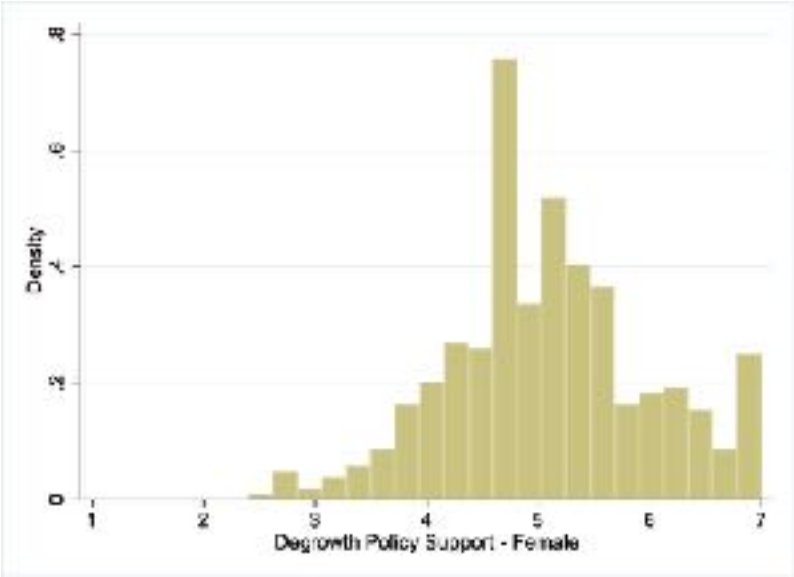
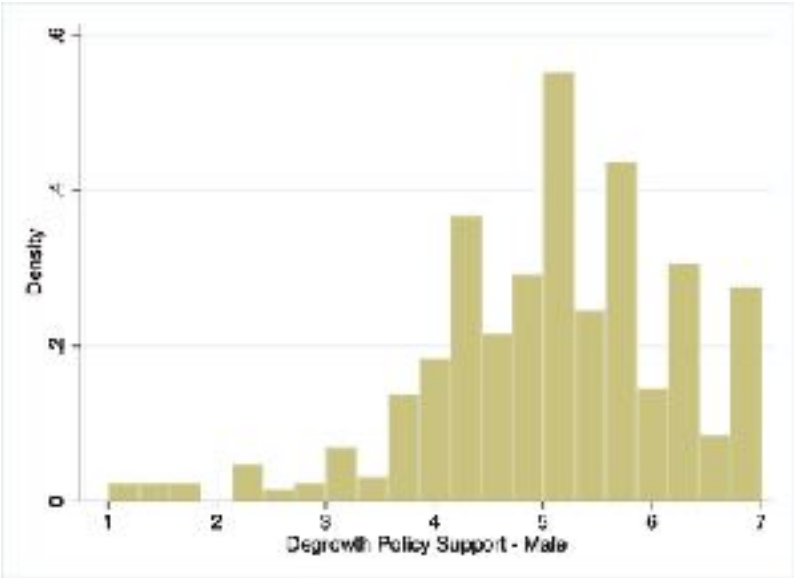


Figure 20 - Distribution of Degrowth Policy Support amongst



O. Moderation Results Study 3

Table 41 - Moderation Analyses (OLS) – Study 3

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Overall Policy Acceptance	Overall Policy Acceptance	Degrowth Policy Acceptance	Degrowth Policy Acceptance	Green Growth Policy Acceptance	Green Growth Policy Acceptance
Degrowth	-0.16**	-0.07	-0.24**	-0.13	-0.09	-0.01
	(0.08)	(0.07)	(0.10)	(0.09)	(0.08)	(0.07)
Citizen	-0.10	-0.04	-0.16*	-0.07	-0.05	-0.01
	(0.08)	(0.06)	(0.09)	(0.08)	(0.08)	(0.06)
Environmental x Mindset Framing	0.13	0.06	0.25*	0.18	-0.00	-0.05
	(0.11)	(0.09)	(0.14)	(0.12)	(0.11)	(0.09)
Message Credibility		0.15***		0.12***		0.18***
		(0.03)		(0.04)		(0.03)
Utopian Impulse		0.28***		0.30***		0.26***
		(0.04)		(0.05)		(0.05)
Perceived Status		-0.00		-0.00		-0.00
		(0.01)		(0.02)		(0.02)
Green Scale		0.16***		0.17***		0.15***
		(0.04)		(0.04)		(0.04)
Political Identity		-0.10***		-0.14***		-0.06***
		(0.01)		(0.02)		(0.01)
Age		0.00		-0.00		0.00
		(0.00)		(0.01)		(0.01)
Income		-0.00*		-0.01***		0.00
		(0.00)		(0.00)		(0.00)
Education						
High school diploma		0.08		-0.01		0.18*
		(0.10)		(0.12)		(0.10)

VARIABLES	(1) Overall Policy Acceptance	(2) Overall Policy Acceptance	(3) Degrowth Policy Acceptance	(4) Degrowth Policy Acceptance	(5) Green Growth Policy Acceptance	(6) Green Growth Policy Acceptance
Some undergraduate		0.12		-0.02		0.27**
		(0.12)		(0.15)		(0.12)
Bachelor's degree		0.23**		0.13		0.33***
		(0.09)		(0.12)		(0.09)
Post-graduate degree		0.31***		0.19		0.43***
		(0.10)		(0.13)		(0.10)
Gender						
Male		0.13***		0.14**		0.12**
		(0.04)		(0.06)		(0.05)
Prefer not to say		0.66***		0.98***		0.34***
		(0.08)		(0.11)		(0.09)
Constant	5.51***	2.76***	5.22***	2.90***	5.81***	2.62***
	(0.06)	(0.32)	(0.07)	(0.39)	(0.06)	(0.33)
Observations	933	811	933	811	933	811
R-squared	0.01	0.43	0.01	0.35	0.00	0.38

Note: Coefficients are displayed, with robust standard errors below in parentheses. Columns (1), (3), and (5) display regression results without covariates, columns (2), (4) and (6) display the results including covariates. The dependent variable is listed at the top of the column. The Green Growth condition is the omitted reference category for environmental framing, while the Consumer condition is the omitted category for mindset framing. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 42 - Moderation Analyses (Logit) – Study 3

VARIABLES	(1) Engagement w/ Carbon Footprint	(2) Engagement w/ Carbon Footprint
Degrowth	0.69*	0.75
	(0.15)	(0.19)
Citizen	0.85	0.83
	(0.19)	(0.22)
Environmental x Mindset Framing	1.42	1.71
	(0.43)	(0.62)
Message Credibility		1.51***
		(0.14)
Utopian Impulse		1.80***
		(0.26)
Perceived Status		0.98
		(0.05)
Green Scale		0.91
		(0.11)
Political Identity		0.94
		(0.04)
Age		1.01
		(0.02)
Income		1.01*
		(0.01)
Education		
High school diploma		1.54
		(0.55)
Some undergraduate		1.58
		(0.67)

VARIABLES	(1) Engagement w/ Carbon Footprint	(2) Engagement w/ Carbon Footprint
Bachelor's degree		2.00**
		(0.66)
Post-graduate degree		2.17**
		(0.79)
Gender		
Male		0.62**
		(0.12)
Constant	3.67***	0.02***
	(0.58)	(0.02)
Observations	933	810

Note: Odds ratios are displayed, with robust standard errors below in parentheses. Analyses use a binary logit model given the dichotomous outcome of engagement with the carbon footprint calculator. Columns (1) displays results without covariates, and column (2) displays the results including covariates. The Green Growth condition is the omitted reference category for environmental framing, while the Consumer condition is the omitted category for mindset framing. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

P. Non-parametric Robustness Checks – Study 3

As the Kruskal-Wallis test can be used for independent variables with 2 or more levels, we used it to assess any significant differences between the levels of the environmental and mindset framing variables. For the Kruskal-Wallis test on overall policy acceptance, comparing the two environmental framing conditions yielded a significant result at the 5% level, x^2 (1) = 4.2, p = .041. This result exhibits a lower p-value than in the linear model, which was only significant at the 10% level. The mindset framing conditions were still not significantly different from each other, x^2 (1) = 0.99, p = .320, and there were no significant differences when comparing all four conditions, x^2 (3) = 5.86, p = .119. For the degrowth policy acceptance variable, the environmental framing conditions resulted in a marginally significant difference at the 10%, x^2 (1) = 3.33, p = .068 but no significant difference for the mindset framing x^2 (1) = 0.63, p = .43, and there were no significant differences when

comparing all four conditions, x^2 (3) = 5.87, p = .118. Finally for the green growth policy acceptance variable, the environmental framing conditions resulted in a significant difference at the 10% level, x^2 (1) = 3.62, p = .057 but no significant difference for the mindset framing x^2 (1) = 0.99, p = .32, and there were no significant differences when comparing all four conditions x^2 (3) = 4.57, p = .206. Neither of the policy sub-scales exhibited any significance in the OLS regressions, so these results somewhat strengthen the support for H1, though only at the 10% level. However, there is still no evidence to support H2.

Table 43 - Non-parametric Kernel Regressions – Study 3

	(1)	(2)	(3)	(4)	(5)
VARIABLES	**Overall Policy Acceptance**	**Degrowth Policy Acceptance**	**Green Growth Policy Acceptance**	**Engagement w/ Carbon Footprint**	**Position Choice**
Degrowth v. Green Growth	-0.04*	-0.05	-0.04	-0.01	0.11***
	(0.02)	(0.03)	(0.03)	(0.01)	(0.03)
Citizen v. Consumer	-0.01	-0.01	-0.01	0.00	0.02
	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)
Mean	5.41***	5.08***	5.74***	0.75***	2.70***
	(0.03)	(0.03)	(0.03)	(0.01)	(0.03)
Observations	933	933	933	933	931
R-squared	0.00	0.01	0.00	0.00	0.02

Note: This table contains results for a non-parametric kernel regression, using bootstrapped standard errors with 100 reps and seed value 123, for all outcome variables in Study 1. Kernel specifies a kernel density function for continuous covariates for use in calculating the local-constant or local-linear estimator. Each coefficient indicates the estimated difference between the two listed conditions, where Green Growth is the reference category for Environmental Framing, and Consumer is the reference category for Mindset Framing. Mean represents the observed estimated mean of the outcome variable in each column from the model. The analyses do not include covariates. The dependent variable is listed at the top of the column. *** p<0.01, ** p<0.05, * p<0.1.

Table 43 shows the results of non-parametric kernel regressions. For the specification with the overall policy acceptance outcome, we find a marginal significance of the

environmental policy variable (β = -.04, p = .054) at the 10% level. These results support the linear specifications suggesting that the Degrowth condition was associated with lower environmental policy support than the Green Growth condition. There is no significant difference in the effect of mindset framing on overall policy acceptance (β = -.01, p = .444). For the degrowth policy acceptance variable, there is a significant difference at the 10% significance the environmental framing (β = -.05, p = .057) or but not for the mindset (β = -.01, p = .599) framing treatment. For the green growth policy acceptance variable, there is no significant difference for either the environmental framing (β = -.04, p = .117) or mindset framing (β = -.01, p = .39). Results for all overall and green growth policy variables are accordingly consistent with the linear specifications, and there is some additional support for H1 from the degrowth policy variable.

Because the non-parametric kernel regression is agnostic to functional form, we can also use this specification to assess the robustness of our logistic regressions. The kernel regression with the carbon footprint outcome variable yields no significant differences between the environmental (β = -.01, p = .262) or mindset framing conditions (β = .001, p = .900). This is consistent with the logit specification. The kernel regression with position choice as the outcome variable results in a significant difference for the environmental framing variable at the 1% level (β = 0.108, p <.001). The significance and direction of the result is also consistent with the logit specification, though it is difficult to compare the magnitude of the effects across specifications. The mindset framing variable was still not significant in this specification (β = 0.022, p = .211). These non-parametric results lend further evidence in support of H6a but not H6b, H1a, or H1b.

Q. Results using Multiple Imputations for Selected Covariates – Studies 1 – 3

a. Study 1

Multiple imputation is a method for handling missing data by replacing missing values with plausible alternatives based on the distributions of and relationships among variables in a dataset (Li et al., 2015; Rubin, 2018). This is a preferred method of handling missing values than single-value imputation, which can result in bias. To justify the use of multiple imputation, the data must either be missing completely at random (MCAR) or, more commonly, missing at random (MAR). It is also important to consider how much data may be imputed, as a substantial amount of imputed data (e.g., 50%) means estimates are no longer derived primarily from observed data.

In Study 1, 11.9% of the data include missing values for our covariates, primarily from the political ideology and income variables. We use a method for determining the missingness of our political ideology and income variables, based on the Multiple Imputation

in Stata series[28]. A logit analysis is conducted whereby all relevant numeric variables predict a binary variable, which is coded as 1 if the value is missing for a given variable, and 0 if it is not missing. **Table 44** below shows that for the analysis with income as the outcome variable, a few variables appear to somewhat significantly predict its missingness, including WDT, intention to consume less, condition, and certain levels of education. For political ideology, a few variables also appear to predict its missingness, including purchase intentions, condition, and Scepticism. Both variables appear to be MAR. Multiple imputation methodology can handle both MAR and MCAR data (Pedersen et al., 2017), so we use it for both of these variables in Study 1. There is one value for age which we recoded as missing, as we assumed it to be a mistake (i.e., age = 3 was recorded originally). We do not assess the missingness of this variable but use multiple imputation on the single value to maintain the full sample size.

Table 44 - Logit Analyses - MCAR v. MAR – Study 1

	(1)	(2)
VARIABLES	**Income**	**Political Ideology**
Willingness to Donate Time	0.87*	0.97
	(0.06)	(0.07)
Purchase Intentions	0.91	1.94**
	(0.28)	(0.52)
Intention to Consume Less	0.57*	1.04
	(0.17)	(0.35)
Petition Click-Through	0.71	0.40
	(0.56)	(0.34)
Condition		
Green Growth	0.36*	0.50
	(0.21)	(0.27)
Degrowth	0.66	0.21**
	(0.39)	(0.13)
Scepticism	1.34	1.47**
	(0.32)	(0.25)
Trust	1.09	1.18

[28] https://www.ssc.wisc.edu/sscc/pubs/stata_mi_decide.htm.

	(0.14)	(0.18)
Social Media Purchasing	1.41	1.27
	(0.50)	(0.49)
Social Media Frequency	0.95	1.06
	(0.32)	(0.30)
Social Media Time	0.84	1.19
	(0.25)	(0.32)
Green Scale	1.78	0.69
	(0.63)	(0.27)
Political Ideology	0.97	
	(0.12)	
Age	1.04	0.92*
	(0.08)	(0.04)
Education		
High school diploma	0.08**	0.49
	(0.09)	(0.41)
Some undergraduate	0.53	0.78
	(0.47)	(0.66)
Bachelor's degree	0.25**	0.41
	(0.17)	(0.32)
Post-graduate degree	0.21*	0.16*
	(0.17)	(0.16)
Gender		
Male	0.54	0.56
	(0.26)	(0.28)
Promotion	0.72	1.40
	(0.16)	(0.43)
Prevention	1.28	1.01
	(0.45)	(0.37)
Income		1.00
		(0.00)
Constant	0.14	0.00
	(0.63)	(0.01)

Observations	456	464

Note: This table displays the results of logit analyses for which the outcome variable is a binary indicator of whether (1) or not (0) the listed variable is missing for a given observation. Each model includes all the relevant numeric variables in the dataset as predictor variables. Odds ratios are displayed. The race and ethnicity variable was excluded from these analyses, as most categories perfectly predicted outcome, resulting in several omitted values. Those identifying as "Non-binary" and "Prefer not to say" for gender were omitted from both analyses as the values perfectly predicted the outcome. *** p<0.01, ** p<0.05, * p<0.1.

To perform multiple imputation, we employed a method using Stata's *mi* set of commands. We first use the multivariate normal method to impute data, creating 10 imputation datasets, based on (Raghunathan et al., 2022). We then use the *mi estimate* command to fit a linear regression model on each of the five imputation datasets, and then combine the results into one set of estimates, and report these estimates in the various tables including covariates in this article.

Study 1 Covariate Analyses with Multiple Imputation

Table 45 - Main Effects (OLS) with Multiple Imputation - Study 1

	(1)	(2)	(3)
VARIABLES	**Purchase Intentions**	**Willingness to Donate Time**	**Intention to Consume Less**
Green Growth	-0.03	0.50	-0.04
	(0.09)	(0.34)	(0.07)
Degrowth	-0.08	0.69**	-0.06
	(0.09)	(0.33)	(0.08)
Scepticism	-0.12***	-0.06	-0.07**
	(0.04)	(0.12)	(0.03)
Trust	0.10***	0.08	0.02
	(0.03)	(0.08)	(0.02)
Past SM Purchasing	-0.11	-0.03	-0.00
	(0.07)	(0.23)	(0.05)
Green Scale	0.46***	0.38**	0.65***
	(0.05)	(0.16)	(0.04)

VARIABLES	(1) Purchase Intentions	(2) Willingness to Donate Time	(3) Intention to Consume Less
Political Ideology	0.06***	0.02	-0.03
	(0.02)	(0.08)	(0.02)
Age	0.00	0.07**	0.01
	(0.01)	(0.03)	(0.01)
Income	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Education			
High school diploma	-0.06	-0.46	-0.09
	(0.15)	(0.47)	(0.12)
Some undergraduate	-0.04	-1.21**	-0.25*
	(0.18)	(0.57)	(0.15)
Bachelor's degree	-0.15	-0.97**	-0.14
	(0.14)	(0.43)	(0.11)
Post-graduate degree	-0.26	-1.19**	-0.13
	(0.16)	(0.50)	(0.13)
Gender			
Male	-0.02	-0.50*	-0.22***
	(0.08)	(0.29)	(0.07)
Non-binary	-0.31	-0.45	-0.54**
	(0.25)	(1.43)	(0.23)
Prefer not to say	-0.32	-1.30	0.17
	(0.39)	(2.95)	(0.24)
Constant	2.08***	1.11	2.46***
	(0.50)	(1.61)	(0.43)
Observations	502	502	502

Note: This table displays the results of OLS regressions with covariates from Study 1, using multiple imputation to replace missing values for political ideology (N = 38), income (N = 31), and age (N = 1) based on 10 iterations. Coefficients are displayed, with robust standard errors below in parentheses. The dependent variable is listed at the top of the column. The Neutral Green condition is the omitted reference category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 46 - Main Effects (Logit) with Multiple Imputation - Study 1

	(1)	(2)
VARIABLES	Petition Click-Through	WDT (Binary)
Green Growth	1.30	1.49
	(0.40)	(0.39)
Degrowth	0.97	1.68**
	(0.32)	(0.43)
Scepticism	1.00	0.94
	(0.11)	(0.09)
Trust	1.04	1.07
	(0.07)	(0.06)
Past SM Purchasing	1.07	0.98
	(0.26)	(0.18)
Green Scale	0.98	1.33**
	(0.15)	(0.16)
Political Ideology	0.87**	1.02
	(0.06)	(0.06)
Age	0.99	1.05*
	(0.03)	(0.03)
Income	1.00	1.00
	(0.00)	(0.00)
Education		
High school diploma	0.86	0.58
	(0.47)	(0.33)
Some undergraduate	1.11	0.32*
	(0.68)	(0.19)
Bachelor's degree	0.96	0.38*
	(0.47)	(0.20)
Post-graduate degree	1.01	0.31**
	(0.52)	(0.18)

VARIABLES	(1) Petition Click-Through	(2) WDT (Binary)
Gender		
Male	1.24	0.68*
	(0.34)	(0.15)
Non-binary	1.15	0.68
	(1.23)	(0.64)
Prefer not to say	5.47	0.43
	(7.14)	(0.80)
Constant	0.21	0.18
	(0.30)	(0.24)
Observations	502	502

Note: This table displays the results of logit regressions with covariates from Study 1, using multiple imputation to replace missing values for political ideology (N = 38), income (N = 31), and age (N = 1) based on 10 iterations. Odds ratios are displayed, with robust standard errors below in parentheses. The dependent variable is listed at the top of the column. The Neutral Green condition is the omitted reference category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 47 - Prevention/Promotion Moderation (Purchase Intentions) with Multiple Imputation - Study 1

	(1)	(2)	(3)	(4)
VARIABLES	Purchase Intentions	Purchase Intentions	Purchase Intentions	Purchase Intentions
Green Growth	-0.032	-0.022		
	(0.093)	(0.092)		
Degrowth	-0.085	-0.094	-0.057	-0.073
	(0.091)	(0.092)	(0.097)	(0.096)
Prevention (Standardized)	0.017		0.079	
	(0.068)		(0.087)	
GG x Prevention	0.065			
	(0.111)			
DG x Prevention	-0.120		-0.192	
	(0.108)		(0.121)	
Scepticism	-0.126***	-0.119***	-0.158***	-0.150***
	(0.039)	(0.039)	(0.050)	(0.050)
Trust	0.099***	0.098***	0.109***	0.107***
	(0.029)	(0.028)	(0.038)	(0.038)
Past Social Media Purchasing	-0.116*	-0.112	-0.074	-0.072
	(0.067)	(0.069)	(0.087)	(0.088)
Green Scale	0.457***	0.472***	0.418***	0.439***
	(0.046)	(0.046)	(0.055)	(0.056)
Political Ideology	0.055***	0.053**	0.057**	0.056**
	(0.020)	(0.021)	(0.025)	(0.026)
Age	0.001	0.001	-0.010	-0.010
	(0.009)	(0.009)	(0.011)	(0.011)
Income	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Education				
High school diploma	-0.045	-0.062	-0.037	-0.038
	(0.153)	(0.150)	(0.188)	(0.185)
Some undergraduate	-0.036	-0.045	-0.212	-0.201

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Purchase Intentions	(4) Purchase Intentions
	(0.172)	(0.174)	(0.225)	(0.227)
Bachelor's degree	-0.151	-0.138	-0.297*	-0.265
	(0.143)	(0.140)	(0.180)	(0.178)
Post-graduate degree	-0.267*	-0.262*	-0.365*	-0.342*
	(0.159)	(0.156)	(0.198)	(0.196)
Gender				
Male	-0.019	-0.031	-0.137	-0.150
	(0.082)	(0.081)	(0.104)	(0.105)
Non-binary	-0.330	-0.313	-0.177	-0.132
	(0.244)	(0.257)	(0.163)	(0.208)
Prefer not to say	-0.320	-0.323	-0.362	-0.366
	(0.407)	(0.394)	(0.411)	(0.407)
Promotion (Standardized)		0.065		0.012
		(0.062)		(0.079)
GG x Promotion		-0.054		
		(0.094)		
DG x Promotion		-0.181**		-0.119
		(0.085)		(0.100)
Constant	2.144***	2.048***	2.763***	2.626***
	(0.510)	(0.500)	(0.626)	(0.608)
Observations	502	502	332	332
Conditions Included:	C1, C2, C3	C1, C2, C3	C2 & C3 only	C2 & C3 only

Note: This table displays the results of moderation analyses using OLS with covariates from Study 1, using multiple imputation to replace missing values for political ideology (N = 38), income (N = 31), and age (N = 1) based on 10 iterations. Coefficients are displayed, with robust standard errors below in parentheses. The dependent variable is purchase intentions. The Neutral Green condition is the omitted category for columns (1) and (2). In columns (3) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 48 - Prevention/Promotion Moderation (Intention to Consume Less) with Multiple Imputation - Study 1

	(1)	(2)	(3)	(4)
VARIABLES	Intention to Consume Less	Intention to Consume Less	Intention to Consume Less	Intention to Consume Less
Green Growth	-0.057	-0.046		
	(0.075)	(0.073)		
Degrowth	-0.059	-0.069	-0.015	-0.039
	(0.076)	(0.075)	(0.083)	(0.081)
Prevention (Standardized)	-0.014		0.169**	
	(0.049)		(0.069)	
GG x Prevention	0.187**			
	(0.086)			
DG x Prevention	0.021		-0.170*	
	(0.081)		(0.096)	
Scepticism	-0.068**	-0.065**	-0.043	-0.036
	(0.029)	(0.030)	(0.038)	(0.039)
Trust	0.019	0.019	0.046*	0.046*
	(0.019)	(0.019)	(0.027)	(0.027)
Past Social Media Purchasing	-0.013	-0.012	-0.031	-0.020
	(0.050)	(0.050)	(0.063)	(0.066)
Green Scale	0.628***	0.664***	0.609***	0.655***
	(0.044)	(0.045)	(0.057)	(0.057)
Political Ideology	-0.030	-0.025	-0.007	-0.002
	(0.021)	(0.021)	(0.026)	(0.027)
Age	0.006	0.005	-0.001	-0.001
	(0.007)	(0.008)	(0.010)	(0.010)
Income	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Education				
High school diploma	-0.084	-0.067	-0.075	-0.067
	(0.120)	(0.114)	(0.147)	(0.139)

VARIABLES	(1) Intention to Consume Less	(2) Intention to Consume Less	(3) Intention to Consume Less	(4) Intention to Consume Less
Some undergraduate	-0.230	-0.228	-0.443**	-0.450**
	(0.146)	(0.149)	(0.187)	(0.189)
Bachelor's degree	-0.145	-0.113	-0.260*	-0.223*
	(0.114)	(0.105)	(0.139)	(0.129)
Post-graduate degree	-0.136	-0.108	-0.157	-0.128
	(0.134)	(0.126)	(0.156)	(0.148)
Gender				
Male	-0.198***	-0.223***	-0.247***	-0.285***
	(0.067)	(0.066)	(0.084)	(0.084)
Non-binary	-0.524**	-0.531**	-0.294	-0.282
	(0.229)	(0.231)	(0.245)	(0.242)
Prefer not to say	0.212	0.174	0.270	0.210
	(0.235)	(0.246)	(0.200)	(0.219)
Promotion (Standardized)		-0.044		-0.006
		(0.057)		(0.076)
GG x Promotion		0.044		
		(0.094)		
DG x Promotion		-0.045		-0.080
		(0.084)		(0.093)
Constant	2.624***	2.416***	2.612***	2.315***
	(0.416)	(0.422)	(0.545)	(0.552)
Observations	502	502	332	332
Conditions Included:	C1, C2, C3	C1, C2, C3	C2 & C3 only	C2 & C3 only

Note: This table displays the results of moderation analyses using OLS with covariates from Study 1, using multiple imputation to replace missing values for political ideology (N = 38), income (N = 31), and age (N = 1) based on 10 iterations. Coefficients are displayed, with robust standard errors below in parentheses. The dependent variable is the intention to consume less. The Neutral Green condition is the omitted category for columns (1) and (2). In columns (3) and (4), Green Growth is the omitted reference, as the Neutral Green

condition has been excluded from these analyses. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 49 - Prevention/Promotion Moderation (WDT) with Multiple Imputation - Study 1

	(1)	(2)	(3)	(4)
VARIABLES	Willingness to Donate Time	Willingness to Donate Time	Willingness to Donate Time	Willingness to Donate Time
Green Growth	0.496	0.477		
	(0.336)	(0.339)		
Degrowth	0.677**	0.690**	0.237	0.268
	(0.324)	(0.328)	(0.324)	(0.326)
Prevention (Standardized)	0.307		-0.016	
	(0.221)		(0.238)	
GG x Prevention	-0.411			
	(0.315)			
DG x Prevention	-0.583*		-0.232	
	(0.310)		(0.322)	
Scepticism	-0.067	-0.060	-0.146	-0.139
	(0.124)	(0.126)	(0.148)	(0.148)
Trust	0.087	0.085	0.087	0.087
	(0.077)	(0.077)	(0.097)	(0.097)
Past Social Media Purchasing	-0.049	-0.035	-0.263	-0.247
	(0.227)	(0.231)	(0.290)	(0.292)
Green Scale	0.395**	0.370**	0.384**	0.327*
	(0.161)	(0.161)	(0.191)	(0.191)
Political Ideology	0.025	0.024	0.050	0.038
	(0.079)	(0.081)	(0.094)	(0.094)
Age	0.066**	0.068**	0.079*	0.083**
	(0.033)	(0.033)	(0.041)	(0.041)
Income	0.000	0.000	0.000	0.000

VARIABLES	(1) Willingness to Donate Time	(2) Willingness to Donate Time	(3) Willingness to Donate Time	(4) Willingness to Donate Time
	(0.000)	(0.000)	(0.000)	(0.000)
Education				
High school diploma	-0.419	-0.435	-0.230	-0.269
	(0.469)	(0.478)	(0.571)	(0.569)
Some undergraduate	-1.238**	-1.173**	-0.390	-0.370
	(0.581)	(0.580)	(0.694)	(0.688)
Bachelor's degree	-0.946**	-0.976**	-0.332	-0.377
	(0.433)	(0.437)	(0.518)	(0.520)
Post-graduate degree	-1.149**	-1.192**	-0.926	-0.967
	(0.501)	(0.511)	(0.605)	(0.610)
Gender				
Male	-0.502*	-0.493*	0.142	0.166
	(0.289)	(0.290)	(0.360)	(0.359)
Non-binary	-0.616	-0.449	-2.864	-2.797
	(1.461)	(1.437)	(1.884)	(1.803)
Prefer not to say	-1.370	-1.234	-0.736	-0.616
	(2.987)	(2.994)	(3.120)	(3.084)
Promotion (Standardized)		-0.097		0.152
		(0.248)		(0.285)
GG x Promotion		0.223		
		(0.359)		
DG x Promotion		0.148		-0.071
		(0.337)		(0.362)
Constant	1.081	1.138	1.166	1.359
	(1.645)	(1.617)	(1.905)	(1.883)
Observations	502	502	332	332
Conditions Included:	C1, C2, C3	C1, C2, C3	C2 & C3 only	C2 & C3 only

Note: This table displays the results of moderation analyses using OLS with covariates from Study 1, using multiple imputation to replace missing values for political ideology (N = 38), income (N = 31), and age (N = 1) based on 10 iterations. Coefficients are displayed, with robust standard errors below in parentheses. The dependent variable is the willingness to donate time to the brand. The Neutral Green condition is the omitted category for columns (1) and (2). In columns (3) and (4), Green Growth is the omitted reference, as the Neutral Green condition has been excluded from these analyses. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

b. Study 2

In Study 2, 15.8% of the data include missing values for our covariates from the political ideology and income variables. We again conducted the same logit analyses to determine the type of missingness of these variables. **Table 50** below shows that for both analyses, a few variables appear to predict their missingness, indicating both income and political ideology are MAR. As multiple imputation methodology is suitable for MAR data (Pedersen et al., 2017), we use it for both of these variables in Study 2. There was also one missing value for age, which we do not assess the missingness of given the single instance but use multiple imputation to maintain the full sample size.

Table 50 - Logit Analyses - MCAR v. MAR – Study 2

	(1)	(2)
VARIABLES	**Income**	**Political Ideology**
Willingness to Donate Time	1.08	0.99
	(0.08)	(0.04)
Purchase Intentions	0.47***	1.12
	(0.09)	(0.16)
Intention to Consume Less	0.78	0.94
	(0.20)	(0.13)
Petition Click-Through	0.23	0.49*
	(0.23)	(0.21)
Condition		
Green Growth	1.54	1.31
	(0.74)	(0.36)
Degrowth	0.65	1.18
	(0.38)	(0.34)
Scepticism	0.80	1.14
	(0.14)	(0.13)
Ethicality	2.03**	1.02
	(0.58)	(0.16)
SM Frequency	0.96	1.03
	(0.16)	(0.09)
Green Scale	1.51	0.80
	(0.44)	(0.12)
Political Ideology	0.94	
	(0.10)	
Age	1.01	0.94**
	(0.04)	(0.03)
Education		
High school diploma	0.57	0.54*
	(0.40)	(0.19)
Some undergraduate	0.13*	0.69

VARIABLES	(1) Income	(2) Political Ideology
	(0.16)	(0.28)
Bachelor's degree	0.56	0.38***
	(0.39)	(0.13)
Post-graduate degree	0.41	0.25***
	(0.34)	(0.11)
Gender		
Male	0.38**	0.39***
	(0.17)	(0.10)
Income		1.00
		(0.00)
Constant	0.04	4.20
	(0.09)	(5.50)
Observations	846	919

Note: This table displays the results of logit analyses for which the outcome variable is a binary indicator of whether (1) or not (0) the listed variable is missing for a given observation. Each model includes all the relevant numeric variables in the dataset as predictor variables. Odds ratios are displayed. The race and ethnicity variable was excluded from these analyses, as most categories perfectly predicted outcome, resulting in several omitted values. Those identifying as “Non-binary” and “Prefer not to say” for gender were omitted from both analyses as the values perfectly predicted the outcome. *** p<0.01, ** p<0.05, * p<0.1.

Study 2 Covariate Analyses with Multiple Imputation

Table 51 - Main Effects (OLS) with Multiple Imputation, All Conditions - Study 2

VARIABLES	(1) Purchase Intentions	(2) Willingness to Donate Time	(3) Intention to Consume Less
Green Growth	0.21***	0.20	-0.12*
	(0.07)	(0.24)	(0.07)
Degrowth	0.21***	-0.09	0.05
	(0.07)	(0.24)	(0.07)
Scepticism	-0.02	0.02	-0.00
	(0.03)	(0.09)	(0.03)
Brand Ethicality	0.42***	0.32***	0.16***
	(0.04)	(0.12)	(0.04)
Green Scale	0.38***	0.34***	0.64***
	(0.03)	(0.11)	(0.03)
Political Identity	0.01	0.07	0.00
	(0.02)	(0.05)	(0.01)
Age	0.01	0.07***	0.01*
	(0.01)	(0.02)	(0.01)
Income	-0.00	-0.00**	0.00
	(0.00)	(0.00)	(0.00)
Education			
High school diploma	-0.10	0.06	0.10
	(0.10)	(0.38)	(0.10)
Some undergraduate	-0.23*	0.17	0.07
	(0.12)	(0.44)	(0.11)
Bachelor's degree	-0.17*	0.13	0.00
	(0.10)	(0.36)	(0.10)
Post-graduate degree	-0.07	0.03	0.11
	(0.11)	(0.40)	(0.11)
Gender			
Male	-0.09	-0.37*	-0.29***
	(0.06)	(0.20)	(0.05)
Non-binary	-0.71***	1.78***	-0.05

VARIABLES	(1) Purchase Intentions	(2) Willingness to Donate Time	(3) Intention to Consume Less
	(0.25)	(0.51)	(0.28)
Prefer not to say	-1.98***	-5.42***	-1.14***
	(0.11)	(0.40)	(0.11)
Constant	0.28	-0.51	1.12***
	(0.36)	(1.26)	(0.37)
Observations	969	969	969

Note: This table displays the results of OLS regressions with covariates from Study 2, using multiple imputation to replace missing values for political ideology (N = 122), income (N = 49), and age (N = 1) based on 10 iterations. Coefficients are displayed, with robust standard errors below in parentheses. The dependent variable is listed at the top of the column. The No Ad condition is the omitted reference category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 52 - Main Effects (OLS) with Multiple Imputation, Green Growth & Degrowth Only - Study 2

VARIABLES	(1) Purchase Intentions	(2) Willingness to Donate Time	(3) Intention to Consume Less
Degrowth	0.02	-0.31	0.16***
	(0.07)	(0.23)	(0.06)
Scepticism	-0.02	0.02	-0.02
	(0.03)	(0.11)	(0.03)
Brand Ethicality	0.42***	0.23	0.16***
	(0.05)	(0.15)	(0.05)
Green Scale	0.47***	0.43***	0.62***
	(0.04)	(0.14)	(0.04)
Political Identity	-0.00	0.08	-0.00
	(0.02)	(0.06)	(0.02)
Age	0.01	0.08***	0.01

VARIABLES	(1) Purchase Intentions	(2) Willingness to Donate Time	(3) Intention to Consume Less
	(0.01)	(0.03)	(0.01)
Income	-0.00	-0.00**	-0.00
	(0.00)	(0.00)	(0.00)
Education			
High school diploma	-0.14	-0.10	0.10
	(0.13)	(0.45)	(0.12)
Some undergraduate	-0.31**	-0.14	-0.02
	(0.15)	(0.53)	(0.14)
Bachelor's degree	-0.25**	-0.12	-0.04
	(0.12)	(0.43)	(0.12)
Post-graduate degree	-0.04	-0.25	0.12
	(0.13)	(0.48)	(0.13)
Gender			
Male	-0.03	-0.33	-0.25***
	(0.07)	(0.24)	(0.06)
Prefer not to say	-2.09***	-5.55***	-1.09***
	(0.14)	(0.47)	(0.12)
Constant	0.15	-0.04	1.28***
	(0.45)	(1.66)	(0.48)
Observations	647	647	647

Note: This table displays the results of OLS regressions with covariates from Study 2, using multiple imputation to replace missing values for political ideology (N = 122), income (N = 49), and age (N = 1) based on 10 iterations. Coefficients are displayed, with robust standard errors below in parentheses. The dependent variable is listed at the top of the column. This table only includes results for comparing the Green Growth and Degrowth conditions, as the No Ad condition has been excluded from the analyses. The Green Growth condition is the omitted category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 53 - Main Effects (Logit) with Multiple Imputation - Study 2

VARIABLES	(1) Petition Click-Through	(2) Petition Click-Through	(3) WDT (Binary)	(4) WDT (Binary)
Green Growth	0.77		1.16	
	(0.19)		(0.22)	
Degrowth	0.82	1.04	0.90	0.77
	(0.20)	(0.26)	(0.17)	(0.15)
Scepticism	1.11	1.04	1.01	1.02
	(0.11)	(0.13)	(0.08)	(0.10)
Brand Ethicality	0.91	0.91	1.28***	1.18
	(0.11)	(0.14)	(0.12)	(0.14)
Green Scale	1.31**	1.37**	1.30***	1.40***
	(0.14)	(0.21)	(0.11)	(0.15)
Political Identity	1.09*	1.11*	1.06	1.09
	(0.06)	(0.07)	(0.05)	(0.06)
Age	1.06**	1.05*	1.06***	1.07***
	(0.02)	(0.03)	(0.02)	(0.03)
Income	1.00*	1.00**	1.00**	1.00**
	(0.00)	(0.00)	(0.00)	(0.00)
Education				
High school diploma	0.72	0.53	1.05	0.91
	(0.30)	(0.28)	(0.32)	(0.37)
Some undergraduate	0.55	0.50	1.15	0.87
	(0.30)	(0.34)	(0.40)	(0.40)
Bachelor's degree	1.84	1.35	1.12	0.89
	(0.69)	(0.65)	(0.32)	(0.34)
Post-graduate degree	1.50	1.34	1.02	0.80
	(0.62)	(0.69)	(0.32)	(0.33)
Gender				
Male	0.71	0.69	0.73*	0.73
	(0.15)	(0.19)	(0.12)	(0.15)
Constant	0.01***	0.01***	0.04***	0.05**

VARIABLES	(1) Petition Click-Through	(2) Petition Click-Through	(3) WDT (Binary)	(4) WDT (Binary)
	(0.01)	(0.02)	(0.04)	(0.07)
Observations	966	646	966	646
Conditions Included:	C1, C2, C3	C2 & C3 only	C1, C2, C3	C2 & C3 only

Note: This table displays the results of logit regressions with covariates from Study 2, using multiple imputation to replace missing values for political ideology (N = 122), income (N = 49), and age (N = 1) based on 10 iterations. Odds ratios are displayed, with robust standard errors below in parentheses. The dependent variable is listed at the top of the column. In Columns (1) and (3), the No Ad condition is the omitted reference category for condition. Columns (2) and (4) only include results comparing the Green Growth and Degrowth conditions, as the No Ad condition has been excluded from the analyses, and the Green Growth condition is the omitted category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. Participants who identified as "Non-binary" or "Prefer not to say" for gender (N = 3) were omitted from the logit analyses as they perfectly predicted the outcome.*** p<0.01, ** p<0.05, * p<0.1.

Table 54 - Green Consumption Moderations with Multiple Imputation - Study 2

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
Green Growth	0.213***		0.206	
	(0.069)		(0.237)	
Degrowth	0.224***	0.016	-0.088	-0.309
	(0.071)	(0.066)	(0.243)	(0.232)
Green Scale (Standardized)	0.197***	0.400***	0.232	0.386**
	(0.046)	(0.056)	(0.175)	(0.174)
GG x Green Scale	0.209***		0.107	
	(0.069)		(0.239)	
DG x Green Scale	0.352***	0.145*	0.218	0.087
	(0.075)	(0.081)	(0.257)	(0.254)
Scepticism	-0.019	-0.018	0.023	0.017
	(0.027)	(0.033)	(0.093)	(0.114)

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
Brand Ethicality	0.420***	0.416***	0.325***	0.221
	(0.037)	(0.047)	(0.120)	(0.154)
Political Ideology	0.011	0.000	0.067	0.097
	(0.016)	(0.019)	(0.053)	(0.062)
Age	0.009	0.007	0.074***	0.078***
	(0.006)	(0.008)	(0.023)	(0.028)
Income	-0.000	-0.000	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Education				
High school diploma	-0.117	-0.144	0.050	-0.113
	(0.098)	(0.125)	(0.377)	(0.452)
Some undergraduate	-0.244**	-0.301**	0.161	-0.151
	(0.117)	(0.151)	(0.439)	(0.534)
Bachelor's degree	-0.166*	-0.242**	0.136	-0.132
	(0.094)	(0.118)	(0.359)	(0.431)
Post-graduate degree	-0.076	-0.021	0.024	-0.252
	(0.103)	(0.126)	(0.395)	(0.476)
Gender				
Male	-0.092	-0.033	-0.375*	-0.339
	(0.056)	(0.068)	(0.202)	(0.242)
Non-binary	-0.338		1.993***	
	(0.246)		(0.580)	
Prefer not to say	-2.016***	-2.026***	-5.430***	-5.571***
	(0.123)	(0.141)	(0.416)	(0.478)
Constant	2.163***	2.518***	1.176	2.080
	(0.358)	(0.453)	(1.219)	(1.604)
Observations	969	647	969	647

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
Conditions Included:	C1, C2, C3	C2 & C3 only	C1, C2, C3	C2 & C3 only

Note: This table displays the results of moderation analyses using OLS with covariates from Study 2, using multiple imputation to replace missing values for political ideology (N = 122), income (N = 49), and age (N = 1) based on 10 iterations. Coefficients are displayed, with robust standard errors below in parentheses. The dependent variable is listed at the top of the column. In Columns (1) and (3), the No Ad condition is the omitted reference category for condition. Columns (2) and (4) only include results comparing the Green Growth and Degrowth conditions, as the No Ad condition has been excluded from the analyses, and the Green Growth condition is the omitted category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category.*** p<0.01, ** p<0.05, * p<0.1.

Table 55 - Political Ideology Moderations with Multiple Imputation - Study 2

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
Green Growth	0.396***		-0.068	
	(0.151)		(0.528)	
Degrowth	0.516***	0.144	-0.380	-0.278
	(0.147)	(0.151)	(0.523)	(0.533)
Political Ideology	0.057**	0.019	0.016	0.101
	(0.027)	(0.026)	(0.091)	(0.091)
GG x Political Ideology	-0.050		0.071	
	(0.036)		(0.125)	
DG x Political Ideology	-0.078**	-0.033	0.074	-0.008
	(0.036)	(0.036)	(0.121)	(0.125)
Scepticism	-0.025	-0.016	0.023	0.017
	(0.027)	(0.033)	(0.093)	(0.115)
Brand Ethicality	0.414***	0.416***	0.327***	0.221
	(0.037)	(0.046)	(0.120)	(0.154)
Green Scale	0.384***	0.476***	0.340***	0.433***

VARIABLES	(1) Purchase Intentions	(2) Purchase Intentions	(3) Willingness to Donate Time	(4) Willingness to Donate Time
	(0.034)	(0.044)	(0.111)	(0.136)
Age	0.010	0.009	0.075***	0.079***
	(0.007)	(0.008)	(0.023)	(0.028)
Income	-0.000	-0.000*	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Education				
High school diploma	-0.104	-0.138	0.066	-0.108
	(0.101)	(0.127)	(0.378)	(0.452)
Some undergraduate	-0.234*	-0.315**	0.165	-0.158
	(0.122)	(0.153)	(0.439)	(0.534)
Bachelor's degree	-0.166*	-0.251**	0.129	-0.137
	(0.098)	(0.121)	(0.359)	(0.431)
Post-graduate degree	-0.077	-0.038	0.027	-0.261
	(0.107)	(0.129)	(0.396)	(0.476)
Gender				
Male	-0.091	-0.029	-0.365*	-0.338
	(0.057)	(0.068)	(0.202)	(0.242)
Non-binary	-0.706***		1.766***	
	(0.190)		(0.489)	
Prefer not to say	-1.972***	-2.131***	-5.461***	-5.621***
	(0.123)	(0.143)	(0.427)	(0.485)
Constant	0.126	0.056	-0.350	-0.094
	(0.374)	(0.458)	(1.275)	(1.702)
Observations	969	647	969	647
Conditions Included:	C1, C2, C3	C2 & C3 only	C1, C2, C3	C2 & C3 only

Note: This table displays the results of moderation analyses using OLS with covariates from Study 2, using multiple imputation to replace missing values for political ideology (N = 122), income (N = 49), and age (N = 1) based on 10 iterations. Coefficients are displayed, with robust standard errors below in parentheses. The dependent variable is listed at the top of the column. In Columns (1) and (3), the No Ad condition is the

omitted reference category for condition. Columns (2) and (4) only include results comparing the Green Growth and Degrowth conditions, as the No Ad condition has been excluded from the analyses, and the Green Growth condition is the omitted category for condition. For education, GCSE is the omitted category. For gender, Female is the omitted category. Due to the use of multiple imputation for political ideology, we did not use the standardized coefficient for this variable. *** p<0.01, ** p<0.05, * p<0.1.

c. Study 3

In Study 3, 13.1% of the data include missing values for our covariates from the political ideology, income variables, and the age errors which we set to missing. We again conducted the same logit analyses to determine the type of missingness of the political ideology and income variables. **Table 56** below shows that for both analyses, a few variables appear to predict their missingness, indicating both income and political ideology are MAR. As multiple imputation methodology is suitable for MAR data (Pedersen et al., 2017), we use it for both of these variables in Study 3. There were also two observations with ages that we recoded as missing (i.e., age = 3 and 8). As with Study 1, we do not assess the missingness of these values, but use multiple imputation to maintain the full sample size.

Table 56 - Logit Analyses - MCAR v. MAR – Study 3

	(1)	(2)
VARIABLES	**Income**	**Political Ideology**
Engagement w/ Carbon Footprint	0.57	0.80
	(0.26)	(0.23)
Position Choice	1.68***	1.20
	(0.33)	(0.19)
Overall Policy Acceptance	0.99	1.04
	(0.29)	(0.19)
Message Credibility	0.79	0.78*
	(0.17)	(0.12)
Utopian Impulse	1.02	1.06
	(0.35)	(0.22)
Perceived Status	1.15	1.20**
	(0.14)	(0.09)
Green Scale	1.71*	0.76
	(0.50)	(0.13)
Political Ideology	0.98	

VARIABLES	(1) Income	(2) Political Ideology
	(0.09)	
Age	0.97	0.97
	(0.04)	(0.03)
Education		
High school diploma	0.68	0.97
	(0.47)	(0.34)
Some undergraduate	0.15*	0.45
	(0.17)	(0.24)
Bachelor's degree	0.53	0.24***
	(0.35)	(0.09)
Post-graduate degree	0.47	0.15***
	(0.34)	(0.07)
Gender		
Male	1.32	0.50**
	(0.55)	(0.14)
Degrowth	0.92	1.15
	(0.37)	(0.30)
Citizen	1.45	1.05
	(0.58)	(0.27)
Race & Ethnicity		
Black	1.27	1.96
	(1.34)	(1.10)
Asian	1.67	1.10
	(1.28)	(0.76)
Mixed	3.26	2.43
	(3.04)	(1.67)
Other		3.80
		(4.13)
Income		1.00

VARIABLES	(1) Income	(2) Political Ideology
		(0.00)
Constant	0.00*	1.36
	(0.01)	(1.96)
Observations	830	885

Note: This table displays the results of logit analyses for which the outcome variable is a binary indicator of whether (1) or not (0) the listed variable is missing for a given observation. Each model includes all the relevant numeric variables in the dataset as predictor variables. Odds ratios are displayed. The "Other" category for the race and ethnicity variable was omitted from column (1) as it perfectly predicted the outcome. Those identifying as "Prefer not to say" for gender were omitted from both analyses for the same reason. *** p<0.01, ** p<0.05, * p<0.1.

Study 3 Covariate Analyses with Multiple Imputation

Table 57 - Main Effects (OLS) with Multiple Imputation - Study 3

	(1)	(2)	(3)
VARIABLES	Overall Policy Acceptance	Degrowth Policy Acceptance	Green Growth Policy Acceptance
Degrowth	-0.04	-0.04	-0.04
	(0.04)	(0.06)	(0.05)
Citizen	-0.00	0.01	-0.02
	(0.04)	(0.06)	(0.04)
Message Credibility	0.15***	0.10***	0.20***
	(0.03)	(0.04)	(0.03)
Utopian Impulse	0.29***	0.33***	0.26***
	(0.04)	(0.05)	(0.04)
Perceived Status	-0.00	-0.00	-0.00
	(0.01)	(0.02)	(0.01)
Green Scale	0.15***	0.15***	0.15***
	(0.03)	(0.04)	(0.04)
Political Identity	-0.09***	-0.12***	-0.05***
	(0.01)	(0.02)	(0.01)
Age	0.00	-0.00	0.01
	(0.00)	(0.01)	(0.01)
Income	-0.00*	-0.00***	0.00
	(0.00)	(0.00)	(0.00)
Education			
High school diploma	0.13	0.01	0.25***
	(0.08)	(0.11)	(0.09)
Some undergraduate	0.19*	0.02	0.37***
	(0.11)	(0.14)	(0.11)
Bachelor's degree	0.26***	0.13	0.39***
	(0.08)	(0.11)	(0.08)
Post-graduate degree	0.37***	0.23**	0.50***
	(0.09)	(0.12)	(0.09)

VARIABLES	(1) Overall Policy Acceptance	(2) Degrowth Policy Acceptance	(3) Green Growth Policy Acceptance
Gender			
Male	0.13***	0.13**	0.14***
	(0.04)	(0.06)	(0.04)
Prefer not to say	-0.27	0.13	-0.67
	(0.65)	(0.58)	(0.73)
Constant	2.47***	2.72***	2.22***
	(0.28)	(0.35)	(0.30)
Observations	933	933	933

Note: This table displays the results of OLS regressions with covariates from Study 3, using multiple imputation to replace missing values for political ideology (N = 88), income (N = 44), and age (N = 2) based on 10 iterations. Coefficients are displayed, with robust standard errors below in parentheses. The dependent variable is listed at the top of the column. The Green Growth condition is the omitted reference category for environmental framing, while the Consumer condition is the omitted category for mindset framing. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 58 - Main Effects (Binary Logit) with Multiple Imputation - Study 3

VARIABLES	(1) Engagement w/ Carbon Footprint
Degrowth	0.87
	(0.14)
Citizen	1.03
	(0.17)
Message Credibility	1.57***
	(0.13)
Utopian Impulse	1.79***
	(0.24)
Perceived Status	1.00

VARIABLES	(1) Engagement w/ Carbon Footprint
	(0.05)
Green Scale	0.90
	(0.10)
Political Identity	0.96
	(0.05)
Age	1.02
	(0.02)
Income	1.00*
	(0.00)
Education	
High school diploma	1.67*
	(0.50)
Some undergraduate	1.75
	(0.65)
Bachelor's degree	2.11***
	(0.59)
Post-graduate degree	2.64***
	(0.84)
Gender	
Male	0.61***
	(0.10)
Prefer not to say	0.26
	(0.24)
Constant	0.01***
	(0.01)
Observations	933

Note: This table displays the results of a binary logit regression with covariates from Study 3, using multiple imputation to replace missing values for political ideology (N = 88), income (N = 44), and age (N = 2) based on 10 iterations. Odds ratios are displayed, with robust standard errors below in parentheses. The dependent variable is engagement with the carbon footprint calculator. The Green Growth condition is the omitted

reference category for environmental framing, while the Consumer condition is the omitted category for mindset framing. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 59 - Main Effects (Ordinal Logit) with Multiple Imputation - Study 3

	(1)
VARIABLES	Position Choice
Degrowth	1.94***
	(0.26)
Citizen	1.28*
	(0.17)
Message Credibility	1.02
	(0.07)
Utopian Impulse	1.13
	(0.12)
Perceived Status	1.04
	(0.04)
Green Scale	1.46***
	(0.14)
Political Identity	0.84***
	(0.03)
Age	1.00
	(0.01)
Income	1.00
	(0.00)
Education	
High school diploma	1.09
	(0.31)
Some undergraduate	1.05
	(0.34)
Bachelor's degree	0.75
	(0.21)

VARIABLES	(1) Position Choice
Post-graduate degree	0.80
	(0.23)
Gender	
Male	0.83
	(0.11)
Cut 1	0.15**
	(0.14)
Cut 2	12.65***
	(10.84)
Cut 3	33.30***
	(28.66)
Observations	931

Note: This table displays the results of an ordinal logit regression with covariates from Study 3, using multiple imputation to replace missing values for political ideology (N = 88), income (N = 44), and age (N = 2) based on 10 iterations. Odds ratios are displayed, with robust standard errors below in parentheses. The dependent variable is engagement with the carbon footprint calculator. The Green Growth condition is the omitted reference category for environmental framing, while the Consumer condition is the omitted category for mindset framing. For education, GCSE is the omitted category. For gender, Female is the omitted category. Cut points 1 – 3 display the thresholds for interpreting a latent continuous variable Y*, where $Y_i = 1$ if $Y^*_i \leq 0.15$, $Y_i = 2$ if $0.15 \leq Y^*_i < 12.65$, $Y_i = 3$ if $12.65 \leq Y^*_i \leq 33.3$, and $Y_i = 4$ if $Y^*_i \geq 33.3$. *** p<0.01, ** p<0.05, * p<0.1.

Table 60 – Moderation Analyses (OLS) with Multiple Imputation – Study 3

	(1)	(2)	(3)
VARIABLES	Overall Policy Acceptance	Green Growth Policy Acceptance	Degrowth Policy Acceptance
Degrowth	-0.05	0.01	-0.11
	(0.06)	(0.06)	(0.08)
Citizen	-0.02	0.02	-0.05
	(0.06)	(0.06)	(0.08)
Environmental x Mindset Framing	0.02	-0.09	0.14
	(0.08)	(0.09)	(0.11)
Message Credibility	0.15***	0.20***	0.10***
	(0.03)	(0.03)	(0.04)
Utopian Impulse	0.29***	0.26***	0.32***
	(0.04)	(0.04)	(0.05)
Perceived Status	-0.00	-0.00	0.00
	(0.01)	(0.01)	(0.02)
Green Scale	0.15***	0.15***	0.15***
	(0.03)	(0.04)	(0.04)
Political Identity	-0.09***	-0.05***	-0.12***
	(0.01)	(0.01)	(0.02)
Age	0.00	0.01	-0.00
	(0.00)	(0.01)	(0.01)
Income	-0.00*	0.00	-0.00***
	(0.00)	(0.00)	(0.00)
Education			
High school diploma	0.13	0.25***	0.01
	(0.08)	(0.09)	(0.11)
Some undergraduate	0.19*	0.37***	0.02
	(0.11)	(0.11)	(0.14)
Bachelor's degree	0.26***	0.39***	0.13
	(0.08)	(0.08)	(0.10)

VARIABLES	(1) Overall Policy Acceptance	(2) Green Growth Policy Acceptance	(3) Degrowth Policy Acceptance
Post-graduate degree	0.37***	0.50***	0.23**
	(0.09)	(0.09)	(0.11)
Gender			
Male	0.13***	0.14***	0.13**
	(0.04)	(0.05)	(0.06)
Prefer not to say	-0.27	-0.67	0.13
	(0.66)	(0.71)	(0.61)
Constant	2.48***	2.19***	2.77***
	(0.28)	(0.30)	(0.35)
Observations	933	933	933

Note: This table displays the results of moderation analyses using OLS with covariates from Study 3, using multiple imputation to replace missing values for political ideology (N = 88), income (N = 44), and age (N = 2) based on 10 iterations. Coefficients are displayed, with robust standard errors below in parentheses. The dependent variable is listed at the top of the column. The Green Growth condition is the omitted reference category for environmental framing, while the Consumer condition is the omitted category for mindset framing. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

Table 61 – Moderation Analyses (Logit) with Multiple Imputation – Study 3

VARIABLES	(1) Engagement w/ Carbon Footprint
Degrowth	0.73
	(0.17)
Citizen	0.87
	(0.21)
Environmental x Mindset Framing	1.40
	(0.46)
Message Credibility	1.57***

VARIABLES	(1) Engagement w/ Carbon Footprint
	(0.14)
Utopian Impulse	1.78***
	(0.24)
Perceived Status	1.00
	(0.05)
Green Scale	0.90
	(0.10)
Political Identity	0.96
	(0.05)
Age	1.02
	(0.02)
Income	1.00*
	(0.00)
Education	
High school diploma	1.68*
	(0.50)
Some undergraduate	1.76
	(0.66)
Bachelor's degree	2.11***
	(0.59)
Post-graduate degree	2.66***
	(0.85)
Gender	
Male	0.60***
	(0.10)
Prefer not to say	0.26
	(0.24)
Constant	0.01***
	(0.01)

VARIABLES	(1) Engagement w/ Carbon Footprint
Observations	933

Note: This table displays the results of a moderation analysis using a binary logit regression with covariates from Study 3, using multiple imputation to replace missing values for political ideology (N = 88), income (N = 44), and age (N = 2) based on 10 iterations. Odds ratios are displayed, with robust standard errors below in parentheses. The dependent variable is engagement with the carbon footprint calculator. The Green Growth condition is the omitted reference category for environmental framing, while the Consumer condition is the omitted category for mindset framing. For education, GCSE is the omitted category. For gender, Female is the omitted category. *** p<0.01, ** p<0.05, * p<0.1.

7. Transparent Changes from Pre-registrations

1. Description of change: In Study 1, OLS regression was used to test H1a and H1b instead of ANOVA.
    a. Rationale: With OLS regressions, robust standard errors could be applied. This also allowed for a better understanding of the direction and magnitude of the effect without additional follow-up tests, which was preferred for simplicity.
    b. Effect of change on study results: As OLS regression and ANOVA are closely related analyses, this did not yield much difference. **Purchase Intentions (H1a):** While the overall ANOVA model was not significant ($p = .206$), an ANOVA comparing just Neutral Green and Degrowth conditions yielded a similar significance level ($p = .066$) as the regression analysis without ($p = .08$) and with ($p = .066$) robust standard errors when comparing these two conditions. **Willingness to Donate Time (H1a):** While the overall ANOVA model was not significant ($p = .126$), an ANOVA comparing just conditions 1 (Neutral Green) and 3 (Degrowth) yielded a similar significance level ($p=.0495$) as the regression analysis without ($p = .047$) and with ($p = .048$) robust standard errors when comparing these two conditions. **Intention to Consume Less (H1b):** No change to the results.
2. Description of change: In Studies 1 and 2, a binary logit regression was used to test H1a with willingness to donate time as the dependent variable as an additional analysis.
    a. Rationale: Despite possible values ranging from 0 to 7, the vast majority of respondents either answered none or all questions, creating a functionally binary variable which did not meet the normality assumption of OLS or ANOVA.
    b. Effect of change on study results: We report the results of both the OLS and the binary logit in the main text, so it does not alter results or conclusions drawn based on them. It is just additive. In Study 1, the logit analyses exhibit slightly higher p-value ($p = .065$) than the OLS model ($p = .049$) when comparing the Neutral Green and Degrowth conditions, dropping from 5% to 10% significance.
3. Description of change: In all three studies, additional non-parametric methods, i.e., Kruskal-Wallis and non-parametric kernel regressions, were included.
    a. Rationale: In all studies, there was at least some evidence to suggest the normality assumption for OLS/ANOVA may not be met.
    b. Effect of change on study results: As these were included additionally as robustness checks, they do not change the results, nor the conclusions drawn from them.
4. Description of change: In Study 3, we altered the phrasing of H1 to specify “Green Growth and Degrowth framing treatments” instead of saying “environmental framing treatments” as written in the pre-registration.
    a. Rationale: We added the specific conditions to improve clarity and generate consistency with the language used in Studies 1 and 2.
    b. Effect of change on study results: No change, this does not impact any results and is merely about presentation.
5. Description of change: In all three studies, additional versions of each covariate analysis were included that utilize multiple imputation to handle missing data, as opposed to the pairwise deletion that was pre-registered.

a. Rationale: In all three studies, there were missing values ranging from 11.9% to 15.8% per study due to the income and political ideology questions. This was because participants could opt out of these questions, an option which was provided based on feedback from the pilot study for Study 1. We kept this opt-out choice to maintain consistency when using the same measures across studies. However, given that the data were all shown to be missing at random (MAR), multiple imputation was warranted.
b. Effect of change on study results: The results do not vary substantially when employing multiple imputation, and in most cases where there was a difference, the results are more statistically significant than the original versions. Additionally, these are only supplementary analysis, and are not used for drawing conclusions about the results. **Study 1:** In nearly all instances, the coefficients of our main independent variables exhibited either the same or a higher level of significance compared to the results without multiple imputation. In only two instances, for the moderation with the prevention scale, the coefficient exhibited a lower significance level than in our analyses without MI. In **Table 48** of **Appendix Q**, the Prevention (Standardized) coefficient dropped from the 1% to 5% significance level, and the DG x Prevention coefficient dropped from the 5% to 10% significance level. In **Table 49** of **Appendix Q**, the Prevention (Standardized) coefficient went from 5% significance to insignificant, the GG x Prevention coefficient dropped from 10% significance to insignificance, and the DG x Prevention coefficient dropped from 5% to 10% significance. **Study 2:** In nearly all instances, the coefficients of our main independent variables exhibited either the same or a higher level of significance compared to the results without multiple imputation. In only one instance, for the moderation with the green scale in **Table 54** of **Appendix Q**, the DG x Green Scale coefficient went from a 5% to 10% significance level.

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Chapter 4
Do I need a rain jacket? Exploring human needs and essential use with a PFAS case study

Abstract: There is a debate on how to regulate chemical pollutants like PFAS, which may have wide-reaching health and environmental consequences, given their pervasive use in consumer and industrial products and their bio-accumulative properties. As not all PFAS uses are equally necessary, the technical framework of essential use has been proposed to start restricting uses which are deemed less critical for society. We explore how the essential use framework at the societal level can be better informed by psychological theories of human needs at the individual level, and how these two concepts relate. We conducted two online experiments (N_1 = 965 (U.K.), N_2 = 389 (U.S.)), to determine how perceived essentiality, need and support for regulations might differ depending on the type of product (functional vs. experiential) and level of risk (low vs. high). In Study 1, the U.K. sample considered functional products more essential and needed than experiential products, while high risk scenarios were associated with greater support for regulation and lower benefit from using PFAS. The significant interaction between these factors suggested that the gap in perceived essentiality, between functional and experiential products, was greater under low risk than high risk. There was also a significant three-way interaction between these factors and perceived personal status on anticipated harm associated with losing access to the product, such that low status individuals felt greater harm from losing experiential products than functional products when the risk was high. In the U.S. sample for Study 2, the main effects and three-way interaction replicated, though the interaction between product type and risk level did not. These findings provide evidence of a hierarchical approach in applying human needs satisfaction, suggesting that experiential products that satisfy psychological or spiritual needs may be prioritised for regulation in the context of human and environmental risk. However, connecting to literature on the compensatory nature of conspicuous consumption for low SES groups, our work also highlights the importance of democratic deliberation of such policies and citizen-input at every stage of the regulatory process to prevent backlash or potential harm to those with lower status. The findings can be applied more broadly to other environmental issues, such as climate mitigation, in regulating consumption to promote sufficiency and reduce overconsumption.

Keywords: Essential use, human needs, PFAS, consumption regulation, sufficiency

Pre-registration:
Study 1
Study 2

Disclaimer: This project is co-authored with Dr Giles Atkinson and Dr Ganga Shreedhar.

I was responsible for the design (with support from Dr Frédéric Basso and Dr Ganga Shreedhar in supervisory discussions). I was also responsible for the analysis, and writing of this draft. Dr Ganga Shreedhar, Dr Giles Atkinson, and Dr Fred Basso have provided assistance on editing this Chapter. The manuscript for submission to a journal has not yet been prepared.

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1. Introduction

Given the limits of voluntary consumption reduction approaches in bringing about societal transformations (Heindl & Kanschik, 2016; Sanne, 2002; Sorrell et al., 2020), and the challenges with private sector interventions uncovered in **Project 1 (SPM)**, regulations on consumption are worth exploring as a potentially necessary institutional level change for combatting overconsumption. To probe citizens' willingness to support regulations on consumption reduction (RQ2a), chemical pollution may provide a more conducive context than other issues like climate change impacts. Perhaps given its lower media profile, chemical pollution has not appeared to incite the same political divide as climate change, at least in terms of public opinion. However, it often poses more immediate health and environmental risks, with a more robust precedent of regulating such substances (D. Vogel, 2012). What's more, these different environmental contexts, i.e., chemical pollution and climate change, can be seen as related in at least two ways. First, they are both impacts associated with production and the resultant consumption (i.e., at individual, social, and structural levels), pointing toward the need for sufficiency and reducing overconsumption more broadly (e.g., Gurtner & Moser, 2024a). Second, chemical pollution may interact with climate change's impacts, for example, by reducing biodiversity and increasing vulnerability of humans and wildlife (Rockström et al., 2009). The main aim of this chapter is to explore public perceptions of consuming products that may pose risks to humans and the environment, and people's openness to regulations on such consumption.

Recently, policymakers have been pressed to consider, and in some cases enact (e.g., in the EU and US), forms of legislation to limit exposure to PFAS (per and polyfluoroalkyl substances). The chemical group comprises more than 5,000 chemicals, which are mainly used for oil and water repellence (Glüge et al., 2020). They are often referred to as "forever chemicals" because they bioaccumulate in our bodies and the environment (Buck et al., 2011; Cousins et al., 2019). However, there remains uncertainty regarding the risk of harm, as the vast quantity of chemicals contained in this group render rigorous toxicology reports on each chemical to determine hazardous consequences infeasible (Cousins et al., 2019). Considering that the effects are not yet fully known, the ubiquitous nature of these substances, and the bio-accumulative properties in both human bodies and natural environments, NGOs and citizens groups have called for stringent regulations or bans on PFAS (Adie, 2023).

Some regulatory proposals involve bans or restrictions on the production and therefore consumption of certain products containing PFAS (T. Cousins et al., 2020). While there are substitute substances that can replace PFAS functionality, not all products currently have alternatives, meaning consumers could lose access to certain oil and water repellent versions of products if PFAS were banned. However, outright product bans in liberal democracies are often avoided in favour of libertarian paternalistic approaches which maintain freedom of choice (Chater & Loewenstein, 2022; Thaler & Sunstein, 2008). PFAS products also span consumer and industrial applications, meaning not all applications provide the same benefits to society and may not be equally prioritised for regulation (e.g., Cousins et al., 2019).

To determine which uses of PFAS to regulate first, some scientists have suggested employing the concept of essential use (Cousins et al., 2019; Garnett & Van Calster, 2021), derived from the Montreal Protocol to phase out ozone-depleting CFCs (chloro-fluorocarbons) (United Nations, 1987). The concept of essential use, which dictates what products or applications are exempt from being phased out, has two primary components, i) that the use is "necessary for health, safety or is critical for the functioning of society" and ii) "there are no available technically and economically feasible alternatives" (United Nations, 1987). The first component of essentiality implies identifying those products or applications that are viewed as more necessary than others, which appears to link essential uses with satisfying certain needs of society. One avenue for exploring this link is through the framework of human needs (e.g., Doyal & Gough, 1991; Max-Neef et al., 1991), as outlined in the **Literature Review (Chapter 2)**.

Prior work has framed essential use in light of needs-based consumption, despite the lack of empirical work applying the theoretical framework of human needs to essential use for PFAS regulation. Indeed, the only prior study assessing public opinion on essential uses of PFAS in the EU equated an essential use to a "need-to-have" product category (Karinen et al., 2024). Others use the terms 'need' or 'needed' as seemingly interchangeable with essential use in the PFAS context (T. Cousins et al., 2021). Whether or not this link is intentional, it highlights the value of formally integrating human needs satisfaction into the concept of essential use to understand the impact of any regulations on people's consumption. This approach is useful given the overlap between what is essential to society and what is needed for human functioning. It is also important to consider other non-need

based motivations for consumption in the context of PFAS, to establish priorities for regulation. In affluent countries of the Global North, the vast majority of consumption decisions are not based on satisfying needs, but rather to convey social status (Bourdieu, 1984; Hirsch, 1995) or for hedonic purposes to satisfy desires and pleasures (Hirschman & Holbrook, 1982). Exploring how essential use may be informed by the concept of human needs and non-need based consumption constitutes the second aim of this paper.

The research undertaken in this chapter sought to address this gap in the literature, leveraging psychological and behavioural insights for the investigation of essential uses of PFAS in consumer products. While not the first study to test perceptions of essential use amongst the general public, we build on work by Karinen et al. (2024) to consider how the essential use definition may be understood through the application of human needs. We designed two online experiments, first in the United Kingdom (N = 965) and then a replication in the United States (N = 389), to elicit the perceived essential use of various consumer products containing PFAS amongst the general public. We experimentally varied the type of product, that is functional versus experiential, as well as the severity of risk associated with PFAS, to determine how these factors might influence evaluations of essentiality. We further inquired about the desire to regulate PFAS products, and other theoretically relevant factors associated with needs-based consumption or risk. We finally examined heterogeneity in preferences amongst groups of different social status, further addressing concerns over who should be involved in the regulatory process (Karinen et al., 2024).

This paper contributes to the literature in several ways. First, we contribute to the literature on consumption regulations by exploring lay people's perceptions and attitudes toward consumption and its regulation. This topic has been challenging to research as limits on consumption have been considered coercive and unfavourable, impinging on personal freedom (Faure et al., 2022) and even producing psychological reactance (Irmak et al., 2020; Laurin et al., 2012). Given the potential of consumption regulations for reducing institutional barriers to sufficiency (e.g., Sanne, 2002; Spangenberg, 2014; Lage et al., 2023), our work utilises a more immediate health and environmental threat to elicit perceptions that can extend to other products posing health and environmental risks (e.g., high emissions goods).

Second, our work investigates the psychological underpinnings for consuming products that pose risks to humans and the environment, which have important implications for sustainable consumption (SC), sufficiency, and degrowth. This contributes to the broader research agenda concerned with bringing production and consumption within a safe and just operating space for humanity, recognizing planetary boundaries and limits to growth (Hickel et al., 2022; Raworth, 2017; Rockström et al., 2009; J. Vogel et al., 2021). We currently face threats to all nine planetary boundaries[29], of which chemical pollution is only one (Rockström et al., 2009). Crossing any one of these boundaries may lead to devastating repercussions. The fact that six have already been crossed, and the potential amplifying impacts of interactions between them, indicates the importance of cross-cutting environmental research to reduce consumption and production (Richardson et al., 2023).

Third, we contribute to the literature on applying human needs within the context of public policy for sustainability transitions (e.g., Koch et al., 2017; Lee et al., 2023). We delineate how the forms of consumption aimed at satisfying certain types of needs (e.g., psychological or spiritual needs) may be more relevant for regulation than others (i.e., physiological needs). These findings may be used to design thoughtful policies that shift production and consumption patterns toward sufficiency, to fit within a social minimum and an ecological maximum consumption level (Spangenberg, 2014; Fuchs et al., 2021; Lee et al., 2023). Prior research has been devoted to understanding the resource and material consumption requirements to meet human needs within planetary boundaries from a scientific perspective (Millward-Hopkins et al., 2020; O'Neill et al., 2018; J. Vogel et al., 2021). However, not enough work has been devoted to understanding public perceptions and attitudes toward such consumption and how these scenarios might be achieved through regulation.

Fourth, we contribute to the literature on perceptions of PFAS and the application of essential use (e.g., Karinen et al., 2024), highlighting ways to make the regulatory process more democratic and inclusive. Incorporating perceptions of everyday citizens has been deemed particularly important in the context of PFAS regulation given the subjective and heterogeneous nature of essential use evaluations (Karinen et al., 2024). We supplement this

[29] These planetary boundaries include climate change, biodiversity loss and species extinction, stratospheric ozone depletion, ocean acidification, phosphorus and nitrogen cycles, land use change, freshwater use, chemical pollution, and atmospheric aerosol loading (Rockström et al., 2009).

literature with a more systematic understanding of human needs, the types of consumption that lead to satisfaction, and how social status influences these consumption decisions. Any regulatory action on PFAS must uphold democratic and participatory values, especially considering the impacts on lower status and less privileged groups, to be considered fair and supported by the general public (Howarth et al., 2020; Stirling, 2008).

This research was conducted in partnership with the U.K.'s Department for Environment Food and Rural Affairs (Defra) in assessing different approaches for potentially regulating PFAS, making it highly applicable to the real-world policy context. Study 1 was funded by Defra to create a workable definition of what essential use might mean in relation to PFAS. It was also motivated by wanting to understand public perceptions associated with the regulatory trade-offs, between protecting environmental and human safety and restricting access to products (e.g., Karinen et al., 2024). Study 2 was conducted independent of Defra, motivated by a desire for replicability in psychological research and to probe the stability of results in an alternative context.

Crucially, we do not mean to suggest that the concept of essential use, which seeks to safeguard functioning at a societal level, is entirely the same as human needs satisfaction, which prioritises interests on the individual level. Rather, we consider how the regulatory concept of essential use may be strengthened and more appropriately applied with an understanding of human needs. Given the lack of prior work connecting these two concepts, we first aimed to develop the theoretical underpinnings related to PFAS consumption. This approach has been laid out in **Section 2,** along with other relevant literature on risk evaluations. Secondly, we sought to elicit perceptions of societal essentiality and human need empirically, determining the direction and magnitude of each effect, as well as the associations between them. This is evidenced in **Sections 3 & 4**, which outline our two studies and the associated results. **Section 5** concludes with a discussion of the findings.

2. Literature Review

2.1. Essential Use & PFAS

The regulatory context of PFAS is complex. Policymakers must weigh industry pressure to prevent regulation (Richter et al., 2021) and the fact that some applications, e.g., industrial uses, of the chemical are highly important (Glüge et al., 2020), against calls for health and safety protections amongst civil society groups and academics (Adie, 2023;

Cousins et al., 2019). Navigating these competing pressures within a given country's regulatory backdrop has led to disparate legislative approaches, especially when comparing the United States, the United Kingdom, and the European Union. The two main approaches appear to be either regulating levels of PFAS in drinking water / food (i.e., regulating contamination), or banning the use of PFAS in goods directly (i.e., regulating production and consumption). At the time of writing, the United States has enacted over 100 laws across 24 states, which either ban or restrict the use of PFAS (Kindy, 2023) in addition to recently finalized national drinking water standard (US EPA, 2024). California has also banned certain PFAS chemicals in cosmetics (Assembly Bill No. 2771 Cosmetic Products: Safety., 2022), to prevent PFAS consumption. And while the EU has recently passed a ban on a sub-group of chemicals for certain products (e.g., food packaging and clothing) (Scheuer, 2024), and proposed measures for PFAS standards in drinking water and food (ECHA, n.d.), the United Kingdom has been slower to enact regulation targeting either consumption or contamination. The regulatory landscape is constantly evolving, so these regulations are not meant to be exhaustive. However, they serve to illustrate the pressing nature of this issue and to contextualise essential use in light of other regulatory approaches.

Cousins et al. (2019) applied the concept of essential use to the case of PFAS, outlining three categories in which PFAS-containing products may be grouped with respect to their essentiality:

- *Category 1:* Non-essential for health, safety, or the functioning of society. These are the highest priority in terms of regulation, regardless of whether alternatives are available.
    - Example: Dental floss
- *Category 2:* Would be considered essential given the importance of their applications, but for which alternatives are available that do not contain PFAS and provide equivalent functionality.
    - Example: Water resistant textiles
- *Category 3:* Essential, in that they are critical for health, safety, or the functioning of society and for which no suitable alternatives currently exist.
    - Example: Occupational protective clothing

It is important to specify that if a product is not deemed essential, the ban would be placed on the use of PFAS in the product, and not necessarily the product itself. This means, for the Category 1 example above, people would still be able to access dental floss that was PFAS-free. Given PFAS's market dominance, many products have not found a viable

substitute to PFAS yet, so the end user would only have access to a product that is less effective. In other cases (i.e., Category 2), the ban may not impact the quality of the product function but could potentially result in a higher price. Though the regulatory contexts do not entirely overlap, regulating certain products (e.g., fossil-fuel powered vehicles, meat) for climate mitigation purposes may mean the availability of alternative substitutes with higher upfront prices (e.g., electric vehicles) or reduced functionality (e.g., plant-based meat).

While the framework laid out by Cousins et al. (2019) is highly informative, it is primarily a technical analysis lacking careful consideration of people's needs, perceptions, and consumption behaviours, as well as a theoretical foundation from a psychological perspective. Very little academic research has attempted to measure attitudes toward PFAS and its potential regulation. For example, Massarutto et al. (2022) used contingent valuation to measure preferences for drinking water regulations in relation to PFAS contamination but did not incorporate essential use.

To our knowledge, only one study has empirically applied the concept of essential use to PFAS to evaluate how citizens rate the essentiality of various PFAS-containing products and uses (Karinen et al., 2024). In a large multi-country, between-subjects experiment of seven EU member-states, Karinen et al. (2024) found that most uses were not rated as fully essential or non-essential, such that a binary categorisation may be impractical. They also found substantial variation in essentiality evaluations across countries and within use categories (e.g., personal care). Importantly, they suggest that the existing definition of essential use may not be sufficient for determining which uses are essential, warranting further investigation, especially through experimental analysis. They also note that it may be easier to determine what is non-essential, than to establish consensus on what is essential. We build on their work by creating and experimentally testing theoretically relevant categories of products that could be applied to the PFAS context, to determine priority product categories for restricting access. We further apply the human needs framework to inform essential use from a psychological and behavioural perspective.

2.2. Human Needs & Consumption

Human needs satisfaction and the resulting well-being may be conceived of as objective or subjective, depending on how it is measured. Objective needs assessments

appear more useful in policy evaluations for determining legislation, and may also be considered better from a societal welfare perspective (e.g., Gough, 2015). Subjective assessments, for example subjective well-being or life satisfaction, may offer a more nuanced view of fulfilment, yet they may provide a less practical foundation for constructing legislation across any heterogeneous population with competing interests and values. Focusing on subjective well-being or happiness as a societal goal can be co-opted to promote economic activity that might harm future generations (Koch et al., 2017). Subjective well-being also often involves some level of hedonic adaptation, whereby individuals adjust expectations and thus return to some baseline (Frederick & Loewenstein, 1999), making it difficult to determine the impact of changing consumption and product availability. As such, this research utilises an objective conception of needs. We further define need as underlying internal forces driving action, which are non-negotiable and will cause harm if not met (Gasper, 1996; Jackson et al., 2004).

The **Literature Review (Chapter 2)** outlined two prominent needs theories that provided the theoretical basis for this project - Gough & Doyal's Theory of Human Needs (1991) and Max-Neef et al.'s Human-Scale Development (1991). These theories appear more relevant to regulating PFAS in the United Kingdom and United States than other seminal theories (e.g., the capabilities approach by Sen, 1999) which are more commonly used in the development context to promote welfare and freedom over purely economic interests. The aforementioned theories are more suitable given their contributions to the area of environmental protection and sustainability (Gough, 2015; Jackson et al., 2004; Vita, Hertwich, et al., 2019) and their application to reducing consumption in higher income countries of the Global North (Brand-Correa et al., 2020; Jackson, 2005; Koch et al., 2017; Lee et al., 2023). Below I will outline how we use relevant parts of both the THN and H-SD, with inputs from other theories, to develop a theoretical basis for this research as well as a unique contribution to needs satisfaction literature with regard to regulating consumption.

The H-SD has nine core needs – subsistence, protection, affection, understanding, participation, idleness (i.e., leisure), creation, identity and freedom – which are finite, classifiable, and non-hierarchical, meaning that they are interdependently connected and satisfied (Max-Neef et al., 1991). The THN encompasses both basic needs of health and

autonomy as well as 11 intermediate needs[30] (Doyal & Gough, 1991; Gough, 2015). The main difference between the H-SD and THN is the presence of hierarchy (which I return to below), and the conceptual (H-SD) versus concrete (THN) nature of their needs. While there may be some cultural and contextual specifications leading to such needs being experienced at varying degrees (Cruz et al., 2009), they both consider needs *objective*, i.e., depending on physiological requirements, and *universal*, or relevant to all human beings (Cruz et al., 2009; Gough, 2015).

2.2.1.Human Needs Satisfiers

Importantly, needs themselves remain constant, but the satisfiers of those needs can and do change (Max-Neef et al., 1991). Satisfiers can change over time, and depend on culture and context (Cruz et al., 2009). In the HS-D, there is a three-dimensional relationship between needs, satisfiers, or the means of satisfaction, and if necessary, material goods. There are five types of satisfiers[31] according to the H-SD, which differ in the degree of satisfaction achieved. In the present context, a product such as a rain jacket containing PFAS may ostensibly satisfy the need for protection, but it might actually undermine protection of one's health and environment. Such a 'destructive' satisfier is better replaced by a product that satisfies protective needs without harm. Of course, needs are non-negotiable and should not be regulated or restricted (Fuchs et al., 2021; Gough, 2015). However, there are a multitude of ways in which a need can be satisfied, and satisfiers can vary substantiality with respect to their impact on the environment (Gurtner & Moser, 2024b). This is important for the regulatory landscape of PFAS, as it suggests that satisfiers and the material goods associated with them can be restricted or replaced if they impede the process of need satisfaction (Lee et al., 2023). To identify specific satisfiers for

[30] The other intermediate needs according to the THN: nutritional food and clean water, protective housing, non-hazardous living and work environments, appropriate healthcare, security in childhood, significant primary relationships, physical security, economic security, safe birth control and childbearing, and basic education.

[31] *Synergistic*: "Are those which, by the way in which they satisfy a given need, stimulate and contribute to the simultaneous satisfaction of other needs." *Singular*: "Aiming the satisfaction of targeted single needs, this kind of satisfier is neutral regarding the satisfaction of other needs." *Destructive*: "Elements of paradoxical effect. Applied under the pretext of satisfying a given need, they do not only annihilate the possibility of its satisfaction, but they also render the adequate satisfaction of other needs impossible. (Sometimes specially related to the need of protection)." *Inhibiting*: "Are those which by the way in which they satisfy (generally over-satisfy) a given need seriously impair the possibility of satisfying other needs." *Pseudo-satisfier*: "These are elements which stimulate a false sensation of satisfying a given need. Though they lack the aggressiveness of destructive, they may, on occasion, annul, in the medium and long term, the possibility of satisfying the need they were originally aimed at." (Cruz et al., 2009; Max-Neef et al., 1991).

policy relevance, the THN goes further to include universal satisfier characteristics (USC), another name for their aforementioned ‘intermediate needs,’ which are the properties of needs satisfiers that apply across cultures and contexts (Doyal & Gough, 1991; Gough, 2015). As PFAS may impede several of these USCs, including a non-hazardous physical environment and adequate nutritional food and water, a material good containing PFAS is unlikely to be an appropriate needs satisfier.

2.2.2.Hierarchies of Needs

While the HS-D takes a non-hierarchical approach, the application of a hierarchy of needs (e.g., in the THN) may be useful in the regulatory context, in order to further prioritise regulating certain types of consumption over others. Accordingly, a third perspective on needs focused more on motivation is useful for characterising different categories of need and the resulting types of consumption undertaken for satisfaction. Chen et al. (2020) outlined the difference between utilitarian and spiritual needs, drawing from a hierarchical theory of needs (Kenrick et al., 2010; Maslow, 1943). They defined utilitarian needs as physiological needs, safety, and other forms of external satisfaction (Chen et al., 2020). Utilitarian consumption, seeking to satisfy utilitarian needs, focuses on objective use value and essential functions. Alternatively, spiritual needs are defined as making meaning in life, e.g., respect, belonging, love and internal satisfaction. Hedonic consumption is often undertaken to satisfy these spiritual needs, that is to fulfil feeling, entertainment, and fantasy (Chen et al., 2020).

These categories (utilitarian vs. spiritual) are underpinned by Kenrick et al. (2010), who reconfigured Maslow’s hierarchy from an evolutionary perspective, differentiating between immediate physiological needs which are necessary for survival and social motivations (e.g., affection, belonging), which are less necessary. Perhaps the most relevant part of their model for present purposes is the acknowledgement that threats in the immediate ecological context may dictate which motivational system (i.e., associated with a specific set of needs) are activated. In the context of PFAS, this suggests that a threat to one’s self-protection associated with PFAS may influence the perceived trade-off of consuming a product containing PFAS for the satisfaction of other, less fundamental social needs.

Connecting to essential use, we argue that utilitarian needs relate most closely to the essential use categories of health, safety and functioning of society. While spiritual needs are fundamental parts of life, providing excitement and pleasure, they do not necessarily enable everyday functioning in the way that utilitarian needs do. Spiritual needs relate to the H-SD's needs including affection, understanding, participation, identity, leisure, and freedom, while utilitarian needs relate to those of subsistence and protection most directly, as well as the THN's basic needs of health and autonomy, which must be satisfied first in their hierarchy.

As such, we synthesize the various needs theories for the present research agenda to develop a hierarchy in which utilitarian needs can be considered more fundamental than spiritual needs from a regulatory perspective. This implies that in the context of human and environmental risk, material consumption aimed at satisfying utilitarian needs may be considered more essential than consumption to satisfy spiritual needs. This supports the notion that not all wants, especially for "positional goods" that may satisfy needs of identity or affection, can be supported in a constrained world (Lee et al., 2023). We do not mean to argue that physiological needs are more important than psychological or spiritual needs in general, as deprivation will likely arise if this latter category of needs goes unsatisfied (Kenrick et al., 2010). Yet in the present context when hierarchies may be useful for determining regulatory priorities, there are important distinctions when it comes to the most suitable needs satisfiers and associated forms of consumption.

2.2.3.Material Consumption Associated with Needs Satisfaction

While utilitarian or physiological needs often require material consumption for satisfaction (e.g., Druckman & Jackson, 2010), spiritual or psychological needs are less likely to be fully satisfied through material consumption (Vita, Lundström, et al., 2019). This relates to the concept of the 'hedonic treadmill' (Brickman & Campbell, 1971). To truly satisfy most psychological or spiritual needs, purchasing new goods will not only be insufficient in the moment, but can actively undermine the satisfaction of such needs and produce persistent dissatisfaction instead (Jackson, 2005).

Prior work connecting the H-SD (Max-Neef et al., 1991) to carbon emissions offers evidence on the material consumption requirements of need satisfaction. Vita et al. (2019)

calculated global carbon and energy footprints associated with each need in the H-SD, finding that the highest emitting needs category was subsistence, followed by protection. Some needs categories such as understanding, creating, participation and freedom were much more likely to be satisfied when moving from lower to moderate emissions, but past a certain threshold this likelihood stopped increasing. Other needs categories like protection, identity, and leisure were uncorrelated with emissions footprints. Considering that emissions are closely related to material consumption (Hertwich, 2011; Ivanova et al., 2016; Vita, Lundström, et al., 2019), it appears that the physiologically driven needs of subsistence and protection are more commonly associated with material consumption than those related to psychological or spiritual needs. This evidence provides support for our hierarchy, such that psychological and spiritual needs that may be currently satisfied through material consumption (of PFAS goods) can be reasonably satisfied through other, non-material means. Based on the definition of needs, regulating such goods is less likely to cause harm than those primarily consumed to satisfy physiological needs.

2.2.4.Applying Needs Theories to Policy

In applying needs theories to public policy, one downside to using an objective (and hierarchical) assessment of human needs is that it could be criticised as being overly restrictive, whereby the determination of needs is elitist, paternalistic, or even totalitarian (e.g., Gough, 2015). However, these concerns can be offset by incorporating experiential knowledge of real people who would be affected by any legislation (e.g., Gough, 2015), supporting the use of experimental work that incorporates public opinion (e.g., Karinen et al., 2024). Instead of imposing a decision of the goods that do or do not fulfil various needs, it is better to elicit this information directly from the population of interest to avoid paternalism or authoritarianism (e.g., Gough, 2015). As this approach relates to understanding the synergies and conflicts between satisfiers, we sought to combine theoretical knowledge of human needs with important input from the relevant public to shed light on essential uses of PFAS. And while we theorise needs on the basis of objective assessments for satisfaction, our research methods incorporate public perceptions that are subjective by nature to avoid a top-down imposition of needs assessment.

2.2.5.Conspicuous Consumption

Though human needs may be satisfied through certain types of consumption, much of contemporary consumption in the post-modern era is not based on needs (Firat & Venkatesh, 1995). Outside of hedonic consumption, conspicuous consumption may also be relevant given its focus on status and social comparison. As outlined in the **Literature Review (Chapter 2)**, Veblen (1899) theorises conspicuous consumption of goods and services as purposefully non-need based, to keep up with higher status counterparts (Trigg, 2001; Veblen, 1899). Conspicuous consumption can be seen as an unconscious desire to live up to a certain "standard of decency," and may extend to purchasing positional goods that are not visible to others (Trigg, 2001; Veblen, 1899). Others distinguish status consumption from conspicuous consumption, whereby the former is more about gaining prestige from acquiring certain goods, and the latter is more ostentatious (e.g., O'Cass & McEwen, 2004), implying the importance of visibility. For our purposes, both types of consumption are relevant as alternatives to needs-based consumption. The unconscious drivers of status and competition may lead some people to consider positional goods to be important or even subjectively 'essential' to their livelihood. However, the wasteful and unconsciousness nature of such consumption (Veblen, 1899), coupled with the potential hazard of conspicuously consuming PFAS products, all indicate the policy relevance of this form of consumption.

2.3. The Role of Status in Consumption Decisions

Given that needs satisfiers are contextually and temporally dependent, it is important to consider how evaluations of product essentiality may differ across groups. Karinen et al. (2024) highlighted the importance of considering individual differences given the substantial heterogeneity uncovered in evaluating which products are considered essential or not. While they examined age, gender, education and political orientation, these factors had low explanatory power. Alternatively, we explore how consumption motivations may differ based on socio-economic status of the individual.

While conspicuous or hedonic consumption may naturally be associated with more affluent groups (Wiedmann et al., 2020), lower status individuals may experience greater repercussions by not being able to consume such products. When making purchasing decisions, low status groups may focus more on hedonic consumption, while high status

groups might consider both hedonic and utilitarian forms of consumption (Chen et al., 2020). Those with lower SES may also be more likely to engage in conspicuous consumption (Y. Wang et al., 2022), as a means of compensating for their reduced power (Rucker & Galinsky, 2008), unmet status desires (Y. Wang et al., 2022), and to repair their low self-esteem or protect against future self-threats (Sivanathan & Pettit, 2010). The likelihood of engaging in conspicuous consumption also appears higher amongst those with low perceived status when social mobility appears low (Y. Wang et al., 2022). As such, policymakers cannot expect citizens of different status groups to uniformly respond to different types of products being restricted, especially those that are mostly consumed for hedonic or status-driven purposes. These insights offer an important empirical justification for considering how social class and power impact consumption decisions and the importance of considering whose input matters in regulating consumption (e.g., Karinen et al., 2024). Thus, our research further explores these differences by status.

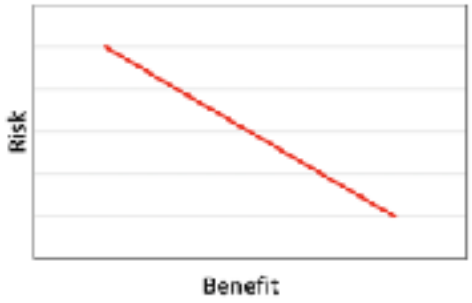
2.4. Risk Evaluations

Given that the impacts of PFAS are not precisely known and are unlikely to be determined in the near future, consuming products containing PFAS presents a state of risk, as by definition, risk involves uncertainty or "the chance of injury, damage, or loss" (Webster, 1983, as cited in Slovic, 2010). For psychologists, risks are often discussed in terms of perceptions, or “risk as feelings” (Slovic & Peters, 2006). Instead of relying on “risk as analysis,” through scientific deliberation, humans primarily rely on their intuitive feelings for evaluations (Slovic, 2010; Slovic & Peters, 2006). Finucane et al. (2000) proposed the affect heuristic, such that individuals call upon the myriad of good and bad representations of various objects and experiences in their minds to determine the goodness or badness of the present. This judgement process is considered quicker and less cognitively taxing than weighing the various costs and benefits of a given risk scenario, though people likely still consider benefits in this mental shortcut.

The literature on the trade-off between risk perceptions and the benefits of consuming such risks suggest an inverse relationship between these concepts. Fischhoff et al. (1978) identified that when benefits appear high, risks are considered lower, while when the benefits appear low, the risk is considered higher (see **Figure 21** for a simplified illustration). This mental association is counter to the positive correlation often found

between risk and benefits in the world (Finucane et al., 2000). Alhakami and Slovic (1994) further identified the role of affect in risk-benefit trade-offs. When people have a positive assessment or affinity toward an activity (i.e., using a product) they are more likely to deem the benefits as high and the risks as low, whereas those who do not like the activity will be swayed toward judging the benefits as low and the risks as high. In the case of risk perceptions, the affect heuristic leads to different determinations of risk and reward depending on their feelings toward the activity or product of interest (Slovic et al., 2007). In the present research, we exploited the uncertainty regarding PFAS's risks (e.g., Cousins et al., 2019). By manipulating the level of risk associated with PFAS, we sought to understand people's evaluations of PFAS-containing products under different risk contexts. In particular, our research investigated whether the perceived benefits that PFAS contribute to a product and the perceived need or essentiality of that product changes when risks are higher versus lower.

Figure 21 - Inverse Relationship between Perceived Risk and Benefit



Note: This figure illustrates the relationship between risk and benefit as conceived by humans outlined by Fischhoff et al. (1978) and used by others in the risk perceptions literature.

3. Study 1

3.1. Defra's Objectives and Input

Study 1 took place in the United Kingdom, given Defra's involvement. The project entailed several preliminary meetings with regulatory stakeholders, including economists who were tasked with collecting social science research regarding perceptions of PFAS, the public's willingness to support potential regulations, and economic valuation of such regulations. Notably, they were concerned that the essential use framework might be overly restrictive, imposing costs (i.e., more expensive substitutes, less product availability) that the general public would not support. After our initial meetings with the Defra team, it was

clear that they were looking for an efficient means of categorising products and applications to determine which categories had the most public support for regulation. Establishing these groups was important given the vast quantity of chemicals and relevant products containing them. These insights led us to explore human needs and non-need based consumption motivations as a way to connect essential use to a more concrete consumer application, driven by theory. Their concerns over the uncertainty of PFAS's risks further drove our exploration into literature on risk assessments and the affect heuristic.

As we developed the experimental stimuli and shared pilot results, they were also influential in helping us to pinpoint example PFAS products that were most pertinent from a regulatory perspective, and in shaping our decisions on how to operationalize risk. Thus, at all stages of the experimental design, we balanced theory with practical application to policy.

Defra provided funding for a survey that also contained other questions pertaining to economic valuation, as part of another PhD student's thesis. This was meant to minimize costs associated with data collection, and maximize the insights they could pull from the project. However, all questions associated with the other PhD student's work came after the entirety of our experiment, and thus there is no reason to believe they influenced our results.

3.2. Summary of Insights from Literature & Hypotheses

Reflecting on the various needs theories, three main takeaways are relevant to the present research: 1) while needs are universal and objective, the means to satisfy them are not, implying that needs can be satisfied in a variety of ways, 2) while needs may be interdependent and non-hierarchical under certain theories (e.g., H-SD from Max-Neef et al., 1991) there is also evidence to suggest that physiological needs appear to be more relevant to the definition of essential use than psychological or spiritual needs (Chen et al., 2020; Doyal & Gough, 1991; Kenrick et al., 2010), and 3) the forms of consumption aimed at satisfying certain types of needs (i.e., physiological needs) require more direct material consumption than other types of needs (e.g., psychological or spiritual needs). Products containing PFAS could be considered material goods that *might* be satisfiers for particular needs, but given the potential threat associated with PFAS, these needs might be better satisfied through other means. The concept of essential use is typically employed to

determine regulatory priorities to avoid banning all products at once. Thus, the hierarchical needs framework developed here helps to categorise essential uses on the basis of human welfare.

Mapping out the needs that apply to essential use, we propose that PFAS products aimed at satisfying utilitarian needs are likely to be deemed more essential. Coupled with the literature on conspicuous consumption, we can categorise products based on their main attributes, that is, whether they are consumed for their functional use value versus other non-technical purposes (e.g., status, hedonic pleasure, etc.). We took this approach to elicit perceptions of essentiality and needs satisfaction based on broad classifications that could apply to all types of consumption, instead of presupposing whether the products are consumed for need versus non-need-based purposes, to avoid top-down intervention (Gough, 2015). Based on objectivity and universality of needs (Doyal & Gough, 1991; Max-Neef et al., 1991), we believe people should be able to distinguish for themselves the differences between need and non-need based consumption.

This study further focuses on the component of "critical to the functioning of society" in the essential use definition (Cousins et al., 2019; United Nations, 1987), which remains too abstract to easily connect to specific products or applications of PFAS. This is especially true of consumer applications, which are most relevant to individual-level consumption and promoting sufficiency. When a PFAS product relates to health and safety, as do many of the industrial uses of PFAS such as medical clothing or firefighting foams, it is rather straightforward to categorise it as an essential use. We sought input from a representative group of individuals through an online experiment to make the rest of the essential use definition more concrete by asking participants to evaluate how different types of consumer products that contain PFAS influence individual and societal functioning.

Based on our review of the literature, we created two broad categories of products containing PFAS: functional versus experiential. By functional, we drew on the idea of physiological needs as well as the types of consumption aimed at objective use value and utility. However, we have avoided the term 'utilitarian' to steer clear of associations with utilitarianism, an ethical theory of securing the greatest happiness for the greatest number of people, which has been critiqued for inadequately considering equality of distribution (Sen, 1979) or environmental protection (e.g., Lehman, 2015). By experiential, we integrate both conspicuous (Veblen, 1899) and hedonic (Hirschman & Holbrook, 1982) motivations for

consumption. We combined these latter two motivations to simplify the number of treatment arms, and because they jointly represent consumption that is not aimed at satisfying core, physiological needs.

Theory would suggest that functional or utilitarian products will be deemed more essential, as they are typically designed to satisfy basic human needs (Yu et al., 2016), than products that are purchased for other reasons such as social comparison or aesthetics. Accordingly, we pre-registered the following hypotheses related to product type:

H1a: Functional products will be perceived as significantly more essential than experiential products.
H1b: Functional products will be perceived as significantly more needed than experiential products.
H1c: Functional products will be perceived as significantly more worthwhile to consume given the risk than experiential products.
H1d: Functional products will be perceived as significantly less relevant for regulation than experiential products.
H1e: PFAS will be perceived as providing a significantly greater benefit to functional products than experiential products.
EH1f (exploratory): PFAS will be perceived as providing a significantly greater benefit to functional products than experiential products.

We also experimentally varied the type of risk associated with the product, characterising the risk associated with PFAS as either high or low. Perceptions of essential use can vary substantially from person to person, but may still be susceptible to the inverse relationship between risk and benefit (e.g., Fischhoff et al., 1978). Theory would predict that the benefits afforded to consumers would be reduced when the risk is high, making them less inclined to view any products as essential under high risk. We pre-registered the following hypotheses related to risk type:

H2a: Characterizing PFAS as low risk will result in perceptions that it is significantly more essential than the high-risk description.
H2b: Characterizing PFAS as low risk will result in perceptions that it is significantly more needed than the high-risk description.
H2c: Characterizing PFAS as low risk will result in perceptions that it is significantly more worthwhile to consume given the risk than the high-risk description.
H2d: Characterizing PFAS as low risk will result in perceptions that it is significantly less relevant for regulation than the high-risk description.
H2e: PFAS will be perceived as providing a significantly greater benefit to products in the low risk condition than the high risk condition.

The benefits of an experiential versus functional product might also produce different affective responses (Alhakami & Slovic, 1994; Slovic et al., 2007), which could interact with risk level. However, whilst we make the case that experiential products may be higher priority for regulation, people may also value the status or hedonic benefits these products more in certain contexts (Chen et al., 2020), so it was unclear a priori which product group would be perceived as providing the greater benefit. Based on the 2 (functional vs. experiential) x 2 (low risk vs. high risk) factorial design, we also pre-registered the following non-directional interaction for all relevant outcomes:

H3: There will be a significant interaction between product type and risk level.

While any regulations based on essential use would likely be applied indiscriminately across the market, losing access to a given product may have disparate impacts by socio-economic status. However, low status groups may appear more attentive to experiential products (e.g., Chen et al., 2020), and consume them for different purposes (Rucker & Galinsky, 2008; Sivanathan & Pettit, 2010; Y. Wang et al., 2022), especially given perceived evaluations of low status (Bricker et al., 2021). However, other evidence suggests that relatively richer households engage in conspicuous consumption to signal status to close neighbours (Bricker et al., 2021), highlighting how perceived versus objective status may have disparate influences on conspicuous consumption (Li et al., 2020). Based on the definition of need as causing harm if not met, and to build upon prior results regarding the role of subjective status (Y. Wang et al., 2022), we explored the following three-way interaction:

EH4 (exploratory): There will be a significant three-way interaction between product type, risk level, and perceived status on harm.

Finally, to develop the connection between essentiality at the societal level and need at the individual level, we also pre-registered the following hypothesis:

H5: Need will be positively associated with perceived essentiality.

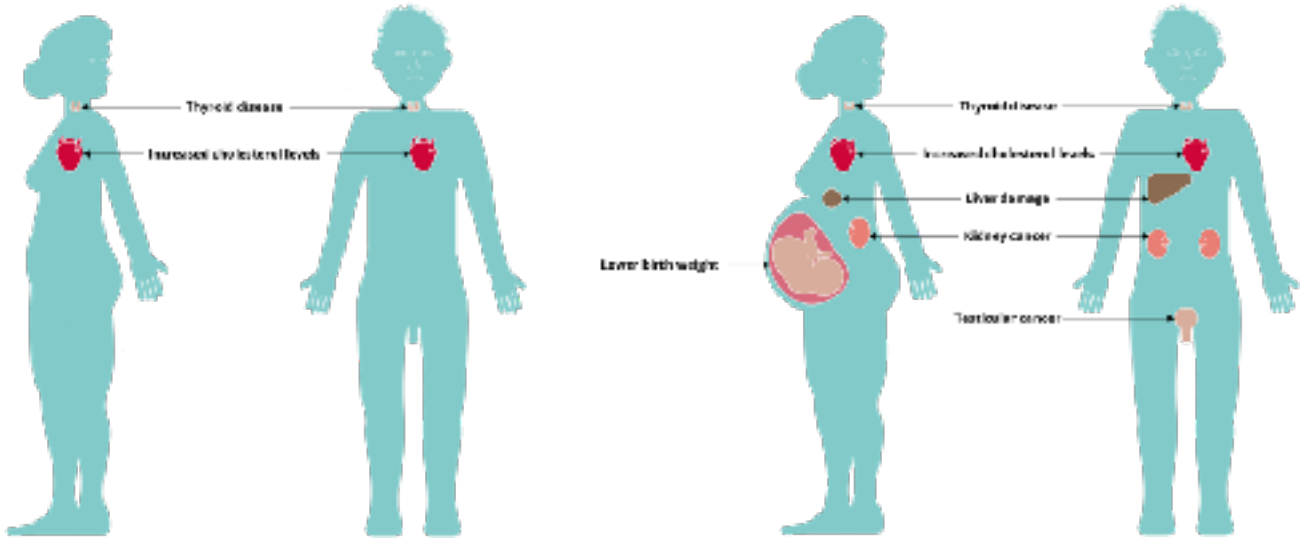
3.3. Methods

3.3.1.Material

This between-subjects experiment comprised two manipulations, product type and risk level. Participants were first given the risk type treatment, which were characterised as either low risk or high risk. The level of risk was conveyed through the potential health impacts that have been associated with PFAS exposure. We selected health impacts over environmental risks as we believed they would be more salient to individuals. For the low-risk treatment, participants were shown a diagram with only two health impacts that were more easily treatable, while those in the high-risk treatment received six health impacts that were more severe. See **Figure 22** for the two diagrams and the accompanying text by treatment. Both groups were given a full debrief at the end of the survey on the impacts and the uncertainty of risk, as well as access to further resources about PFAS.

Participants were then given the product manipulation to further describe where they might encounter PFAS. There were three potential product examples for each product type. Participants were randomly assigned to one out of the three possible examples at random, depending on their treatment group. Functional product examples were non-stick cookware, rainwear, or takeaway food packaging. The functional group also received the following description: "*PFAS chemicals are commonly found in everyday products that are purchased for their functional and technical capabilities, as they provide a practical use to people*." Experiential product examples were makeup, fashion apparel, or hair products, with the following description: *"PFAS chemicals are commonly found in everyday products that are purchased for their functional and technical capabilities, as they provide a practical use to people."* Each product example also included an accompanying image (see **Appendix A**). Both manipulations and the other components of the survey received ethics approval from LSE.

Figure 22 - Stimuli for Low and High Risk Manipulation



*"Given that these health issues are considered **manageable by modern medicine and not life threatening**, the risk of adverse health associated with PFAS is considered **low**."*

*"Given that many of these health issues are considered **quite severe and potentially life threatening**, the risk of adverse health associated with PFAS is considered **high**."*

Note: The diagram on the left-hand side was used for the low risk condition, with fewer and less severe health impacts. The diagram on the right was used in the high risk condition, with a higher quantity of health impacts that were also more severe. These were accompanied by the descriptions in the grey text boxes, along with other background information about PFAS and its functionality that was consistent across conditions. The original diagram was sourced from the European Environmental Agency (2019), including several other health risks with lower certainty that have been edited out.

3.3.2.Sample

We recruited a representative sample of participants from the United Kingdom through Prolific Academic, where participants were paid a fair rate for their time. Participants had to be at least 18 years old, reside in the U.K., speak English fluently, and access the survey through a computer to ensure the graphics were viewed properly. We selected the option to recruit a representative sample of the U.K. population by age, gender, and ethnicity. Participants were further excluded if they did not pass our seriousness or attention checks. Based on the availability of grant funding and the length of our survey, we sought to recruit 1,000 participants. This sample size is compatible with a priori power

analyses using G*Power, which indicate a minimum sample size between 787 and 863 participants using a small effect size and a power level between 0.8 and 0.95 for ANOVA, ANCOVA, and linear regression with R2 increase.[32] As with **Project 1 (SPM)**, we used ANOVA to determine sample size based in order to incorporate the number of treatment groups for our main effects models. However, we preferred to use linear regression for all analysis to report robust standard errors.

We first ran a pilot in May 2022, with N = 100 participants from Prolific Academic. After adjusting the experimental design based on input from Defra,[33] the main study data was collected in January 2023. The final sample consisted of 965 participants, indicating that the study is adequately powered. N = 1,027 accessed the survey, but N = 27 did not consent. N = 1 got dropped for missing a prolific ID, and N = 10 were dropped for not completing the survey. Finally, N = 4 participants did not take the survey seriously, and N = 19 failed the attention check. We further excluded N = 1 for not reporting their education.

3.3.3.Procedure

Participants were given an informed consent document outlining the purpose of the study, their rights, and contact details if they had any questions or concerns. After consenting, participants were first randomised into the risk treatment, providing them with background on PFAS and the appropriate diagram of health risks associated with PFAS. They were then given information on a random example product that may contain PFAS, as part of the product treatment. After, they answered both risk and product manipulation checks, followed by the outcome variables. Next, they answered questions about their individual characteristics. After completing a separate part of the survey[34], they reported demographic

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[32] A sample of 787 was derived from the following: Test family = F Tests, Statistical test = ANOVA: Fixed effect, special, main effects and interactions, Effect size f = 0.1, Power = 0.8, Numerator df = 1, Number of groups = 4. An ANCOVA with the same specifications and Number of covariates = 14 yielded the same sample of 787.
A sample of 863 was derived from the following: Test family = F Tests, Statistical test = Linear multiple regression: Fixed model, R^2 increase, Effect size f^2 = 0.02, Power = 0.95, Number of tested predictors = 3, Total number of predictors = 10.

[33] Our pilot study varied risk level by comparing human health only versus human and environmental risk. However, after piloting, we did not see an effect on this difference, and given that U.K. Reach considers both human and environmental health as equally important, Defra considered this distinction less meaningful than testing low versus high risk. We also altered the product example descriptions to make the experiential products more specific (e.g., hair mousse as opposed to hair products generally), to be more in line with the specificity of the functional products).

[34] This study included a second component on risk valuation, including further background information and a contingent valuation experiment, as part of another student's PhD.

information, and were finally given a debrief about the risk information treatment before exiting the survey.

3.3.4. Measures

Table 62 contains the details on all dependent variables, covariates, and other measures included in Study 1. All dependent variables measure the individual's perceptions of the given outcome, including essentiality (based on the definition of essential use), need-based consumption (i.e., need), risk trade-off, need for regulation (i.e., regulation), and benefit, as well as harm as an exploratory outcome and potential mediator. Essentiality and regulation explore the policy question on applying essential use to PFAS. Need and harm speak to the literature on human needs (Doyal & Gough, 1991; Max-Neef et al., 1991), whereas benefit and risk trade-off derive from the literature on risk evaluations (Finucane et al., 2000; Fischhoff et al., 1978; Slovic et al., 2007). A more direct measure of human need might have explicitly included the various needs outlined by the HS-D (e.g., subsistence, protection, etc.) or TNH (e.g., health, autonomy, etc.). However, we felt such concepts would require more in depth explanations that would be difficult to achieve given the constraints of a relatively brief online survey. Although using a more general measure of need limits our ability to specify which needs are being satisfied, we felt this measure could capture more parsimoniously the crux of our conception of need.

Covariates pertinent to the literature on conspicuous consumption include conspicuous consumption orientation or CCO (Roy Chaudhuri et al., 2011; Sahin & Nasir, 2021), perceived status (Adler & Stewart, 2007), and social norms (Parkes et al., 2024). As conspicuous consumption and status consumption are distinct concepts (O'Cass & McEwen, 2004), we chose only conspicuous consumption orientation to focus more on overt displays and visibility whilst avoiding redundancy across measures. It was included to control for the different values that people place on experiential versus functional products, which may influence their affective assessment of risk (e.g., Finucane et al., 2000). Hedonism (Schwartz et al., 2012) was further relevant for product type treatment, given that the experiential category comprised both status and pleasure-driven motivations.

Covariates relevant to the literature on risk evaluations include risk likelihood and risk perceptions, in the specific domain of health and safety (Blais & Weber, 2006). Personal values (Schwartz et al., 2012) of universalism (concern and nature) were considered relevant

for the risk treatment given that PFAS poses a risk to both human health and well-being (concern) and environmental safety (nature). We also included political ideology (Whitmarsh & Corner, 2017) as government intervention in consumption may be considered political on the basis of restricting freedom (e.g., Faure et al., 2022), with higher likelihood of reactance against regulating consumption amongst conservatives (e.g., Irmak et al., 2020). We also included measures of socio-demographics such as age, gender, race and ethnicity, income, and education.

We further explored perceived status as a moderator. Prior work indicates that consumption of goods outside of basic necessities for lower-income groups is perceived as less socially permissible (Hagerty & Barasz, 2020). Additionally, low status has been shown to influence purchasing of positional goods as compensation for one's societal standing (Rucker & Galinsky, 2008; Y. Wang et al., 2022).

To check that our manipulations were noticed, we included a manipulation check for the product type (i.e., "*What was the example product?")*[35] and risk type *("From the description you just read, how risky does using PFAS products appear to be?").*[36] The product type manipulation check can be considered a stimulus check, assessing whether the participant paid attention to the stimuli (Ejelöv & Luke, 2020). The risk check cannot be used to assess whether the manipulation "worked" for a given individual, or as a stimulus check. However, given the potential difficulty in disentangling individual risk perceptions from the manipulation check, we thought this approach was a more useful means of assessing whether the manipulation was successful on average.

We finally included an attention check, adapted from Oppenheimer (2009) as well as a check for whether they took the survey seriously, adapted from Musch & Klauer (1999). Participants were excluded if they did not pass the attention or seriousness checks.

[35] Each participant received three response options – the product they received (e.g., rainwear), a product in the opposite category of what they received (e.g., hair products), and microwaves as a decoy with potentially hazardous implications.

[36] Each participant was asked to rate the perceived risk of PFAS, from 0 (Not at all risky) to 7 (Extremely risky).

Table 62 - All Variables Included in Study 1

Type	Variable Name	Description	Other Notes
Dependent variables	Perceived essentiality	*"These [function-oriented | desire-driven] products are critical (i.e., vitally important or essential) to the functioning of society."* • Rating on Likert scale from 1 (strongly disagree) to 7 (strongly agree)	
	Need-based consumption	*"I need to consume these types of [function-oriented | desire-driven] products."* *"Other people need to consume these types of [function-oriented | desire-driven] products."* • Rating on Likert scale from 1 (strongly disagree) to 7 (strongly agree)	Responses across the statements were averaged for an overall score.
	Risk trade-off	*"It is still worth consuming these [function-oriented | desire-driven] products given the potential risk associated with PFAS."* • Rating on Likert scale from 1 (strongly disagree) to 7 (strongly agree)	
	Need for regulation	*"The use of PFAS in these [function-oriented | desire-driven] products should be restricted by government regulation, such as requiring PFAS be removed from certain products."* • Rating on Likert scale from 1 (strongly disagree) to 7 (strongly agree)	
	Benefit	*"How beneficial do you think PFAS is to the example of [example product]? That is, what amount of benefit do you think PFAS provides?"* • Rating on Likert scale from 1 (Not at all beneficial) to 7 (Extremely beneficial)	
Potential mediators	Perceived harm	- *"A person would experience physical harm by not having access to these products."* - *"A person would experience mental or emotional harm by not having access to these products."* • Rating on Likert scale from 1 (strongly disagree) to 7 (strongly agree).	Responses across the statements were averaged for an overall score.
Potential moderators	Product relevance	*"How relevant is the example product of [example product] to you? That is, do you buy or use this type of product often?"* • Rating on Likert scale from 1 (Not at all relevant) to 7 (Extremely relevant)	

Type	Variable Name	Description	Other Notes
moderators, covariates	Perceived status	"*Think of this ladder as representing where people stand in the United Kingdom…* *…On the slider below, please select the number corresponding to the rung where you think you stand at this time in your life, relative to other people in the United Kingdom."* • Rating on slider scale from 1 (best off) to 10 (worst off)	McArthur scale of social status – i.e., the ladder (Adler & Stewart, 2007) Participants were shown an accompanying image of a ladder, with each rung numbered 1 (top) to 10 (bottom).
	Conspicuous consumption orientation	- *"I enjoy it when people know I am wearing a luxury brand.* - *Using high-status products and brands allows me to be popular among my friends and colleagues.* - *I buy some products and brands to be different from others.* - *I use some products and brands that are more attractive than others.* - *I buy some products and brands to enhance my image.* - *I use some products and brands to increase my own value from the point of view of others.* - *When I pay more for a product and brand because of its status others should see me using it.* - *I buy some products and brands to show off."* - Rating on Likert scale from 1 (strongly disagree) to 7 (strongly agree)	Scale developed by Chaudhuri et al. (2011), adapted by Sahin & Nasir (2021) Responses across the statements were averaged for an overall score.
	Demographics	Age, gender, race/ethnicity, education, income	
	Political ideology	*"In politics people sometimes talk of 'left' and 'right'. Using the scale below, where would you place yourself on the political spectrum?"* a. Rating on slider scale from 0 (left) to 10 (right)	Whitmarsh & Corner (2017)

Type	Variable Name	Description	Other Notes
	DOSPERT (domain specific risk-taking scale)	- *"Drinking heavily at a social function.* - *Engaging in unprotected sex.* - *Driving a car without wearing a seat belt.* - *Riding a motorcycle without a helmet.* - *Sunbathing without sunscreen."* For each scenario, participants are asked to rate both a) **the likelihood of taking the risk**, and b) **their perceptions of the risk.** Answers are provided on a 7-point scale from extremely unlikely to extremely likely, and not at all risky to extremely risky, respectively.	Blais & Weber (2006), including only the health and safety domain. Responses across the statements were averaged for an overall score. One item was excluded ("Walking home alone at night in an unsafe area of town.") due to feedback during piloting.
	Personal values	a. Hedonism, e.g.: - *"Enjoying life's pleasures is important to me.* - *Having a good time is important to me.* - *I take advantage of every opportunity to have fun."* b. Universalism-concern, e.g.: - *"Protecting society's weak and vulnerable members is important to me.* - *I think it is important that every person in the world have equal opportunities in life.* - *I want everyone to be treated justly, even people I don't know."* c. Universalism-nature, e.g.: - *"I strongly believe that I should care for nature.* - *It is important to me to work against threats to the world of nature.* - *Protecting the natural environment from destruction or pollution is important to me."* ● Rating on Likert scale from 1 (strongly disagree) to 7 (strongly agree)	Schwartz et al. (2012) There are 3 statements per dimension, which were averaged for a score within that dimension. Thus hedonism, universalism-concern, and universalism-nature were each included as three separate covariates.
	Social norms	*"How frequently do you think the following groups of people buy or use the types of [function-oriented | desire-driven] products mentioned in the text?* - *Your close friends and family* - *Your colleagues, classmates, or acquaintances* - *Residents of your neighbourhood* - *Residents of your town or city* - *Residents of the UK"* ● Rating on Likert scale from 1 (Never) to 7 (Very frequently)	Responses across the statements were averaged for an overall score.

3.4. Study 1 Results

3.4.1.Reliability & Manipulation Checks

We assessed the reliability of pre-validated scales used in the experiment by calculating Cronbach's alpha. Conspicuous consumption orientation (a = .92), hedonism (a = .79), universalism-nature (a = .82), universalism-concern (a = .88), risk perceptions (a = .73), and social norms about consumption (a = .94) all exhibited strong reliability. Risk likelihood (a = .63) exhibited fair reliability. The two combined measures that were not pre-validated, harm (a = .65) and need (a= .85), exhibited fair to good reliability.

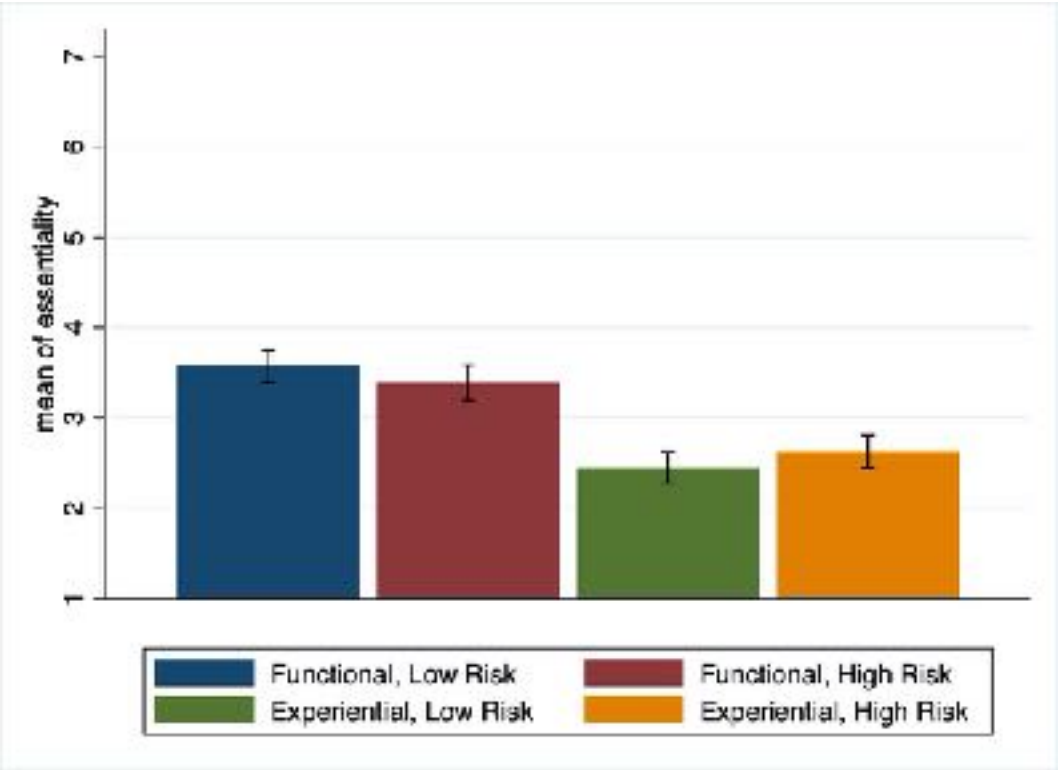
For the product manipulation, only N = 1 participant failed the manipulation check for experiential products, and no one in the functional products group failed. For the risk manipulation, those in low risk (M = 3.6, SD = 1.43) conditions reported significantly lower evaluations of risk than those in the high risk (M = 5.2, SD = 1.3) conditions, t(961) =-18.72, < .001.

3.4.2.Descriptive Results

Table 63 reports the summary statistics of our sample. The final sample of N = 965 was broadly representative of the U.K. population in terms of gender, and mostly representative in terms of race, though we somewhat oversampled White respondents (87%, U.K. = 81.7%) compared to Black (3%, U.K. = 4.0%) and Asian (8%, U.K. = 9.3%) respondents. We slightly oversampled older participants (mean = 46, U.K. mean = 40.6), and oversampled those with a college degree or more (60%, U.K. = 34%). Our median income level (£35K-45K) was broadly consistent but slightly higher than the median U.K. income (around £32K). See **Appendix C** for all comparisons with the U.K. population.

The experimental groups did not differ significantly with respect to any observable characteristics, including gender, $x^2(9) = 10.67$, p = .299, race and ethnicity, $x^2(12) = 11.83$, p = 0.460, education, $x^2(15) = 11.98$, p = 0.681, income, F(3) = 1.34, p = .259, age, F(3) = 1.48, p = .217, or political ideology, F(3) = 0.64, p = .592.

Figure 23 - Mean Essentiality by Treatment Group (Study 1)



Note: Each bar represents the mean value of perceived essentiality in each experimental condition. The black line extending above each bar indicates the 95% confidence interval.

Table 63 - Summary Statistics - Study 1

Baseline Characteristic	Functional + Low Risk				Functional + High Risk				Experiential + Low Risk				Experiential + High Risk				Full Sample			
	N = 244				N = 235				N = 239				N = 247				N = 965			
	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%
Age	47.56	15.69	-	-	46.11	15.68	-	-	46.01	15.69	-	-	44.59	15.28	-	-	46.06	15.59	-	-
Gender																				
Male	-	-	125	51%	-	-	120	51%	-	-	114	48%	-	-	112	45%	-	-	471	49%
Female	-	-	117	48%	-	-	115	49%	-	-	122	51%	-	-	134	54%	-	-	488	51%
Non-binary	-	-	2	1%	-	-	0	0%	-	-	3	1%	-	-	0	0%	-	-	5	1%
Prefer not to say	-	-	0	0%	-	-	0	0%	-	-	-	0%	-	-	1	0%	-	-	1	0%
Education																				
No formal qual.	-	-	2	1%	-	-	1	0%	-	-	1	0%	-	-	0	0%	-	-	4	0%
GCSE / O Level	-	-	36	15%	-	-	23	10%	-	-	27	11%	-	-	32	13%	-	-	118	12%
A-level or equivalent	-	-	53	22%	-	-	50	21%	-	-	61	26%	-	-	63	26%	-	-	227	24%
University Degree	-	-	102	42%	-	-	97	41%	-	-	101	42%	-	-	104	42%	-	-	404	42%
Graduate Degree	-	-	47	19%	-	-	62	26%	-	-	46	19%	-	-	46	19%	-	-	201	21%
Other	-	-	4	2%	-	-	2	1%	-	-	3	1%	-	-	2	1%	-	-	11	1%
Income (£)																				
Less than £15,000	-	-	27	11%	-	-	23	10%	-	-	18	8%	-	-	15	6%	-	-	83	9%
£15,000 - £24,999	-	-	33	14%	-	-	36	15%	-	-	38	16%	-	-	30	12%	-	-	137	14%
£25,000 - £34,999	-	-	49	20%	-	-	46	20%	-	-	44	18%	-	-	47	19%	-	-	186	19%
£35,000 - £44,999	-	-	34	14%	-	-	27	11%	-	-	35	15%	-	-	39	16%	-	-	135	14%
£45,000 - £54,999	-	-	35	14%	-	-	32	14%	-	-	31	13%	-	-	35	14%	-	-	133	14%
£55,000 - £70,000	-	-	32	13%	-	-	26	11%	-	-	30	13%	-	-	36	15%	-	-	124	13%

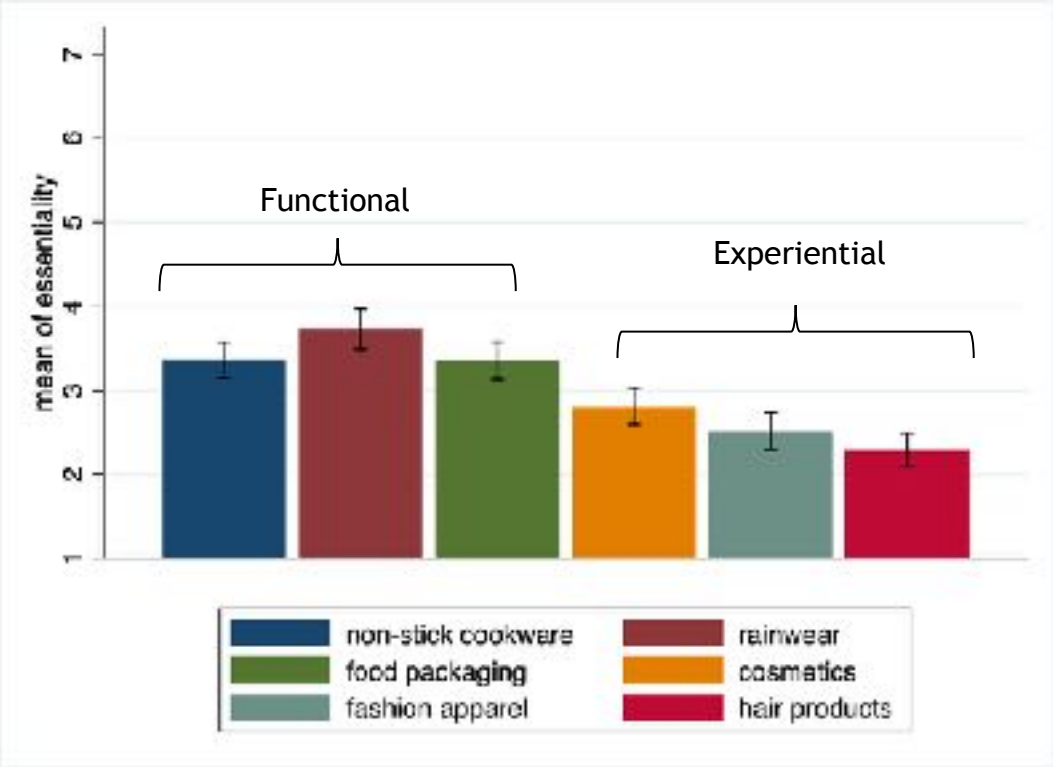
Baseline Characteristic	Functional + Low Risk				Functional + High Risk				Experiential + Low Risk				Experiential + High Risk				Full Sample			
	N = 244				N = 235				N = 239				N = 247				N = 965			
	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%
More than £70,000	-	-	25	10%	-	-	37	16%	-	-	39	16%	-	-	34	14%	-	-	135	14%
Prefer not to say	-	-	9	4%	-	-	8	3%	-	-	4	2%	-	-	11	4%	-	-	32	3%
Race & Ethnicity																				
White	-	-	211	86%	-	-	205	87%	-	-	210	88%	-	-	217	88%	-	-	843	87%
Black	-	-	6	2%	-	-	8	3%	-	-	2	1%	-	-	11	4%	-	-	27	3%
Asian	-	-	20	8%	-	-	18	8%	-	-	21	9%	-	-	14	6%	-	-	73	8%
Mixed	-	-	4	2%	-	-	3	1%	-	-	4	2%	-	-	1	0%	-	-	12	1%
Not Otherwise Specified	-	-	3	1%	-	-	1	0%	-	-	2	1%	-	-	4	2%	-	-	10	1%
Political Identity	4.12	2.18	-	-	4.13	2.07	-	-	3.90	2.28	-	-	4.13	2.17	-	-	4.07	2.18	-	-
Social Norms	5.60	1.82	-	-	5.53	1.72	-	-	5.53	1.63	-	-	5.50	1.68	-	-	5.54	1.71	-	-
Conspicuous Consumption	2.85	1.34	-	-	2.73	1.31	-	-	2.91	1.32	-	-	3.03	1.34	-	-	2.88	1.33	-	-
Hedonism	5.11	0.96	-	-	5.24	0.98	-	-	5.15	1.00	-	-	5.15	1.07	-	-	5.16	1.00	-	-
Universalism (Concern)	6.01	0.85	-	-	6.06	0.92	-	-	6.01	0.87	-	-	6.02	0.85	-	-	6.02	0.87	-	-
Universalism (Nature)	5.80	0.97	-	-	5.95	0.86	-	-	5.82	0.95	-	-	5.77	1.03	-	-	5.83	0.96	-	-
Risk Perceptions	2.42	1.05	-	-	2.33	1.01	-	-	2.35	1.02	-	-	2.37	1.04	-	-	2.37	1.03	-	-
Risk Likelihood	5.32	1.04	-	-	5.44	0.86	-	-	5.38	0.86	-	-	5.46	0.92	-	-	5.40	0.92	-	-
Perceived Status	5.44	1.58	-	-	5.39	1.64	-	-	5.46	1.56	-	-	5.50	1.64	-	-	5.45	1.60	-	-

Note: For continuous variables, mean and standard deviation (SD) are provided. For categorical variables, count (n) and percent (%) of each category are provided. For income, the minimum value of 0 is associated with “Prefer not say.” Gender was defined as how a person identified.

Figure 23 shows the mean essentiality of each treatment group, depending on product type and risk level. The mean of essentiality never exceeded 3.6 (functional, low risk), median = 3, which means on average participants are only at most neutral about the essential use of these products, i.e., rating essentiality as “Neither agree nor disagree”. Aggregating across all conditions, the mean and median are both 3, i.e., “Somewhat disagree” that the given product is essential. There appears to be higher evaluations of essentiality under low risk than high risk, on average, yet none of the products containing PFAS were considered particularly essential at baseline.

Figure 24 displays perceived essentiality of the product examples, aggregating across risk levels. While rainwear was rated as the most essential product, the mean value was only 3.75, median = 4, i.e., “Neither agree nor disagree.” All functional products received a higher average rating than experiential products.

Figure 24 - Mean Essentiality by Product Example (Study 1)



Note: Each bar represents the mean value of perceived essentiality for a given product example. The black line extending above each bar indicates the 95% confidence interval.

3.4.3.Main Effects Results

To statistically test H1a-e on product type, we aggregated across the individual product examples, using OLS regression analysis. See **Table 64** for results without covariates, and **Appendix D** for results with covariates included. The difference in perceived essentiality was highly statistically significant and medium[37] in magnitude before (β = -0.94, p <.001) and after including covariates ($\beta = -1.00$, p <.001). The negative relationship suggests that experiential products were viewed as significantly less essential than functional products, in favour of H1a. Experiential products were also perceived as significantly less needed ($\beta = -0.53$, p <.001) and less worth consuming given the potential risk than functional products ($\beta = -0.45$, p <.001), supporting H1b and H1c, respectively, both small to medium in magnitude.[38] Finally, PFAS added a significantly lower benefit to experiential compared to functional products ($\beta = -0.74$, p <.001), which was medium in magnitude,[39] in favour of H1e. All effects are significant at the 1% level and remain so when including covariates. Only after including covariates, functional products were perceived as less necessary for regulation than experiential products ($\beta = 0.15$, p = .044), lending partial support to H1d, though small in magnitude. [40] Harm also became significant with the inclusion of covariates ($\beta = -0.16$, p = .018) at the 5% level, though just over our Bonferroni adjusted significance level of 0.05 / 3 = .017.

Table 64 also contains the results associated with H2a-e, comparing risk types. There were no significant differences in perceived essentiality based on the level of risk, controlling for product type, offering no support for H2a. Perceived need was marginally significantly lower for the low risk versus high-risk scenarios ($\beta = 0.15$, p = .091), only at the 10% level, lending weak support for H2b, with a rather small magnitude.[41] Risk trade-off ($\beta = -0.68$, p < .001) was also lower for high-risk scenarios, indicating that products

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[37] Cohen's f = .33 (without covariates) and f = .38 (with covariates).

[38] For need: f = .19 (without covariates) and f = .22 (with covariates). For risk trade-off: f = .16 (without covariates) and f = .19 (with covariates).

[39] f = .26 (without covariates) and f = .29 (with covariates).

[40] For regulation, f = .07.

[41] f = .05 (without covariates) and f = .06 (with covariates).

seemed less worth consuming given the risk at the 1% level and medium in magnitude,[42] in favour of H2c. The need for regulation ($\beta = 0.65$, p < .001) was perceived as higher for high risk scenarios at the 1% level, with medium magnitude, while the benefits that PFAS contributed to the product ($\beta = 0.18$, p = .039) were considered lower in high risk scenarios at the 5% level, with small magnitude in favour of H2d and H2e, respectively.[43] These results all remained significant with the inclusion of covariates.

Table 64 - Main Effects Regressions – OLS (Study 1)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**Essentiality**	**Need**	**Risk Trade-off**	**Regulation**	**Benefit**	**Harm**
Experiential products	-0.939***	-0.526***	-0.450***	0.108	-0.738***	-0.101
	(0.092)	(0.091)	(0.092)	(0.079)	(0.089)	(0.072)
High risk	-0.002	-0.153*	-0.684***	0.648***	-0.184**	-0.041
	(0.092)	(0.091)	(0.092)	(0.079)	(0.089)	(0.072)
Constant	3.483***	3.439***	3.695***	5.116***	4.587***	2.230***
	(0.080)	(0.080)	(0.078)	(0.069)	(0.074)	(0.065)
Observations	965	965	965	965	965	965
R-squared	0.097	0.037	0.077	0.067	0.072	0.002

Note: These results are for an OLS regression with two predictors, one for product type and one for risk level. For product type, the reference category is functional products. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

To examine whether our outcome variables met the normality assumption of OLS, we checked the residuals for each model, using a Shapiro-Wilk test as well as P-P plots. See **Appendix B** for more details on normality of the residuals. None of our outcome variables appeared perfectly normally distributed, as they all failed the Shapiro-Wilk test, and presented mixed evidence in the P-P plots. We used robust standard errors, which can

[42] f = .24 (without and with covariates).

[43] For need for regulation: f = .26 (without covariates) and f = .27 (with covariates). For benefit: f = .07 (without and with covariates).

mitigate concerns around deviations from normality (e.g., White, 1980; Knief & Forstmeier, 2021), and we additionally ran Mann-Whitney U tests to compare differences between groups for each of our treatment variables (see **Appendix G**).

3.4.4.Interaction Effects Results

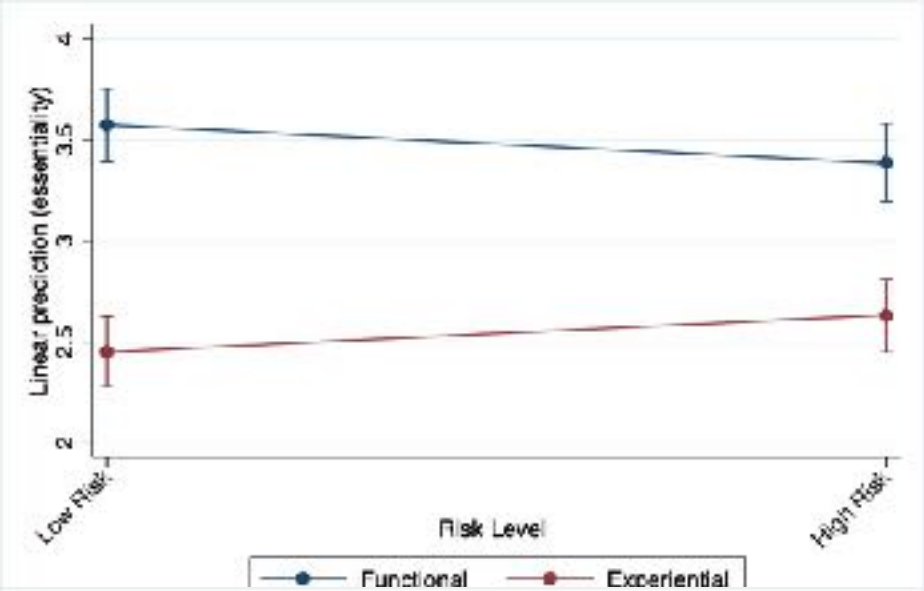
To test for interaction effects between the product and risk treatment variables in H3, we used an OLS regression with a term interacting product type and risk level. See **Table 65** for results. For essentiality, there is a significant main effect for product type ($\beta = -1.12$, p < .001) of medium magnitude (f = .32) and a significant interaction effect ($\beta = 0.37$, p = .047) between product and risk type of small magnitude (f = .06) at the 5% level. **Figure 25** displays the shape of this relationship. For functional products, essentiality appears to decrease slightly when risks go from low to high (blue line). For experiential products, essentiality appears to increase slightly when risks go from low to high (red line). Therefore, the gap in perceived essentiality between functional and experiential products is greater under low risk than high risk. The results remain significant with the inclusion of covariates (see **Appendix F**).

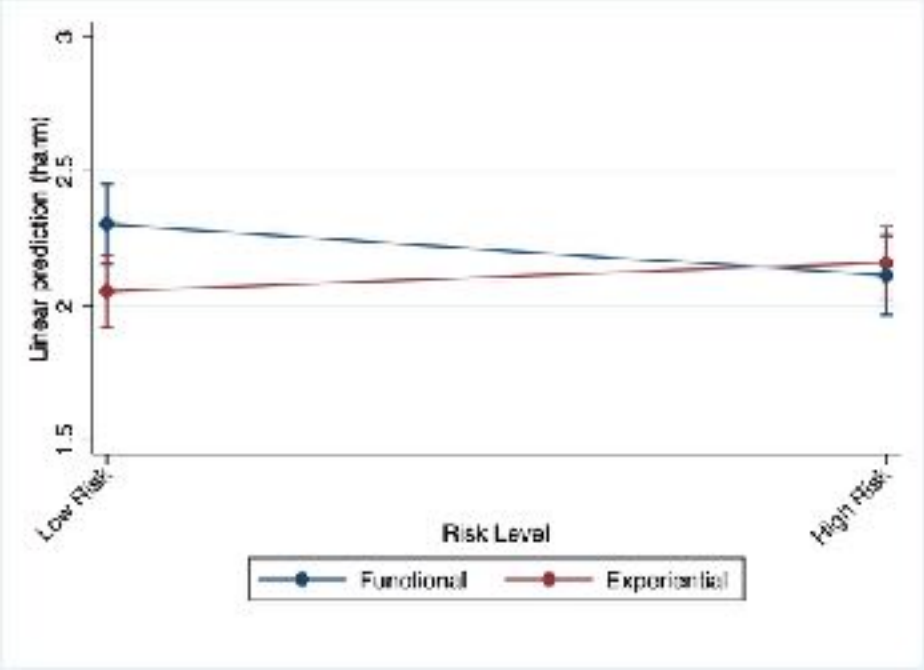
Table 65 - Product x Risk Interaction Effects (Study 1)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**Essentiality**	**Need**	**Risk Trade-off**	**Regulation**	**Benefit**	**Harm**
Experiential products	-1.122***	-0.632***	-0.587***	0.078	-0.753***	-0.249**
	(0.127)	(0.129)	(0.134)	(0.119)	(0.122)	(0.102)
High Risk	-0.187	-0.260*	-0.822***	0.618***	-0.199	-0.191*
	(0.134)	(0.134)	(0.128)	(0.112)	(0.125)	(0.107)
Experiential x High Risk	0.366**	0.212	0.274	0.060	0.030	0.296**
	(0.184)	(0.181)	(0.184)	(0.159)	(0.177)	(0.144)
Constant	3.574***	3.492***	3.762***	5.131***	4.594***	2.303***
	(0.091)	(0.093)	(0.088)	(0.080)	(0.084)	(0.076)

Observations	965	965	965	965	965	965
R-squared	0.101	0.038	0.079	0.067	0.072	0.007

Note: These results are for an OLS regression with three predictors, including product type, risk level, and their interaction. For product type, the reference category is functional products. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.





Note: This chart reports the predicted values of essentiality at each level of product type and risk level when interacting the two variables. The bars around each point indicate the 95% confidence interval. The y-axis scale has been reduced to demonstrate the direction of the effect, which is less perceptible at the full axis range.

Note: This chart reports the predicted values of harm at each level of product type and risk level when interacting the two variables. The bars around each point indicate the 95% confidence interval. The y-axis scale has been reduced to demonstrate the direction of the effect, which is less perceptible at the full axis range.

As an exploratory analysis, we also found significant main ($\beta_{product} = -0.25$, p = .015; $\beta_{risk} = -0.19$, p =.075) and interaction effects ($\beta_{product\ x\ risk} = 0.30$, p = .041) for perceived harm. **Figure 26** displays the shape of the relationship. Under the low risk condition, functional products were more likely to cause harm if unavailable than experiential products. This reversed under high risk, where experiential products were slightly more likely to cause harm if unavailable than functional products. However, the interaction did not meet the Bonferroni adjusted significance criteria of 0.017.

We also conducted an exploratory analysis examining a three-way interaction between product type, risk level, and an individual's perceived status to test H4. To allow for easier interpretation, the status variable was reverse coded so that larger numbers were associated with higher status and was mean standardized. **Table 66** shows a significant three-way interaction with perceived harm at the 5% level ($\beta_{product\ x\ risk\ x\ status} = -0.28$, p = .046), which drops to the 10% level when including covariates ($\beta_{product\ x\ risk\ x\ status} = -0.27$, p = .052). **Figure 27** shows that evaluations of which product types may cause the most harm (if unavailable) change depending on risk level. Under low risk, those with lower perceived status anticipated more harm if functional products were unavailable, whilst those with higher perceived status anticipate relatively more harm if experiential products were unavailable. The opposite trend appears true under high risk. Notably, those with lower perceived status appear to value experiential products more when the risks are high, but less when the risks are low. However, the interaction did not meet the Bonferroni adjusted significance criteria of 0.017.

Table 66 - Product x Risk x Status Three-way Interaction Effects – Harm (Study 1)

	(1)	(2)
VARIABLES	**Harm**	**Harm**
Experiential products	-0.249**	-0.266***
	(0.102)	(0.098)
High Risk	-0.189*	-0.141
	(0.107)	(0.103)
Experiential x High Risk	0.297**	0.205
	(0.144)	(0.137)
Perceived Status (Standardized)	-0.105	-0.127*
	(0.071)	(0.070)
Experiential x Perceived Status	0.169*	0.163*
	(0.097)	(0.095)
High Risk x Perceived Status	0.140	0.141
	(0.102)	(0.102)
Experiential x High Risk x Perceived Status	-0.281**	-0.270*
	(0.141)	(0.139)
Norms		0.006
		(0.024)
Conspicuous Consumption		0.165***
		(0.032)
Political Identity		0.005
		(0.017)
Hedonism		-0.056
		(0.040)
Universalism Concern		0.002
		(0.054)
Universalism Nature		-0.172***
		(0.046)
Risk Likelihood		-0.022
		(0.042)
Risk Perception		0.059

VARIABLES	(1) **Harm**	(2) **Harm**
		(0.045)
Gender		
Female		-0.071
		(0.076)
Non-binary		-0.089
		(0.399)
Prefer not to say		-1.228***
		(0.153)
Education		
No formal qualifications		-0.490**
		(0.232)
A-level or equivalent		-0.016
		(0.124)
University or a College degree		0.006
		(0.113)
Graduate degree (Masters or PhD)		-0.128
		(0.126)
Other		0.222
		(0.365)
Income		
£15,000-£24,999		0.011
		(0.146)
£25,000-£34,999		0.220
		(0.136)
£35,000-£44,999		0.050
		(0.141)
£45,000-£54,999		0.066
		(0.144)
£55,000-£70,000		0.111

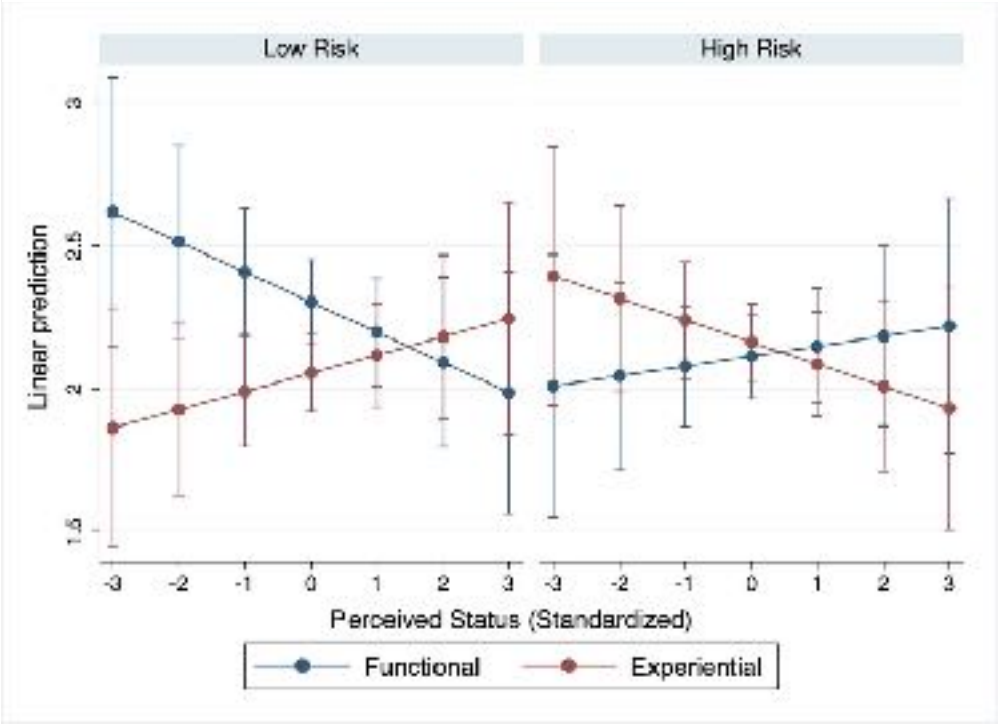
	(1)	(2)
VARIABLES	**Harm**	**Harm**
		(0.152)
£70,000		-0.036
		(0.145)
Prefer not say		-0.163
		(0.210)
Age		-0.012***
		(0.003)
Race		
Black		0.028
		(0.243)
Asian		0.145
		(0.129)
Mixed		0.227
		(0.447)
Other		0.446
		(0.483)
Constant	2.303***	3.337***
	(0.076)	(0.482)
Observations	965	965
R-squared	0.011	0.131

Note: These results are for an OLS regression with predictors for product type, risk level, perceived status, and all possible interactions between the three variables. For product type, the reference category is functional products. For risk type, the reference category is low risk. Perceived status is a continuous variable that has been mean standardized. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Note: This chart reports the predicted values of harm for each product type at each level of perceived status. To take into account risk level, the chart is split between low risk (left) and high risk (right). The bars around each point indicate the 95% confidence interval.

3.4.5.Associations between Outcomes

We also tested the relationship between essentiality and need (H5). These results are contained in **Appendix G**. We controlled for harm in the regression given the theoretical



importance of harm in the definition of need (e.g., Gasper, 1996). The results suggest that need is a significant predictor of essentiality ($\beta = 0.69$, p < .001) with a large magnitude (f = .82) at the 1% level, lending support for H5. The magnitude and significance of this association remains robust to the inclusion of treatment variables and covariates.

3.4.6.Robustness Checks

To check for heterogeneity at the product level, we also analysed each product example, controlling for risk level. We focused on essentiality as our main outcome of interest. Rainwear was considered significantly more essential than all products at the 1% level, except for frying pans, which was at the 5% significance level. All functional products were considered more essential than any experiential product at the 1% level. Of experiential products, cosmetics were considered significantly more essential than hair products ($\beta = 0.52$, p < .001) at the 1% level, and marginally more than fashion apparel ($\beta = 0.297$, p = .059) at the 10% level only. These results are consistent with the results for perceived need (see **Appendix E**).

Table 67 - Essentiality Regressions – by Product (Study 1)

	(1)	(2)	(3)	(4)	(5)	(6)
	Functional Products			Experiential Products		
VARIABLES	Essentiality (Frying pan)	Essentiality (Rainwear)	Essentiality (Food packaging)	Essentiality (Cosmetics)	Essentiality (Fashion apparel)	Essentiality (Hair products)
Frying pan	-	-0.381**	-0.004	0.540***	0.836***	1.061***
	-	(0.165)	(0.157)	(0.156)	(0.155)	(0.151)
Rainwear	0.381**	-	0.378**	0.921***	1.218***	1.442***
	(0.165)	-	(0.168)	(0.167)	(0.165)	(0.162)
Food packaging	0.004	-0.378**	-	0.543***	0.840***	1.064***
	(0.157)	(0.168)	-	(0.159)	(0.158)	(0.154)
Cosmetics	-0.540***	-0.921***	-0.543***	-	0.297*	0.521***
	(0.156)	(0.167)	(0.159)	-	(0.157)	(0.153)
Fashion apparel	-0.836***	-1.218***	-0.840***	-0.297*	-	0.224
	(0.155)	(0.165)	(0.158)	(0.157)	-	(0.152)
Hair products	-1.061***	-1.442***	-1.064***	-0.521***	-0.224	-
	(0.151)	(0.162)	(0.154)	(0.153)	(0.152)	-
High Risk	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003
	(0.092)	(0.092)	(0.092)	(0.092)	(0.092)	(0.092)
Constant	3.356***	3.738***	3.360***	2.817***	2.520***	2.296***
	(0.118)	(0.129)	(0.120)	(0.119)	(0.116)	(0.119)
Observations	965	965	965	965	965	965
R-squared	0.114	0.114	0.114	0.114	0.114	0.114

Note: These results are for an OLS regression with predictors for each product example and for risk level. For product example, the reference category is included at the top of the column, in parentheses. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

In addition to the product level regressions and the non-parametric Mann-Whitney U tests in **Appendix H,** we also re-ran additional robustness checks. First, we reran the main effects regressions and product x risk interactions, dropping participants who reported low

product relevance (i.e., product relevance less than 4 or “Neither agree nor disagree”). Given that most outcome variables only had 7 categories (with the exception of need and harm), we ran ordered logit models for the four pre-registered variables that had 7 categories (essentiality, risk trade-off, regulation, and benefit) to check the robustness of our linear specifications. We did so for both main effects and interaction effects (see **Appendix H**). While the ordinal logit results confirm the main effects from the linear models, the interaction effect on essentiality is only significant at the 10% level. Additionally, while main effects appear to hold for those with high product relevance, the interaction effect does not. The non-parametric tests support our main effects results, and additionally suggest that experiential products are considered more important for regulation at the 10% level.

3.5. Study 1 Discussion

In Study 1, we found confirmatory evidence for the majority of our hypotheses related to product type, risk level, and the interaction between these two factors. Results for the H1 hypotheses on product type suggest that experiential products were considered less essential, less needed, less worth the risk of consuming, and that there was less benefit from PFAS for these products than functional products. Only H1d was not supported, indicating that there was no significant difference in the perceived need to regulate PFAS in functional versus experiential products. We also did not find any significant difference by product for our exploratory outcome harm. There may have been some suppression effects for regulation and harm, as product type became a significant predictor in these models only after covariates were included, in the directions we hypothesized.

When comparing high and low risk, H2c-e were supported, suggesting that higher risk scenarios produced a greater perceived need for regulation, lower risk trade-off, and lower perceived benefit of PFAS to the product, compared to lower risk scenarios. There was also marginally significant support for H2b (need), only at the 10% level. However, H2a was not supported, as there was no significant difference in perceived essentiality by risk level. Supporting the risk perceptions literature (e.g., Fischhoff et al., 1978), there appeared an inverse relationship between higher risk and lower perceived benefit.

While risk level exhibited no significant main effect on essentiality, perceptions of essentiality and associated harm from losing each product type did appear to depend on the

risk level, supporting H3. There appeared a greater gap in perceived essentiality of the two product types when risk was low, which narrowed under high risk. Perceptions of harm across the two product types also differed significantly under the two risk conditions. Under low risk, functional products were perceived to cause more harm if unavailable, whilst under high risk, experiential products were viewed as causing a similar or slightly greater amount of harm. Further, our exploratory three-way interaction for EH4 suggests that the heightened value of experiential products under high risk could be driven by those with lower as opposed to higher levels of perceived status, connecting to prior literature on differences in consumption by SES (Chen et al., 2020; Rucker & Galinsky, 2008; Sivanathan & Pettit, 2010; Y. Wang et al., 2022).

As the literature on human needs would suggest, individuals appeared to perceive products that satisfy functional purposes as more important, both from individual and societal perspectives, than products that satisfy spiritual or psychological ones. The associations between essentiality and need also indicate support for H5, such that there are clear overlaps between these concepts. These overlaps suggest that it may be appropriate to apply human needs theories to the concept of essential use, but this relationship will be further explored in the replication Study 2.

4. Study 2

In order to mitigate against the risk of false positives, and given reproducibility issues in psychological studies (Open Science Collaboration, 2015), we conducted a second study which closely followed the design of Study 1. However, given the benefits of constructive replications for developing theory (Hüffmeier et al., 2016) and to test the rigor of our results in a different context, we conducted Study 2 using participants from the United States. Evidence from Karinen et al. (2024) suggests the importance of cross-country evaluations of essentiality, as they found substantial differences amongst the EU member states. We chose the United States to provide another understudied geography in the application of essential use to PFAS. We included a product categorisation analysis to test our assumptions, as well as the opportunity for open-text responses to provide richer data on the relation between individual need and societal functioning.

The United States presents a setting with some baseline similarities to the United Kingdom, i.e., a mostly democratic government and market-driven economy, but also differences with respect to PFAS, such that more regulations appear to have been passed in the United States to regulate PFAS (Kindy, 2023). Most of these regulations have to do with downstream impacts, such as regulating drinking water as opposed to product or consumption-oriented restrictions. Still, the fact that PFAS regulation is more advanced there may heighten public awareness of PFAS compared to the United Kingdom. Therefore, it could be more difficult to achieve significant differences from our experimental treatments if this awareness constrained the extent to which people viewed PFAS products as essential or needed. While we could not be certain of this a priori, we viewed the United States as a conservative comparison. We pre-registered all hypotheses from Study 1 that returned a significant main effect for Study 2 (maintaining the same labels for consistency). For the product type manipulation, this includes **H1a** (essentiality), **H1b** (need), **H1c** (risk trade-off), and **H1e** (benefit). We also pre-registered the hypotheses associated with risk level that returned a significant result, that is, **H2b** (need), **H2c** (risk trade-off), **H2d** (regulation), and **H2e** (benefit).

We further pre-registered the significant interaction effects found in Study 1:

H3a: There will be a significant interaction between product type and risk level on perceived essentiality.
H3b: There will be a significant interaction between product type and risk level on perceived harm.

EH4 (exploratory): There will be a significant three-way interaction between product type, risk, and perceived status on perceived harm.

Given the positive and significant associations between need and essentiality, we pre-registered the following as well:

H5: Need will be significantly and positively associated with perceived essentiality.

Given emerging evidence on the role of harm in Study 1, we also explored the following hypothesis:

EH6 (exploratory): Essentiality will be significantly associated with harm.

4.1. Methods

4.1.1.Material

Study 2 used the same experimental material as Study 1, with rephrasing and spelling changes to fit the U.S. audience.

4.1.2.Sample

A representative U.S. sample was recruited through Prolific Academic, where participants were paid a fair rate for their time. Participants had to be at least 18 years old, reside in the United States, and access the survey through a computer to ensure the graphics were viewed properly.[44] We selected the option through Prolific to recruit a representative sample by age, gender, and ethnicity. Participants were further excluded if they did not pass the seriousness or attention checks we included in the survey.

Based on effect sizes from Study 1, we sought to recruit 400 participants. This sample size was derived using a medium effect size (f = .33) based on analyses with perceived essentiality as the outcome variable in Study 1. Power calculations resulted in a range from N = 122 participants (f = .33) to N = 210 participants (f = .25). [45] To ensure we had enough participants remaining after exclusions and in case the effect size was smaller in the U.S. sample, we roughly doubled the minimum sample required.

The remaining sample consisted of N = 389 participants, recruited in late October 2023. N = 423 accessed the survey, but N = 21 did not consent. N = 3 did not answer seriously, and another N = 10 failed the attention check. The study was adequately powered to detect a medium effect size.

4.1.3.Procedure

Study 2 largely followed the same procedure as Study 1, with a few minor differences. While Study 1 was part of a longer survey that followed with additional valuation questions, this study was a standalone survey. We did, however, include additional questions that were

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[44] While we had screened for English fluency in Study 1, there was no longer an option to pre-screen candidates based on this factor when recruiting a representative sample in Prolific. While we could not directly ensure fluency through pre-screening, we mentioned English fluency as a requirement in our consent form.

[45] N = 122 was derived from: Test family = F-test, Statistical test = ANOVA, special, main & interactions, f = .33, alpha = .05, Power = 0.95, Numerator df = 1, Number of groups = 4. N = 210 was derived from the same ANOVA, except that f = .25.
The linear regression specification for the moderation analysis yielded N = 177: Test family = F-test, Statistical test = Linear multiple regression: Fixed model, R^2 increase, f^2 = 0.1, Power = .95, Number of tested predictors = 3, Total number of predictors = 17.

not included in Study 1. First, we included additional qualitative questions to gain more insight on the differences between human need and essentiality, after the outcome variables and before the covariates. Second, we included a set of questions asking participants to categorise each example product included (as functional or experiential). These questions were added between the covariate questions on individual characteristics (e.g., conspicuous consumption orientation) and the other demographic questions.

4.1.4.Measures

Study 2 included the majority of measures from Study 1, with a few exceptions. We dropped risk likelihood, given its lower reliability and that risk perception was the more significant predictor of perceived essentiality.[46] We changed the income variable to a continuous measure to allow for more granularity. We also included an additional demographic variable, asking separately about Hispanic or Latin American ethnicity, based on U.S. census recommendations (*Census.Gov*, 2022). Additionally, we included a new open-response question:

> "In this study, we define a "need" as something that will cause an individual harm if not met, and "essential" as something that is critical for the functioning of society. In your view, is there any difference between what an individual needs to function properly and what a society at large requires to function properly? Please share some brief thoughts below."

This question was coded qualitatively to understand perceived differences between individual human needs and societal essentiality, as incorporating mixed methods approaches can enhance survey research (Mauceri, 2016). Technically, this question could be answered through a binary yes or no, though we prompted respondents for an explanation. As such, we wanted to create a spectrum of responses from yes (they are not the same) to no (they are the same), incorporating the variety of reasons provided by respondents, to provide richer data on this relationship than could have been derived through a quantitative questionnaire alone.

We also included two sets of questions on the product categories we had created. For the functional rating, we listed out all six product examples that had been used across the sample, and asked participants to rate each product on a scale from 1 to 7, where 1

[46] Note that this was mistakenly specified on the pre-registration document. See **Section 7**.

indicated "Not at all functional" and 7 indicated "Purely functional". We did the same for the experiential question, obtaining a separate set of ratings. We then calculated an average functional and an average experiential rating for each product example.

4.2. Study 2 Results

4.2.1.Reliability & Manipulation Checks

Conspicuous consumption orientation (a = .94), hedonism (a = .82), universalism-nature (a = .90), universalism-concern (a = .84), ~~risk perceptions (a = .73),~~ risk perceptions (a = .81), and social norms about consumption (a = .93) all exhibited strong reliability. The two combined measures that were not pre-validated, harm (a = .77) and need (a = .87), exhibited good reliability as well.

For the product manipulation, only three participants failed the manipulation check for experiential products[47], and no one in the functional products failed. For the risk manipulation, those in low risk conditions reported significantly lower evaluations of risk than those in the high risk conditions, t(387) = -10.4468, < .001.

4.2.2.Descriptive Results

Table 68 reports the summary statistics of our sample. The final sample of N = 389 was representative of the U.S. population in terms of gender and race. We under sampled Hispanic and Latin American respondents (5%, U.S. = 19%). The again oversampled older respondents (median = 45, U.S. median = 39) and those with a college degree or more (63%, U.S. = 34.3%). We slightly oversampled lower income respondents ($66K, U.S. = $75.6K). See **Appendix I** for a full comparison with the U.S. population.

The experimental groups did not differ significantly with respect to gender, $x^2(9) = 4.94$, p = .839, race, $x^2(15) = 9.76$, p = .835, Hispanic or Latin ethnicity, $x^2(3) = 5.91$, p = .116, education, $x^2(12) = 14.15$, p = .291, age, F(3) = 1.62, p = . 185, or political ideology, F(3) = 1.63, p = .182. Income differed only at the 10% level, F(3) = 2.16, p = . 0925, with the largest difference between condition 1 (functional, low risk) and condition 4 (experiential, high risk).

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[47] Two participants failed to choose “Make-up” in the low-risk condition, and one participant failed to select “Hair products” in the low-risk condition.

Figure 29 shows the mean essentiality of each treatment group in Study 2, depending on product type and risk level. The mean of essentiality never exceeded 3.77 (functional, high), median = 3.5. Across all conditions, the mean = 3.4 and median = 3, i.e., "Somewhat disagree." As with Study 1, on average participants appeared neutral to negative about the essential use of these products, though functional products were rated more essential than experiential products on average. **Figure 28** displays perceived essentiality of specific products in each treatment group. Rainwear was again the most essential product, with a mean of 4.1, median = 4, i.e., "Neither agree nor disagree", however, food packaging (mean = 3.86, median = 4) was a close second amongst the U.S. sample.

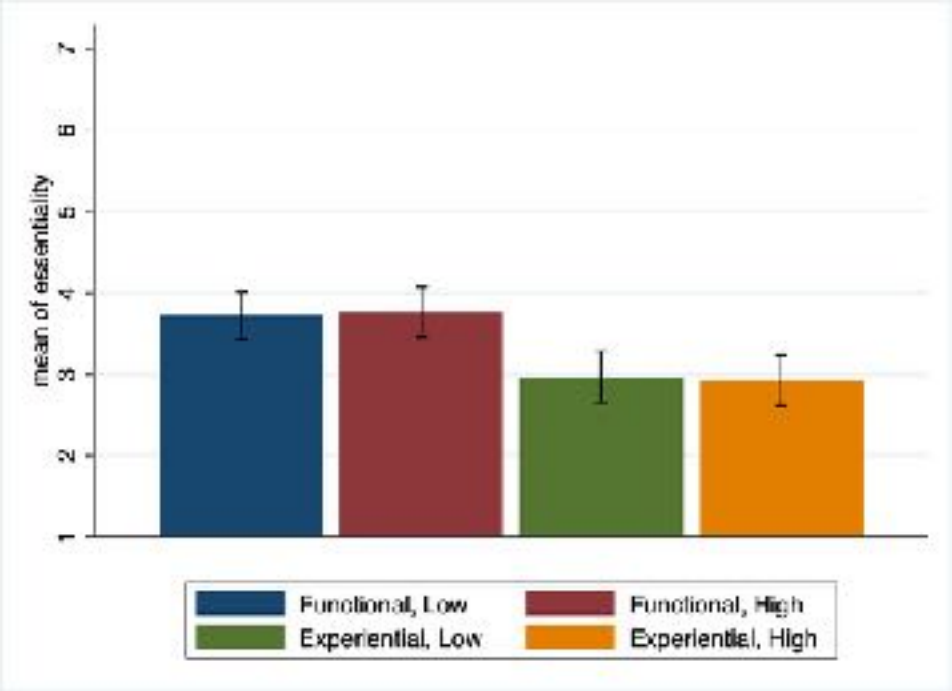
Table 68 - Summary Statistics - Study 2

Baseline Characteristic	Functional + Low Risk				Functional + High Risk				Experiential + Low Risk				Experiential + High Risk				Full Sample			
	N = 100				N = 98				N = 93				N = 98				N = 389			
	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%
Age	48.49	15.72	-	-	44.50	15.62			44.03	15.18			46.48	16.84	-	-	45.91	15.90	-	-
Gender																				
Male	-	-	46	46 %	-	-	43	44 %	-	-	48	52 %	-	-	43	44 %	-	-	180	46 %
Female	-	-	52	52 %	-	-	53	54 %	-	-	44	47 %	-	-	53	54 %	-	-	202	52 %
Non-binary	-	-	2	2 %	-	-	1	1 %	-	-	1	1 %	-	-	2	2 %	-	-	6	2 %
Prefer not to say	-	-	-	-	-	-	1	1 %	-	-	-	-	-	-	-	-	-	-	1	0 %
Education																				
Some HS	-	-	1	1 %	-	-	1	1 %	-	-			-	-	1	1 %	-	-	3	1 %
HS Degree / GED	-	-	10	10 %	-	-	16	16 %	-	-	13	14 %	-	-	9	9 %	-	-	48	12 %
Some Undergrad	-	-	18	18 %	-	-	23	23 %	-	-	26	28 %	-	-	26	27 %	-	-	93	24 %
College Degree	-	-	43	43 %	-	-	47	48 %	-	-	38	41 %	-	-	43	44 %	-	-	171	44 %
Graduate Degree	-	-	28	28 %	-	-	11	11 %	-	-	16	17 %	-	-	19	19 %	-	-	74	19 %
Income ($)	83,960	49,766	-	-	76,224	51,773	-	-	71,581	47,592	-	-	67,224	44,108	-	-	74,835	48,627	-	-
Race & Ethnicity																				
Indigenous / Native	-	-	1	1 %	-	-	1	1 %	-	-	2	2 %	-	-			-	-	4	1 %
Asian	-	-	6	6 %	-	-	7	7 %	-	-	4	4 %	-	-	5	5 %	-	-	22	6 %
Black	-	-	19	19 %	-	-	10	10 %	-	-	13	14 %	-	-	13	13 %	-	-	55	14 %
Native Hawaiian / PI	-	-	1	1 %	-	-		0 %	-	-		0 %	-	-		0 %	-	-	1	0 %

White	-	-	72	72 %	-	-	79	81 %	-	-	73	78 %	-	-	78	80 %	-	-	302	78 %
Not otherwise listed	-	-	1	1 %	-	-	1	1 %	-	-	1	1 %	-	-	2	2 %	-	-	5	1 %
Hispanic/ Latin	-	-	1	1 %	-	-	6	6 %	-	-	4	4 %	-	-	8	8 %	-	-	19	5 %
Political Identity	4.01	2.90	-	-	4.92	2.91	-	-	4.57	2.80	-	-	4.35	3.25	-	-	4.46	2.98	-	-
Social Norms	5.54	1.01	-	-	5.64	1.12	-	-	5.32	1.06	-	-	5.15	1.14	-	-	5.42	1.10	-	-
Conspicuous Consumption	3.02	1.48	-	-	2.99	1.59	-	-	3.24	1.50	-	-	2.98	1.61	-	-	3.05	1.54	-	-
Hedonism	5.16	0.99	-	-	5.04	1.22	-	-	5.08	1.16	-	-	5.12	1.18	-	-	5.10	1.14	-	-
Universalism (Concern)	5.99	1.03	-	-	5.76	1.12	-	-	5.73	1.09	-	-	6.06	0.91	-	-	5.89	1.04	-	-
Universalism (Nature)	5.64	1.11	-	-	5.49	1.24	-	-	5.56	1.28	-	-	5.82	1.03	-	-	5.63	1.17	-	-
Risk Perceptions	5.53	1.04	-	-	5.48	0.99	-	-	5.29	1.13	-	-	5.53	1.13	-	-	5.46	1.07	-	-
Perceived Status	5.01	1.67	-	-	5.48	1.79	-	-	5.24	1.60	-	-	5.37	1.84	-	-	5.27	1.73	-	-

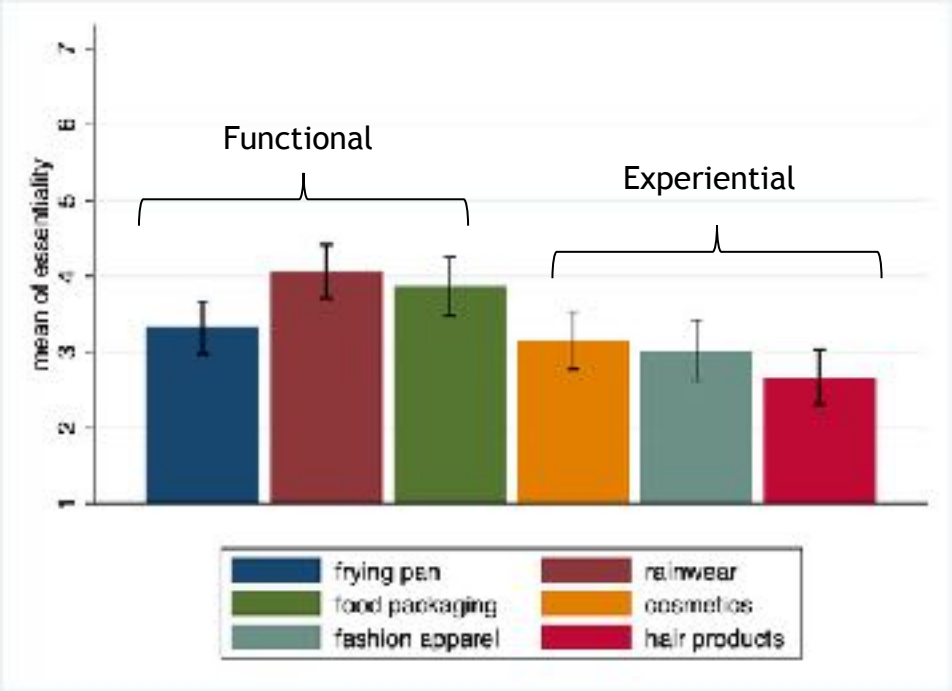
Note: For continuous variables, mean and standard deviation (SD) are provided. For categorical variables, count (n) and percent (%) of each category are provided. Gender was defined as how a person identified. College degree is equivalent to a University degree in the U.K. sample.

Figure 29 - Mean Essentiality by Treatment Group (Study 2)



Note: Each bar represents the mean value of perceived essentiality in each experimental condition. The black line extending above each bar indicates the 95% confidence interval.

Figure 28 - Mean Essentiality by Product Example (Study 2)



Note: Each bar represents the mean value of perceived essentiality for a given product example. The first three bars are part of the functional treatment group, whereas the second three bars comprise the experiential group. The black line extending above each bar indicates the 95% confidence interval.

4.2.3.Main Effects Results

To statistically test H1 regarding the difference between functional and experiential products, we again ran OLS regressions, aggregating across product examples. See **Table 69** for the results associated with H1a-e, without covariates. See **Appendix K** for results with covariates. Consistent with Study 1, experiential products were perceived as significantly less essential than functional products before ($\beta = -0.80$, p <.001) and after including covariates ($\beta = -0.77$, p <.001), with a medium effect size, supporting H1a.[48] Experiential products were also perceived as significantly less needed ($\beta = -0.51$, p =.001) and less worth consuming given the potential risk than functional products ($\beta = -0.41$, p =.009), both small to medium effect sizes, supporting H1b and H1c, respectively.[49] Finally, PFAS added a significantly lower benefit to experiential compared to functional products ($\beta = -0.88$, p <.001), with a medium magnitude, lending support to H1d.[50] All effects are significant at the 1% level and remained so when including covariates, except for risk trade-off, which dropped to 5%.

Table 69 - Main Effects Regressions - OLS (Study 2)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**Essentiality**	**Need**	**Risk Trade-off**	**Regulation**	**Benefit**	**Harm**
Experiential products	-0.795***	-0.512***	-0.411***	0.207	-0.882***	-0.156
	(0.157)	(0.156)	(0.157)	(0.146)	(0.150)	(0.143)
High risk	0.004	-0.164	-0.655***	0.636***	-0.233	-0.354**
	(0.157)	(0.156)	(0.157)	(0.146)	(0.150)	(0.143)
Constant	3.741***	3.594***	3.789***	4.786***	4.368***	2.741***
	(0.131)	(0.130)	(0.128)	(0.131)	(0.124)	(0.130)

[48] f = .26 (without covariates) and f = .27 (with covariates).

[49] For need: f = .17 (without and with covariates). For risk trade-off: f = .13 (without and with covariates).

[50] f = .30 (without covariates) and f = .27 (with covariates).

VARIABLES	(1) Essentiality	(2) Need	(3) Risk Trade-off	(4) Regulation	(5) Benefit	(6) Harm
Observations	389	389	389	389	389	389
R-squared	0.063	0.030	0.060	0.052	0.088	0.019

Note: These results are for an OLS regression with two predictors, one for product type and one for risk level. For product type, the reference category is functional products. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Harm is included in column (6) to show the main effects before any interactions are included, however there is no hypothesis associated with it.

Table 69 also contains results associated with H2 on risk level, and **Appendix K** includes results with covariates. There were no significant differences in perceived essentiality, consistent with Study 1, or need, which was significant at the 10% level in Study 1. Benefit, which was significant at the 5% level in Study 1, was also insignificant. For risk trade-off, products containing PFAS seemed less worth consuming given the risk at the 1% level, before ($\beta = -0.66$, p < .001) and after ($\beta = -0.64$, p < .001) covariates were included, with small to medium effect sizes.[51] The need for regulation ($\beta = 0.64$, p < .001) was perceived as higher for high risk scenarios at the 1% level, even after including covariates, ($\beta = 0.6$, p < .001), with small to medium magnitudes.[52]

To examine whether our outcome variables met the normality assumption of OLS, we again used Shapiro-Wilk tests and P-P plots. See **Appendix J** for more details on normality of residuals. The results are consistent with Study 1. Again, in addition to using robust standard errors, we ran Mann-Whitney U tests to compare differences between groups for each of our treatment variables (see **Appendix M**).

4.2.4.Interaction Effects Results

Table 70 shows the results of our regression testing for interaction effects between product type and risk level (H3). Unlike in Study 1, there were no significant interaction

[51] f = .21 (without covariates) and f = .22 (with covariates).

[52] f = .22 (without covariates) and f = .24 (with covariates).

effects for essentiality or harm amongst our U.S. sample. Thus, no evidence supports H3a or H3b.

Table 70 - Product x Risk Interaction Effects (Study 2)

	(1)	(2)	(3)	(4)
VARIABLES	**Essentiality**	**Essentiality**	**Harm**	**Harm**
Experiential products	-0.752***	-0.800***	0.043	-0.128
	(0.219)	(0.203)	(0.214)	(0.202)
High Risk	0.045	0.027	-0.160	-0.300
	(0.217)	(0.214)	(0.207)	(0.194)
Experiential x High Risk	-0.084	0.064	-0.395	-0.124
	(0.314)	(0.299)	(0.286)	(0.265)
Norms		0.142*		0.020
		(0.074)		(0.065)
Conspicuous Consumption		0.232***		0.211***
		(0.058)		(0.056)
Perceived Status		0.071		0.087**
		(0.048)		(0.043)
Political Identity		0.026		0.007
		(0.028)		(0.026)
Hedonism		0.112		0.004
		(0.101)		(0.069)
Universalism Concern		-0.201*		-0.408***
		(0.113)		(0.112)
Universalism Nature		0.066		0.057
		(0.105)		(0.088)
Risk Perception		0.005		-0.000
		(0.083)		(0.067)
Gender				
Female		-0.167		-0.067
		(0.166)		(0.139)
Non-binary		-0.828		-0.657**

VARIABLES	(1) Essentiality	(2) Essentiality	(3) Harm	(4) Harm
		(0.530)		(0.303)
Prefer not to say		-2.564***		-1.853***
		(0.590)		(0.513)
Education				
No formal qualifications		-0.001		-0.134
		(0.666)		(0.417)
A-level or equivalent		-0.333		-0.228
		(0.268)		(0.241)
University or a College degree		-0.370		-0.291
		(0.233)		(0.208)
Graduate degree (Masters or PhD)		-0.464*		-0.322
		(0.270)		(0.244)
Income (Thousands)		0.000		-0.001
		(0.002)		(0.001)
Age		0.009*		0.003
		(0.005)		(0.004)
Race				
Asian		0.935		2.154***
		(0.750)		(0.499)
Black		1.355**		1.918***
		(0.675)		(0.395)
Nat Hawaiian / PI		-1.775***		0.688*
		(0.667)		(0.373)
White		0.460		1.526***
		(0.649)		(0.346)
Other		0.623		1.140
		(0.973)		(0.746)
Hispanic/Latin		0.020		0.428
		(0.385)		(0.321)

VARIABLES	(1) Essentiality	(2) Essentiality	(3) Harm	(4) Harm
Constant	3.720***	1.377	2.645***	2.206***
	(0.148)	(1.021)	(0.153)	(0.812)
Observations	389	389	389	389
R-squared	0.063	0.251	0.024	0.232

Note: These results are for an OLS regression with three predictors, including product type, risk level, and their interaction. For product type, the reference category is functional products. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 71 shows results for the three-way interaction between product type, risk, and an individual's perceived status on perceived harm, testing EH4. While there was no significant main effect for product and risk type, the interaction between product type and perceived status was significant at the 1% level ($\beta_{product\ x\ status}$= 0.61, p = .010), and the interaction between risk type and perceived status was significant at the 5% level ($\beta_{risk\ x\ status}$= 0.55, p = .012), both with small magnitudes.[53] The three-way interaction was significant at the 1% level ($\beta_{product\ x\ risk\ x\ status}$= -0.86, p = .004), small to medium in magnitude,[54] and met a Bonferroni adjusted significance criteria (a = 0.05/2 = .025). These interaction terms remained significant with covariates, though the product x status and three-way interactions dropped to the 5% level. **Figure 30** displays the shape of the interaction, which is directionally consistent with the results from Study 1, however, the difference in evaluations of experiential products by status level are less pronounced than in Study 1. Experiential products are rated rather consistently regardless of status under high risk. Higher status individuals rated perceived harm as higher for experiential product under low risk, while lower status individuals rate perceived harm of experiential products slightly higher under high risk.

[53] For product x status: f = .06 (without covariates) and f = .07 (with covariates). For risk x status: f = .04 (without covariates) and f = .08 (with covariates).

[54] f = .15 (without covariates) and f = .14 (with covariates).

Table 71 - Product x Risk x Status Three-way Interaction Effects – Harm (Study 2)

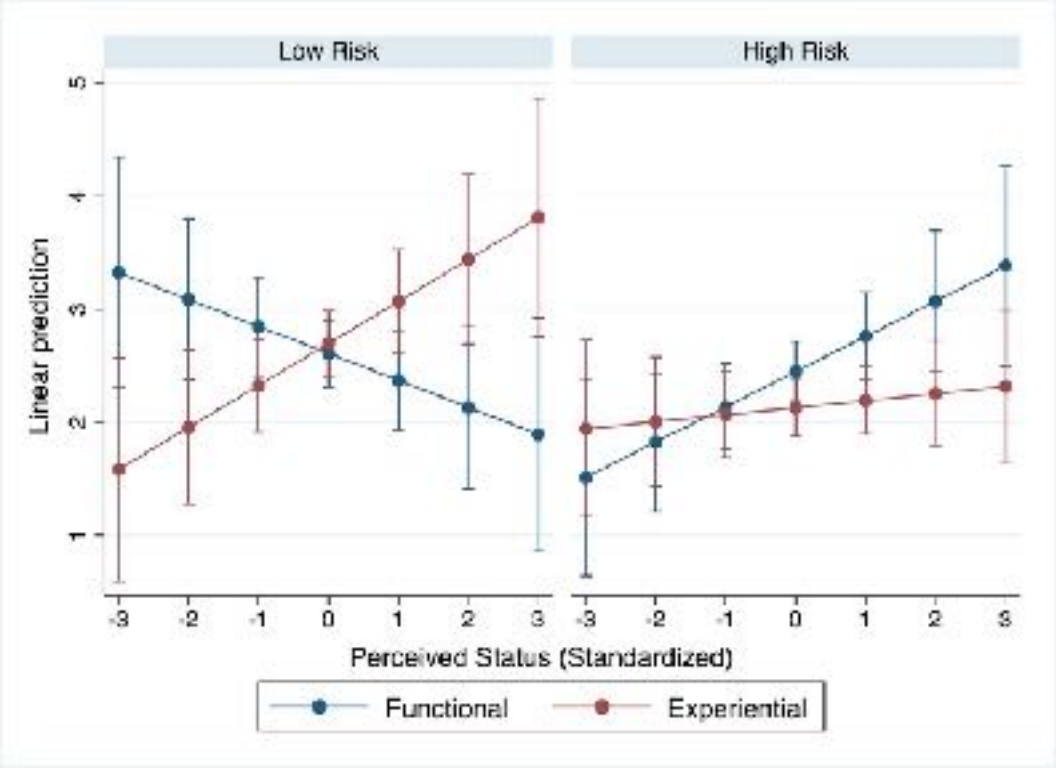
	(1)	(2)
VARIABLES	**Harm**	**Harm**
Experiential products	0.087	-0.051
	(0.210)	(0.200)
High Risk	-0.161	-0.253
	(0.202)	(0.190)
Experiential x High Risk	-0.405	-0.182
	(0.282)	(0.264)
Perceived Status (Standardized)	-0.238	-0.229
	(0.166)	(0.159)
Experiential x Perceived Status	0.610***	0.544**
	(0.235)	(0.230)
High Risk x Perceived Status	0.550**	0.562***
	(0.219)	(0.208)
Experiential x High Risk x Perceived Status	-0.859***	-0.710**
	(0.298)	(0.288)
Norms		0.011
		(0.065)
Conspicuous Consumption		0.205***
		(0.055)
Political Identity		-0.000
		(0.026)
Hedonism		-0.011
		(0.070)
Universalism Concern		-0.393***
		(0.112)
Universalism Nature		0.053
		(0.086)
Risk Perception		-0.000
		(0.067)

VARIABLES	(1) Harm	(2) Harm
Gender		
Female		-0.090
		(0.140)
Non-binary		-0.675***
		(0.222)
Prefer not to say		-2.127***
		(0.543)
Education		
No formal qualifications		0.189
		(0.322)
A-level or equivalent		-0.217
		(0.242)
University or a College degree		-0.290
		(0.209)
Graduate degree (Masters or PhD)		-0.314
		(0.249)
Income (Thousands)		-0.000
		(0.001)
Age		0.002
		(0.004)
Race		
Asian		2.375***
		(0.542)
Black		2.093***
		(0.446)
Nat Hawaiian / PI		1.115**
		(0.439)
White		1.737***
		(0.403)

VARIABLES	(1) Harm	(2) Harm
Other		1.187
		(0.726)
Hispanic/Latin		0.453
		(0.313)
Constant	2.609***	2.499***
	(0.150)	(0.777)
Observations	389	389
R-squared	0.058	0.254

Note: These results are for an OLS regression with predictors for product type, risk level, perceived status, and all possible interactions between the three variables. For product type, the reference category is functional products. For risk type, the reference category is low risk. Perceived status is a continuous variable that has been mean standardized. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure 30 - Marginal Effects Plot – Product x Risk x Status Interaction – Harm (Study 1)



Note: This chart reports the predicted values of harm for each product type at each level of perceived status. To take into account risk level, the chart is split between low risk (left) and high risk (right). The bars around each point indicate the 95% confidence interval.

4.2.5.Associations between Outcomes

We again investigated the relationship between perceived essentiality and need (H5), as well as essentiality and harm (EH6). Regressing essentiality on need and harm, both need ($\beta = 0.66$, p < .001) and harm ($\beta = .17$, p = .002) significantly predicted essentiality at the 1% level, accounting for just over 50% of the variance in essentiality (R^2 = 0.52). While the magnitude of perceived need was large, harm exhibited a small to medium effect.[55] They remained robust to the inclusion of covariates. The association with harm met the Bonferroni adjusted significance criteria (a = .0125). As product type was not a significant predictor of harm (**Table 69**), a mediation analysis to test the association between harm and essentiality more rigorously was not warranted.

Table 72 - Regressing Essentiality on Need, Harm, and Other Factors (Study 2)

	(1)	(2)	(3)
VARIABLES	**Essentiality**	**Essentiality (w/ Product & Risk)**	**Essentiality (w/ Product, Risk, Covariates)**
Need	0.658***	0.633***	0.608***
	(0.050)	(0.052)	(0.057)
Harm	0.168***	0.178***	0.162***
	(0.055)	(0.056)	(0.056)
Experiential products		-0.443***	-0.449***
		(0.117)	(0.122)
High risk		0.171	0.169
		(0.108)	(0.110)
Norms			0.015
			(0.059)
Conspicuous Consumption			0.036
			(0.047)
Perceived social status			0.050

[55] For need: f = .83. For harm: f = .19.

VARIABLES	(1) Essentiality	(2) Essentiality (w/ Product & Risk)	(3) Essentiality (w/ Product, Risk, Covariates)
			(0.038)
Political Identity			0.023
			(0.022)
Hedonism			0.080
			(0.068)
Universalism Concern			0.033
			(0.073)
Universalism Nature			0.021
			(0.080)
Risk Perception			-0.020
			(0.063)
Gender			
Female			0.028
			(0.125)
Non-binary			-0.184
			(0.373)
Prefer not to say			-1.153**
			(0.462)
Education			
No formal qualifications			0.811
			(0.861)
Some undergrad			-0.229
			(0.181)
University or a College degree			-0.150
			(0.164)
Graduate degree (Masters or PhD)			-0.237
			(0.191)
Income (Thousands)			-0.000

VARIABLES	(1) Essentiality	(2) Essentiality (w/ Product & Risk)	(3) Essentiality (w/ Product, Risk, Covariates)
			(0.001)
Age			0.006
			(0.004)
Race			
Asian			-0.115
			(0.525)
Black			0.206
			(0.489)
Nat Hawaiian / PI			-1.219***
			(0.464)
White			-0.311
			(0.450)
Other			0.570
			(0.585)
Hispanic/Latin			-0.173
			(0.249)
Constant	0.790***	0.976***	0.061
	(0.146)	(0.172)	(0.774)
Observations	389	389	389
R-squared	0.520	0.541	0.578

Note: These results are for an OLS regression with predictors for harm and need in Column (1). Column (2) and (3) include additional covariates. For product example, the reference category is included at the top of the column, in parentheses. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

4.2.6.Product Categorisation Analysis

Categorising products neatly between functional and experiential products required us to make certain assumptions. Therefore, we included an additional set of questions in

Study 2 to assess how well our assumptions held amongst a broadly representative U.S. sample.

We asked each participant to rate on a scale from 1 to 7 how functional and how experiential each of our 6 products were. We excluded their ratings for the specific product they received in the stimuli, as this would likely be biased by the information they were provided earlier in the study. **Table 73** shows the mean ratings by product, along with results from a t-test on the difference between functional and experiential ratings for each product. All functional products were rated as significantly more functional at the 1% level ($p < .001$), and experiential products as significantly more experiential at the 1% level. However, the two ratings appear closer for experiential products than the ratings for functional products, especially for fashion apparel and hair products. This indicates that respondents perceived the products we categorised as experiential to have some functional qualities as well.

Table 73 - Category Ratings for Each Product and T-Test on Difference in Means

Product	Our Category	Functional Rating	Experiential Rating	Significance (T-Test)	Observations
Rainwear (jacket)	F	6	3	p<.001	325
Non-stick cookware (pan)	F	5	2	p<.001	321
Food packaging	F	5	3	p<.001	323
Fashion apparel (shirts)	E	4	5	p<.001	325
Hair products (mousse)	E	4	5	p<.001	326
Cosmetics (face powder)	E	3	5	p<.001	325

Note: F stands for functional, whereas E stands for experiential. Each rating consists of the average across the sample for the given category, either functional or experiential. Significance (T-Test) reports the p-value for a t-test comparing the two mean ratings, for functional and experiential. Observations indicates how many participant ratings were included for each product, as we excluded the rating associated with example product that the participant received in the stimuli.

4.2.7.Qualitative Results

We analysed open-text responses to provide a richer interpretation of the relationship between human need and societal essentiality. While we recognize that the extent of our data (1-2 sentence long responses) is not sufficient for most qualitative analysis methods, we

believe that the addition of open-text data allowed us to "extend the scope and depth of understanding" (Fielding & Schreier, 2001; Mauceri, 2016, p. 1222), especially for this understudied area. Given that there was a theoretical framework and research question in mind – that is, the relation between individual human needs and societal essentiality – we applied tools from thematic analysis (Braun & Clarke, 2006). The goal was to create a meaningful spectrum of themes from no (there is no difference) to yes (there is a difference). See **Appendix L** for methodology and detailed codebook.

Table 74 displays each theme, their counts, and two exemplary quotes. In total, we uncovered eight themes, ranging from 1 - *No meaningful difference - a functioning society is comprised of functioning individuals* to 8 - *They are not the same*, plus a ninth category for indirect answers or uncertain responses. We found that many respondents did not believe there to be a difference between what an individual needed to function and what a society needed to do so, providing evidence in favour of our application of human needs to the concept of essential use. This is evident in the fact that the largest category was 1 - *No meaningful difference - a functioning society is comprised of functioning individuals*. As exemplified in quote A for this category, people viewed society as a group of individuals, so their specific needs would be the same as what a society collectively needed.

However, several themes related to the differences between the two concepts. In theme 3 - *They overlap in terms of satisfying basic needs,* several respondents noted the difference between basic needs for survival and other requirements, such that most people only really need fundamentals like food, water, air, or shelter to function. Additionally, a substantial number of responses fell into theme 5 - *They are related, but differ in terms of scale, scope, and complexity*. That is, individuals need these basic requirements such as food or water to function properly, whereas what society needs to function is at a more complex scale, including laws, infrastructure, systems, and cooperation. Another interesting point arises from theme 7 - *Tension between satisfying each level - what is necessary for individual may not be for society, and vice versa*. For example, the types of activities (e.g., consumption) that an individual undertakes to satisfy their needs may have negative impacts on society.

Table 74 – Qualitative Analysis on Relation between Individual Need and Societal Essentiality

Category	Code Name	# References	Quotation
1	No meaningful difference - a functioning society is comprised of functioning individuals	109	*A - "I don't see a difference, society is a group of [individuals], so they need the same requirements to function properly."* *B - "I think that it is only micro and macro and nothing else, on the micro individual on the macro majority, so there is no difference"*
2	They are directly related - societal functioning can facilitate individual functioning	10	*A - "No, because I think what individuals need to function properly makes them function, which in turn is also what makes society function properly. They are directly related"* *B - "No, I do not believe there to be a difference as a I feel an individual needs the society at large to function properly in order for them to function properly."*
3	They overlap in terms of satisfying basic needs	47	*A - "I think they are basically the same if you go down to the very minimum that fits both requirements like food, water and air."* *B - "Every individual needs the same basic human needs met that I listed previously. The only difference for a society of humans might be some sort of collective structure or order to prevent chaos."*
4	Individual needs may vary, but societal essentiality is more universal or generalized	87	*A - "I would say yes, as every individual is different and has their own specific needs that have to be met, whereas society as a whole has more collective needs that reflect the more general needs of each individual."* *B - "I think that what an individual needs varies based on the individual. What society need can be more generalized."*

Category	Code Name	# References	Quotation
5	They are related, but differ in terms of scale, scope, and complexity	91	*A - "Yes, I do believe that individual needs are different than societal needs. For example, an individual may need water to survive. A society needs protected sources of clean water and a reliable means to deliver them. A person needs clothing and shelter. A society needs regulations to keep shelters safe and means to transport materials and finished products where they need to go."* *B - "Individuals need basic necessities like food, shelter, and personal fulfillment. Societies require infrastructure and governance. there's overlap, societal requirements extend to collective well-being, justice, and cooperation."*
6	Depends on other factors	5	*A - "I think it depends on the person and the environment they are living in. For example, people who live in large cities require public transportation but those in rural areas can use their own forms of transportation."* *B - "I don't think there's a whole lot of difference between the two. I suppose the individual need is more personalized to the individual because it depends on how one defines "harm". Some people will have a higher threshold for harm and therefore what they define as a need may be different from another person."*
7	Tension between satisfying each level - what is necessary for individual may not be for society, and vice versa	17	*A - "There is a difference because society functioning is more important than any one individual functioning properly."* *B - "The need for an individual is always subjective to their personal circumstances. While fulfilling this individual need, it may be negative to the wider society, and a non-essential for the society to function properly."*
			A - "Yes, what an individual needs might be vastly different from what society needs."

Category	Code Name	# References	Quotation
8	**They are not the same**	**29**	*B - "Individuals and society are two very different things. Tastes and cultures differ. Everyone has a choice."*
9	**Not a direct answer / Not sure**	**54**	*A - "I can do without mousse if I am protected in the long run from any diseases. It is not worth the sacrifice."* *B - "People think they need more than they really do."*

Note: This table displays the themes extracted from the open-text question, "*In this study, we define a 'need' as something that will cause an individual harm if not met, and 'essential' as something that is critical for the functioning of society. In your view, is there any difference between what an individual needs to function properly and what a society at large requires to function properly? Please share some brief thoughts below.*" While most responses were only assigned to one code, some responses had multiple codes, so the total number of references is greater than the number of responses in the dataset.

4.2.8.Robustness Checks

Comparing specific products in **Table 75**, rainwear was considered significantly more essential than all products at the 1% level, except for takeout food packaging, with which it was statistically indistinguishable. Of experiential products, cosmetics were considered more essential than hair products at the 10% level, but statistically indistinguishable from fashion apparel. This departs from our U.K. sample, who rated rainwear as significantly more essential than food packaging, and cosmetics as significantly more essential than the other experiential products. Additionally, though all functional products were more essential than experiential products amongst the U.K. sample, frying pans and cosmetics were not significantly different in the U.S. sample.

Table 75 - Main Effects Regressions by Product (Study 2)

	(1)	(2)	(3)	(4)	(5)	(6)
	Functional Products			**Experiential Products**		
VARIABLES	**Essentiality (Frying pan)**	**Essentiality (Rainwear)**	**Essentiality (Food packaging)**	**Essentiality (Cosmetics)**	**Essentiality (Fashion apparel)**	**Essentiality (Hair products)**
Frying pan		-0.739***	-0.540**	0.167	0.308	0.657**
		(0.252)	(0.266)	(0.263)	(0.270)	(0.257)
Rainwear	0.739***		0.199	0.906***	1.047***	1.396***

	(0.252)		(0.267)	(0.264)	(0.271)	(0.258)
Food packaging	0.540**	-0.199		0.707**	0.848***	1.197***
	(0.266)	(0.267)		(0.278)	(0.284)	(0.272)
Cosmetics	-0.167	-0.906***	-0.707**		0.141	0.490*
	(0.263)	(0.264)	(0.278)		(0.282)	(0.269)
Fashion apparel	-0.308	-1.047***	-0.848***	-0.141		0.349
	(0.270)	(0.271)	(0.284)	(0.282)		(0.275)
Hair products	-0.657**	-1.396***	-1.197***	-0.490*	-0.349	
	(0.257)	(0.258)	(0.272)	(0.269)	(0.275)	
High Risk	0.007	0.007	0.007	0.007	0.007	0.007
	(0.155)	(0.155)	(0.155)	(0.155)	(0.155)	(0.155)
Constant	3.320***	4.059***	3.860***	3.153***	3.012***	2.663***
	(0.195)	(0.184)	(0.211)	(0.206)	(0.214)	(0.214)
Observations	389	389	389	389	389	389
R-squared	0.091	0.091	0.091	0.091	0.091	0.091

Note: These results are for an OLS regression with predictors for each product example and for risk level. For product example, the reference category is included at the top of the column, in parentheses. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

In addition to the product level regressions and the non-parametric Mann-Whitney U tests in **Appendix M**, we have included additional robustness checks: 1) rerunning the main effects and interactions regressions dropping participants who reported low product relevance, and 2) ordered logit models to check the robustness of main and interaction effects (see **Appendix M**). The ordinal logit specifications support the linear main effects findings for both treatment variables, whilst dropping low product relevance only supported the main effects results for risk. Both checks for interaction effects are consistent with the linear specification, finding no significance. The non-parametric tests also support the linear main effects results.

4.3. Study 2 Discussion

Despite different sample populations, Study 2 replicated nearly all main effects results from Study 1, as well as the three-way interaction effects. We found evidence supporting all four pre-registered hypotheses related to product type (H1a, b, c, and e), and two out of

the four pre-registered hypotheses related to risk level (H2c and d). Consistent with Study 1, we also did not find any evidence to support H1d, related to the effect of product type on regulation, or H2a, related to the effect of risk level on essentiality. Inconsistent with Study 1, there was no significant effect of risk level on need, which was significant at the 10% level in Study 1, or benefit, which was significant at the 5% level in Study 1. Examining specific products, rainwear was again considered the most essential product, but it appears the U.S. sample viewed takeaway food packaging as relatively more essential than the U.K. sample did. Additionally, the significant two-way interaction effects from Study 1 for harm and essentiality did not replicate in Study 2. However, the three-way interaction between product, risk and perceived status on harm was significant at the 1% level, meeting the Bonferroni adjusted significance criteria.

Evaluating the assumptions we employed for categorising products as either functional or experiential, these assumptions appeared reasonable based on responses from the U.S. sample. Nevertheless, participants considered our experiential products of fashion apparel and hair products to have some functional purposes as well, which may have been overlooked in our categorisation. We do not have the same data from the U.K. sample. However, given that the U.S. sample rated nearly all products as directionally more essential than the U.K. sample,[56] and rated experiential products in the same relative order (i.e., cosmetics 1st, fashion apparel 2nd, hair products 3rd), we believe our assumptions are likely as appropriate or more for the U.K. sample.

Analysing the open-text responses shows that there is reason to consider human needs as relevant within the context of essential use, but participants presented a variety of explanations as to why these concepts may not perfectly overlap. In particular, there appears a difference in terms of scale, complexity, and generalizability, though many respondents acknowledged the universality of basic needs that apply at both levels. These results also support the findings from the regression of harm, need, and essentiality, finding that need and essentiality were indeed positively correlated (H5), but that the variation in essentiality was not entirely explained by need. As such, further investigation on the relation between human needs at an individual level and essential uses or functions at a societal

[56] T-tests comparing the two samples for each product example revealed that food packaging, $t(226) = -2.321$, $p = .012$ (one-tailed), fashion apparel = $t(226) = -2.292$, $p = .011$ (one-tailed), and hair products = $t(221) = -1.838$, $p = .034$, were all significantly more essential in the U.S. than U.K. sample at the 5% level. Rainwear, $t(221) = -1.452$, $p = .074$ (one-tailed), and cosmetics, $t(224) = -1.582$, $p = .058$ (one-tailed), were marginally more essential at the 10% significance level. Frying pans were slightly less essential amongst the U.S. sample, frying pan = $t(224) = 0.153$, $p = .561$ (one-tailed), though not significantly different.

level is warranted in the context of PFAS and sufficiency at large. Finally, the prominence in respondent's commentary of food, water, and shelter, i.e., basic needs rooted in physiological requirements, lends further empirical support to our hierarchical distinction between physiological and psychological needs in policy formulation.

5. General Discussion & Conclusion

5.1. General Discussion & Future Research

This research investigated perceptions of essential use of PFAS in two studies across United Kingdom and United States, comparing alternative product categories (functional versus experiential) and varied risk levels (low versus high). We derived our product categories from various psychological theories related to human needs, developing a hierarchical set of needs, with physiological or utilitarian motivations for consumption coming before psychological or spiritual ones. We considered this distinction relevant for regulation in the context of risks to human health and environmental protection. More broadly, we sought to gain deeper insight into the psychological underpinnings for consuming products that pose risks to humans and the environment, which may apply to other environmental threats, in promoting sufficiency and reducing overconsumption.

In Study 1, we predicted that functional products would be valued over experiential products in all relevant outcomes (H1), while the higher risk context would reduce the value of PFAS-containing products across outcome variables (H2). After discovering support for the majority of our hypotheses, we replicated the experiment with minor updates in the United States to test the robustness of our findings, in a new context where PFAS regulations were already more prevalent.

5.1.1.Implications for Product Type

Across both studies, individuals prioritised products that satisfy functional purposes, both from the perspective of individual need and societal essentiality, over products that satisfy spiritual or psychological purposes (i.e., experiential products) at the 1% significance level. Our findings support the presence of a hierarchy of motivations or objectives for consumption (Chen et al., 2020; Doyal & Gough, 1991; Kenrick et al., 2010), such that on average and when risk is held constant, people evaluate objective use-value as more

important than affective benefits in the context of PFAS products. These findings might offer initial means of grouping products containing PFAS to prioritise regulation, where products consumed primarily for non-functional purposes could be banned first regardless of the availability of substitutes (i.e., Category 1 in Cousins et al., 2019). This approach echoes calls from Karinen et al. (2024), who suggest that focusing on identifying non-essential uses, as opposed to establishing consensus for essential uses, could help to streamline the regulatory process.

However, despite differences in perceived need and essentiality, there were no significant differences in calls to regulate each product group in either study. This particular outcome variable is relevant for RQ2 on people's perceptions of consumption regulations. In both studies, functional and experiential treatments produced a mean value between 5 and 6, suggesting that participants fell between "Somewhat agree" and "Agree" with the need for regulation. As such, it appears that the lack of significance does not stem from a lack of preference for regulation, but rather a desire to regulate both product types. These evaluations are consistent with the low to neutral evaluations of perceived essentiality (i.e., median = "Somewhat disagree") for both product groups across the two studies. Evaluating these findings in tandem for RQ2, one might suggest that in the face of human and environmental risk, people appear supportive of regulations to limit production and consumption of certain harmful goods. Support for such regulations only appears to increase as risks become more severe. While we cannot pinpoint the exact experimental component that resulted in a desire for regulation, considering the median level of knowledge about PFAS prior to taking our study was 1 (i.e., "Very poor") or 2 (i.e., "Poor") for Studies 1 and 2, respectively, we can likely rule out that it was due to any preconceived notions about the chemical group. Karinen et al. (2024) similarly found that prior knowledge had limited impact on evaluations of essentiality.

The results of our product categorisation analysis in Study 2 also suggests that the line between functional and experiential products may not be as clear for regulatory purposes as we initially surmised. While consensus emerged between our assumptions and the U.S. sample with respect to functional products, the functional versus experiential ratings were much closer for the products we assumed as experiential, especially fashion apparel and hair products. In the example of hair products, what we viewed as an aesthetic benefit (i.e., looking good) may have been perceived by others as a functional one (e.g., holding hair in

place), highlighting the subjective nature of these product classifications and essentiality evaluations in general. Regardless, it is important to underscore that the functional versus experiential categories could describe both need and non-need-based consumption. For example, a paper clip is functional but arguably does not satisfy any need, whilst a luxury handbag is experiential but could (somewhat) satisfy the psychological need for identity.

Building upon essential use regulations, we argue that the regulatory concern should first and foremost be the extent to which the product is considered essential or satisfies a fundamental or core human need. These classifications should not be used to justify a lack of regulation, but rather to help prioritize low hanging fruit for regulation. Neither hair products nor fashion apparel appear to be considered essential or needed in our studies, so perceptions of their functional nature do not derive from a fundamental need in the first place. On the other hand, cosmetics were viewed as mostly experiential, reinforcing findings from Karinen et al. (2024) and making them a well-defined priority for regulation. In fact, certain cosmetic companies have already started to voluntarily remove PFAS from their products, and California has banned PFAS in cosmetics from 2025 (Assembly Bill No. 2771 Cosmetic Products: Safety., 2022). However, widespread adoption of this practice appears unlikely without more comprehensive regulation (Stallard, 2023).

This research underscores the importance of incorporating public input at every stage of regulation when it has considerable impact on their daily consumption practices (Karinen et al., 2024). Policymakers should consider citizens' opinions on everything from general frameworks to specific product uses, to uphold democratic values while prioritizing the satisfaction of human needs (e.g., Lee et al., 2023). This approach is necessary to support the "dual strategy" of public policy, pairing expert knowledge with lived experience of those whose needs satisfaction is at stake, given the diversity of needs satisfiers and the specific conditions that will influence how citizens prioritise them (Gough, 2015). Future research could explore alternative products or product categories by incorporating direct input from participants on these factors from the outset.

5.1.2.Implications for Risk Level and Interaction Effects

Supporting the risk perceptions literature (e.g., Fischhoff et al., 1978), we too found an inverse relationship between higher risk and lower perceived benefit. The results also

suggest that evaluations of the need for PFAS regulation were sensitive to risk level, which is challenging given the uncertainty of PFAS risks and low likelihood of gaining more information any time soon (Cordner et al., 2019; Cousins et al., 2019). However, these findings also imply that as more evidence emerges regarding harmful risks associated with PFAS, the less beneficial people may perceive the chemical, making product restrictions more palatable. Karinen et al. (2024) similarly noted that evaluations of essentiality may evolve over time.

Most strikingly, while risk level exhibited no significant main effect on essentiality, perceptions of essentiality, and even more so for associated harm of losing each product type, did depend on the risk level when interacting the two factors in Study 1. With increased risk, people appeared to value experiential products more, whilst valuing functional products relatively less. These findings may relate to the affect heuristic, whereby affinity toward a good or scenario influences the perceptions of both risk and reward (Finucane et al., 2000; Slovic et al., 2007). Perhaps the hedonic or status-driven reasons for consuming experiential goods heighten a person's affinity for a given product, such that when the risks are higher, they evaluate the product as more important for themselves and society. Meanwhile, functional products are not consumed for affective reasons, but for rather practical ones, so their evaluations were likely less dependent on interest or affinity. When risks were sufficiently low, the affective attachment appeared less pronounced. These interaction results did not replicate in Study 2, which is somewhat surprising given the consumeristic and status-driven tendencies noted in American culture (e.g., Higgs, 2014). However, the interaction effects were also less robust than the main effects in Study 1. Future research should further explore these interactions, directly testing affect differences in people's evaluations of experiential versus functional products to understand mechanisms for this interaction effect.

Our exploratory three-way interaction suggests that the heightened value of experiential products under high risk is driven by participants with low perceived status, confirming prior literature on the role of socio-economic status in conspicuous consumption (Rucker & Galinsky, 2008; Veblen, 1899; J. Wang et al., 2019). Fearing that less access to experiential products would diminish their ability to compensate for their place in society, and building upon the affect heuristic, low status individuals may have felt this heightened affective attachment to experiential goods when risk was high. Interestingly, this result

replicated in the U.S. sample, even though the two-way interaction between product and risk did not, further bolstering the role of status in disentangling these effects.

Policymakers must carefully consider the ways in which the application of essential use and any resulting restrictions on product availability may unduly harm lower status groups. Prior literature on climate regulations found that individuals with lower socio-economic status were less supportive of pro-environmental policy compared to higher status individuals even when they exhibit strong environmental concern, in part due to a reduced sense of control (Eom et al., 2018). Some form of restrictions on PFAS products are likely necessary to protect human health and the environment, and these status differences should not be used as a discourse of delay, as evidenced in the case of climate regulations (Lamb et al., 2020). However, policies must be democratically deliberated (Karinen et al., 2024) and communicated effectively to avoid perceptions of top-down austerity governance (e.g., Carpenter & Perrier, 2023). Otherwise, these regulatory questions will devolve into the 'policy perfectionism' trap of avoiding ambitious policies due to perceived issues around support, without engaging in public deliberation to overcome them (Lamb et al., 2020).

This process could be done effectively through citizens assemblies, as with the U.K. Climate Assembly (Climate Assembly UK, 2020), or other deliberative and participatory research methods (Ercan et al., 2022). Otherwise, and even if caution is taken, regulation seen as undemocratic may face a backlash amongst individuals with less access to power, resulting in the kind of resistance and politicization of environmental protection as seen from the Gilets Jaunes protests in France (Carpenter & Perrier, 2023) and ongoing farmer protests across Europe (Henley, 2024). On the other hand, caution must also be taken to prevent backlash from those with heightened access to power (e.g., Patterson, 2023), as well as corporate interests invested in avoiding regulations (Cordner et al., 2019; Richter et al., 2021). Otherwise these policies will likely never see the light of day. Future research should engage in these deliberative methods to further pinpoint regulatory possibilities for PFAS that could protect the interests of those with lower status and power.

Prior work also suggests that when provided an alternative means of restoring self-integrity, people may feel less driven toward status consumption (Sivanathan & Pettit, 2010). This echoes the literature on needs satisfiers, such that there are many ways to satisfy any individual need (Cruz et al., 2009; Gough, 2015). More research should be conducted on other mechanisms for compensating low status individuals to mitigate the compensatory

appeal of conspicuous consumption in the first place. Given the scale of this objective, it is unlikely to be achieved through individual level interventions. It is more relevant for the system-level change and cultural shift sought after by degrowth.

5.1.3.Individual Need and Societal Essentiality

We examined associations between perceived essentiality at the societal level and individual human needs, along with the related concept of harm, to shed light on the theoretical links between these concepts. While essentiality was positively and significantly associated with both need and harm, the concepts did not overlap entirely. And while the definition of need incorporates harm (Gasper, 1996; Jackson et al., 2004), harm explained only a relatively small proportion of the variance in essentiality. Future work should test these connections through more rigorous or causal approaches, for example by experimentally manipulating need or essentiality directly.

These results are also supported by our qualitative analysis, which suggests that while many people do view the requirements for individual and societal functioning to be closely related, there were several reasons why respondents viewed them as conceptually distinct. The notion that need and essentiality differ may indicate that there is a lack of congruence when applying the concept of essential use to individual product applications for consumer end-use. That is, how do people relate whether something is critical to the functioning of society to their daily lives and consumption decisions? It appears challenging given the different scale and scope of what individuals versus societies need to function, as noted by several respondents. Perhaps essential use is not as relevant when considering consumer products. More provocatively, perhaps no consumer products can be considered critical to the functioning of society, as the material goods that societies need are at a much greater scale (e.g., infrastructure) than what an individual consumer might purchase. This assertion is further supported by i) the low levels of essentiality across our consumer product examples and ii) findings from Karinen et al. (2024) that consumer-oriented product categories (e.g., personal care, household products) were not deemed essential. However, consumer products may be deemed important for health and safety, which are the two other components of essential use not explored here.

5.2. Strengths & Limitations

The strength of this research lies primarily in the access to and co-creation with policymakers to develop a research agenda with high policy and regulatory relevance, and the replication of results outside the original U.K. context. Our initial and ongoing meetings with Defra allowed us to design an experiment that was rooted in psychological theory, but which never lost sight of real-world practicalities and objectives for regulation. While the initial research program was focused solely on the U.K. context, our replication of the results in a different context allowed us to test the robustness of our findings, whilst also investigating some cultural or country-level nuances with regard to PFAS consumption. This replication identified the results that were robust, that is, the main effects, three-way interaction with status, and associations between outcomes. It also highlights those that were less stable, i.e., the interaction between product and risk. The second study also allowed us to test our assumptions regarding product categories. Our mixed methods approach also strengthened the research by providing nuance on the relation between individual needs and societal essentiality that quantitative methods alone could not achieve.

That said, two main limitations of this study were time and budget, which meant that we did not pre-test our product categorisation (i.e., functional versus experiential) with a larger group before running Study 1. However, we did run these categories by policymakers and industry experts in a conference setting, which gave us some confidence. Due to a lack of prior research on perceived essentiality and related concepts, we could not find pre-validated measures for our outcome variables and relied mostly on unidimensional self-reported measures (except for need and harm) that were generated by us. However, it appears Karinen et al. (2024) took a similar approach in evaluating essentiality, by not using a pre-validated or multi-dimensional measure. Additionally, given the experimental design and choice of outcome measures, we could not determine any causal relationship between the key concepts of essentiality, need, and harm, which would have been useful for developing a theoretical link between essential use and human needs. Mediation analysis, which could have further uncovered whether harm was the mechanism behind evaluations of essentiality for each product type, was also not justified due to a lack of significant main effect of product type on harm. Finally, due to various constraints on time and the nature of an online survey, our generalized measure of “need” was less granular than asking about

specific needs. Having disaggregated information about the needs each product did or did not satisfy may have been more informative both from a theoretical and a regulatory perspective, in ensuring alternative satisfiers were available.

5.3. Conclusion

Among the multitude of environmental concerns our world faces, chemical pollution is less commonly discussed, even though its potential impacts could be considered more immediate and proximate in certain contexts. We explored the case of PFAS, a chemical group which is widely used for its water and oil repellence in both industrial and consumer goods, despite concerns around its potentially harmful impacts (Cousins et al., 2016, 2019). Given the difficulty in ascertaining risk reports on the vast number of chemicals in this group, we sought to develop a means of categorising products, in particular those with consumer applications, to provide a foundation of evidence if regulations based on the concept of essential use were implemented. To do so, we amalgamated various psychological theories on human needs satisfaction to generate a hierarchy of needs particularly relevant for the context of regulating consumption in the face of human and environmental risk. Our findings suggest that in both the United Kingdom and United States, experiential products, purchased for their affective benefits such as status or hedonic satisfaction, were perceived as less essential and less likely to satisfy a need than functional products. We propose that products primarily consumed for their experiential purposes are less directly connected to needs satisfaction, and thus could be prioritized for regulation under the concept of essential use.

We also found further support for an inverse relationship between perceived risks and benefits of PFAS (Finucane et al., 2000; Fischhoff et al., 1978). This relationship suggests that as more information emerges to confirm the risks of PFAS, or perhaps as risk salience increases due to pervasive calls for regulations, the less beneficial people may consider the chemical, and the more favourable regulation could be perceived. That said, our three-way interaction of product, risk and status in both studies indicate that restrictions on access to PFAS products differ by an individual's perceived social status. Given that lower status individuals anticipated more harm if they lost access to experiential versus functional products under high risk, we recommend that any regulatory process surrounding PFAS

products must uphold democratic and participatory values so as not to create backlash or unduly harm lower status groups.

The findings from this research also constitute an important exercise in democratically deliberating socially and ecologically useful consumption, which can be used for policymaking based on human needs satisfaction (Guillen-Royo, 2020; e.g., Lee et al., 2023). As such, status differences present important implications for regulating consumption in the face of environmental threats more generally, including in the context of the climate crisis. These findings are therefore highly relevant for a degrowth transition, in which downscaling of goods and services must be planned and democratically determined, rather than imposed by any state (Deriu, 2012; Fournier, 2008).

Whether it is through the means of individual lifestyle shifts, or sweeping agendas for societal transformation such as degrowth, scientists have urged for affluent countries in the Global North, including the United Kingdom and United States, to reduce levels of consumption and production to avoid ecological breakdown (Wiedmann et al., 2020). The richest citizens should bear the brunt of these reductions, as their consumption is disproportionately responsible for most environmental impacts. In practice, our research might infer that restricting this sort of consumption will be difficult to achieve without deliberate and synergistic considerations of reducing inequality and advancing societal values that move away from status-seeking, competition, and hyper-consumerism (e.g., Stuart et al., 2020). Policies that indirectly limit consumption by targeting affluence, such as wealth taxes or maximum income ratios, may be favoured to reduce consumption capabilities of the ultra-rich without negatively impacting those at lower income levels, promoting redistribution. Additionally, work time reduction policies can reduce consumption associated with travel and consumption at work without reducing incomes for workers (Kallis et al., 2013; Platform London, 2021). Typically, work time policies are paired with other policies such as limits to advertising, to avoid people spending the extra leisure time on high-emissions and status-oriented consumption, such as long-haul flights (Gunderson, 2018; Stuart et al., 2020). And while conspicuous consumption has manifested itself long before the advent of commercial advertising (Veblen, 1899), the promotion of “false needs” under capitalism is heavily reinforced by inescapable brand-sponsored communications, suggesting that restrictions on advertising are considered an important step for overcoming the ideology of overconsumption in capitalist economies (Gunderson, 2018; Marcuse, 1964;

Stuart et al., 2020). Coupled with policies to improve living conditions and reduce inequalities in power, this policy mix may reduce status concerns amongst those currently in lower status positions. Hence, our results might point to the need for a comprehensive degrowth policy proposal, as opposed to isolated restrictions on consumption, to ensure consumption reduction is achieved through equitable and sustainable means. However, much more work is needed in this area, with greater input on the lived experiences of low status individuals, to determine the most inclusive forms of regulation. **Project 3** will begin to explore the popularity and predictors of such degrowth policy packages within the United States.

6. Appendix

A. Images Used for Example Products in Product Manipulation

B. Study 1 - Normality of Residuals for Outcome Measures

Figure 33 - P-P Plot - Need (Study 1)

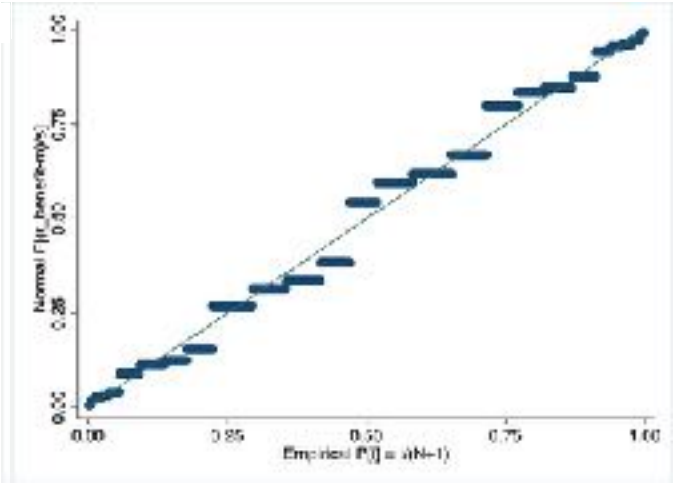
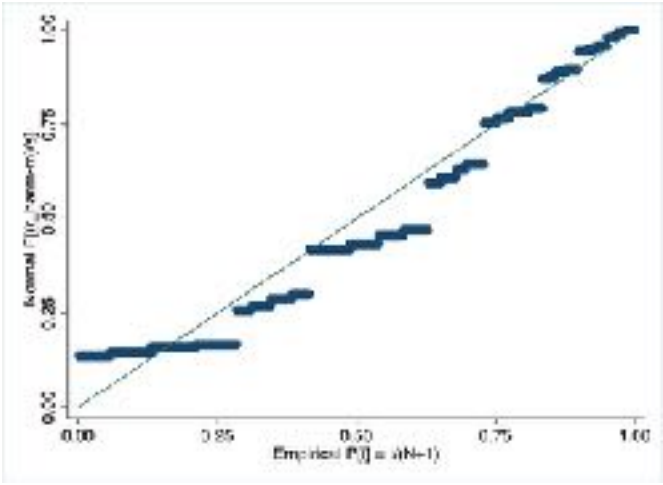


Figure 38 - P-P Plot - Harm (Study 1)



The Shapiro-Wilk test is a numeric measure of normality, in which the null hypothesis H0 is that the data are normally distributed. Essentiality, W(965) = 0.94, p < .001, need, W(965) = 0.98, p < .001, risk trade-off, W(965) = 0.98, p < .001, regulation, W(965) = 0.94, p < .001, benefit, W(965) = 0.99, p < .001, and harm, W(965) = 0.91, p < .001, all failed the Shapiro-Wilk test. The P-P charts for each outcome variable above (**Figure 34** - **Figure 38**) also indicate deviations from normality, though need and risk-trade-off appear visually closest to a normal distribution.

C. Demographic Comparison between Sample and U.K. General Population – Study 1

Table 76 – Comparison with U.K. General Population – Study 1

Demographic	Sample Median	U.K. Population Median
Age	46	40.7
Income	£35,000 - £44,999	£34,963

Demographic	Category	Sample %	U.K. Population %
Gender	Female	50.6%	51.0%
	Male	48.8%	49.0%
Race & Ethnicity	Asian	7.6%	9.3%
	Black	2.8%	2.5%
	White	87.4%	81.7%
	Mixed / Multiple	1.2%	2.9%
	Other ethnic group	1.0%	1.6%
Education	Level 3 (e.g., A-Levels) or higher	87.4%	67.0%
	Level 4 (e.g., Bachelor's degree) or higher	62.7%	33.8%

Note: Categories were split up depending on availability of U.K. data and may not be as granular as our surveyed categories (e.g., education). While we recorded participants' gender (i.e., how they identify), we could only find suitable U.K. data on sex. Level 3 and 4 are U.K. government classifications. Level 3 includes two or more A Levels or equivalent qualifications. Level 4 includes Higher National Certificate, Higher National Diploma, Bachelor's degree, and post-graduate qualifications. Data on the U.K. population are sourced from the latest available releases, which is not consistent across measures. Race & ethnicity (ONS, 2022) figures used data from the 2021 Census. Age and sex figures were based on 2022 data (ONS, 2023b). Income (ONS, 2023a) and education figures (National Statistics, 2023) used data from 2023.

D. Study 1 – Main Effects Results with Covariates

Table 77 - Main Effects Results w/ Covariates – OLS (Study 1)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**Essentiality**	**Need**	**Risk Trade-off**	**Regulation**	**Benefit**	**Harm**
Experiential products	-1.002***	-0.594***	-0.519***	0.154**	-0.771***	-0.165**
	(0.087)	(0.086)	(0.088)	(0.075)	(0.087)	(0.070)
High risk	-0.032	-0.158*	-0.654***	0.637***	-0.179**	-0.041
	(0.087)	(0.086)	(0.088)	(0.076)	(0.088)	(0.069)
Norms	0.020	0.084***	0.043	0.027	0.078***	0.007
	(0.031)	(0.032)	(0.032)	(0.026)	(0.030)	(0.024)
Conspicuous Consumption	0.170***	0.231***	0.161***	-0.015	0.132***	0.168***
	(0.037)	(0.039)	(0.039)	(0.033)	(0.039)	(0.032)
Perceived social status	0.039	0.050*	0.003	0.010	-0.003	-0.027
	(0.028)	(0.027)	(0.027)	(0.024)	(0.027)	(0.022)
Political Identity	0.074***	0.045*	0.033	-0.032	0.031	0.008
	(0.024)	(0.024)	(0.023)	(0.021)	(0.024)	(0.017)
Hedonism	0.110**	0.004	0.080	-0.053	0.006	-0.057
	(0.049)	(0.050)	(0.050)	(0.045)	(0.052)	(0.040)
Universalism Concern	-0.124*	-0.046	0.050	-0.038	0.151**	0.013
	(0.070)	(0.072)	(0.068)	(0.062)	(0.068)	(0.054)
Universalism Nature	-0.170***	-0.183***	-0.366***	0.384***	-0.199***	-0.181***
	(0.058)	(0.058)	(0.058)	(0.056)	(0.059)	(0.046)
Risk Likelihood	0.017	-0.015	0.099*	-0.035	0.051	-0.020
	(0.052)	(0.052)	(0.056)	(0.050)	(0.055)	(0.042)
Risk Perception	0.167***	0.098*	-0.041	0.034	-0.052	0.065
	(0.058)	(0.057)	(0.057)	(0.051)	(0.053)	(0.045)
Gender						
Female	0.086	-0.075	0.106	-0.009	0.092	-0.075
	(0.092)	(0.092)	(0.092)	(0.078)	(0.098)	(0.076)
Non-binary	0.988	0.466	0.582*	-0.339	0.052	-0.147
	(0.633)	(0.523)	(0.305)	(0.234)	(0.671)	(0.403)

VARIABLES	(1) Essentiality	(2) Need	(3) Risk Trade-off	(4) Regulation	(5) Benefit	(6) Harm
Prefer not to say	-1.266***	-1.665***	-1.079***	0.722***	-1.378***	-1.166***
	(0.169)	(0.178)	(0.175)	(0.157)	(0.180)	(0.146)
Education						
No formal qualifications	-0.322	0.353	-0.911	0.540	-0.590	-0.551**
	(1.097)	(1.045)	(0.657)	(0.530)	(0.845)	(0.221)
A-level or equivalent	-0.071	-0.090	-0.022	0.061	0.046	-0.017
	(0.148)	(0.150)	(0.150)	(0.135)	(0.152)	(0.123)
University or a College degree	-0.200	-0.091	-0.108	0.086	0.027	0.000
	(0.139)	(0.142)	(0.142)	(0.119)	(0.139)	(0.112)
Graduate degree (Masters or PhD)	-0.023	-0.105	-0.171	0.094	0.149	-0.134
	(0.159)	(0.165)	(0.164)	(0.136)	(0.163)	(0.126)
Other	-0.236	-0.528	-0.705*	0.322	-0.267	0.233
	(0.438)	(0.350)	(0.388)	(0.334)	(0.345)	(0.352)
Income						
£15,000-£24,999	-0.111	-0.160	0.094	-0.041	-0.194	-0.013
	(0.200)	(0.194)	(0.199)	(0.180)	(0.197)	(0.145)
£25,000-£34,999	-0.111	0.089	0.170	0.055	-0.174	0.212
	(0.186)	(0.187)	(0.187)	(0.167)	(0.188)	(0.135)
£35,000-£44,999	-0.127	0.077	0.125	-0.115	-0.197	0.050
	(0.200)	(0.208)	(0.194)	(0.182)	(0.200)	(0.141)
£45,000-£54,999	-0.242	-0.066	0.032	-0.029	-0.158	0.058
	(0.199)	(0.201)	(0.192)	(0.173)	(0.194)	(0.144)
£55,000-£70,000	-0.199	0.046	0.165	-0.170	0.032	0.102
	(0.206)	(0.209)	(0.196)	(0.180)	(0.201)	(0.151)
£70,000	-0.208	0.174	0.243	-0.236	0.074	-0.050
	(0.201)	(0.203)	(0.197)	(0.178)	(0.196)	(0.145)
Prefer not say	-0.555**	-0.195	-0.084	-0.150	-0.549**	-0.150
	(0.279)	(0.284)	(0.247)	(0.206)	(0.268)	(0.207)

VARIABLES	(1) Essentiality	(2) Need	(3) Risk Trade-off	(4) Regulation	(5) Benefit	(6) Harm
Age	-0.013***	-0.006*	0.001	0.005*	-0.002	-0.012***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Race						
Black	0.351	-0.037	-0.455	0.144	-0.066	0.035
	(0.277)	(0.317)	(0.314)	(0.275)	(0.295)	(0.245)
Asian	0.208	0.020	0.038	-0.176	-0.081	0.143
	(0.178)	(0.162)	(0.178)	(0.172)	(0.163)	(0.129)
Mixed	-0.730*	-0.776**	-0.381	0.253	-0.266	0.214
	(0.377)	(0.305)	(0.417)	(0.301)	(0.450)	(0.431)
Other	0.643	-0.038	0.076	0.087	-0.307	0.515
	(0.434)	(0.431)	(0.514)	(0.242)	(0.504)	(0.471)
Constant	3.444***	3.126***	4.159***	3.024***	4.188***	3.366***
	(0.620)	(0.603)	(0.626)	(0.527)	(0.622)	(0.484)
Observations	965	965	965	965	965	965
R-squared	0.235	0.160	0.197	0.187	0.139	0.125

Note: These results are for an OLS regression with predictors for product type and risk level, as well as other relevant covariates. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

E. Study 1 – Results by Product Example for Perceived Need

Table 78 - Need Regressions - by Product (Study 1)

	(1)	(2)	(3)	(4)	(5)	(6)
	Functional Products			Experiential Products		
VARIABLES	Need (Frying pan)	Need (Rainwear)	Need (Food packaging)	Need (Cosmetics)	Need (Fashion apparel)	Need (Hair products)
Frying pan	-	-0.388**	0.266*	0.213	0.572***	0.678***
	-	(0.158)	(0.161)	(0.152)	(0.149)	(0.154)
Rainwear	0.388**	-	0.655***	0.601***	0.960***	1.067***
	(0.158)	-	(0.165)	(0.155)	(0.153)	(0.157)
Food packaging	-0.266*	-0.655***	-	-0.053	0.306*	0.412**
	(0.161)	(0.165)	-	(0.158)	(0.156)	(0.160)
Cosmetics	-0.213	-0.601***	0.053	-	0.359**	0.465***
	(0.152)	(0.155)	(0.158)	-	(0.146)	(0.150)
Fashion apparel	-0.572***	-0.960***	-0.306*	-0.359**	-	0.106
	(0.149)	(0.153)	(0.156)	(0.146)	-	(0.148)
Hair products	-0.678***	-1.067***	-0.412**	-0.465***	-0.106	-
	(0.154)	(0.157)	(0.160)	(0.150)	(0.148)	-
High Risk	-0.155*	-0.155*	-0.155*	-0.155*	-0.155*	-0.155*
	(0.090)	(0.090)	(0.090)	(0.090)	(0.090)	(0.090)
Constant	3.401***	3.790***	3.135***	3.188***	2.830***	2.723***
	(0.118)	(0.122)	(0.124)	(0.116)	(0.110)	(0.120)
Observations	965	965	965	965	965	965
R-squared	0.064	0.064	0.064	0.064	0.064	0.064

Note: These results are for an OLS regression with predictors for each product example and for risk level. For product example, the reference category is included at the top of the column, in parentheses. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

F. Study 1 – Interaction Effect Results with Covariates

Table 79 - Product x Risk Interaction Effects w/ Covariates (Study 1)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Essentiality	Need	Risk Trade-off	Regulation	Benefit	Harm
Experiential products	-1.145***	-0.650***	-0.603***	0.086	-0.764***	-0.265***
	(0.120)	(0.125)	(0.130)	(0.115)	(0.120)	(0.098)
High Risk	-0.177	-0.215*	-0.739***	0.568***	-0.172	-0.143
	(0.128)	(0.128)	(0.123)	(0.106)	(0.124)	(0.103)
Experiential x High Risk	0.290*	0.113	0.170	0.137	-0.015	0.203
	(0.174)	(0.174)	(0.175)	(0.152)	(0.176)	(0.137)
Norms	0.019	0.084***	0.043	0.027	0.078***	0.007
	(0.031)	(0.032)	(0.032)	(0.026)	(0.030)	(0.024)
Conspicuous Consumption	0.166***	0.230***	0.160***	-0.017	0.132***	0.165***
	(0.037)	(0.039)	(0.039)	(0.033)	(0.039)	(0.032)
Perceived Social Status	0.038	0.049*	0.002	0.009	-0.003	-0.027
	(0.028)	(0.027)	(0.027)	(0.024)	(0.027)	(0.022)
Political Identity	0.073***	0.045*	0.032	-0.032	0.031	0.007
	(0.024)	(0.024)	(0.023)	(0.021)	(0.024)	(0.017)
Hedonism	0.113**	0.005	0.082	-0.052	0.005	-0.055
	(0.049)	(0.050)	(0.050)	(0.045)	(0.052)	(0.040)
Universalism Concern	-0.129*	-0.048	0.047	-0.041	0.151**	0.009
	(0.070)	(0.072)	(0.068)	(0.062)	(0.068)	(0.054)
Universalism Nature	-0.164***	-0.180***	-0.363***	0.387***	-0.200***	-0.177***
	(0.058)	(0.058)	(0.058)	(0.056)	(0.059)	(0.046)
Risk Likelihood	0.016	-0.016	0.099*	-0.036	0.051	-0.020
	(0.052)	(0.052)	(0.056)	(0.050)	(0.055)	(0.042)
Risk Perception	0.167***	0.098*	-0.041	0.034	-0.052	0.065
	(0.058)	(0.057)	(0.057)	(0.051)	(0.053)	(0.045)

VARIABLES	(1) Essentiality	(2) Need	(3) Risk Trade-off	(4) Regulation	(5) Benefit	(6) Harm
Gender						
Female	0.082	-0.076	0.104	-0.011	0.093	-0.078
	(0.092)	(0.092)	(0.092)	(0.078)	(0.098)	(0.076)
Non-binary	0.999	0.470	0.588*	-0.334	0.052	-0.139
	(0.629)	(0.525)	(0.309)	(0.231)	(0.673)	(0.397)
Prefer not to say	-1.338***	-1.693***	-1.121***	0.688***	-1.374***	-1.216***
	(0.173)	(0.182)	(0.181)	(0.158)	(0.187)	(0.150)
Education						
No formal qualifications	-0.314	0.356	-0.907	0.543	-0.590	-0.546**
	(1.107)	(1.041)	(0.662)	(0.524)	(0.845)	(0.230)
A-level or equivalent	-0.061	-0.086	-0.017	0.065	0.046	-0.010
	(0.148)	(0.150)	(0.150)	(0.135)	(0.152)	(0.123)
University or a College degree	-0.189	-0.086	-0.102	0.091	0.026	0.008
	(0.139)	(0.143)	(0.142)	(0.119)	(0.140)	(0.111)
Graduate degree (Masters or PhD)	-0.005	-0.098	-0.160	0.102	0.148	-0.122
	(0.159)	(0.165)	(0.164)	(0.136)	(0.164)	(0.126)
Other	-0.235	-0.527	-0.704*	0.323	-0.267	0.233
	(0.429)	(0.349)	(0.388)	(0.332)	(0.345)	(0.355)
Income						
£15,000-£24,999	-0.104	-0.157	0.098	-0.038	-0.194	-0.008
	(0.199)	(0.194)	(0.199)	(0.180)	(0.197)	(0.145)
£25,000-£34,999	-0.114	0.087	0.168	0.054	-0.174	0.210
	(0.185)	(0.187)	(0.187)	(0.167)	(0.188)	(0.136)
£35,000-£44,999	-0.133	0.074	0.122	-0.118	-0.197	0.046
	(0.200)	(0.209)	(0.193)	(0.183)	(0.200)	(0.141)
£45,000-£54,999	-0.247	-0.068	0.029	-0.031	-0.158	0.054
	(0.198)	(0.201)	(0.192)	(0.173)	(0.194)	(0.144)

VARIABLES	(1) Essentiality	(2) Need	(3) Risk Trade-off	(4) Regulation	(5) Benefit	(6) Harm
£55,000-£70,000	-0.207	0.043	0.160	-0.174	0.033	0.097
	(0.206)	(0.209)	(0.196)	(0.180)	(0.201)	(0.152)
£70,000	-0.199	0.177	0.248	-0.232	0.074	-0.044
	(0.201)	(0.203)	(0.197)	(0.178)	(0.197)	(0.145)
Prefer not say	-0.576**	-0.203	-0.096	-0.160	-0.548**	-0.165
	(0.282)	(0.285)	(0.249)	(0.205)	(0.268)	(0.207)
Age	-0.013***	-0.006*	0.001	0.005*	-0.002	-0.012***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Race						
Black	0.333	-0.044	-0.465	0.136	-0.065	0.023
	(0.278)	(0.317)	(0.313)	(0.274)	(0.296)	(0.246)
Asian	0.215	0.023	0.042	-0.173	-0.081	0.148
	(0.179)	(0.163)	(0.178)	(0.172)	(0.163)	(0.129)
Mixed	-0.716*	-0.771**	-0.373	0.260	-0.266	0.224
	(0.385)	(0.306)	(0.420)	(0.297)	(0.450)	(0.437)
Other	0.609	-0.052	0.056	0.071	-0.305	0.491
	(0.426)	(0.430)	(0.515)	(0.244)	(0.504)	(0.472)
Constant	3.509***	3.151***	4.197***	3.055***	4.185***	3.411***
	(0.624)	(0.607)	(0.628)	(0.529)	(0.621)	(0.488)
Observations	965	965	965	965	965	965
R-squared	0.238	0.160	0.198	0.187	0.139	0.127

Note: These results are for an OLS regression with three predictors, including product type, risk level, and their interaction. For product type, the reference category is functional products. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

G. Study 1 - Association Between Need, Harm, and Essentiality

Regressing essentiality on need and harm in **Table 80**, both need ($\beta = .69$, p < .001) and harm ($\beta = .15$, p < .001) were significant predictors of essentiality at the 1% level, accounting for half of the variance in essentiality (R^2 = .505). The coefficients and p-values remain stable with the inclusion of product type, risk level, and covariates, and the R^2 changes very little with these additions. Given these associations, we considered using harm as a mediator for perceived essentiality or perceived need. However, because product type was not a significant predictor of harm, a mediation analysis was not warranted.

Table 80 - Regressing Essentiality on Need, Harm, and Other Controls (Study 1)

	(1)	(2)	(3)
VARIABLES	**Essentiality**	**Essentiality (w/ Product & Risk)**	**Essentiality (w/ Product, Risk, Covariates)**
Need	0.686***	0.646***	0.624***
	(0.028)	(0.028)	(0.029)
Harm	0.150***	0.163***	0.135***
	(0.037)	(0.036)	(0.037)
Experiential products		-0.583***	-0.609***
		(0.070)	(0.070)
High risk		0.104	0.072
		(0.066)	(0.064)
Norms			-0.034
			(0.021)
Conspicuous Consumption			0.003
			(0.029)
Perceived social status			0.011
			(0.021)
Political Identity			0.044**
			(0.017)
Hedonism			0.115***

VARIABLES	(1) Essentiality	(2) Essentiality (w/ Product & Risk)	(3) Essentiality (w/ Product, Risk, Covariates)
			(0.034)
Universalism Concern			-0.097*
			(0.052)
Universalism Nature			-0.031
			(0.041)
Risk Likelihood			0.029
			(0.037)
Risk Perception			0.097**
			(0.040)
Gender			
Female			0.143**
			(0.068)
Non-binary			0.717**
			(0.337)
Prefer not to say			-0.069
			(0.128)
Education			
No formal qualifications			-0.468
			(0.742)
A-level or equivalent			-0.012
			(0.111)
University or a College degree			-0.143
			(0.101)
Graduate degree (Masters or PhD)			0.061
			(0.119)
Other			0.061
			(0.388)
Income			
£15,000-£24,999			-0.010

VARIABLES	(1) Essentiality	(2) Essentiality (w/ Product & Risk)	(3) Essentiality (w/ Product, Risk, Covariates)
			(0.138)
£25,000-£34,999			-0.195*
			(0.117)
£35,000-£44,999			-0.182
			(0.127)
£45,000-£54,999			-0.208
			(0.132)
£55,000-£70,000			-0.242*
			(0.137)
£70,000			-0.309**
			(0.135)
Prefer not say			-0.413**
			(0.204)
Age			-0.007***
			(0.002)
Race			
Black			0.369*
			(0.217)
Asian			0.176
			(0.143)
Mixed			-0.274
			(0.363)
Other			0.598
			(0.380)
Constant	0.560***	0.899***	1.039**
	(0.086)	(0.105)	(0.482)
Observations	965	965	965
R-squared	0.505	0.542	0.583

Note: These results are for an OLS regression with predictors for harm and need in Column (1). Column (2) and (3) include additional covariates. For product example, the reference category is included at the top of the column, in parentheses. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

H. Study 1 – Robustness Checks

a. Non-Parametric Tests

For the non-parametric tests, we used a Mann-Whitney U test to evaluate whether participants rated outcome variables differently by functional versus experiential products. The results indicated that functional products exhibited significantly greater essentiality than experiential products, $z = 9.89$, $p < .001$, greater need, $z = 5.52$, $p < .001$, better risk-trade-off, $z = 4.87$, $p < .001$, and greater benefit, $z = 7.99$, $p < .001$, all at the 1% level. Experiential products were considered more important for regulation, $z = -1.73$, $p = .083$, at the 10% level.

We also used a Mann-Whitney U test to evaluate whether participants rated outcome variables differently by low versus high risk. The results indicated that low risk scenarios did not exhibit significantly greater essentiality than high risk, $z = 0.31$, $p = .761$, and only differed by need, $z = 1.74$, $p = .082$, at the 10% level. Low risk scenarios exhibited significantly better risk trade-off, $z = 7.17$, $p < .001$ and regulation, $z = -8.28$, $p < .001$, at the 1% level, and benefit, $z = 2.07$, $p = .038$ at the 5% level.

b. Dropping Low Product Relevance

Table 81 - Main Effects Regressions (OLS) – Dropping Low Product Relevance (Study 1)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**Essentiality**	**Need**	**Risk Trade-off**	**Regulation**	**Benefit**	**Harm**
Experiential products	-0.900***	-0.507***	-0.268**	0.039	-0.636***	-0.016
	(0.126)	(0.129)	(0.128)	(0.109)	(0.117)	(0.099)
High risk	0.028	-0.098	-0.705***	0.683***	-0.104	-0.033
	(0.122)	(0.124)	(0.121)	(0.105)	(0.112)	(0.098)
Constant	3.659***	3.604***	3.832***	5.057***	4.716***	2.264***
	(0.095)	(0.098)	(0.092)	(0.084)	(0.085)	(0.077)
Observations	567	567	567	567	567	567
R-squared	0.083	0.029	0.067	0.071	0.054	0.000

Note: These results are for an OLS regression with two predictors, one for product type and one for risk level, where observations have been dropped for those who reported low product relevance (i.e., less than "Neither agree nor disagree"). For product type, the reference category is functional products. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 82 – Product x Risk Interaction – Dropping Low Product Relevance (Study 1)

VARIABLES	(1) Essentiality	(2) Need	(3) Risk Trade-off	(4) Regulation	(5) Benefit	(6) Harm
Experiential products	-1.109***	-0.586***	-0.303	-0.061	-0.774***	-0.115
	(0.172)	(0.189)	(0.187)	(0.171)	(0.164)	(0.139)
High Risk	-0.124	-0.156	-0.731***	0.611***	-0.204	-0.105
	(0.154)	(0.156)	(0.146)	(0.131)	(0.139)	(0.128)
Experiential x High Risk	0.406	0.153	0.068	0.193	0.266	0.191
	(0.251)	(0.258)	(0.256)	(0.220)	(0.234)	(0.198)
Constant	3.731***	3.632***	3.844***	5.091***	4.763***	2.298***
	(0.105)	(0.107)	(0.099)	(0.093)	(0.092)	(0.085)
Observations	567	567	567	567	567	567
R-squared	0.087	0.030	0.068	0.072	0.056	0.002

Note: These results are for an OLS regression with three predictors, one for product type, one for risk level, and their interaction, where observations have been dropped for those who reported low product relevance (i.e., less than “Neither agree nor disagree”). For product type, the reference category is functional products. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

c. Ordinal Logit Analyses for Variables with 7 categories

Table 83 - Ordinal Logit Analysis for Relevant Main Effects Regressions (Study 1)

	(1)	(2)	(3)	(4)
VARIABLES	**Essentiality**	**Risk Trade-off**	**Regulation**	**Benefit**
Experiential products	-1.177***	-0.546***	0.175	-0.930***
	(0.119)	(0.115)	(0.117)	(0.116)
High risk	-0.004	-0.823***	0.980***	-0.221*
	(0.116)	(0.116)	(0.119)	(0.115)
Cut 1	-2.255***	-2.365***	-4.327***	-4.396***
	(0.121)	(0.123)	(0.358)	(0.224)
Cut 2	-0.841***	-1.211***	-3.048***	-2.496***
	(0.103)	(0.105)	(0.201)	(0.125)
Cut 3	0.164*	-0.222**	-2.028***	-1.199***
	(0.099)	(0.100)	(0.139)	(0.106)
Cut 4	0.601***	0.596***	-1.030***	-0.225**
	(0.103)	(0.105)	(0.110)	(0.101)
Cut 5	2.756***	2.331***	0.366***	1.006***
	(0.181)	(0.159)	(0.102)	(0.110)
Cut 6	5.051***	6.309***	1.805***	2.664***
	(0.501)	(1.002)	(0.114)	(0.174)
Observations	965	965	965	965

Note: Odds ratios are displayed, with robust standard errors below in parentheses. Analyses use an ordinal logit model given that these variables only contained 7 categories. Cut points 1 – 6 display the thresholds for interpreting a latent continuous variable Y*, for example, in column (1), $Y_i = 1$ if Y^*_i is $\leq$ -2.255, $Y_i = 2$ if $-2.255 \leq Y^*_i < -0.841$, $Y_i = 3$ if $-0.841 \leq Y^*_i \leq 0.164$, etc. *** p<0.01, ** p<0.05, * p<0.1.

Table 84 - Ordinal Logit Analysis for Relevant Interaction Effect Regressions (Study 1)

VARIABLES	(1) Essentiality	(2) Risk Trade-off	(3) Regulation	(4) Benefit
Experiential products	-1.393***	-0.712***	0.146	-0.940***
	(0.161)	(0.168)	(0.161)	(0.159)
High Risk	-0.218	-0.985***	0.950***	-0.231
	(0.160)	(0.158)	(0.166)	(0.162)
Experiential x High Risk	0.434*	0.328	0.060	0.019
	(0.231)	(0.231)	(0.234)	(0.230)
Cut 1	-2.363***	-2.445***	-4.341***	-4.400***
	(0.130)	(0.132)	(0.362)	(0.231)
Cut 2	-0.945***	-1.292***	-3.062***	-2.501***
	(0.115)	(0.119)	(0.205)	(0.136)
Cut 3	0.062	-0.301***	-2.042***	-1.204***
	(0.112)	(0.114)	(0.146)	(0.117)
Cut 4	0.500***	0.519***	-1.045***	-0.229**
	(0.114)	(0.116)	(0.121)	(0.113)
Cut 5	2.655***	2.258***	0.351***	1.002***
	(0.188)	(0.164)	(0.114)	(0.121)
Cut 6	4.952***	6.237***	1.791***	2.659***
	(0.505)	(1.000)	(0.124)	(0.182)
Observations	965	965	965	965

Note: Odds ratios are displayed, with robust standard errors below in parentheses. Analyses use an ordinal logit model given that these variables only contained 7 categories, along with an interaction term between the product type and risk variables. Cut points 1 – 6 display the thresholds for interpreting a latent continuous variable Y*, for example, in column (1), $Y_i = 1$ if Y^*_i is $\leq$ -2.363, $Y_i = 2$ if $-2.363 \leq Y^*_i < -0.945$, $Y_i = 3$ if $-0.945 \leq Y^*_i \leq 0.062$, etc. *** p<0.01, ** p<0.05, * p<0.1.

I. Demographic Comparison between Sample and U.S. General Population

Table 85 - Comparison with U.S. General Population - Study 2

Demographic	Sample Median	U.S. Population Median
Age	45	38.9
Income	$66,000	$74,580

Demographic	Category	Sample %	U.S. Population %
Gender	Female	46.3%	50.40%
	Male	51.9%	49.60%
Race & Ethnicity	Asian	5.7%	6.3%
	Black	14.1%	13.6%
	White	77.6%	75.5%
	North American Indigenous	1.3%	1.3%
	Native Hawaiian/Pacific Islander	0.3%	0.3%
	Not otherwise listed	1.0%	3.0%
	Hispanic	4.9%	19.1%
Education	High school graduate or higher	99.2%	89.1%
	Bachelor's degree or higher	63.0%	34.3%

Note: The top panel compares continuous variables, whereas the bottom panel includes categorical variables. Categories were split up depending on availability of U.S. data and may not be as granular as our surveyed categories (e.g., education). While we recorded participants' gender (i.e., how they identify), we could only find suitable U.S. data on sex. All data on the U.S. population are originally sourced from the U.S. Census Bureau Vintage 2022 dataset. Specific values for race & ethnicity, education, and gender were obtained from the U.S. Census Bureau QuickFacts (2022). Age and income values were obtained from summary webpages, entitled "America is Getting Older" (US Census Bureau, 2022b) and "Income in the United States: 2022" (US Census Bureau, 2022a), respectively.

J. Study 2 - Normality of Residuals for Outcome Measures

Figure 40 - P-P Plot – Risk Trade-off (Study

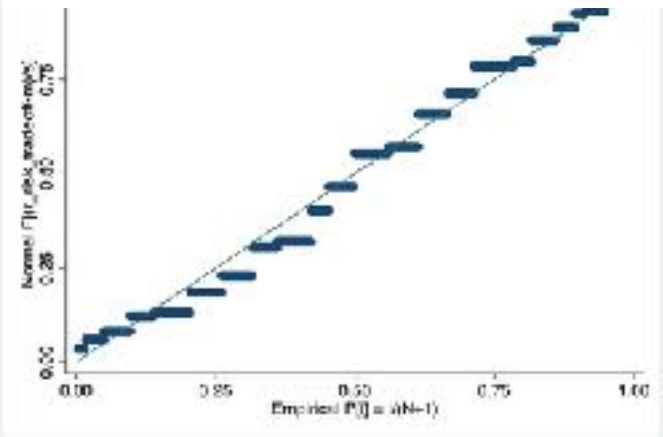


Figure 39 - P-P Plot - Need (Study 2)

Figure 42 - P-P Plot - Regulation (Stu

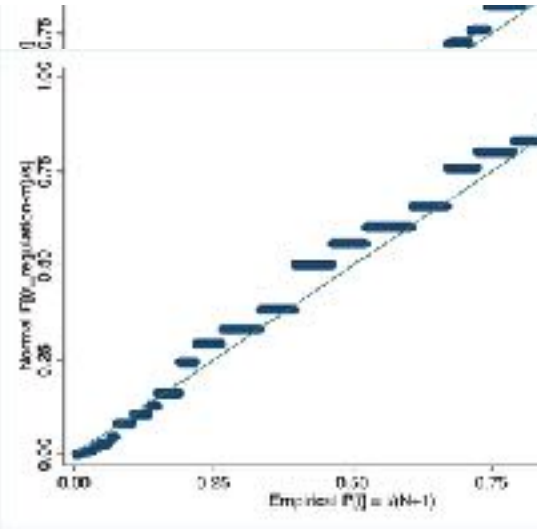
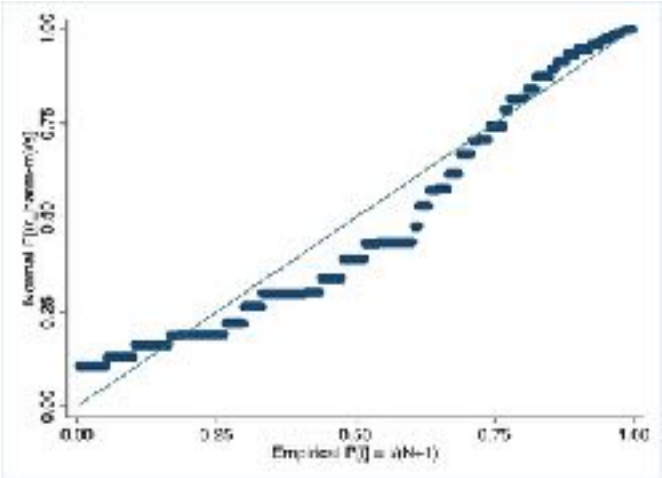


Figure 43 - P-P Plot - Harm (Study 2)



The Shapiro-Wilk test was also used to check if the data are normally distributed. Essentiality, W(389) = 0.95, p < .001, need, W(389) = 0.97, p < .001, risk trade-off, W(389) = 0.98, p < .001, regulation, W(389) = 0.96, p < .001, benefit, W(389) = 0.98, p < .001, and harm, W(389) = 0.92, p < .001, all failed the Shapiro-Wilk test. The P-P charts for each outcome variable above (**Figure 39** - **Figure 43**) also indicate deviations from normality, though need, risk-trade-off, and to some extent regulation, appear visually closest to a normal distribution.

K. Study 2 – Main Effects Results with Covariates

Table 86 - Main Effects Results w/ Covariates – OLS (Study 2)

VARIABLES	(1) Essentiality	(2) Need	(3) Risk Trade-off	(4) Regulation	(5) Benefit	(6) Harm
Experiential products	-0.768***	-0.473***	-0.363**	0.142	-0.783***	-0.190
	(0.147)	(0.147)	(0.152)	(0.129)	(0.150)	(0.134)
High risk	0.060	-0.083	-0.639***	0.598***	-0.154	-0.363***
	(0.150)	(0.143)	(0.150)	(0.136)	(0.154)	(0.135)
Norms	0.141*	0.201***	0.198**	0.028	0.217***	0.023
	(0.073)	(0.069)	(0.078)	(0.069)	(0.072)	(0.066)
Conspicuous Consumption	0.231***	0.265***	0.236***	-0.056	0.164***	0.212***
	(0.058)	(0.060)	(0.060)	(0.055)	(0.060)	(0.056)
Perceived Status	0.070	0.009	0.075	-0.033	0.011	0.088**
	(0.048)	(0.045)	(0.048)	(0.041)	(0.049)	(0.043)
Political Identity	0.026	0.002	-0.005	0.002	-0.030	0.007
	(0.028)	(0.029)	(0.029)	(0.026)	(0.028)	(0.026)
Hedonism	0.113	0.053	0.021	0.001	0.109	0.003
	(0.100)	(0.093)	(0.084)	(0.070)	(0.081)	(0.069)
Universalism Concern	-0.200*	-0.273**	-0.191*	-0.175	0.029	-0.410***
	(0.113)	(0.111)	(0.113)	(0.121)	(0.117)	(0.112)
Universalism Nature	0.066	0.060	-0.157	0.630***	-0.184*	0.057
	(0.105)	(0.090)	(0.099)	(0.103)	(0.098)	(0.088)
Risk Perception	0.005	0.042	-0.011	0.036	0.113	-0.001
	(0.083)	(0.079)	(0.082)	(0.069)	(0.084)	(0.067)
Gender						
Female	-0.167	-0.303*	-0.123	0.268*	-0.135	-0.067
	(0.166)	(0.167)	(0.164)	(0.146)	(0.165)	(0.139)
Non-binary	-0.825	-0.876*	-0.663*	-0.025	-0.471	-0.664**

VARIABLES	(1) Essentiality	(2) Need	(3) Risk Trade-off	(4) Regulation	(5) Benefit	(6) Harm
	(0.527)	(0.494)	(0.386)	(0.512)	(0.352)	(0.296)
Prefer not to say	-2.585***	-1.871***	-1.531***	2.165***	-3.303***	-1.812***
	(0.579)	(0.505)	(0.555)	(0.487)	(0.508)	(0.510)
Education						
No formal qualifications	0.004	-1.287**	-0.203	0.962**	0.724	-0.145
	(0.659)	(0.612)	(0.849)	(0.447)	(0.872)	(0.408)
A-level or equivalent	-0.332	-0.107	-0.130	-0.058	-0.192	-0.231
	(0.267)	(0.252)	(0.274)	(0.229)	(0.264)	(0.242)
University or a College degree	-0.366	-0.276	-0.278	0.065	-0.020	-0.298
	(0.233)	(0.231)	(0.246)	(0.209)	(0.250)	(0.210)
Graduate degree (Masters or PhD)	-0.457*	-0.271	0.042	0.128	0.015	-0.336
	(0.267)	(0.257)	(0.280)	(0.247)	(0.285)	(0.244)
Income	0.000	0.001	0.001	-0.003*	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Age	0.009*	0.005	0.004	-0.007	0.003	0.002
	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)
Race						
Asian	0.944	1.169*	1.901***	-1.794***	1.286**	2.137***
	(0.749)	(0.632)	(0.510)	(0.424)	(0.513)	(0.493)
Black	1.366**	1.400**	1.728***	-1.406***	1.269***	1.897***
	(0.670)	(0.569)	(0.405)	(0.296)	(0.454)	(0.384)
Nat Hawaiian / PI	-1.752***	-1.048*	-0.316	-0.218	0.821**	0.644*
	(0.657)	(0.562)	(0.371)	(0.293)	(0.417)	(0.355)
White	0.468	0.876	1.771***	-1.501***	1.116***	1.511***
	(0.647)	(0.541)	(0.353)	(0.268)	(0.399)	(0.337)
Other	0.634	-0.193	1.642***	-1.089*	1.100	1.118
	(0.972)	(0.983)	(0.627)	(0.635)	(1.190)	(0.732)

VARIABLES	(1) Essentiality	(2) Need	(3) Risk Trade-off	(4) Regulation	(5) Benefit	(6) Harm
Hispanic/Latin	0.019	0.201	0.727**	-0.017	-0.633	0.430
	(0.385)	(0.386)	(0.321)	(0.302)	(0.389)	(0.321)
Constant	1.364	1.705*	2.454***	4.104***	0.713	2.699***
	(1.008)	(0.904)	(0.867)	(0.729)	(0.873)	(0.785)
Observations	389	389	389	389	389	389
R-squared	0.251	0.240	0.245	0.312	0.197	0.231

Note: These results are for an OLS regression with predictors for product type and risk level, as well as other relevant covariates. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

L. Details of Qualitative Analysis & Full Codebook

Thematic analysis was used to generate codes based on the open-text responses. This entailed reading all responses once first, to get an initial familiarity with the data, as recommended by Braun and Clarke (2006). The next step was to generate codes based on the responses, but which constituted a reason for answering yes or no to the question, given the yes/no format of the initial question. This process resulted in 48 initial codes. These codes were then grouped to establish overarching reasons on the spectrum from there being no difference in societal and individual functioning to there being no overlap in these levels. This resulted in 8 relevant themes, plus an additional category of irrelevant responses, which also includes uncertain responses. This last theme emerged in the process of reviewing the data as it became clear that a substantial number of responses were not directly answering the question. **Table 87** below includes all codes which comprise each theme, as well as the number of times each code was referenced ("References"). The large, bolded number next to each theme is the sum of all code references relevant to that theme. Some responses corresponded to more than one code, so there are more references than data points. We also selected two exemplary quotes for each theme, displayed in the "Quotation" column.

Table 87 - Full Codebook Including Codes and Themes

Category	Code Name	References	Quotation
1	**No meaningful difference - a functioning society is comprised of functioning individuals**	**109**	*A - "I don't see a difference, society is a group of [individuals], so they need the same requirements to function properly."* *B - "I think that it is only micro and macro and nothing else, on the micro individual on the macro majority, so there is no difference"*
	No difference	68	
	Little difference in terms of products	1	
	Not a big difference	13	
	Shouldn't be a difference, but not a perfect world	1	
	Shouldn't be a difference, but tend to focus on certain groups	1	
	The same - humans make up society	11	
	The same, functioning society needs functioning people	14	
2	**They are directly related - societal functioning can facilitate individual functioning**	**10**	*A - "No, because I think what individuals need to function properly makes them function, which in turn is also what makes society function properly. They are directly related"* *B - "No, I do not believe there to be a difference as a I feel an individual needs the society at large to function properly in order for them to function properly."*
	Interrelated - societal stability improves individual wellbeing	7	
	Similar but causal effect	3	
	They overlap in terms of satisfying basic needs	**47**	*A - "I think they are basically the same if you go down to the very minimum that fits both*
	Only overlap in basic needs across individuals	18	

3	Basic needs - food, water, shelter		25	*requirements like food, water and air."*
	Need is about survival		3	
	Overlap, but society also needs rules and transportation		1	*B - "Every individual needs the same basic human needs met that I listed previously. The only difference for a society of humans might be some sort of collective structure or order to prevent chaos."*
4	**Individual needs may vary, but societal essentiality is more universal or generalized**	**87**		*A - "I would say yes, as every individual is different and has their own specific needs that have to be met, whereas society as a whole has more collective needs that reflect the more general needs of each individual."*
	Individual needs vary, society's needs don't		10	
	individual differences in need		24	
	More choice individually		9	
	Need = subjective, essential = not subjective		5	
	Some overlap, but some individual differences in need		19	
	Societal needs might not apply to all individuals		17	*B - "I think that what an individual needs varies based on the individual. What society need can be more generalized."*
	Society can still function if an individual can't		1	
	Some overlap, but different ways of meeting need		2	
	They are related, but differ in terms of scale, scope, and complexity	**91**		*A - "Yes, I do believe that individual needs are different than societal needs. For example, an individual may need water to survive. A society needs protected sources of clean water and a reliable means to deliver them. A person needs clothing and*
	Related, but differ on scale, scope, and complexity		1	
	Basically the same, but society needs universal currency		1	
	Different scales – e.g., food versus order or laws		25	
	Different scales, societal is more about collective wellbeing		19	

5	Individual needs also incorporate psychological balance	1	*needs clothing and shelter. A society needs regulations to keep shelters safe and means to transport materials and finished products where they need to go."* *B - "Individuals need basic necessities like food, shelter, and personal fulfillment. Societies require infrastructure and governance. there's overlap, societal requirements extend to collective well-being, justice, and cooperation."*
	Individual needs are easier to handle than societal needs	3	
	Interrelated, but differ on scale and scope	3	
	Related but not the same	8	
	Related but not the same, different scope	4	
	Similar as humans make up society - but different scale	3	
	Societal level also concerns justice	1	
	Societal needs are more complex	4	
	Societal needs at a larger scale	6	
	Societal needs broader	5	
	Society needs cooperation, may or may not benefit individuals	2	
	Some difference - society needs infrastructure	5	
6	**Depends on other factors**	**5**	*A - "I think it depends on the person and the environment they are living in. For example, people who live in large cities require public transportation but those in rural areas can use their own forms of transportation."* *B - "I don't think there's a whole lot of difference between the two. I*
	Depends on person and environment	3	
	Difference in perspective	1	

				between the two. I suppose the individual need is more personalized to the individual because it depends on how one defines "harm". Some people will have a higher threshold for harm and therefore what they define as a need may be different from another person."
	Slight difference - depends on threshold for harm		1	
7	**Tension between satisfying each level – what is necessary for individual may not be for society, and vice versa**	**17**		*A - "There is a difference because society functioning is more important than any one individual functioning properly."*
	Tension between individual and societal levels		4	
	Individuals prioritize need over society		1	*B - "The need for an individual is always subjective to their personal circumstances. While fulfilling this individual need, it may be negative to the wider society, and a non-essential for the society to function properly."*
	Needs not completely necessary for society to function		2	
	Related - need might arise from society not functioning		5	
	Societal need more important than individual need		5	
8	**They are not the same**	**29**		*A - "Yes, what an individual needs might be vastly different from what society needs."*
	Not the same		29	*B - "Individuals and society are two very different things. Tastes and cultures differ. Everyone has a choice."*

9	**Not a direct answer / Not sure**	**54**		*A - "I can do without mousse if I am protected in the long run from any diseases. It is not worth the sacrifice."*
	Not a direct answer		47	
	Not sure		7	*B - "People think they need more than they really do."*

Note: This table displays the themes extracted from the open-text question, "*In this study, we define a 'need' as something that will cause an individual harm if not met, and 'essential' as something that is critical for the functioning of society. In your view, is there any difference between what an individual needs to function properly and what a society at large requires to function properly? Please share some brief thoughts below.*" While most responses were only assigned to one code, some responses had multiple codes, so the total number of references is greater than the number of responses in the dataset.

M. Study 2 – Robustness Checks

a. Non-Parametric Tests

The results of the Mann-Whitney U test indicated that functional products exhibited significantly greater essentiality than experiential products, $z = 5.09$, $p < .001$, greater need, $z = 3.34$, $p < .001$, more preferable risk-trade-off, $z = 2.69$, $p = .007$, and greater benefit, $z = 5.63$, $p < .001$, all at the 1% level. The need for regulation did not significantly differ by product type, $z = -1.43$, $p = .154$, nor did harm, $z = 1.17$, $p = 0.243$.

We also used a Mann-Whitney U test for the risk treatment variable. The results indicated that low risk scenarios did not exhibit significantly greater essentiality than high risk, $z = 0.26$, $p = .797$, or need, $z = 1.15$, $p = .251$. Low risk scenarios exhibited significantly more preferable risk trade-off, $z = 4.21$, $p < .001$ and need for regulation, $z = -4.30$, $p < .001$, at the 1% level, and benefit, $z = 1.69$, $p = .090$ at the 10% level. Harm was significantly higher for the low risk condition, $z = 2.47$, $p = 0.014$, at the 5% level.

b. Dropping Low Product Relevance

Table 88 - Main Effects Regressions (OLS) – Dropping Low Product Relevance (Study 2)

VARIABLES	(1) Essentiality	(2) Need	(3) Risk Trade-off	(4) Regulation	(5) Benefit	(6) Harm
Experiential products	-0.337	0.008	0.017	0.196	-0.550***	0.168
	(0.211)	(0.202)	(0.206)	(0.179)	(0.201)	(0.205)
High risk	-0.005	-0.205	-0.577***	0.485***	-0.314	-0.435**
	(0.202)	(0.200)	(0.200)	(0.184)	(0.196)	(0.198)
Constant	3.857***	3.766***	3.967***	4.748***	4.629***	2.841***
	(0.163)	(0.161)	(0.149)	(0.158)	(0.156)	(0.173)
Observations	231	231	231	231	231	231
R-squared	0.011	0.005	0.035	0.033	0.040	0.025

Note: These results are for an OLS regression with two predictors, one for product type and one for risk level, where observations have been dropped for those who reported low product relevance (i.e., less than “Neither agree nor disagree”). For product type, the reference category is functional products. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 89 - Product x Risk Interaction – Dropping Low Product Relevance (Study 2)

	(1)	(2)
VARIABLES	**Essentiality**	**Harm**
Experiential products	-0.478	0.279
	(0.290)	(0.292)
High risk	-0.113	-0.350
	(0.253)	(0.252)
Experiential x High Risk	0.288	-0.226
	(0.422)	(0.410)
Constant	3.913***	2.797***
	(0.180)	(0.197)
Observations	231	231
R-squared	0.013	0.026

Note: These results are for an OLS regression with three predictors, one for product type, one for risk level, and their interaction, where observations have been dropped for those who reported low product relevance (i.e., less than "Neither agree nor disagree"). For product type, the reference category is functional products. For risk type, the reference category is low risk. The outcome variable is displayed at the top of each column. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

c. Ordinal Logit Analyses for Variables with 7 categories

Table 90 - Ordinal Logit Analysis for Relevant Main Effects Regressions (Study 2)

	(1)	(2)	(3)	(4)
VARIABLES	**Essentiality**	**Risk Trade-off**	**Regulation**	**Benefit**
Experiential products	-0.943***	-0.461**	0.234	-1.029***
	(0.186)	(0.182)	(0.182)	(0.186)
High risk	-0.031	-0.752***	0.784***	-0.255
	(0.180)	(0.183)	(0.184)	(0.182)
Cut 1	-2.590***	-2.328***	-3.432***	-3.345***
	(0.213)	(0.187)	(0.379)	(0.235)
Cut 2	-1.081***	-1.122***	-2.330***	-2.050***
	(0.166)	(0.162)	(0.240)	(0.182)
Cut 3	-0.058	-0.378**	-1.416***	-0.886***
	(0.154)	(0.154)	(0.188)	(0.160)
Cut 4	0.428***	0.539***	-0.540***	0.026
	(0.154)	(0.155)	(0.171)	(0.155)
Cut 5	1.840***	2.041***	0.623***	1.246***
	(0.195)	(0.217)	(0.169)	(0.178)
Cut 6	3.487***	3.234***	1.883***	2.575***
	(0.364)	(0.346)	(0.190)	(0.264)
Observations	389	389	389	389

Note: Odds ratios are displayed, with robust standard errors below in parentheses. Analyses use an ordinal logit model given that these variables only contained 7 categories. Cut points 1 – 6 display the thresholds for interpreting a latent continuous variable Y*, for example, in column (1), $Y_i = 1$ if Y^*_i is $\leq$ -2.59, $Y_i = 2$ if -2.59 $\leq$ Y^*_i < -1.08, $Y_i = 3$ if -0.06 $\leq$ Y^*_i $\leq$ 0.43, etc. *** p<0.01, ** p<0.05, * p<0.1.

Table 91 - Ordinal Logit Analysis for Relevant Interaction Effect Regressions (Study 1)

	(1)
VARIABLES	**Essentiality**
Experiential products	-0.890***
	(0.258)

High risk	0.019
	(0.236)
Experiential x High Risk	-0.105
	(0.362)
Cut 1	-2.566***
	(0.221)
Cut 2	-1.057***
	(0.180)
Cut 3	-0.034
	(0.170)
Cut 4	0.452***
	(0.171)
Cut 5	1.864***
	(0.207)
Cut 6	3.512***
	(0.361)
Observations	389

Note: Odds ratios are displayed, with robust standard errors below in parentheses. Analyses use an ordinal logit model given that essentiality only contained 7 categories, along with an interaction term between the product type and risk variables. Cut points 1 – 6 display the thresholds for interpreting a latent continuous variable Y*, for example, in column (1), $Y_i = 1$ if Y^*_i is $\leq$ -2.57, $Y_i = 2$ if -2.57 $\leq Y^*_i <$ -1.06, $Y_i = 3$ if -1.06 $\leq Y^*_i \leq$ -0.03, etc. *** p<0.01, ** p<0.05, * p<0.1.

7. Transparent Changes to Pre-Registration

1. Description of change: In the pre-registration for Study 2, we specified “Note that we drop the Risk Perceptions variable from Study 1 to streamline our variable selection, as Risk Likelihood was a consistently more significant predictor of our outcomes.” We actually dropped the risk likelihood variable.
    a. Rationale: This was a mistake in the document. Examining **Table 77** in **Appendix D**, it is clear that the risk likelihood is not a significant predictor of essentiality or need, whilst the risk perceptions variable does significantly predict these outcomes.
    b. Effect of change on study results: At the point of pre-registration, we had already built the design of Study 2 without the risk likelihood variable, so it was never intended to be in the model. However, given the rather insignificant effect this variable had on all outcomes except risk trade-off (only at the 10% level) in Study 1, it is unlikely that this impacted the results greatly in any direction.
2. Description of change: In Study 2, we pre-registered hypotheses in a certain order, but we have changed the numbering of these hypotheses as presented here. In particular this impacts H4 (originally H6) and H5 (originally H4).
    a. Rationale: These hypotheses have been renumbered to improve the flow when introducing different hypotheses. As we registered more exploratory hypotheses than were included in this paper, this also impacted the numbering of hypotheses.
    b. Effect of change on study results: This should not have any impact on results.

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Chapter 5

Less consumption, more policy support? A discrete choice experiment on degrowth in the United States.

Abstract: Research on degrowth and its policy proposals has rapidly expanded, despite lacking empirical evidence on public perceptions. One conceptual proposition for the Global North is that lifestyle changes, such as undertaking sufficiency-oriented behaviours, may engender degrowth policy support. Our research investigated U.S. public support for degrowth policies, its relation to sufficiency behaviours, and how this association differed by individual characteristics. We also tested whether framing such policy proposals, around degrowth principles or neutrally, would influence policy support. In a pre-registered, online discrete choice experiment (N = 1,012), we elicited perceptions of four commonly advocated degrowth policies - work time reductions, downscaling fossil fuel production, universal basic services, and limits to advertising. Analyses revealed support for fossil fuel caps, universal healthcare, and the shortest work weeks, as well as partial support for advertising restrictions, compared to the status quo. Framing did not significantly influence support for any degrowth policy. While political ideology was a consistent predictor of support, universalism values were less influential. There was also a significant positive association between engaging in sufficiency and degrowth policy support, especially for fossil fuel restrictions. However, latent class analysis suggested that those who supported more degrowth policies did not necessarily engage in sufficiency behaviours most frequently. The strongest degrowth supporters were more left leaning, expressed higher universalism and material simplicity values, and were higher income, educated, and formally employed. These findings point to a complex relationship between sufficiency lifestyles and degrowth policy support, underpinned by heterogeneity amongst various groups. They further underscore the importance of studying the variety of degrowth policy perceptions amongst different swathes of the general public to build more comprehensive and popular proposals for societal transformation.

Keywords: Sufficiency, behaviour, degrowth, policy support, public acceptability, discrete choice experiment

Pre-registration:
Full Study

Disclaimer: This chapter is an adapted and amended version of a paper that has been submitted to the journal Ecological Economics for peer review:

> *O'Dell, D., Contu, D., & Shreedhar, G. (2024). Public support for degrowth policies and sufficiency behaviours in the United States: A discrete choice experiment. Under review.*

The date of submission was 31/1/2024 and revisions were received on 7/3/2024. This paper focused only on the relationship between sufficiency behaviours and degrowth policy support. The version included here expands upon this journal article, including several other hypotheses which were pre-registered in the original project but were not fleshed out in the journal article. Because they were pre-registered, the article acknowledges these additional hypotheses in an extended transparent changes document. In the journal article, I was responsible for the design (with help from Dr Davide Contu), most of the analysis (with help from Dr Davide Contu), and writing the original draft. Dr Ganga Shreedhar assisted with conceptualization of the research agenda including the use of a discrete choice experiment. Dr Davide Contu and Dr Ganga Shreedhar both assisted with editing the journal article version. This project was funded in part by a PhD summer research grant from LSE's Phelan U.S. Centre.

1. Introduction

Perhaps the most concrete means of institutional change toward a degrowth future, at least within academic literature, is to enact a robust set of policies that bolster both ecological and social protections (Fitzpatrick et al., 2022). The **Literature Review (Chapter 2)** introduced some of these policies, which broadly aim to mitigate environmental degradation, reduce inequality, and promote more community-oriented and democratic societies (Cosme et al., 2017). Given the appetite for policy change uncovered in the prior chapters, and the inadequacy of private sector institutions to effect change identified in **Project 1 (SPM)**, this chapter explores the implementation of a more comprehensive eco-social policy agenda and its connection with individual sufficiency practices.

Despite the proliferation of research on degrowth and its policies, policymakers are still hesitant to move away from green growth-based objectives (Fitzpatrick et al., 2022a; King et al., 2023). This unwavering commitment to green growth, as seen in the United States and United Kingdom,[57] is mostly considered a lack of political will for degrowth as opposed to a lack of feasibility (Hickel et al., 2022). And whilst growth-scepticism and post-growth policy initiatives have begun to emerge within European Parliament (European Parliament Directorate General for Parliamentary Research Services, 2023; Kallis et al., 2023), consensus is unlikely to shift away from this growth imperative without overwhelming support from constituents (Buch-Hansen, 2018). Support among the general population is also pivotal for ensuring the non-reformist policies withstand the policy process and do not get co-opted (Kongshøj, 2023; Schaffer et al., 2022). To generate the requisite support around degrowth and its policies, especially outside of activist and academic groups (Kongshøj, 2023), it is necessary to understand how broader swathes of the general public perceive them.

To date, very little academic literature is concerned with public perception of degrowth policies, which is troubling given the strong commitment to democratic deliberation underlying degrowth's agenda (Buch-Hansen & Koch, 2019; D'Alisa & Kallis, 2020; Gabriel & Bond, 2019; Gunderson & Yun, 2017; Sekulova et al., 2013). The few existing studies that elicit perceptions of degrowth-related policies from the general public focus on Sweden and the United Kingdom (Khan et al., 2023; Lee et al., 2023; Thorman et al., 2020).

[57] For example, both Labour and Tories in the U.K. have publicly advocated for economic growth in recent years (Kwarteng, 2022; Starmer, 2022), whilst U.S. President Joe Biden's platform explicitly focuses on growing the economy (The White House, 2023).

The first aim of this project was to fill this gap in the degrowth literature, by providing insight from the United States as a large and high emitting country of the Global North.

Despite the lack of empirical evidence in the literature, one conceptual proposition for mobilising greater support is the behaviour-to-transformation pathway introduced in the **Literature Review (Chapter 2)**. Lifestyle changes, such as undertaking more sufficiency-oriented behaviours, may shift values amongst communities and social groups, engendering policy support to enable the conditions for a degrowth transition (Kallis et al., 2020). This approach echoes other connections between sufficiency and system level transformations in the literature. Given that efficiency approaches are unlikely to adequately address environmental degradation and mitigate the climate crisis (Jackson, 2009; Kallis, 2017), scholars argue for sufficiency approaches or 'strong sustainable consumption' to complement sustainable transitions (Lorek & Fuchs, 2013; Spangenberg & Lorek, 2019). However, outside of conceptual pieces and individual case studies, there has been little empirical evidence to facilitate such connections or determine whether individual behaviour change can prefigure a degrowth transformation (e.g., Trainer, 2024). What's more, not enough empirical work has been devoted to assessing public support for specific degrowth policies across various countries, especially when presented as a comprehensive proposal for combating environmental and social crises of our time (Khan et al., 2023; Lee et al., 2023). Addressing this gap in empirical evidence on the connection between sufficiency behaviours and policy support for degrowth policies (i.e., RQ3b) constitutes the second aim of this project. It also addresses RQ1a, relating degrowth with individual consumption more broadly.

Project 1 (SPM) made a first attempt at measuring support for some degrowth policies amongst a U.K. sample. Descriptive results suggest that work time reductions, fossil fuel restrictions, advertising regulations, and UBI were all considered "Somewhat acceptable" or better on average, whilst wealth taxes received substantially less support. However, the low reliability of the composite degrowth policy measure ($a = 0.66$), coupled with the evidence of preference heterogeneity based on demographics and values, suggests that these policies cannot necessarily be lumped together. Instead, careful evaluation of each policy, including different design specifications, must be taken into account to accurately assess its viability and acceptability amongst citizens in various geographies and demographics. As such, the third aim of this paper is to further investigate heterogeneity in people's preferences for different policies, addressing RQ3c. We examined heterogeneity in

general policy support, whilst also dissecting the additional characteristics that link sufficiency-orientation to policy support.

To achieve these aims, we designed a discrete choice experiment, which i) systematically measured people's preferences for selected policies from the degrowth literature, ii) linked support for these policies with participants' adoption of sufficiency behaviours in assessing the transformation pathway, and iii) examined other factors that influence policy support and its connection with sufficiency.

Based on its potentially negative connotations (e.g., Drews & Antal, 2016), we avoided using the term degrowth throughout our stimuli, instead characterising the policies as combatting the linked social and ecological crisis. Given the findings from Study 3 in **Project 1 (SPM)** that Green Growth framing was more persuasive for eliciting policy acceptance, we experimentally varied the background materials introducing the policy proposals to test whether framing around degrowth principles would hinder or enhance policy support.

The main contributions of this paper are as follows. First, we aimed to examine support for degrowth policies in a broadly representative sample from the United States. Prior evidence has largely focused on attitudes and perceptions amongst experts (King et al., 2023; Lehmann et al., 2022), academics (Cosme et al., 2017; Drews et al., 2019a) and policymakers (Ahvenharju, 2020; Kallis et al., 2023). Those measuring public support studied Sweden (Khan et al., 2023; Lee et al., 2023) and the U.K. (Thorman et al., 2020), both smaller countries which could be considered less polarised on climate issues (Carlsson et al., 2021; Pidgeon, 2012). Second, extending conceptual debates (Kallis et al., 2020; Lorek & Fuchs, 2013; Spangenberg & Lorek, 2019), we provide the first empirical evidence on a 'behaviour-to-transformation' pathway by studying how sufficiency behaviour affects degrowth policy support. Third, we focused on heterogeneity and individual differences to empirically identify the characteristics of degrowth policy supporters. We also identified heterogeneity in examining the link between sufficiency and policy support. Fourth, we tested the role of framing on policy support, given the importance of strategic frames for communicating post-growth ideas to the public (Tomaselli et al., 2021). Finally, this study went beyond standard survey measures which use Likert scale ratings to assess acceptability of a general policy area (e.g., work time reductions) (Khan et al., 2023; Thorman et al., 2020). Our discrete choice experiment provided a more rigorous empirical analysis, including

assessing trade-offs between different policies. We could also determine the most popular version of specific proposals (e.g., work weeks consisting of 5 days/35 hours versus 4 days/ 28 hours).

The remainder of this chapter is structured as follows. **Section 2** provides an overview of relevant literature related to degrowth policies and sufficiency, outlining existing theories on how individual actions may bring about societal transformation. **Section 3** details the methodology in designing, implementing, and analysing the data from our discrete choice experiment. **Section 4** presents the results of the discrete choice experiment and associated analyses. **Section 5** discusses the findings, limitations, and areas for future research, and concludes the paper.

2. Literature Review

2.1. Degrowth Policies

The degrowth policy agenda has proliferated over the last decade, with a recent review counting over 500[58] proposals found in academic literature on the topic (Fitzpatrick et al., 2022a). Most of these policies, such as work-time reductions, universal basic incomes or services, income caps or wealth taxes, and jobs guarantees, incorporate both ecological and social goals (see Fitzpatrick et al. 2022 for a comprehensive list of goals, objectives and instruments).

As noted in the **Literature Review (Chapter 2)**, Cosme et al. (2017) found that the majority of policies were top-down or nationally focused, despite the agenda's commitment to bottom-up organising and democratic deliberation (Buch-Hansen & Koch, 2019; D'Alisa & Kallis, 2020; Gabriel & Bond, 2019; Gunderson & Yun, 2017; Sekulova et al., 2013). This tension is evidenced by the fact that not nearly enough studies have asked the general public their opinion of policies that are meant to be the will of the people. As the feasibility and credibility of policy implementation depends on the public's acceptance (Drews et al., 2018; Kongshøj, 2023), political will of the people should be prioritised. The more citizens get the opportunity to participate in shaping their social and political structures, the more likely democracy is possible (Crouch, 2004; Romano, 2012).

[58] The authors identify 530 proposals, including 50 goals, 100 objectives, and 380 instruments.

A couple of recent and aforementioned Swedish studies have started to fill this gap, investigating public perceptions of policies that guarantee minimum levels of social protection within planetary boundaries (Khan et al., 2023; Lee et al., 2023). However, whilst they address the general gap in policy perceptions of everyday citizens, there is little overlap between our DCE and the specific policies they examined. Khan et al. (2023) focused on more redistributive policies, including a maximum income, a wealth tax, and a basic income, as well as a meat tax. The only overlapping policy is working time reductions. Meanwhile, Lee et al. (2023) concentrated on the role that citizens can play in formulating such policy proposals, using citizen forums. They developed basic services policies to ensure human needs satisfaction, drawing on Max-Neef et al.'s HS-D framework (Guillen-Royo, 2020; Max-Neef et al., 1991). However, they did not include healthcare given Sweden's publicly funded system (Janlöv et al., 2023). As such, there are no overlaps between our studies in terms of selected policies.

Another point of departure is methodology, as these prior studies have mostly asked participants to rate generalised policy objectives as opposed to specific proposals. Lee et al. (2023) improved upon this method by specifying multiple levels of their universal basic services policies, that is, whether a service like transportation should be free or available at a low rate. Additionally, these prior studies used standard Likert scales to measure support for each policy separately. While useful in gauging baseline support as we did in **Project 1 (SPM)**, these methodological choices do not allow researchers to assess trade-offs between policies or determine relative preferences between a set of proposals. The discrete choice experiment offers a more systematic way to measure multiple levels of a given policy and to assess trade-offs between policies, in understanding policy leverage points (e.g., Abson et al., 2017).

Whilst polls and citizens assemblies have also examined the public acceptability of certain degrowth and sufficiency-oriented policies across Europe (Climate Assembly UK, 2020; Lage et al., 2023; Trades Union Congress, 2018; YouGov, 2019), to our knowledge, no academic study has directly inquired about support for these policies as a comprehensive proposal in the United States. In this paper, we sought to construct a degrowth policy package that attempted to safeguard both ecological and social protections and was feasible for the United States. Our package comprised four policy instruments taken from the degrowth policy literature (Ahvenharju, 2020; Cosme et al., 2017; Fitzpatrick et al., 2022a).

Fossil Fuel Limits: This proposal draws on policies that involve direct restrictions on environmental impacts. Environmental impacts can be defined broadly in terms of natural resource depletion and pollution, or more narrowly in terms of carbon-based energy resource depletion with associated emissions (Alcott, 2010). This may involve limits on consumption and/or production of such resources. For the sake of simplicity in this experiment, we adopted a narrower approach associated with fossil fuels production, and therefore indirectly consumption. We chose this approach given the contentious nature of consumption-oriented policies (Faure et al., 2022; Gurtner & Moser, 2024) and the fact that direct limits on consumption can appear to blame consumers without addressing productive capacities (Schnaiberg, 1980; Stuart et al., 2020). The degrowth policy literature is vague regarding what is meant by a resource cap or limit, often because the exact level is both scientifically and economically complex and requires both global and country-specific caps (Kallis & Martinez-Alier, 2010). Still, Kallis & Martinez-Alier (2010) underscore the importance of democratically deliberating these sorts of policies, given their complexity and susceptibility to authoritarian enforcement.[59] Polling in the United States shows support for dramatically reducing fossil fuel use (McCarthy, 2019) but less work has explored support for mechanisms to achieve this aim. We defined resource limits as restricting the extraction of fossil fuels in the United States, indirectly influencing resource availability for consumption.

Work Time Reductions (WTR): This policy is aimed not just at reducing energy use and carbon emissions (Fitzgerald et al., 2018; Knight et al., 2013; Platform London, 2021), but also at an improved quality of life outside the toil of work (e.g., Kallis et al., 2013). In addition to more leisure time, expanding time outside work would ideally mean more free time to pursue creative pursuits, community-oriented work, care duties, and environmental stewardship (Schor, 2015; Stuart et al., 2020). Notably, to prevent a rebound whereby expanded leisure time increases time in energy-intensive activities (Gunderson, 2018; Sekulova et al., 2013), WTR may need to be paired with other policies, such as regulations on advertising and limits to resource use (Fitzpatrick et al., 2022; Stuart et al., 2020). We included these additional policy instruments in our design accordingly. A four-day work week has been trialled by companies in Europe (Joly et al., 2024), the U.K. (Stewart, 2023), and

[59] There is also a trade-off between being too vague and too specific in characterising the levels of this attribute. Vagueness can be detrimental to a choice experiment by making it less realistic or consequential (Johnston et al., 2017), but including too much complexity or technical specificity about a resource cap (e.g., carbon budgets and entitlements) may also alienate participants.

more recently in the U.S. (Artry, 2022). However, when designing this study in 2021-2022, U.S. trials were scarce. Polling suggests that the majority of U.S. residents would support these policies and find them feasible given current workloads (Carbonaro, 2023). Importantly, WTR do not typically call for a reduction in pay despite fewer hours in work, to avoid exacerbating economic inequality. Progressive senators have just proposed a four-day work week bill in March 2024, emphasising that no pay would be lost (Sanders, 2024). We defined WTR as policies to reduce the number of days/hours in the working week without affecting income.

Regulations on Advertising: While this policy is perhaps less common in the degrowth policy agenda than the others included, it is an important complement to combatting the ideology of overconsumption (Stuart et al., 2020). Advertising has proliferated in recent decades, becoming a ubiquitous force in nearly all facets of everyday life (Higgs, 2014). Proposals to restrict advertising draw from a long tradition of critical thinkers, pre-dating degrowth, who condemn how capitalism and its industry producers manufacture desires for consumption (Debord, 1983; Marcuse, 1964). Individuals cannot be expected to reduce consumption, especially of status goods and energy-intensive leisure activities, if their leisure time is filled with abundant advertising messages that incentivise consumption (M. Carrington et al., 2021; Soper, 2020). However, the literature related to advertising limits is currently lacking concrete policy proposals and implementation plans. Typical proposals target ads about status goods (Stuart et al., 2020) or resource-intensive leisure consumption (e.g., long-haul flights) (Gunderson, 2018), those in public spaces (Videira et al., 2014), and those directed at children (Stuart et al., 2020). Support for restricting advertising of high emissions goods has been uncovered through citizen assemblies in the United Kingdom (Climate Assembly UK, 2020), as well as in Germany and Austria (Lage et al., 2023), but there is little evidence from the United States. We defined advertising regulations as policies that limit the ability for firms to advertise high-emissions products.

Universal Basic Services (i.e., Healthcare): With the downscaling of consumption and production, public provisioning of services will be required to ensure the basic necessities are met to maintain or increase quality of life (Lee et al., 2023; Vogel et al., 2021). These necessities include areas like housing, transportation, and in the U.S., access to healthcare. Whilst there were many possible sectors to include in our policy package, universal healthcare appeared the most pressing from a U.S. perspective, given its presence in U.S.

policy debates over the last decade (Democratic National Committee, n.d.), and the anomalous nature of the United States privatised healthcare system amongst Western nations. The U.S. Medicaid system currently offers government-sponsored health insurance based on an individual or household income-level relative to a certain percentage of the federal poverty line (FPL). Otherwise, health insurance is privatised, requiring individuals to access coverage through employment or purchase plans on the Health Insurance Marketplace at a higher rate (USAGov, 2023). As such, Medicaid offers a relatively straightforward[60] process for creating different levels of expansion, by increasing the eligibility threshold (i.e., income level) up to a point where all U.S. citizens are covered regardless of their income. Polls indicate support, especially amongst Democrats, and for a public insurance option to compete with private plans (KFF, 2020). Experimental work indicates increased support when framing policies as expansions of existing policies (Karra & Sandoe, 2020). We defined health insurance policy as expanding access to (free) public health insurance.

Based on the review of the degrowth policy literature, polling results, and the policy proposals we selected, we explored[61] the following hypothesis related to RQ3a:

H1 (exploratory): There will be support for degrowth policies compared to the status quo.

2.1.1.Degrowth Perceptions

While more empirical evidence is needed on perceptions from the general public and their support for specific degrowth policies, there is ample research on perceptions of the underlying growth-versus-environment debate, as summarised in the **Literature Review (Chapter 2)**. Deprioritizing economic growth is one means through which societal values and policy objectives would be transformed under degrowth. The concepts of agrowth and post-growth outlined in **Chapter 2** also share this core proposition, making research associated with these approaches relevant here.

Research on this debate suggests that people's perceptions vary depending on context and their background. Environmental protection specialists (Lehmann et al., 2022) and

[60] One point of complication is that different states have different policies for the income threshold to qualify for Medicaid – that is, to date 41 states (including DC) have expanded to 138% of the FPL under the Affordable Care Act, while the rest use lower thresholds (KFF, 2023). For simplicity and given that most states have expanded, we used the 138% figure as the baseline.

[61] See Transparent Changes Document in **Section 0** for more details on why this was not pre-registered.

climate mitigation policy researchers (King et al., 2023) tend to hold more growth critical values, in line with agrowth or degrowth. Members of European Parliament tended to cluster around support for degrowth, eco-socialism, or green growth, suggesting that green growth is no longer the consensus amongst these policymakers, but rather a centre-right belief (Kallis et al., 2023).

Whilst growth critical values appear prevalent amongst certain circles with expertise or influence, these beliefs are not necessarily reflected amongst the general public. Amongst the general public, green growth appeared preferable in Spain (Drews et al., 2019) and Canada (Tomaselli et al., 2019). However, a study amongst 34 European countries found that a majority preferred prioritising environmental protection over economic growth (Paulson & Büchs, 2022).

Given this mixed evidence, we sought to fill the research gap on perceptions in the United States by varying the framing of our policy packages. The degrowth information treatment condition reflected growth critical ideals in the growth-versus-environment debate, and connected environmentally damaging activity with negative social and psychological impacts, calling for a transformation to our economic system. The control condition framed ecological and social issues neutrally and avoided the growth-versus-environment debate or any mention of system change. We tested the following hypothesis:

H2: Exposure to the degrowth background information treatment will influence policy support for all degrowth policy attributes compared to the status quo.

We included this framing variation for two main reasons. First, the United States is a large and diverse country with enduring political division on the issue of climate change (Hoffman, 2011; McCright et al., 2014; Oatley, 2023). Introducing degrowth's principles and calling for system-level transformation was likely to elicit a strong reaction in either direction. Criticisms of degrowth from across the political spectrum (Huber, 2022; Piper, 2021; The Economist, 2023) justified testing this baseline framing effect.

Second, we wanted to probe the popularity of the policies themselves, separate from any degrowth connotations. These policies would likely garner support amongst adjacent movements who may disagree with particular aspects of degrowth's agenda. Whilst support will be necessary across the political spectrum, it is arguably more urgent to establish a unified left wing coalition (de Kadt, 2023; Löwy et al., 2022). However, there is a lively

debate between degrowth and other socialist political currents (Holgersen, 2023). For example, eco-socialism envisions collective ownership over the means of production, organised around environmental preservation and social needs, but may view growth and industrialisation more favourably (Löwy, 2005, 2020; Nineham & Huber, 2023). And while the Democratic Socialist movement in the United States has campaigned on universal healthcare (Sanders, n.d.), they also champion economic growth in promoting job security and economic prosperity (Driscoll, 2024; Phillips & Elvander, 2023). Despite their differences on growth, socialist currents represent important allies for degrowth, considering their shared critiques of capitalism and their synergistic capabilities (Chertkovskaya & Paulsson, 2021). Degrowth is even considered a type of eco-socialism among its proponents (Löwy et al., 2022; Saitō, 2024). Testing this framing allowed us to determine which policies could act as an olive branch to other leftist movements, to expand degrowth beyond its current confines and limitations (de Kadt, 2023; Işıkara & Narin, 2023).

Given the political nature of the degrowth account, we further pre-registered the following:

H3: The effect of the background information treatment on support for alternative policies will be moderated by political ideology.

2.2. Sufficiency Behaviours & Degrowth

Despite the available definitions of sufficiency, there is less clarity in how to operationalise it (Jungell-Michelsson & Heikkurinen, 2022). Though sufficiency is often used with respect to consumption, and degrowth more commonly encompasses production concerns, sufficiency has been connected to production and business activities as well (Bocken et al., 2020; Heikkurinen et al., 2019; Niessen & Bocken, 2021). It has further been conceptualised as both a goal in itself and a way to bring production and consumption within planetary boundaries (Jungell-Michelsson & Heikkurinen, 2022). For this research project, we consider sufficiency as an important value or principle, centred around producing and consuming "enough," within the broader degrowth agenda (Schmelzer et al., 2022). We further operationalised sufficiency through consumption practices.

To date, most empirical research related to sufficiency attitudes or behaviours has focused on demonstrating that sufficiency lifestyles can help mitigate the climate crisis within our current system. Sufficiency-oriented attitudes are associated with lower carbon

footprints compared to traditional measures of pro-environmental attitude (Kropfeld et al., 2018), as well as lower-carbon intensive lifestyles, though limited by structural constraints (Verfuerth et al., 2019). However, despite the importance of promoting sufficiency discourses for transforming society to mitigate climate change (Gurtner & Moser, 2024), less work has investigated how sufficiency behaviours might facilitate these transformations more broadly.

Some scholars have advocated for the adoption of lifestyle changes to enable a degrowth transition, i.e., through the behaviour-to-transformation pathway. If "taking personal action is a first step toward building societies that implement needed changes in policies and institutions" (Kallis et al., 2020, p. 51), then adopting sufficiency practices may encourage more communal, socially equitable, and sufficiency-oriented goals for society. These values may also enhance support for degrowth policies, which aim to break down structural barriers to the transition (Kallis et al., 2020). One mechanism linking behaviour to policy support might be through enhanced politicisation, in developing a greater interest in active political engagement (G. Kallis, personal communication, January 10, 2024). Once this heightened political motivation translates into policy adoption (a notable hurdle outside the scope of this thesis), societal transformation toward degrowth can occur, bringing about a new societal order and a rapid reduction in emissions (Kallis et al., 2020). We refer to this as the 'transformation pathway' in short.

We focus on the specific case of increasing policy support. Other forms of political engagement may result from this pathway, including activism, organising, or even running for a political office. However, other degrowth scholars have acknowledged the interplay between prefigurative lifestyle choices (Breines, 1989) and the policies that can enable wider adoption of social movements (Schmelzer et al., 2022).

Despite these theoretical links between lifestyle choices and degrowth policy support, extant literature stops short of connecting degrowth's policy proposals with any changes in consumption levels from an empirical perspective. This relationship has two directions, that is, whether consumption behaviour influences policy, or policy adoption influences consumption levels. The **Literature Review (Chapter 2)** presented modelling results related to the former relationship and outlined challenges in determining how policies might influence consumption behaviour before they are implemented. This paper focuses on the latter relationship, how sufficiency behaviours might influence policy support and societal

transformation, primarily because it was more empirically feasible to do so. This approach follows prior studies examining how pro-environmental behaviour may influence environmental policy support more generally. However, these studies provided mixed evidence, suggesting behaviour may be positively (Nilsson et al., 2017), negatively (Noblet & McCoy, 2018; Werfel, 2017), or weakly correlated (Sharpe et al., 2021) with policy support, warranting further investigation.

One prior study by Thorman et al. (2020) incorporated public attitudes toward policies in line with degrowth, without naming degrowth in the article, as well as behaviours for reducing consumption. However, they treated the two measures (of policy support and behaviour) as separate dependent variables instead of testing any linkages between them. They further tested psychological manipulations, including social norms interventions, finding that no significant impact on top of information provision about the mitigation potential of policies. Finally, they used future-oriented behavioural intentions, rather than past or present engagement in such behaviours. We build on their work by using more granular policy measures, testing the linkage between behaviour and policy support, and looking at past sufficiency engagement instead of future intentions.

Given the conceptual and nascent empirical evidence from the degrowth literature on the transformation pathway, we pre-registered the following hypothesis:

H4: Self-reported engagement in sufficiency behaviours will increase policy support for all degrowth policy attributes compared to the status quo.

2.3. Individual Predictors in Policy Support

Value-based characteristics have been found to predict support for environmental policies generally, as well as degrowth policies specifically. Left-wing political ideology is a consistent predictor of climate and environmental policy support (e.g., Drews & van den Bergh, 2016; McCright et al., 2013), especially in the United States (Bliuc et al., 2015; Hoffman, 2011; McCright & Dunlap, 2011). Khan et al. (2023) demonstrated that political ideology was one of the strongest predictors for degrowth-relevant policies that target both ecological and social issues, consistent with our findings in **Project 1 (SPM)**.

Other findings suggest political orientation may only indirectly influence policy support, through other values such as egalitarian worldviews, environmental and self-

transcendent values and climate knowledge (Dietz et al., 2007; Drews & van den Bergh, 2016; Harring & Jagers, 2013; Leiserowitz, 2006; Smith & Leiserowitz, 2014). Egalitarian worldviews encompassed dimensions of wealth redistribution, basic needs satisfaction, reducing poverty, and ending discrimination (Smith & Leiserowitz, 2014). Meanwhile, holding an individualistic worldview is associated with reduced support for climate policy (Smith & Leiserowitz, 2014). Trust in government has also been found to influence support for energy efficiency policies, especially more coercive policies (Faure et al., 2022).

Knowledge-based factors including climate knowledge and educational attainment have been shown to predict environmental (e.g., a meat tax) or social (e.g., wealth redistribution) policy support but were less relevant for eco-social policies in line with degrowth (Dallinger, 2010; Khan et al., 2023).

Other demographic characteristics have been found to predict environmental policy support. For example, personal beliefs about climate change can lead to greater support, but this relationship is weaker for those with lower incomes and educational attainment (Eom et al., 2018). The relationship is mediated by one's sense of control, whereby lower status individuals may feel less control over life outcomes, making policy support appear less consequential. Employment positively predicted degrowth policies including work time reductions in Sweden, whereas income was generally negatively associated with policy support, at least for redistributive policies (Khan et al., 2023). Gender has been shown to influence climate beliefs, pro-environmental attitude and behavior (Milfont & Sibley, 2016; Zelezny et al., 2000), but there is less evidence on differences for policy support (e.g., Dietz et al., 2007). Finally, climate policy support was found to be lower amongst older individuals (Hao et al., 2020; Ziegler, 2017), and a larger share of elderly people in aggregate populations was associated with less ambitious climate policy targets (Albalate et al., 2023).

Based on the various individual factors influencing policy support, and to address RQ3c, we tested the following hypothesis:

H5 (exploratory): The link between sufficiency behaviours and degrowth policy support will differ depending on individual characteristics and socio-demographics.

H6a: Political ideology will significantly predict support for alternatives to the status quo, such that being further to the left will increase support.

H6b: Political ideology will significantly predict support for alternatives to the status quo, such that being further to the right will reduce support.

H7: Universalism values (nature, concern) will significantly predict support for alternatives to the status quo.

Finally, see **Appendix A** for pre-registered hypotheses and results related to a) policy consequentiality and b) pay consequentiality. Policy consequentiality measured participants' evaluations of how likely it was that the U.S. government would enact policies to further reduce emissions and improve living standards, while pay consequentiality measured how realistic the payments vehicle (i.e., tax) was. We included these hypotheses to ensure validity of our experiment (Johnston et al., 2017).

2.4. Lifestyles Movements & Societal Transformation

Scholarship from the field of social movements (Haenfler et al., 2012), and its intersection with consumer studies (Bossy, 2014; Wahlen & Laamanen, 2015; Yates, 2015), can also be instructive on the role of individual behaviours and lifestyle movements in fostering social change. Lifestyle movements are defined by participants advocating "lifestyle change as a primary means to social change, politicising daily life while pursuing morally coherent 'authentic' identities" (Haenfler et al., 2012, p. 14). They link to prefigurative politics (Breines, 1989) and political consumerism (e.g., Stolle et al., 2005).

We consider sufficiency as related to the voluntary simplicity lifestyle movement (Haenfler et al., 2012), with more altruistic and ecological motivations (e.g., Jungell-Michelsson & Heikkurinen, 2022). Typical of lifestyle movements, the sufficiency behaviours as outlined in Sandberg (2021) are most often taken individually and in private (Haenfler et al., 2012; Wahlen & Laamanen, 2015). However, lifestyle movements can connect to and interact with broader social movements (Haenfler et al., 2012; Yates, 2015). That is, consumption decisions are political and can inspire the solidarity and cooperation needed for collective action (Wahlen & Laamanen, 2015). Further, social movement organisations may explicitly link personal action to social change (e.g., reducing one's carbon footprint), and lifestyle movements may connect people to similar or related causes outside of their initial interest (e.g., linking environmental with social justice causes) (Haenfler et al., 2012). As such, there appears potential for sufficiency practices and lifestyles to mobilise the kind of transformative agenda implied by degrowth. We contribute to this literature by focusing on the intra-individual component of influence, i.e., how one's behaviour may relate to their own support for degrowth policies, as opposed to collective influences.

3. Method

3.1. Sample

We chose to pursue a U.S. sample for several reasons. First, the concept of degrowth is considered more fringe there than it is in Europe (Czech, 2021), perhaps given the American culture of optimism or implications on the American Dream (Bliss, 2016, 2018; McIntyre, 2014). As such, it is understudied in degrowth literature. Second, it is important to study countries in the greatest need of a degrowth transition, including historically high emitters like the United States (European Commission Joint Research Centre, 2022). Third, the United States is considered a hegemonic world power, with economic, political, and cultural influence (e.g., Robinson, 2005). Though this hegemony may be in question (e.g., Bhutto, 2019), exposing counter-hegemonic sentiments within a dominant world power may have ripple effects to other regions and cultures.

Based on grant funding and the length of our survey, we aimed for a final sample of 1,000 participants. This sample size is compatible with a priori power analyses using G*Power (Faul et al., 2007, 2009), specifying a small effect size (d=0.2) and a power level of 0.8 for a t-test, difference between two independent means, which suggested a minimum total sample of N = 620, or 310 in each treatment group.[62] We recruited a sample of 1,406 Americans through a survey research company, which only offered a representative sample based on age, gender and geographic region. During pilot testing we experienced a high rate of failure to our comprehension checks (17.6%), so we oversampled to ensure a large enough final sample.

Our final sample consisted of N = 1,012 participants, recruited in September and October of 2022. N = 123 did not take the survey seriously, N = 270 failed both comprehension checks, and one participant did not respond to any choice cards. Though we initially used quotas to improve representativeness, we had to abandon them given issues raised by the survey research company. See **Section 0** for this and other transparent changes to the pre-registration.

[62] Specifically, we selected Test family = “t tests”, Statistical test = “Means: Difference between two independent means (two groups)”, Tail(s) = One, effect size d = 0.2, alpha = .05, Power = 0.8, Allocation ratio N2/N2 = 1.

3.2. Discrete Choice Experiment (DCE)

A discrete choice experiment (DCE) is a quantitative technique for eliciting preferences in the absence of revealed preference data (Johnston et al., 2017). The method involves asking individuals to state their preference over hypothetical alternative scenarios, goods, or services. We used policy proposals as the scenarios, as done for example in Ščasný et al. (2017). The DCE design allows researchers to determine which policies are significantly preferred compared to the status quo (i.e., the existing policy scenario) and which specific level of policy change is most preferable. To inform our experimental design, determine that our policies were appropriate, and to finalise attributes and their specific levels (described in **Section 3.3**), we first conducted focus groups amongst a convenience sample from the United States. See **Appendix B** for details. Qualitative pretesting is considered necessary in DCEs to ensure content credibility and comprehensibility (Coast et al., 2012; Johnston et al., 2017).

In the DCE, participants were provided with a set of choices (i.e., choice sets) comprised of degrowth policies (plus a cost and a benefit), otherwise known as attributes. The attributes were fixed, as all six attributes were included in each choice set. Each participant was shown eight randomly selected choice sets out of a possible 40. It is therefore a within-subjects design, as repeated measures were collected per participant for each choice set they received. Participants were asked to choose one of three alternative policy proposals (Option A, Option B, or Status Quo) in each of the eight rounds. The levels for each attribute in the status quo column remained fixed, whilst those in Options A and B varied randomly with each iteration.

Determining the number of choice sets per participant (i.e., 8) involves assessing the trade-off between maximising the data points available to increase power whilst minimising participant burden from repeated choice tasks (Bech et al., 2011). The other consideration is cost, as more choice sets per participant translates to longer and more costly surveys. Eight choice sets struck the right balance of factors within our budget.

The number of total choice sets included (i.e., 40) depends on the design of the experiment. A full factorial design would consist of all possible variations (Mangham et al., 2009). In our case, multiplying the number of levels in each attribute (i.e., 2*2*2*3*3*3 - see

Section 3.3) would have created 216 possible choice sets. Including all such variations is typically considered too costly and impractical (Kuhfeld, 2010).

The total number of choice sets, as well as the specific combination of levels for each attribute in Options A and B, were selected through a multi-step process following Contu et al. (2016). This process, using the NGENE software (ChoiceMetrics, 2014), made the design more efficient by limiting the number of possible combinations. In the initial phase of data collection, combinations were extracted from a fractional orthogonal design. Orthogonality specifies that parameter estimates are uncorrelated and attributes are independent (Kuhfeld, 2010; Mangham et al., 2009). This produced an initial sample of 32 total choice sets, which were used in our first pilot of 100 participants recruited through Prolific Academic. Using this pilot data, we estimated Multinomial Logit Models (MNL) and a Random Parameters Logit (RPL) (see **Appendix C** for model details) to obtain priors to be included within a Bayesian Efficient design. Based on these priors, we updated the combination of choice sets to provide to the main sample, allowing us to remove certain unrealistic choices.

We then recruited our sample via the market research firm. Given the complexity of the DCE design, piloting several times is recommended to ensure the experiment runs smoothly and is well understood by participants (Bateman et al., 2002). However, budgeting constraints meant that we could not run an additional pilot. We also lacked control over data collection using the outside company, so we could not ensure that Qualtrics integration with their platform would be seamless before beginning data collection. Instead, we collected data from 100 participants on their platform and ran simple diagnostics to check for anomalies related to data quality. No updates or changes to the design were made, nor were any changes made to the hypotheses, analysis plans, or any other plans for the research pertaining to the pre-registration. Our design was pre-registered after these first 100 responses were collected, specifying that some data had been collected already. While pre-registrations are typically done before any data are collected, we felt it necessary to confirm the study was running properly on the new platform with a smaller sample. Given our budgetary constraints, this meant balancing potential credibility threats with data quality. However we tried to ensure this process was done as carefully as possible.

After collecting an additional 130 responses (N = 230 total) that passed our comprehension checks, we again ran the process of obtaining priors and improving the design efficiency, using around 23% of the final sample. We updated the choice sets available

one last time before recruiting the remaining participants[63], consistent with Contu et al. (2016). Our pre-registration specified that we would take this final step of analysing and updating the design after collecting data from 20-30% of the sample. All responses, except those from the Prolific pilot, were pooled for analysis, though our data build accounted for the two variations of choice sets.

3.3. Policy Attributes

We included six attributes in our experiment, consisting of four policies along with a cost and benefit, each with two to three levels. Discrete choice experiments often include attributes related to costs and benefits in order to create trade-offs (Faure et al., 2022). Having a monetary attribute also allows for the calculation of willingness to pay, which is typically done to place a monetary value on non-market goods, such as externalities (e.g., Mariel et al., 2021). I have chosen to exclude willingness to pay estimates from the main text, discussed further in **Section 5.2** on limitations.

For the cost attribute, we included a percentage increase in income taxes creating financial trade-offs between alternative policy options. Importantly, as degrowth is concerned with reducing inequality, the tax could not be regressive. Accordingly, the tax increases were higher for the top 1% of earners (i.e., households earning over $600K[64]), who faced tax increases that were three times more than the 99%.

For the benefit, we included an emissions reduction target as a percentage decrease from the 2005 level of emissions by 2030. This attribute was designed based on the Inflation Reduction Act, which promises a 40% reduction in emissions by 2030, based on the levels of emissions in 2005 (The White House, 2023). The Inflation Reduction Act had passed in the U.S. Congress shortly before our survey launched, as a landmark climate bill. Prior to this bill passing, the status quo emissions reductions target would have been around 12.5% (Glynn et al., 2022). While this bill was indeed the most ambitious American mitigation strategy to date, it still fell short of meeting the Paris Agreement targets by at least 20%.

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[63] The differences between the two sets of choice cards were minor. In the final set of 40, the choice sets represent more meaningful trade-offs based on prior information about which levels were more commonly selected.

[64] We rounded up to $600K from the value of $597,815, which is the annual income needed to be considered the top 1% of earners across the United States (Miranda, n.d.). This is based on 2018 IRS data, using 2021-adjusted dollars.

The IRA made for a concrete and timely status quo scenario for our DCE more broadly, so we included it in the experiment's background information. The baseline in a DCE should be clearly explained to participants to convey how alternative scenarios depart from it (Johnston et al., 2017). Where the IRA did not specify a specific baseline (e.g., healthcare), additional policy research was conducted to confirm the status quo.

For the policy attributes, there were other policies commonly cited in the degrowth literature to consider, in particular universal basic income or wealth taxes (Fitzpatrick et al., 2022). However, the nature of a DCE limits the type of policies that may be included. Other than the monetary cost attribute, attributes that directly affect a person's income level may unduly influence their preferences for the policies (e.g., Bateman et al., 2002). As such, we chose only those policies which would not directly impact a participant's finances. The monetary attribute must also be relevant to all participants in order for it to be consequential (Johnston et al., 2017), so incorporating a wealth tax as the payment vehicle would not have impacted most of our sample.

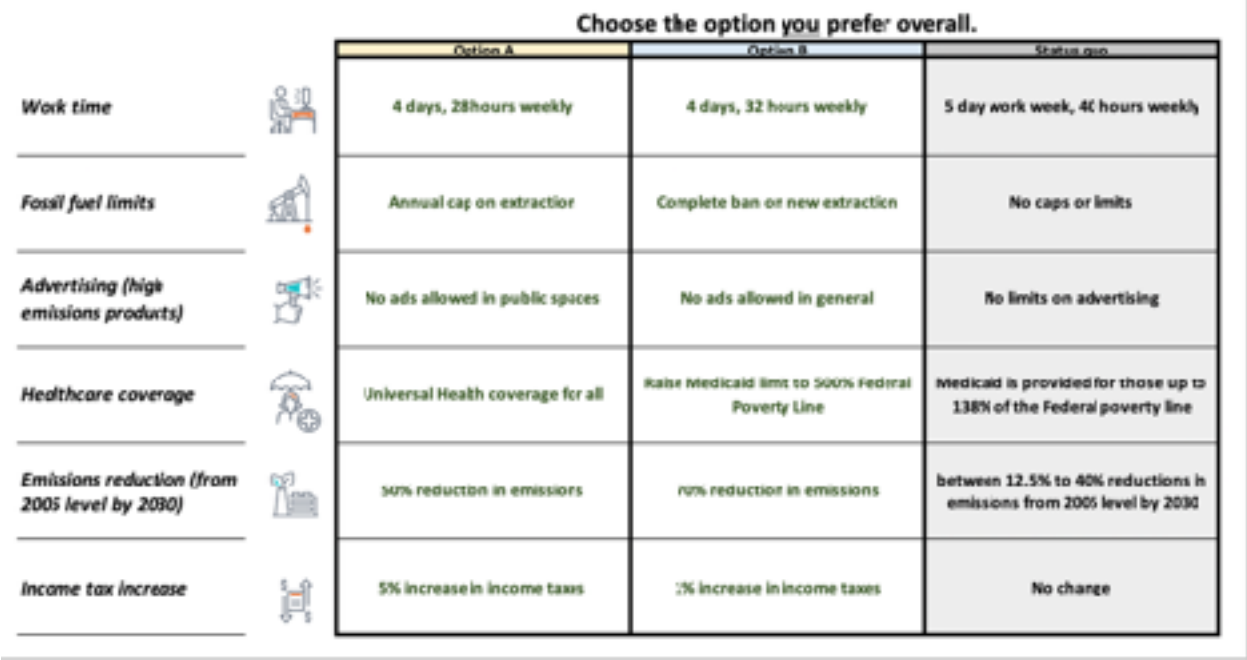
Table 92 provides a breakdown of the attributes and levels, and **Figure 44** displays a sample choice card. Work time reductions ranged from i) 5-day, 35-hour work week, to ii) 4-day, 32-hour work week), to iii) 4-day, 28-hour work week. They were informed that salaries would stay the same to mitigate fears over losing income (e.g., Khan et al., 2023). Fossil fuel limits, characterised as government limits on the extraction and production of fossil fuels (e.g., natural gas, oil, and coal) by energy firms, ranged from i) caps on annual fossil fuel extraction and production, to ii) a ban on new fossil fuel extraction and production. Advertising limits were defined as restrictions on advertising of high emissions products (e.g., animal products, long-haul flights, private jets) ranging from i) removing these ads from public spaces (e.g., transit, billboards) to ii) prohibiting these ads altogether. Healthcare coverage ranged from i) expanded Medicaid for 500% of the Federal Poverty line (i.e., income of $68K for individuals, $140K for family of 4), to ii) universal health insurance for all. Private insurance options would still be available. Proposals also varied by the amount of emissions reduction (50%, 60%, 70%) and income tax increase (1%, 3%, 5% for incomes under $600K) to fund the policies. For each attribute, the baseline level in the model is the least ambitious proposal, which is listed first.

Table 92 - Choice Set Attributes and Their Specific Levels

Attributes	Attribute Levels	Number of Levels
Work time	Policies reduce the number of days/hours in the working week to: i) 5 days/35 hours ii) 4 days/32 hours iii) 4 days/28 hours **Status Quo:** The current work week is 5 days/40 hours.	3
Fossil fuel limits	Policies restrict extraction of fossil fuels (e.g., oil, gas, and coal) in the U.S. via: i) an annual cap on extraction and production volumes ii) ii) a full ban on new extraction **Status Quo:** There are currently no restrictions or caps in place.	2
Advertising limits	Policies limit the ability for firms to advertise for high-emissions products (e.g., animal products, long-haul flights, private jets): i) in public spaces ii) in general **Status Quo:** There are currently no restrictions in place.	2
Healthcare coverage	Policies expand access to (free) public health insurance to include: i) coverage for those at 500% of the Federal Poverty Line ii) coverage for all residents of the U.S., regardless of income. **Status Quo:** Medicaid currently covers those at 138% of the FPL.	2
Emissions reduction	By 2030, policies aim to reduce annual emissions from 2005 levels by: i) 50% ii) 60% iii) 70% **Status Quo:** The Inflation Reduction Act forecasts a 40% reduction.	3
Income tax increase	The two alternative policy choices will require additional annual costs compared to the current policy. For those making less than $600K, policies will require an increase in the amount of income tax paid by: i) 1% ii) 3% iii) 5% **Status Quo:** No change.	3

Note: Each choice set (Option A or B) on a given choice card consists of only one level for each attribute, and every attribute is included on every choice card.

Figure 44 - Sample Choice Card from Discrete Choice Experiment



Note: This is one example out of the possible 40 iterations. The levels in Option A and Option B changed in each round of choices. The levels in the Status quo column stayed the same across all choice cards. Participants had to choose one column in its entirety.

3.4. Other Materials & Measures

The main outcome variable of interest is the choice of a policy proposal, coded as 1 for the one they selected (Option A, Option B, or Status Quo) or 0 for the two they did not select. The experimental treatment variable associated with H2 was the framing condition associated with the background information, with treatment (i.e., degrowth) and control (i.e., neutral) versions. See **Table 93** for the stimuli of each condition, and **Figure 45** for a chart included along with the stimuli for both groups. The main differences between the two versions include the level of detail in the text and the inclusion of a section on societal transformation (for the degrowth treatment only). This manipulation safeguarded against protest behaviours, whereby respondents may not give truthful responses if they reject some element of the DCE scenario (Meyerhoff et al., 2014). We considered protests responses likely, especially following the degrowth framing, given the centrality of economic growth in U.S. politics and culture (Collins, 2002).

Table 93 - Background Information Text for Each Treatment

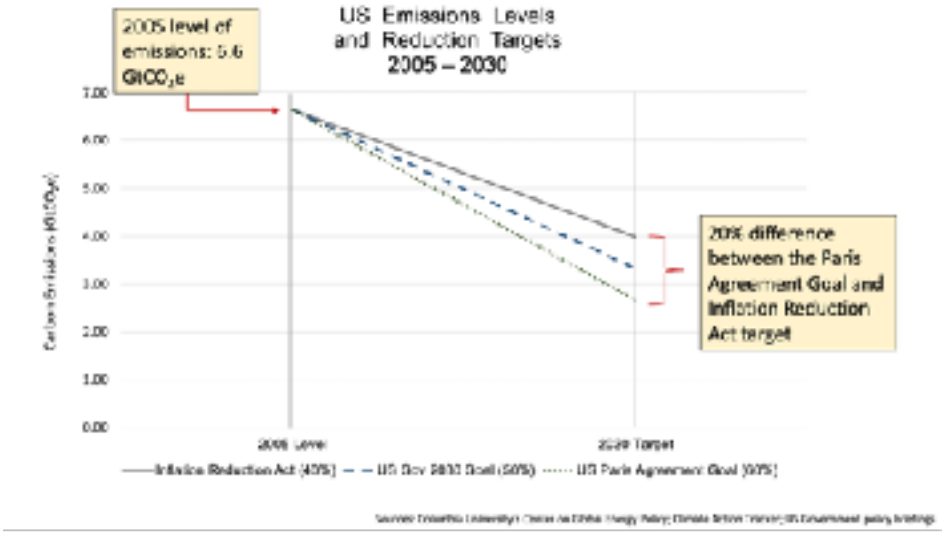
Section Topic	Treatment	Control
Climate Change Background	Temperatures have increased by 1.1 degrees Celsius since pre-Industrial times. Recent extreme weather patterns, including heat waves, droughts, and floods, indicate that some catastrophic warming due to climate change is already happening.	Temperatures have increased by 1.1 degrees Celsius since pre-Industrial times.
	In response, the United States government has recently set a goal of reducing carbon emissions by 50% from 2005 levels by the year 2030. A newly passed bill, the Inflation Reduction Act, plans to reduce emissions by up to 40% by 2030.	To prevent further warming and climate change, the United States government has recently set a goal of reducing carbon emissions by 50% from 2005 levels by the year 2030. A newly passed bill, the Inflation Reduction Act, plans to reduce emissions by up to 40% by 2030.
	While this is a landmark bill, neither it nor the ultimate target of 50% reduction in emissions by 2030 will be enough to prevent climate catastrophe.	N/A
	The international Paris Agreement sought to keep warming at or below a 1.5 degrees Celsius limit to avoid climate breakdown. The US would need to cut emissions by at least 60% by 2030, and eventually reach net zero emissions by 2050, to stay in line with the 1.5 degrees Celsius target. Above this level of warming, we will see even more devastating climate effects around the world.	The international Paris Agreement sought to keep warming at or below a 1.5 degrees Celsius limit to avoid climate breakdown. The US would need to cut emissions by at least 60% by 2030, and eventually reach net zero emissions by 2050, to stay in line with the 1.5 degrees Celsius target.
	Climate scientists have urged the necessity of cutting emissions quickly and as much as possible. Yet, there is still a 20% gap in potential emissions reduction between the Inflation Reduction Act (40%) and the Paris Agreement level (60%), as shown in the chart below.	Hence, there is still a 20% gap in potential emissions reduction between the Inflation Reduction Act (40%) and the Paris Agreement level (60%), as shown in the chart below.

Section Topic	Treatment	Control
Societal Transformation	To achieve this objective, the Intergovernmental Panel on Climate Change (IPCC) have called for system-level transformations to the way we produce and consume goods and services, i.e., the economy, in affluent societies like the United States.	N/A
	This is because our current economic system is unsustainable – we cannot keep growing our economy forever, as we exhaust the limited resources of our only planet. To transform our system, our country will need to reduce the volume of production and consumption of the most polluting and environmentally harmful industries and goods, especially industries that use fossil fuels.	

Section Topic	Treatment	Control
Link Between Social and Ecological Crises	Excessive consumption is not just an individual choice, but the result of societal pressures to buy the latest products and display a certain level of status. This sort of excessive consumption is not only bad for the planet, but it also intensifies inequality and results in negative psychological and social impacts – such as anxiety, low self-esteem, feelings of inadequacy, and increased competition and hostility. At the same time, inequality in America is at an all-time high, with millions of people struggling to satisfy their basic needs in one of the world's richest economies. Meanwhile, those who are financially secure tend to consume much more than is necessary and significantly more than their global share.	At the same time, America is experiencing a variety of other issues that may reduce people's quality of life, including inflation and rising cost of living, inequality, and social and political unrest.
	As such, inequality, excessive consumption, and ecological collapse are all inherently related. In America, the connection between these major issues presents a social and ecological crisis, which has not been solved through individual behavior change or business-led environmental initiatives alone. Research also suggests this crisis cannot be solved by simply focusing on the climate, but rather requires a reorientation of society, enabled through policy change. These policies would shift America's priorities away from excessive consumption and resource depletion, while providing more social support to ensure that these changes do not reduce quality of life.	Research suggests that policy issues of this sort are not separate from climate change, but are all linked with climate change as part of a social and ecological crisis.

Note: The experimental treatment was broken into three sections of text, as denoted by "Section Topic," which were displayed on separate pages. The control group did not receive any text related to societal transformation.

Figure 45 - Comparison of Emissions Reduction Targets (from Experimental Stimuli)



Note: This figure was shown to both treatment and control groups in the 'Climate Change Background' section included in **Table 93**. It outlines the difference in emissions reduction targets between the Inflation Reduction Act and the Paris Agreement goal of staying under 1.5 degrees Celsius.

We also asked participants to rate the frequency of their engagement on a variety of sufficiency-oriented behaviours, to test H3. This battery of 12 items was adapted from Shreedhar and Freitag (2024) who studied behaviours relevant to preventing extinction. We could not locate any existing measures associated specifically with sufficiency behaviours, only sufficiency attitudes (e.g., Verfuerth et al., 2019). We streamlined their list of behaviours, using the four sufficiency typologies outlined in Sandberg (2021) to determine inclusion. This categorisation was done independently by two researchers, one internal to the project (myself) and one external (an MSc student). The two researchers discussed and resolved discrepancies to create the final set of behaviours. It was also important that these behaviours included a variety of domains, including nutrition, mobility, housing, and employment, to be generalisable for a lifestyle of sufficiency. Participants were asked to rate how often they had engaged in each behaviour over the past year, ranging from 1 (Never) to 7 (Always). **Table 94** displays the mean and standard deviation of each item in our sample. After averaging scores across items ($\alpha = 0.88$), we created a binary measure of overall engagement (greater than or equal to 4)[65] and non-engagement (less than 4)[66] from

[65] This included "Sometimes," "Often," "Very often," and "Always".

[66] This included "Never," "Very rarely" and "Rarely"

this composite. We chose a binary measure of sufficiency to simplify our comparison and because we felt it was more meaningful to interpret than a one unit increase in sufficiency engagement, using a continuous measure. However, we have included versions of relevant analyses with the continuous variable for comparison.

Table 94 - Sufficiency Behaviour Scale Items, Mean and Standard Deviations

Item	Mean Frequency	Standard Deviation
Reduced water use (e.g. shorter showers)	4.25	1.79
Chose meals with less meat and animal proteins	3.55	1.84
Avoided flights	4.43	2.21
Bought fewer things (e.g. shop less, reuse clothes, avoid plastic)	4.24	1.72
Considered having no or fewer children	3.58	2.46
Bought fewer animal products (e.g. less leather, more plant-based items)	3.64	1.93
Ate a plant-based diet	3.04	2.03
Used active travel (e.g. walking and cycling)	3.78	1.93
Worked and studied from home	3.61	2.20
Shared resources with others (e.g. micro-grids, car-sharing)	3.00	1.94
Wasted less food (e.g. reusing leftovers, composting)	4.86	1.76
Used renewable energy in your home	3.23	2.01
Composite (average)	**3.77**	**1.32**

Note: Items adapted from Shreedhar and Freitag (2024), using sufficiency typologies from Sandberg (2021) to determine inclusion. Participants were asked to rate how often they have engaged in each behaviour over the past year, ranging from 1 (Never) to 7 (Always). Scores were averaged across items. The continuous measure consists of this average, whilst the binary measure was further split into engagement (average $\geq$ 4) or non-engagement (average < 4).

We included several other variables related to participants' characteristics that might be relevant to their policy support or sufficiency engagement. However, the multinomial logit form used to analyse choice data, further described in **Section 3.7** and **Appendix C**, does not allow for inclusion of multiple covariates in the way OLS or logit analyses in prior chapters would. Instead, the multinomial logit specification meant that we could only include these variables as interaction terms with each attribute, which would substantially expand complexity and the number of parameters without testing for specific hypotheses. As such, the following variables were included mostly for understanding the sample composition

through descriptive analysis, for testing specific hypotheses related to individual differences (i.e., H3, H5-H7), and for the latent class analyses.

Trust in government was adapted from Faure et al. (2022), Kettle & Dow (2016), and Kim et al. (2013). As this measure was used in a previous DCE related to energy efficiency policies (Faure et al., 2022), it seemed the most relevant for our purposes. Political ideology, based on left or right orientation as opposed to political party, was adapted from Whitmarsh & Corner (2017). We wanted to avoid discussing "Republicans" and "Democrats" to reduce political partisanship. We also wanted to maintain consistency with **Project 1 (SPM)** to determine the role of political ideology in policy evaluations across contexts and geographies. Voluntary simplicity beliefs were measured via the material simplicity sub-scale from Rich et al. (2020), as this dimension appeared most relevant for sufficiency and environmental protection motivations. Universalism-concern and universalism-nature, which measure people's values related to protecting the most vulnerable and protecting nature, respectively, were adapted from Schwartz et al. (2012). As previous research dictates that egalitarian worldviews and self-transcendence values positively predict climate policy support (e.g., Drews & van den Bergh, 2016; Smith & Leiserowitz, 2014), we wanted to test similar concepts using an alternative measure. We also wanted to test both social and ecological values given the eco-social focus of our policy proposal. See **Appendix D** for items and Cronbach's alpha values of all measures.

As socio-demographic characteristics, we also asked age, educational attainment, income, race, and ethnicity, including a separate question on Hispanic or Latin American heritage (US Census Bureau, n.d.), employment status, gender, and state of residence.

We further asked a set of debrief questions to assess the quality of the choice experiment and to further contextualise the sample (Bateman et al., 2002; Johnston et al., 2017). In addition to policy and payment consequentiality mentioned in **Section 2.3** (see **Appendix A**), we asked respondents the importance of each policy attribute, and their agreement with a degrowth policy agenda - both ecological and social dimensions, without the word 'degrowth'. We further asked their familiarity with social and ecological issues, their familiarity with the Inflation Reduction Act (i.e., the status quo), and how they would rate their own climate knowledge. Finally, we asked about their climate beliefs (i.e., scepticism), adapted from Kruse & Atkinson (2022) and Zaval et al. (2014), as well as their beliefs about the reasons people were in poverty, adapted from Kruse & Atkinson (2022). See

Table 95 for summary statistics related to climate knowledge, climate beliefs, ecological policy agreement, social policy agreement, and poverty beliefs, which were further included in our individual probability analysis in **Section 4.4.3** to understand the characteristics of each group. See **Appendix E** for debrief question wording and the distribution of responses.

We measured two comprehension checks related to the background information to ensure response quality (Kruse & Atkinson, 2022). These questions related to i) the emissions reduction goal for the US Government (i.e., 50%) and ii) the ideal warming limit set out by the Paris Agreement (i.e., 1.5° Celsius).[67] These also acted to ensure participants were paying attention during the experimental stimuli, which was especially long for the treatment group. Only participants who failed both comprehension checks were excluded from analysis. We included a third comprehension question about how much more tax the over $600K income group would pay (i.e., 3x). This fact was an important component to ensure the DCE design fit with degrowth principles of redistribution and reducing inequality. We did not exclude any participants who failed this comprehension check, as it was much more commonly failed than the other checks in our pilot testing.[68] We also asked the same seriousness check from prior chapters from Musch & Klauer (1999), excluding those who did not take the survey seriously.

3.5. Procedure

Before participants consented to take part in the study, they answered a set of demographic questions to determine their eligibility. These questions on age, gender, political ideology, and race were tied to quotas set on Qualtrics.

Once they passed through the quota, participants were asked to provide consent. They were given an informed consent document outlining the purpose of the study, their rights, and contact details if they had any questions or concerns. Of those who consented, half were shown the sufficiency questions first, while the other half were given the discrete choice experiment first. This variation was done to check for any ordering effects. The discrete choice section of the survey comprised the background information on the social and ecological crises, the hypothetical policy scenario, and the policy attributes included in

[67] Technically, the Paris Agreement established warming under 2° C, but encouraged efforts toward the 1.5°C limit.

[68] Only 24% of the Prolific pilot (N = 25) answered this correctly, whilst 91% answered each of the other checks correctly.

their choice sets. Respondents randomly received either the treatment or control background information, but all other components of the DCE were the same across groups. After seeing an example choice card, participants then proceeded to eight rounds of choice sets, each time choosing one alternative proposal (Option A, Option B) or the Status quo proposal. The next step was the DCE debrief questions. Those who did not get the sufficiency questions at the start of the survey answered these questions after the debrief questions. Lastly, everyone answered the other personal characteristics and socio-demographic questions. Before exiting the survey, participants received a study debrief, which explained the experimental treatment component of the study (see **Appendix F**).

Before launching the survey or conducting any piloting, the study received the requisite ethical approval. The median[69] duration of the survey was around 17.5 minutes.

3.6. Survey Order

As mentioned above, we randomly varied the order of the survey to check for any ordering effects, i.e., whether answering the sufficiency questions first influenced the respondents' selection of policy packages, or vice versa. Ordering effects of auxiliary questions and choice sets themselves have been noted in the stated preference literature (Bateman & Langford, 1997; Carlsson et al., 2012; Johnston et al., 2017). While we did not find that survey order influenced their choices in the DCE (see **Appendix G**), a t-test on sufficiency scores by order group suggests that receiving the DCE first significantly increased sufficiency engagement, $t(1010) = -3.32$, $p = 0.001$. However, the magnitude was small (Cohen's $d = -0.21$). To further assess the impact of this ordering effect, we reran our main latent class model specification (**Table 100**) excluding participants who received the DCE first. See **Appendix G** for these results, which suggests that although sufficiency remained somewhat significant, the direction of the effect changes. However, because the sample size ($N = 497$) is less than half the size of our full sample, and on the low end for a typical LCM (e.g., Sinha et al., 2021), it is difficult to isolate the effect of survey order.

[69] The mean duration was substantially higher, at around 54 minutes, due to outliers. We did not exclude these outliers, as the amount of information provided may have taken some participants substantially longer.

3.7. DCE Theory & Models

The choice experiment method comes from McFadden's Random Utility Theory (1974) and Lancaster's theory of value (1966). As a stated preference methodology, the choice experiment assumes that amongst a set of choices, an individual will select the option that brings them the greatest utility (Bateman et al., 2002). The utility function is typically split into two components, one deterministic, i.e., observable (V) and one stochastic, i.e., random (ε). Two common approaches for modelling this utility are the multinomial logit (MNL) and random parameters logit (RPL). The MNL assumes preference homogeneity across respondents (Strazzera et al., 2012), whilst the RPL allows for preference heterogeneity (Hensher & Greene, 2003; Revelt & Train, 1998). The RPL assumes a continuous distribution of preferences comprised of a mean value β_k (i.e., the coefficient) and idiosyncratic random deviation η_{ik} (i.e., the standard deviation).

A third approach, which also allows for preference heterogeneity, is the latent class model (Boxall & Adamowicz, 2002; Hagenaars & Mccutcheon, 2003). Instead of a continuous distribution, utility is estimated for distinct and countable classes or groups, whereby the utility parameter is the same within each class or segment but differs across segments. The latent class model is probabilistic, such that the model does not assign an individual to a particular class but produces a conditional probability on the likelihood that a respondent would fit into each class in the model (Sinha et al., 2021). LCMs require the researcher to make an informed decision on the number of classes to be chosen, most commonly using the Bayesian Information Criterion (BIC) and the Akaike Information Criterion (AIC). As such, it is typical to run several models with a different number of classes and compare statistical and substantive criteria to determine the best fit model.

See **Appendix C** for more detailed methodological specifications for each model, including all utility and probability functions. To run each model presented in this paper, we used R's Apollo package (Hess & Palma, 2019). For all subsequent analyses, except where otherwise specified as exploratory, the significance criterion is a = 0.05.

4. Results

4.1. Descriptive Results

See **Table 95** for descriptive statistics of the sample. As there were no significant differences across our two treatment groups in terms of demographics and characteristics

(see **Appendix H** for balance checks), we have pooled the sample for all analyses except those related to the framing effect.

Our final sample comprised N = 1,012 participants from the U.S., which were recruited to be representative on the basis of age, gender, and region. We oversampled participants who were older (median = 47, U.S. median = 39), had a university degree (52.4%, U.S. = 34.3%)[70] and identified as White (86.3%, U.S. = 75.5%). We under sampled other racial and ethnic categories (8.1% Black respondents, U.S. average = 13.6%; 2.2% Asian respondents, U.S. = 6.3%; 8.5% Hispanic, U.S. average = 19.1%). Indigenous populations, as well as 'not otherwise listed,' were broadly representative. Our sample was also representative by income and gender. While all 50 states and Washington D.C. were technically represented, the majority of respondents did not indicate their home state,[71] making it difficult to assess regional representativeness. See **Appendix C** for all comparisons with the U.S. population.[72]

In terms of policy preferences, 13.4% of our sample always selected the Status Quo option, whilst 54% never chose this option (see **Figure 46**), providing some preliminary evidence of support for alternative policies. For our sufficiency engagement measure, nearly 45% of the sample had engaged in the last year, while 55% had not.

[70] U.S. data is available for 25 years and older, whereas our sample consists of 18–24-year-olds as well, so the numbers are not exactly comparable. However, this would bias our sample toward being even more educated.

[71] Only 28% of respondents indicated which state they were located, resulting in mostly missing values.

[72] All U.S. population figures are taken from the US Census Bureau Population Estimates from July 1, 2022. See **Appendix C** for more details.

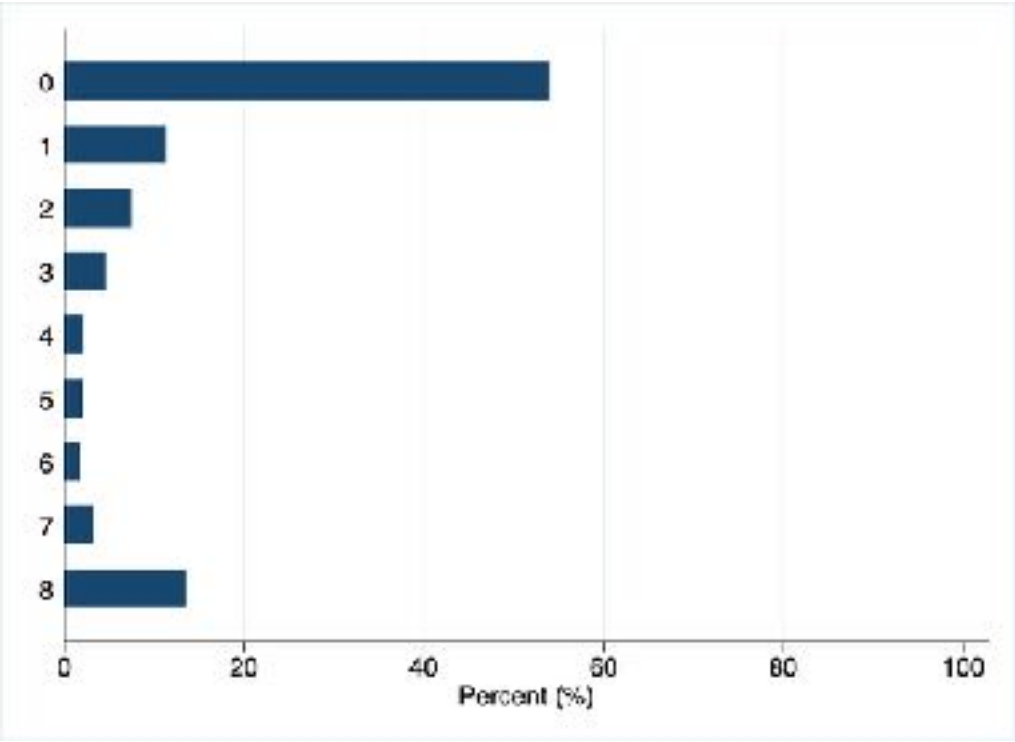
Table 95 - Sample Characteristics and Summary Statistics

	N = 1,012					
Baseline Characteristic	**n**	**%**	**Mean**	**SD**	**Min**	**Max**
Gender						
Female	516	51.0%	-	-	-	-
Male	494	48.8%	-	-	-	-
Prefer not say	2	0.2%	-	-	-	-
Education						
Some HS	23	2.3%	-	-	-	-
High school diploma	245	24.2%	-	-	-	-
Some undergraduate	214	21.1%	-	-	-	-
Bachelor's degree	343	33.9%	-	-	-	-
Graduate degree	187	18.5%	-	-	-	-
Income ($)						
Less than $20,000	125	12.4%	-	-	-	-
$20,000 - $34,999	128	12.6%	-	-	-	-
$35,000 - $49,999	111	11.0%	-	-	-	-
$50,000 - $74,999	163	16.1%	-	-	-	-
$75,000 - $99,999	188	18.6%	-	-	-	-
$100,000 - $199,000	230	22.7%	-	-	-	-
$200,000 - $399,000	27	2.7%	-	-	-	-
$400,000 - $599,000	1	0.1%	-	-	-	-
Over $600,000	3	0.3%	-	-	-	-
Prefer not say	36	3.6%	-	-	-	-
Race & Ethnicity						
Asian	22	2.2%	-	-	-	-
Black	82	8.1%	-	-	-	-
White	873	86.3%	-	-	-	-
Other	35	3.5%	-	-	-	-
Hispanic	86	8.5%	-	-	-	-
Not Hispanic	927	91.6%	-	-	-	-
Age	-	-	50.53	18.32	18	89
Political Ideology	-	-	5.43	2.72	0	10

Trust in Government	-	-	3.53	1.31	1	6.75
Voluntary Simplicity Engagement	-	-	5.07	1.19	1	7
Universalism Concern	-	-	5.56	1.14	1	7
Universalism Nature	-	-	5.44	1.19	1	7
Climate Knowledge	-	-	3.30	1.14	1	5
Climate Beliefs	-	-	4.88	1.27	1	7
Ecological Policy Agreement	-	-	4.86	1.52	1	7
Social Policy Agreement	-	-	4.88	1.60	1	7
Sufficiency Engagement						
Engaged (≥4)	558	55.1%	-	-	-	-
Did not engage (<4)	454	44.9%	-	-	-	-
Poverty Beliefs						
People not doing enough	434	42.9%	-	-	-	-
Circumstances beyond their control	444	43.9%	-	-	-	-
Don't know / non-response	134	13.2%				

Note: For continuous variables, mean and standard deviation (SD) are provided. For categorical variables, count (n) and percent (%) of each category are provided. For income, the minimum value of 0 is associated with "Prefer not say." Gender was defined as how a person identified, with a non-binary option. "Other" for race and ethnicity represents North American Indigenous (N=9), Native Hawaiian / Pacific Islander (N=1), and Not Otherwise Listed (N=25). Not all categories in the Race & Ethnicity section sum to 100%, as race and Hispanic ethnicity were separate questions.

Figure 46 - Frequency of Selecting Status Quo Policies



Note: This chart shows how often (in percent) respondents selected the Status Quo policy option amongst their eight choice sets. 0 = never selected the Status Quo option, while 8 = always selected this option.

4.2. Baseline Support for Degrowth Policies

Column (2) in **Table 96** displays the results of a random parameters logit model to test H1 on general policy support. These results indicate highly statistically significant (at the 1% level) support for three out of the four degrowth policies - work time reductions, resource limits, and healthcare coverage - compared to the status quo. For WTR, the positive coefficient means that shorter work weeks were preferred over the baseline of 35-hour weeks. The negative coefficient for resource limits indicates that participants preferred the baseline cap to a full ban. Participants also preferred universal access to healthcare over the baseline of expanding Medicaid. There was no significant support for any limits to advertising compared to the status quo. Respondents also significantly preferred more ambitious emissions reductions targets but were sensitive to tax increases. These attributes were also significant at the 1% level.

Results from the simpler MNL model in column (1) support these findings. The significance of the RPL's standard deviations for all attributes except for ad limits in column (3) indicates the presence of heterogeneity in preferences amongst the sample. This significance provides evidence in favour of the RPL model over the MNL, which restricts preference heterogeneity. As H1 was exploratory, we applied to these two analyses a Bonferroni adjusted significance criteria a = .0125 (0.05 / 4 exploratory analyses), which all significant coefficients met. Overall, these results indicate strong support for the alternative degrowth policies, except for limits to advertising, providing evidence in favour of H1.

Table 96 – MNL & RPL Models Results for Baseline Policy Support

	(1)	(2)	(3)
Dependent Variable: Choice	**MNL (Coeff)**	**RPL (Coeff)**	**RPL (SD)**
Status Quo	-0.421 ***	-3.083 ***	3.301 ***
	(0.112)	(0.236)	(0.404)
Work Time	0.07 ***	0.062 ***	-0.344 ***
	(0.018)	(0.021)	(0.046)
Resource Limits	-0.146 ***	-0.205 ***	-0.445 ***

	(1)		(2)		(3)	
Dependent Variable: Choice	**MNL (Coeff)**		**RPL (Coeff)**		**RPL (SD)**	
	(0.029)		(0.037)		(0.062)	
Ad Limits	-0.036		-0.047		0.077	
	(0.026)		(0.025)		(0.123)	
Health Insurance	0.201	***	0.217	***	0.72	***
	(0.033)		(0.041)		(0.062)	
Emissions	0.049	***	0.054	***	0.264	***
	(0.017)		(0.021)		(0.049)	
Taxes	-0.154	***	-3.282	***	-3.221	***
	(0.02)		(0.375)		(0.244)	
N	1,012		1,012		-	
Pseudo R^2	0.02		0.27		-	
Log Likelihood	-8,625.27		-6,446.45		-	
AIC	17,264.53		12,920.90		-	
BIC	17,313.48		13,018.79		-	

Note: This table displays results from multinomial and random parameters logit models. Robust standard errors are reported in parentheses. Column (3) shows the standard deviations associated with the RPL model's coefficients, displayed in column (2). * p <.1, ** p <.05, and *** p <.01.

4.3. Framing Treatment Results

To test H2 related to the treatment effect, we ran an RPL interacting each attribute with the treatment variable. The results in **Table 97** suggest that exposure to the framing treatment had little influence on a participant's choice of policies. The first set of coefficients represent the effect of receiving the neutral framing, which seemed to significantly reduce support for the status quo but also made participants more sensitive to taxes, both at the 1% level. From the interaction effects, there does not appear to be any significant difference between the treatment and control groups on any of the four policy attributes. The only significant interaction effect was with emissions reductions at the 1% level, suggesting that the degrowth treatment was associated with a less ambitious emissions reduction target. Column (1) displays the simpler MNL model, where there were no significant interaction effects, even for the emissions target. The significant standard deviations in the RPL model indicate heterogeneity in preferences, despite the lack of significant differences based on treatment effect. See the latent class models (both 3 and 4

classes) including the treatment variable as a covariate in **Appendix J**. While this analysis was pre-registered, it did not provide any further evidence to support H2.

We also pre-registered H3, hypothesising that the framing treatment effect would differ depending on the participant's political ideology. Given the complexity in analysing moderation effects with a multinomial logit model, we used an ordinal logit regression. The outcome variable was the number of times participants selected the status quo (i.e., as displayed in **Figure 46**). The framing condition, political ideology, and the interaction between the two were predictor variables. This specification allowed us to test whether the effect of the framing treatment on the likelihood of preferring the status quo (versus alternative policies) was influenced by political ideology. This specification also allowed for the inclusion of covariates.

Table 97 - MNL & RPL Model Results with Framing Treatment Interactions

	(1)	(2)	(3)
Dependent Variable: Choice	**MNL (Coeff)**	**RPL (Coeff)**	**RPL (SD)**
Status Quo	-0.353 **	-2.747 ***	2.36 ***
	(0.162)	(0.357)	(0.634)
Work Time	0.052 **	0.037	-0.362 ***
	(0.026)	(0.481)	(0.055)
Resource Limits	-0.163 ***	-0.197	0.387 *
	(0.044)	(0.126)	(0.198)
Ad Limits	-0.03	-0.035	-0.136
	(0.036)	(0.472)	(1.207)
Health Insurance	0.191 ***	0.179	0.722 ***
	(0.048)	(0.259)	(0.087)
Emissions	0.05 *	0.057	0.25 ***
	(0.026)	(0.051)	(0.086)
Taxes	-0.146 ***	-3.161 ***	4.077 ***
	(0.03)	(0.96)	(0.678)
Status Quo x Treatment	-0.138	-0.578	-
	(0.225)	(1.664)	-
Work Time x Treatment	0.034	0.045	-
	(0.036)	(0.974)	-
Resource Limits x Treatment	0.032	0.015	-
	(0.059)	(0.215)	-
Ad Limits x Treatment	-0.011	-0.02	-
	(0.051)	(0.269)	-
Health Insurance x Treatment	0.021	0.044	-
	(0.066)	(0.34)	-
Emissions x Treatment	-0.002	-0.006 ***	-
	(0.035)	(0)	-
Taxes x Treatment	-0.014	0.001	-
	(0.041)	(0.015)	-
N	1,012	1,012	-
Pseudo R^2	0.02	0.27	-

	(1)	(2)	(3)
Dependent Variable: Choice	**MNL (Coeff)**	**RPL (Coeff)**	**RPL (SD)**
Log Likelihood	-8,613.50	-6,458.47	-
AIC	17,254.99	12,958.95	-
BIC	17,352.88	13,105.78	-

Note: This table displays results from multinomial and random parameters logit models, interacting each attribute with the treatment variable. Robust standard errors are reported in parentheses. Column (3) shows the standard deviations associated with the RPL model and its coefficients, displayed in column (2). 500 inter-person Halton Draws were used for the RPL. The treatment variable is a binary variable for (0) control or (1) treatment. * p <.1, ** p <.05, and *** p <.01.

Table 98 displays the results associated with H3. In columns (1) and (2), the framing treatment significantly influenced the status quo count, both at the 5% level. However, when including the interaction effect with political ideology in columns (3) and (4), this significance disappeared, and the interaction was also not significant. As such, there does not appear any evidence to support H3 regarding the moderating influence of political ideology on the framing effect.

Table 98 - Ordinal Logit Model for Framing x Political Ideology Interaction

	(1)	(2)	(3)	(4)
VARIABLES	Count Status Quo	Count Status Quo	Count Status Quo	Count Status Quo
Degrowth Framing (Treatment)	0.76**	0.74**	0.82	1.06
	(0.09)	(0.10)	(0.28)	(0.38)
Political Ideology		1.29***	1.30***	1.30***
		(0.04)	(0.05)	(0.05)
Degrowth Framing x Political Ideology			0.98	0.94
			(0.06)	(0.05)
Trust in Government				0.78***
				(0.05)
Voluntary Simplicity				0.98
				(0.07)
Universalism Concern				0.87
				(0.08)
Universalism Nature				0.64***
				(0.06)
Income				
Prefer Not Say				1.41
				(0.59)
$20K - $34,999				0.80
				(0.24)
$35K - $49,999				1.33
				(0.44)
$50K - $74,999				1.26
				(0.36)
$75K - $99,999				0.96
				(0.30)
$100K - $199,999				0.91
				(0.26)

VARIABLES	(1) Count Status Quo	(2) Count Status Quo	(3) Count Status Quo	(4) Count Status Quo
$200K - $399,999				1.03
				(0.43)
$400K - $599,999				0.00***
				(0.00)
Over $600K				1.00
				(1.16)
Gender				
Male				1.16
				(0.17)
Prefer Not Say				0.00***
				(0.00)
Education				
High school diploma				0.89
				(0.53)
Some undergraduate				0.87
				(0.52)
Bachelor's degree				0.56
				(0.33)
Graduate degree				0.72
				(0.43)
Age				1.01**
				(0.00)
Race & Ethnicity				1.10
				(0.13)
Hispanic				2.26***
				(0.69)
Cut 1	1.01	4.21***	4.40***	0.59
	(0.09)	(0.77)	(0.99)	(0.64)
Cut 2	1.63***	7.02***	7.33***	1.08

VARIABLES	(1) Count Status Quo	(2) Count Status Quo	(3) Count Status Quo	(4) Count Status Quo
	(0.14)	(1.28)	(1.67)	(1.17)
Cut 3	2.33***	9.92***	10.37***	1.64
	(0.21)	(1.83)	(2.35)	(1.78)
Cut 4	2.99***	12.70***	13.27***	2.22
	(0.28)	(2.38)	(3.05)	(2.40)
Cut 5	3.40***	14.89***	15.56***	2.69
	(0.32)	(2.79)	(3.60)	(2.92)
Cut 6	3.88***	17.43***	18.22***	3.26
	(0.38)	(3.34)	(4.28)	(3.54)
Cut 7	4.36***	19.62***	20.51***	3.77
	(0.43)	(3.78)	(4.83)	(4.10)
Cut 8	5.63***	25.37***	26.52***	5.13
	(0.59)	(4.89)	(6.28)	(5.57)
Observations	1,012	911	911	911

Note: Odds ratios are displayed, with robust standard errors below in parentheses. Analyses use an ordinal logit model treating the count of status quo as an ordinal variable from 0 to 8. Neutral framing is the reference category for the degrowth framing. Political ideology is treated as continuous, ranging from 0 to 10. Cut points 1 – 8 display the thresholds for interpreting a latent continuous variable Y*, for example, in column (1), $Y_i = 1$ if Y^*_i is ≤ 1.01, $Y_i = 2$ if $1.01 \leq Y^*_i < 1.63$, $Y_i = 3$ if $1.63 \leq Y^*_i \leq 2.33$, etc. *** p<0.01, ** p<0.05, * p<0.1.

4.4. Sufficiency Behaviours

4.4.1.RPL

To test H4 on sufficiency behaviours, we first used an RPL model to allow for preference heterogeneity, treating sufficiency as both binary and continuous. See **Table 99** for results. When treating sufficiency as binary in columns (1) and (2), the first set of coefficients for each attribute represents those who had not engaged in sufficiency. Aside from work time reductions, it appears that those who had not engaged in sufficiency were less likely to support the status quo (1% level), more likely to support a fossil fuel cap over ban (1% level), more likely to support an ad ban in public spaces over a general ban, more

likely to support universal healthcare (1% level), more likely to support more ambitious emissions reductions targets (5% level) and more sensitive to taxes (1% level). The set of parameters with an interaction indicates the results for those who had engaged in sufficiency, compared to those who had not engaged. Those who were engaged in sufficiency were less likely to support the status quo than those who did not engage, at the 1% significance level. Participants who engaged in sufficiency behaviours were also significantly more likely to support a fossil fuel ban over a cap (1% level), more likely to support a general ban on advertising of high emissions goods (5% level) and were less sensitive to taxes to fund policies than those who did not engage, at the 5% significance level.

When treating sufficiency as a continuous variable in columns (3) and (4), the significance of advertising limits and emissions reduction targets amongst those who had not engaged dropped from the 1% to the 10% level, and the significance of the status quo attribute also lowered from the 1% to the 5% level. Otherwise, the results for the non-engaged group are consistent. In terms of interaction effects, the interaction with the status quo, resource limits, and taxes all remain with the binary model. Meanwhile, practising sufficiency was additionally associated with supporting the shortest work weeks at the 5% significance level, but there was no longer a significant association with advertising limits. Neither model indicates a significant association between sufficiency behaviour and support for health insurance policies or emissions reduction targets.

See **Appendix K Table 114** for the MNL model that supports these findings. In **Table 99**, the standard deviations in columns (2) and (4) are significant at the 1% level for all attributes, except advertising limits, across both models. This indicates heterogeneity in preferences among the sample, providing evidence in favour of the RPL model over the MNL. Overall, these results indicate support for H4, except with respect to emissions reduction targets and health insurance policies.

Table 99 - RPL Model Results with Sufficiency Interactions

	Binary		Continuous	
	(1)	(2)	(3)	(4)
Dependent Variable: Choice	**RPL (Coeff)**	**RPL (SD)**	**RPL (Coeff)**	**RPL (SD)**
Status Quo	-2.065 **	3.91 ***	1.244 **	3.62 ***
	(0.294)	(0.319)	(0.547)	(0.255)
Work Time	0.041	0.377 ***	0.007	-0.388 ***
	(0.025)	(0.038)	(0.01)	(0.041)
Resource Limits	-0.361 **	0.507 ***	-0.61 ***	-0.497 ***
	(0.063)	(0.065)	(0.132)	(0.06)
Ad Limits	-0.126 **	0.032	-0.082 *	-0.039
	(0.044)	(0.035)	(0.042)	(0.157)
Health Insurance	0.184 **	0.818 ***	0.243 ***	0.804 ***
	(0.045)	(0.071)	(0.058)	(0.058)
Emissions	0.094 **	0.286 ***	0.114 *	0.285 ***
	(0.041)	(0.048)	(0.062)	(0.041)
Taxes	-1.921 **	1.571 ***	-1.585 ***	1.665 ***
	(0.236)	(0.136)	(0.497)	(0.413)
Status Quo x Sufficiency	-1.768 **	-	-1.057 ***	-
	(0.409)	-	(0.147)	-
Work Time x Sufficiency	0.033	-	0.013 **	-
	(0.057)	-	(0.006)	-
Resource Limits x Sufficiency	0.27 **	-	0.097 ***	-
	(0.092)	-	(0.031)	-

	Binary		Continuous	
	(1)	(2)	(3)	(4)
Dependent Variable: Choice	**RPL (Coeff)**	**RPL (SD)**	**RPL (Coeff)**	**RPL (SD)**
Ad Limits x Sufficiency	0.146 **	-	0.007	-
	(0.058)	-	(0.005)	-
Health Insurance x Sufficiency	0.03	-	-0.01	-
	(0.06)	-	(0.009)	-
Emissions x Sufficiency	-0.079	-	-0.015	-
	(0.06)	-	(0.015)	-
Taxes x Sufficiency	0.116 **	-	0.039 **	-
	(0.053)	-	(0.019)	-
N	1,012	-	1,012	-
Pseudo R^2	0.27	-	0.28	
Log Likelihood	-6,416.24	-	-6,380.5	-
AIC	12,874.48	-	12,803.1	-
BIC	13,021.31	-	12,949.9	-

Note: This table displays results from the random parameters logit model, interacting each attribute with the sufficiency behaviours variable. Robust standard errors are reported in parentheses. In columns (1) and (2), the variable is treated as binary, whereas in the columns (3) and (4), this variable is treated as a continuous average of engagement in the 12 items, ranging from 1 (Never) to 7 (Always). 500 inter-person Halton Draws were used. *** p<0.01, ** p<0.05, * p<0.1.

4.4.2.LCM with Covariates

Given the evidence in **Table 99** of heterogeneity in respondent choices for certain attributes, and the significant associations with sufficiency behaviours, we also used a Latent Class Model (LCM) to further understand heterogeneity across individuals in assessing H4. Given that we did not pre-register this specific analysis to test H4, we have applied the Bonferroni adjusted significance criteria of a = .0125.

As mentioned, LCMs require the researcher to make an informed decision on the number of classes chosen, typically using statistical information such as the AIC and BIC. We tested several models to determine the appropriate number of classes. While covariates are useful in characterising class allocation, it is customary to compare the number of classes first, without any covariates (Weller et al., 2020). In these baseline specifications, the 4-

class model appeared the most appropriate, as it produced the lowest information criteria whilst achieving convergence. When including covariates to explain class allocation, the 3-class model yielded more significant parameters, larger class sizes, and easier interpretation of the results than the 4-class model. Although the information criteria was slightly better under the 4-class model, we preferred the 3-class model with covariates due to other substantive criteria, which can be as important as statistical criteria (Weller et al., 2020). Following best practice, our covariate selection was driven by theoretical relevance (Weller et al., 2020; Wurpts & Geiser, 2014). We chose sufficiency behaviours to explore the transformation pathway further. We also selected socio-demographic covariates of age, education, and employment status, which were previously found relevant for climate or eco-social policy support (e.g., Ziegler, 2017; Khan et al., 2023). We have included the model with 4 classes and covariates as a robustness check in **Appendix K.b.**

Table 100 - Latent Class Model Results (3 Classes and Covariates)

Variable	Class A		Class B		Class C	
Status Quo	-1.19	***	2.16	**	-3.02	***
	(0.31)		(0.86)		(0.27)	
Work Time	-0.01		-0.27		0.09	***
	(0.05)		(0.18)		(0.02)	
Resource Limits	-0.29	***	0.16		-0.11	***
	(0.08)		(0.34)		(0.04)	
Ad Limits	-0.06		-0.38		-0.02	
	(0.08)		(0.33)		(0.03)	
Health Insurance	-0.01		0.05		0.25	***
	(0.1)		(0.4)		(0.05)	
Emissions	-0.01		-0.34		0.07	***
	(0.05)		(0.26)		(0.02)	
Taxes	-0.30	***	-0.28		-0.12	***
	(0.06)		(0.21)		(0.03)	
Class Membership Function						
Constant	0.78		-		2.07	***
	(0.73)		-		(0.59)	
Sufficiency	0.70	***	-		0.45	**
	(0.24)		-		(0.2)	

Education	-0.14		-	-0.26	
	(0.24)		-	(0.19)	
Employment	-0.32	*	-	-0.30	**
	(0.18)		-	(0.14)	
Age	0.06		-	0.06	
	(0.25)		-	(0.19)	
Mean Probability	0.21		0.18	0.61	
N	1,012		-	-	
Pseudo R^2	0.25		-	-	
Log Likelihood	-6,574.39		-	-	
AIC	13,210.79		-	-	
BIC	13,427.54		-	-	

Note: Robust standard errors are reported in parentheses. Class B is the reference group, so the covariate estimates should be interpreted relative to this class. Employment was split into three categories, (1) "Unemployed" for those retired or not in work, (2) "Alternatively Employed" for students and caregivers, and (3) "Employed" for full-time, part-time or self-employment. Age was simplified into two categories, under 42 (Gen Z and Millennials), and over 42 (Gen X +). Education was split by with and without a college degree. *** p<0.01, ** p<0.05, * p<0.1.

Table 100 reports the results of the LCM with 3 classes and our selected covariates. Membership in Class A was associated with support for alternative policies over the status quo, preferences for fossil fuel caps over bans, and sensitivity to tax increases, all at the 1% significance level. This group represented around 21% of our sample. Membership in Class B was associated with greater support for status quo policies at the 1% significance level. No other attributes were significant for Class B, which comprised approximately 18% of our sample. Finally, membership in Class C, our largest class comprising around 61% of our sample, was characterised by support for alternative proposals at the 1% level and several degrowth policy attributes. Members of Class C preferred the shortest work weeks, universal healthcare, and more ambitious emissions reduction targets at the 1% significance level. They also preferred a fossil fuel cap to a ban, and were sensitive to tax increases, both at the 1% significance level.

For sufficiency behaviours, we used the binary measure of engagement or non-engagement, as the continuous variable was too granular to influence class allocation. We

also simplified our demographic variables of age, education and employment into 2-3 categories to simplify comparisons (e.g., Strazzera et al., 2012). Class A (1% level) and Class C (5% level) exhibited greater levels of engagement in sufficiency than Class B. However, there was no significant difference in engagement between Class A and C. Class A (10% level) and Class C (5% level) were also less likely to be formally employed than Class B. The sufficiency coefficient for Class A ($p = .002$) safely met our stricter significance criteria ($a = .0125$), suggesting a significant difference with Class B. The sufficiency coefficient for Class C ($p = .012$) barely met this threshold, while the employment coefficients (Class A p-value = .042; Class C p-value = .017) did not meet it.

Taken together, results from the latent class model support H4, suggesting that engagement in sufficiency behaviours is associated with less support for the status quo and greater support for specific degrowth policies, exemplified through Class C. However, results from Class A suggest that engagement in sufficiency behaviour may be most closely linked with support for fossil fuel caps and less direct for other policies. In order to assess H5 related to individual characteristics, we ran additional analyses to further portray each latent group.

4.4.3.LCM - Individual Probability Analysis

To provide a more detailed breakdown of characteristics in assessing H5, we conducted an exploratory analysis using individual probabilities of class allocation for each respondent. Based on the probability of allocation to each class, we created several class allocation variables at different thresholds (e.g., between 50% – 90%) to assess the variation in class composition depending on the cut-off for class membership allocation. We tested these different thresholds due to the probabilistic nature of LCMs. That is, the model does not determine a perfect allocation to any class, but rather calculates a probability of being assigned to each class. We then calculated the mean values for various characteristics, using covariates and debrief questions. We ran t-tests to estimate significant differences in these characteristics between each pair of classes (e.g., A versus B, A versus C). There was a trade-off between accuracy and inclusivity, as selecting a higher probability threshold meant dropping participants who did not exhibit a high enough probability for any class. A race and ethnicity difference (10% significance level) emerged starting from the 80% threshold of allocation probability, so we selected this as our threshold.

It should be noted that the analysis that follows involves several assumptions carried through from the latent class analysis. These include the selection of the number of classes and relevant covariates for predicting class allocation, as well as the selection of the threshold (e.g., 80%) for class allocation. While these assumptions can be validly justified, the results from this form of analysis may be considered less rigorous than the various MNL, RPL, and LCM models included in this chapter, whereby individual characteristics are entered into the model as interactions with each attribute. Given that it is testing an exploratory hypothesis, we have applied the stricter significance criteria of a = 0.0125 to guard against spurious differences amongst groups.

Table 101 – Individual Probability Analysis Results (80% Threshold) – LCM-3 (with Covariates)

	Mean Values			Significance Level		
Variable	Class A	Class B	Class C	T-Test: Class A and B	T-Test: Class A and C	T-Test: Class B and C
Age	48.59	60.27	49.00	***		***
Income	3.38	3.73	4.04		***	*
Gender	1.47	1.58	1.48	*		**
Education	3.16	3.33	3.52		***	*
Employment	2.25	2.35	2.45		***	
Race/Ethnicity	2.89	3.02	2.97	*		
Hispanic Ethnicity	1.94	1.98	1.88		**	***
Political Identity	5.62	7.34	4.80	***	***	***
Climate Beliefs	4.81	3.60	5.35	***	***	***
Climate Knowledge	3.17	3.28	3.33			
Voluntary Simplicity	4.90	4.85	5.21		**	***
Ecological Policy Agreement	4.59	3.06	5.45	***	***	***
Social Policy Agreement	4.54	3.37	5.46	***	***	***
Trust in Government	3.60	2.61	3.71	***		***
Universalism - Concern	5.30	4.91	5.86	***	***	***
Universalism - Nature	5.27	4.62	5.80	***	***	***
Poverty Beliefs	1.50	1.27	1.58	***		***
N	**122**	**126**	**561**			

Note: Class allocation is based on whether an individual has greater than 80% probability of being in a particular class, which means that not all participants were sorted into a class category (N = 809). The first set of columns under "Mean Values" indicates the mean level of each variable within the class indicated at the top of the column. The second set of columns under "Significance Level" indicates the significance associated with the t-test comparing each pair of classes. *** p<0.01, ** p<0.05, * p<0.1.

To summarize each class, Class A could be considered dedicated environmentalists, as they are most likely to practice sufficiency personally and support ecological but not social policies. Class B may be characterised as the disengaged, being least likely to practice sufficiency or support any degrowth policies. Finally, Class C could be classified as the stereotypical degrowthers, being likely to engage in sufficiency to some extent but most

supportive of eco-social policy initiatives. **Table 101** reports the results of the individual probability analysis, from which we can further characterise each class as follows.

The so-called 'dedicated environmentalists' in Class A were on average less highly educated, lower income, younger (than Class B), slightly more likely to be female (than Class B), less likely to be employed (than Class C), more likely to be Hispanic or Latin American (than Class C), moderate (politically, in terms of climate beliefs, universalism, degrowth policy agreement, and poverty beliefs), had higher trust in government (than Class B) and had lower agreement with voluntary simplicity values (than Class C).

The 'disengaged' group in Class B was on average older, more likely to be male, more politically conservative, more likely to believe people are not doing enough to help themselves out of poverty, exhibited low trust in government, low agreement with degrowth policy objectives (ecological and social), was less likely to believe in climate change and human causes or impacts, less likely to agree with voluntary simplicity values (than Class C), had low agreement with universalism values, and more likely to be Hispanic or Latin American (than Class C).

Finally, the 'stereotypical degrowthers' in Class C were on average younger (than Class B), most highly educated, had the highest income, more likely to be female (than Class B), more likely to be employed (than Class A), furthest to the left politically, likely to believe in climate change and human causes or impacts, exhibited higher agreement with voluntary simplicity values, degrowth policy objectives (ecological and social), higher trust in government (than Class B), higher agreement with universalism values, and more likely to believe poverty is due to circumstances beyond an individual's control. There were no significant differences in self-reported climate knowledge, and racial identity[73] only diverged between Class A and B at the 10% level.

These results provide evidence in support of H5, that the link between sufficiency and support for degrowth policies does indeed depend on socio-demographic and other individual differences. In summary, among those who engaged in sufficiency more often (i.e., Classes A and C), support for more degrowth policies appeared more likely for the following types of people (using our Bonferroni adjusted significance criterion a = 0.0125): higher income, more highly educated, those with paid or formal employment, further left politically,

[73] This difference appears driven by the proportion of Black and White participants, where class A comprised 13% Black and 81% White participants, while Class B comprised 3% Black and 94% White participants.

greater belief in climate change and human causes/impacts, stronger material simplicity values, greater agreement with degrowth policy objectives (ecological and social), and greater agreement with universalism values (nature and concern).

4.5. Value-based Predictors - MNL & RPL

4.5.1.Political Ideology

To test H6 related to the influence of political ideology on policy preferences, we used an RPL with interactions between each attribute and the continuous political ideology variable. **Table 102** shows the results of this analysis in columns (2) and (3). The first set of coefficients without interactions represent the effect of having a political ideology of 0, i.e., all the way to the left. While being far left was not significantly associated with resource or ad limits, it did appear to be significantly associated with reduced support for the status quo at the 1% level. It was also associated with increased support for the shortest work weeks, universal health insurance, and more ambitious emissions reduction targets all at the 1% level. It was also associated with being more sensitive to taxes at the 1% significance level.

Examining the interaction effects, being further right politically was associated with a preference for the status quo over alternative policies, significant at the 1% level, support for less ambitious work time reductions (i.e., 35-hour weeks), and expanding Medicaid over universal healthcare, at the 1% significance level. It was also associated with a preference for limits to advertising in public spaces over a general ban, only at the 10% level. It was further associated with a preference for less ambitious emissions reduction targets at the 1% level, but also lower sensitivity to tax, only at the 1% level. Political ideology did not appear to influence support for fossil fuel restrictions in either direction. Column (1) displays the MNL results, which mostly supported these results, though both resource and advertising limits were insignificant in the MNL. The significance of standard deviations for all attributes at the 1% suggests that the RPL is preferred to the MNL given preference heterogeneity. Overall, these results lend support in favour of H6a and H6b, suggesting that left-wing political ideology increased support for more ambitious degrowth policies, whilst right-wing political ideology reduced support.

Table 102 - MNL & RPL Model Results with Political Ideology Interactions

	(1)		(2)		(3)	
Dependent Variable: Choice	**MNL (Coeff)**		**RPL (Coeff)**		**RPL (SD)**	
Status Quo	-1.146	***	-5.493	***	3.802	***
	(0.291)		(0.621)		(0.275)	
Work Time	0.187	***	0.261	***	0.38	***
	(0.043)		(0.056)		(0.036)	
Resource Limits	-0.076		-0.106		-0.501	***
	(0.066)		(0.103)		(0.073)	
Ad Limits	-0.002		0.015		0.198	**
	(0.058)		(0.021)		(0.08)	
Health Insurance	0.503	***	0.673	***	0.782	***
	(0.077)		(0.108)		(0.063)	
Emissions	0.179	***	0.279	***	0.267	***
	(0.041)		(0.047)		(0.043)	
Taxes	-0.236	***	-1.995	***	1.877	***
	(0.047)		(0.47)		(0.342)	
Status Quo x Political ID	0.085	*	0.411	***	-	
	(0.046)		(0.101)		-	
Work Time x Political ID	-0.024	***	-0.04	***	-	
	(0.007)		(0.01)		-	
Resource Limits x Political ID	-0.012		-0.021		-	
	(0.011)		(0.02)		-	
Ad Limits x Political ID	-0.008		-0.013	*	-	
	(0.01)		(0.007)		-	
Health Insurance x Political ID	-0.063	***	-0.096	***	-	
	(0.013)		(0.019)		-	
Emissions x Political ID	-0.025	***	-0.043	***	-	
	(0.007)		(0.008)		-	

Taxes x Political ID	0.016 **	0.018 *	-
	(0.008)	(0.011)	-
N	911	911	-
Pseudo R^2	0.07	0.28	-
Log Likelihood	-7,385.95	-5,677.32	-
AIC	14,799.90	11,396.64	-
BIC	14,896.31	11,541.25	-

Note: This table displays results from a multinomial logit and random parameters logit model, interacting each attribute with the political ideology variable. Robust standard errors are reported in parentheses. Column (3) shows the standard deviations associated with the RPL model's coefficients, displayed in column (2). The political ideology variable is continuous, from 0 (Left) to 10 (Right). 500 inter-person Halton Draws were used for the RPL. *** p<0.01, ** p<0.05, * p<0.1.

4.5.2.Universalism

Universalism in H7 comprises two dimensions, care for nature (i.e., "Nature") and concern for others (i.e., "Concern"). The results for the RPL related to Nature are contained in **Table 103**, columns (2) and (3), which indicate that caring for nature significantly reduced one's preference of the status quo and one's sensitivity to taxes, both at the 1% significance level. It also appeared to significantly increase support for universal healthcare over an expansion of Medicaid, at the 5% level. Column (1) contains the results for the MNL, which confirm the results for the status quo interaction. However, Nature was also associated with higher support for a fossil fuel ban and more ambitious emissions reduction targets, both at the 5% level, whilst the coefficients for health insurance and taxes were no longer significant in the MNL. The significance of all standard deviations except for ad limits in Column (3) suggests the RPL is the preferred model. Overall, it appears that universalism-nature has some influence on respondents' preferences for alternative policies in favour of H7, though not consistent across specifications.

Table 103 - MNL & RPL Model Results with Universalism Nature Interactions

	(1)	(2)	(3)
Dependent Variable: Choice	**MNL (Coeff)**	**RPL (Coeff)**	**RPL (SD)**
Status Quo	0.997 *	3.148 ***	3.751 ***
	(0.567)	(1.01)	(0.349)

	(1)		(2)		(3)	
Dependent Variable: Choice	**MNL (Coeff)**		**RPL (Coeff)**		**RPL (SD)**	
Work Time	0.004		-0.112		0.393	***
	(0.099)		(0.456)		(0.043)	
Resource Limits	-0.492	***	-0.637	*	-0.478	***
	(0.157)		(0.371)		(0.07)	
Ad Limits	-0.158		-0.148		-0.082	
	(0.134)		(0.298)		(0.189)	
Health Insurance	-0.012		-0.139		0.806	***
	(0.169)		(0.146)		(0.06)	
Emissions	-0.195	*	-0.249		-0.264	***
	(0.106)		(0.325)		(0.065)	
Taxes	-0.108		-1.354	***	1.444	***
	(0.127)		(0.28)		(0.187)	
Status Quo x Universalism - Nature	-0.287	***	-1.126	***	-	
	(0.101)		(0.186)		-	
Work Time x Universalism - Nature	0.012		0.03		-	
	(0.017)		(0.079)		-	
Resource Limits x Universalism - Nature	0.061	**	0.075		-	
	(0.028)		(0.066)		-	
Ad Limits x Universalism - Nature	0.022		0.017		-	
	(0.024)		(0.053)		-	
Health Insurance x Universalism - Nature	0.038		0.061	**	-	
	(0.03)		(0.026)		-	
Emissions x Universalism - Nature	0.043	**	0.053		-	
	(0.018)		(0.056)		-	
Taxes x Universalism - Nature	-0.008		0.035	***	-	
	(0.022)		(0.011)		-	
N	1,012		1,012		-	

	(1)	(2)	(3)
Dependent Variable: Choice	**MNL (Coeff)**	**RPL (Coeff)**	**RPL (SD)**
Pseudo R^2	0.06	0.28	-
Log Likelihood	-8,286.29	-6,373.86	-
AIC	16,600.58	12,789.71	-
BIC	16,698.47	12,936.55	-

Note: This table displays results from a multinomial logit and random parameters logit model, interacting each attribute with the Universalism – Nature variable. Robust standard errors are reported in parentheses. Column (3) shows the standard deviations associated with the RPL model's coefficients, displayed in column (2). The Nature variable is a continuous composite, ranging from 1 (Strongly disagree) to 7 (Strongly agree). 500 inter-person Halton Draws were used for the RPL. *** p<0.01, ** p<0.05, * p<0.1.

RPL results related to Concern values are contained in **Table 104**, columns (2) and (3). These results indicate that a person's concern for the interest of others did not influence their policy choices for any attribute included in the proposal. The MNL in column (1) offers some support for H7, specifically suggesting that those with higher concern values exhibited greater support for a fossil fuel ban and support greater emissions reduction targets, both at the 5% level. However, the significance of all standard deviations except for ad limits in column (3) indicate that the RPL may be the better fit model. Overall, there appears some weak evidence in support of H7.

Table 104 - MNL & RPL Model Results with Universalism Concern Interactions

	(1)	(2)	(3)
Dependent Variable: Choice	**MNL (Coeff)**	**RPL (Coeff)**	**RPL (SD)**
Status Quo	0.493	1.664	3.722 ***
	(0.572)	(4.971)	(0.398)
Work Time	-0.02	-0.114	0.392 ***
	(0.105)	(0.14)	(0.044)
Resource Limits	-0.531 ***	-0.674	-0.481 ***
	(0.163)	(0.689)	(0.101)
Ad Limits	0.106	0.133	-0.202

	(1)		(2)		(3)	
Dependent Variable: Choice	**MNL (Coeff)**		**RPL (Coeff)**		**RPL (SD)**	
	(0.143)		(0.668)		(0.124)	
Health Insurance	-0.093		-0.21		0.801	***
	(0.177)		(0.646)		(0.063)	
Emissions	-0.159		-0.146		-0.249	***
	(0.104)		(0.317)		(0.066)	
Taxes	-0.154		-1.641	***	1.745	***
	(0.131)		(0.503)		(0.368)	
Status Quo x Universalism - Concern	-0.179	*	-0.837		-	
	(0.101)		(0.875)		-	
Work Time x Universalism - Concern	0.016		0.03		-	
	(0.018)		(0.024)		-	
Resource Limits x Universalism - Concern	0.068	**	0.081		-	
	(0.028)		(0.118)		-	
Ad Limits x Universalism - Concern	-0.025		-0.034		-	
	(0.025)		(0.115)		-	
Health Insurance x Universalism - Concern	0.052		0.073		-	
	(0.031)		(0.11)		-	
Emissions x Universalism - Concern	0.037	**	0.035		-	
	(0.018)		(0.055)		-	
Taxes x Universalism - Concern	0		0.026		-	
	(0.022)		(0.016)		-	
N	1,012		1,012		-	
Pseudo R^2	0.04		0.27		-	
Log Likelihood	-8,432.61		-6,402.95		-	
AIC	16,893.21		12,847.90		-	
BIC	16,991.10		12,994.73		-	

Note: This table displays results from a multinomial logit and random parameters logit model, interacting each attribute with the Universalism – Concern variable. Robust standard errors are reported in parentheses. Column (3) shows the standard deviations associated with the RPL model's coefficients, displayed in column (2). The Concern variable is a continuous composite, ranging from 1 (Strongly disagree) to 7 (Strongly agree). *** p<0.01, ** p<0.05, * p<0.1.

4.6. Goodness of Fit & Robustness Checks

As this project entails a long list of analyses, it is useful to compare the goodness of fit of each model to assess their relative use value. As mentioned, the AIC and BIC can be used to determine model fit. The pseudo r^2 can also be used to assess goodness of fit, for example using McFadden's Pseudo-R^2 (McFadden, 1974). While this measure has similar interpretations to the OLS R^2 value, in that a higher value shows a better fit, values in the range of 0.2-0.4 are considered quite high. **Table 105** compares these criteria for each model used (excluding robustness checks). Considering both AIC and BIC, the RPL model with an interaction for political ideology appears to exhibit the best fit. From a substantive perspective, LCM-3 with covariates is our preferred model, given the richness of information and the theoretical relevance for this thesis.

Table 105 - Comparing Model Fit Criteria Across All Models

Hypothesis	Model Specification	AIC	BIC	Pseudo R^2	# Parameters	Interaction Variable
H1	MNL	17,264.53	17,313.48	0.02	7	-
H2	MNL w/ interaction	17,254.99	17,352.88	0.02	14	Framing Treatment
H3	MNL w/ interaction	16,800.72	16,898.61	0.05	14	Sufficiency (binary)
H3	MNL w/ interaction	16,366.58	16,464.47	0.07	14	Sufficiency (continuous)
H6	MNL w/ interaction	14,799.90	14,896.31	0.07	14	Political Ideology
H7	MNL w/ interaction	16,600.58	16,698.47	0.06	14	Universalism Nature
H7	MNL w/ interaction	16,893.21	16,991.10	0.04	14	Universalism Concern
H1	RPL	12,920.90	13,018.79	0.27	14	-
H2	RPL w/ interaction	12,958.95	13,105.78	0.27	21	Framing Treatment
H3	RPL w/ interaction	12,874.48	13,021.31	0.27	21	Sufficiency (binary)
H3	RPL w/ interaction	12,803.05	12,949.88	0.28	21	Sufficiency (continuous)
H6	RPL w/ interaction	11,396.64	11,541.25	0.28	21	Political Ideology
H7	RPL w/ interaction	12,789.71	12,936.55	0.28	21	Universalism Nature

H7	RPL w/ interaction	12,847.90	12,994.73	0.27	21	Universalism Concern
N/A	LCM-2	13,549.35	13,654.22	0.23	15	-
N/A	LCM-3	13,211.81	13,372.63	0.25	23	-
N/A	LCM-4	13,096.05	13,312.80	0.26	31	-
H3	LCM-3 (covariates)	13,210.79	13,427.54	0.25	31	Sufficiency Binary
H3	LCM-4 (covariates)	13,089.56	13,390.21	0.26	43	Sufficiency Binary

Note: AIC stands for Akaike Information Criterion, and BIC stands for Bayesian Information Criterion. The pseudo R^2 of each model is calculated as 1 - (LL / LL(0)), using adjusted values. 500 inter-person Halton draws were used for the RPL models. The covariates in the LCM models with covariates are sufficiency (binary), age, education, and employment.

We also performed several robustness checks to probe the stability of these models. In prioritising robustness checks, I have focused on analyses related to H3 as the main hypothesis of interest. I have not included all possible robustness checks to minimise the volume of additional tables included. However, the MNL models included for each analysis above act as a robustness check for the associated RPL analyses. Further, given that the RPL with political ideology interaction (**Table 102**) was the preferred statistical model, a robustness check with 1,000 Halton-draws was included to ensure stability (see **Appendix K.b**).

For the RPL with sufficiency interactions, I have included the following robustness checks for the model with a binary sufficiency variable: 1) estimating the model with a higher number of inter-person Halton-draws (1,000); 2) dropping respondents who made more than $99,999 annually or did not provide income, and 3) dropping respondents who made less than $35,000 annually or did not provide income. [74] These results, which can be found in **Table 116** of **Appendix K.b**, support the connection between sufficiency behaviours and fossil fuel policies.

For the LCM, I have additionally included the following robustness checks: 1) using estimates from the MNL as starting values, and 2) the LCM estimation including the same covariates with 4 classes, which can be found in **Appendix K.c**. For the most part, the results confirm the robustness of our findings. When using 4 classes in the LCM with covariates, the positive association between sufficiency behaviours and policy support is less

[74] We used $99K and $35K based on the categorical nature of the income variable. We dropped those with incomes below $35K to exclude participants under the federal poverty line (under $27,750 in 2022), representing the lowest income quintile. We dropped those with incomes above $99K to exclude the highest quintile of earners (over $153,001 in 2022). Figures from U.S. Census Bureau report, Guzman & Kollar (2023).

clear, though the two groups engaged the most in sufficiency do support resource limits, and one of these groups supports WTR.

Finally, an alternative version of the LCM individual probability analysis using the 70% threshold is included in **Appendix K.c**, confirming the results of the 80% specification.

5. Discussion & Conclusion

5.1. Discussion

This research employed the use of a discrete choice experiment to elucidate degrowth policy support amongst a U.S. sample. We focused on four policies: work time reductions, fossil fuel restrictions, limits to advertising, and expanding access to health insurance. We also varied the personal tax liability to fund these policies and the emissions reductions target. In addition to understanding baseline support for these policies on average to address RQ3a, we also tested whether a person's engagement in sufficiency behaviours influenced their support for degrowth policies, empirically testing the viability of the transformation pathway, whilst addressing RQ1a and RQ3b. We undertook several other analyses to test hypotheses related to individual differences to address RQ3c, on the role of demographics and values. We finally investigated whether the proposal's framing influenced participants' policy preferences. While our sample was not perfectly representative, we would have expected the skewness, especially by age and political ideology, to bias our sample in favour of the status quo, based on prior literature (Drews & van den Bergh, 2016; Khan et al., 2023; Ziegler, 2017).

Regarding H1 on general policy support, the results suggest highly significant support for all policies except advertising restrictions compared to the status quo. On average, our sample preferred a resource cap to a full ban, but they preferred the shortest work weeks to longer ones, and universal coverage for health insurance instead of an incremental expansion of Medicaid. Respondents were sensitive to taxes, which is assumed in a DCE based on standard economic theory and consistent with climate policy acceptability literature more generally (Brannlund & Persson, 2012; Fanghella et al., 2023; Gevrek & Uyduranoglu, 2015). However, they generally preferred more ambitious emissions reduction targets for faster climate mitigation.

These results suggest favourable evaluations of policies aimed at tackling the socio-ecological crisis in America, supporting H1. Such findings might be surprising given the political landscape in the U.S. and the centrist skew of our respondents. Though not directly comparable, our American sample appeared more open to policies that might enable a degrowth transition than Swedish respondents, who typically support environmental and welfare policies more (Khan et al., 2023; Lee et al., 2023). However, there was little overlap in the actual policies selected between ours and other studies. As a package, our policies focused more on improving quality of life, whilst downscaling the economy's reliance on fossil fuels. Respondents preferred the most ambitious proposals for certain eco-social policies that have the greatest impact on improving quality of life, i.e., WTR and healthcare. These policies were likely viewed as more popular and less coercive than policies related to wealth redistribution (e.g., wealth tax) or penalties on consumption (e.g., meat tax) from Khan et al. (2023). And while there are very few existing policies limiting advertising,[75] WTR and free healthcare have better precedent in existing firms and other countries, especially in Europe (e.g., Blanpain, 1994; Stewart, 2023). Their existence may have improved perceived feasibility.

There were no significant differences in policy preferences between the Degrowth and Neutral framing conditions, related to H2. The only significant interaction effect was on the emissions reduction target, which suggests that receiving the degrowth treatment was associated with preferring less ambitious reduction targets. While this result may be further evidence of the demotivating effect that degrowth's system level narrative can have on individuals (i.e., from Chapter 3), it is questionable given the small magnitude and the lack of other effects. It is difficult to interpret the reason for insignificant results, which depart from the (marginally) significant differences between Green Growth and Degrowth framing in Study 3 from **Project 1 (SPM)**. One reason could be poor execution of the framing differences. The pro-economic growth argument in the Green Growth framing of **Project 1 (SPM)** might have been more concrete and compelling than the Neutral framing presented here, which mostly side-stepped the issue of economic growth.

What is clear is that including an explicitly growth critical introduction to these policies did not elicit protest responses or a significant preference for the status quo. The

[75] The city of Haarlem in the Netherlands passed a ban on meat advertisements in public (Boffey, 2022). More recently, France's lower house voted in favour of a bill banning advertising of fast fashion companies (Symons, 2024).

effect of framing on selecting the status quo was also not influenced by a participant's political ideology (H3). This implication is highly promising for the prospect of a degrowth movement in a politically divided country like the United States (Bliuc et al., 2015; Hoffman, 2011; McCright & Dunlap, 2011). Echoing opinion polls (Trades Union Congress, 2018; YouGov, 2019) and contributing to the literature on public opinion about degrowth and sufficiency in other countries (Khan et al., 2023; Lage et al., 2023; Lee et al., 2023; Thorman et al., 2020) we can indeed say that there is evidence of support for eco-social policies that aim to transform society in line with degrowth in the United States.

With regard to H4 on sufficiency behaviours, there appears a significant positive association between engagement in sufficiency behaviours and support for at least some degrowth policies across various specifications, addressing RQ3b. In our MNL and RPL models, regardless of how the sufficiency behaviour variable was treated, it is clear that engaging in sufficiency was associated with stronger support for more stringent restrictions on fossil fuels. There is also some evidence that practising sufficiency was associated with increased support for the shortest work weeks and a general ban on advertising of high emissions goods.

Though these results on sufficiency cannot be interpreted causally, they provide the first empirical evidence linking reduced consumption behaviours and degrowth policy support, providing some justification for the transformation pathway (Kallis et al., 2020). These findings are in line with prior work suggesting that pro-environmental behaviour leads to greater environmental policy support, possibly because of a desire to maintain environmental self-identity (Nilsson et al., 2017), or due to enhanced politicisation (Kallis et al., 2020).

However, it is clear that this link is strongest for the most straightforward ecological policy (fossil fuel restrictions) and less robust for the eco-social policies that also aim to enhance quality of life (WTR) and tackle the ideology of consumption (advertising limits). For the most socially oriented policy, improving access to healthcare, there was no such link in the RPL or MNL models.

The results of the latent class analysis further complicate the ostensibly positive relationship. Despite the prevalence in our sample of the association between sufficiency engagement and support for some policies (around 60%, or over 80% for fossil fuel cap), those who were most engaged in sufficiency behaviours (Class A) were not the most likely to

embrace eco-social degrowth policies. As such, the transformation pathway appears viable for building support around ecologically driven policies and movements. And certain sufficiency-oriented people may be open to the broader eco-social agenda of degrowth, realized through policies that improve living standards and provisioning for basic needs. However, there is not strong enough evidence to suggest that sufficiency lifestyles will politicize a diverse coalition toward broader societal transformation.

Supporting H5, the link between sufficiency and policy support appears to depend on other individual and socio-demographic characteristics. Our individual probability analysis indicates that support for eco-social degrowth policies is more likely amongst sufficiency-oriented people with higher incomes, more traditional paid employment, higher levels of education, leftist political orientation, universalism values, material simplicity values, and stronger climate change beliefs. While the results of this analysis may be considered less rigorous than the other analyses, they help contextualize the gap in support for socially oriented policies amongst those who practice sufficiency, adding nuance to existing literature.

The characteristics of Class C support prior claims that characterising degrowth as a form of eco-socialism may limit its appeal to a specific group of leftists (Kongshøj, 2023). Prior work on determinants of eco-social policy support also suggested higher incomes were associated with reduced support for redistributive and WTR policies (Khan et al., 2023). However, formal employment predicted support for WTR (Khan et al., 2023), consistent with our results. This finding lends support to a self-interested motive (e.g., Fanghella et al., 2023), e.g., that those in more traditional work arrangements seek a better work-life balance. However, working less without earning less may be viewed as a luxury reserved for those with steady employment (e.g., Pickup, 2023). With precarity and instability at work on the rise in the United States (Medaris, 2024), freelancers or hourly contractors may fear less time in paid work is associated with less financial stability (Khan et al., 2023). However, as this is symptomatic of broader issues associated with employment under capitalism, complementary proposals such as a jobs guarantee, universal care income, or universal basic services might offset such concerns (Fitzpatrick et al., 2022). These results are also consistent with prior work on support for post-growth ideas (i.e., growth-vs-environment debate), which found greater support amongst high income and employed or self-employed

people, those with higher educational attainment, and those high in post-materialist values (L. Paulson & Büchs, 2022).

These prior studies suggest that societal transformation beyond growth is not necessarily as compelling for disadvantaged or less progressive groups. Our results lend some support to this notion, and provide an additional layer of complexity, such that depending on a person's relative position in society and their political leanings, sufficiency engagement may either hinder or enhance degrowth policy support, at least for less ecologically focused policies.

We also explored how value-based factors directly influence degrowth policy support, including political ideology (H6) and universalism values (H7). Political ideology was significantly associated with all attributes except fossil fuel restrictions. Leftist political orientation appears to be one of the most consistent predictors for a range of degrowth policies, including more coercive policies associated with income redistribution and meat taxes (Khan et al., 2023), as well as environmental policy support more generally (Drews & van den Bergh, 2016; McCright et al., 2013). Our work shows that while this is indeed the case, there is still a preponderance of support for most of our policies amongst a centrist or even right-skewed sample compared to the status quo.

Our findings also show the limits of political ideology's influence, as it does not relate to fossil fuel restrictions. This policy, which is likely the most familiar to participants given its discussion in the media (D. Carrington, 2023; Morton et al., 2023), may be considered the least politically divisive policy objective of the bunch. Support for fossil fuel caps across Class A and C, despite their divergent views on politics and values, further suggests that fossil fuel restrictions present a less partisan entry point for garnering degrowth policy support, at least amongst centrists. However, it appears respondents mostly prefer a phase-out method of capping production annually over more ambitious dismantling strategies for ending fossil fuel reliance. This may be due to an awareness of the negative side-effects of ending fossil fuel production, including economic and labour-force concerns (e.g., McCarthy, 2019). When pushing for fossil fuel restrictions, it is important to simultaneously mitigate the employment and mental health impacts on workers of this industry, which tends to be ignored in the degrowth literature (Buch-Hansen & Nesterova, 2023).

Universalism values appeared to be much less influential in participants' policy support and presented somewhat counter-intuitive findings. That is, while Nature values

were associated with a preference for universal health insurance, the Concern values only made people more sensitive to taxes. They also diverge from prior work demonstrating the importance of environmental protection values and concern for equality (i.e., egalitarian worldview) (e.g., Drews & van den Bergh, 2016) as well as social justice values (Khan et al., 2023) in predicting environmental and eco-social policy support. Our findings suggest that general leftist orientation is a more influential and consistent predictor of degrowth policy support than specific values for human or environmental protection.

5.1.1.Implications for Degrowth Strategy

Recently, the degrowth movement has begun to contend with the question of movement strategy (Barlow et al., 2022), for which our results related to sufficiency behaviours (H4 & H5) offer a nuanced perspective. In acknowledging the multiplicity of currents, disciplinary focuses, and viewpoints within the movement (S. Paulson, 2017), these calls for strategy have at least two purposes: i) to push degrowth beyond the fringe, and ii) to avoid co-optation by actors that would undermine necessary system change (Barlow et al., 2022). Thus, strategy is important for building a broad base of support without losing sight of degrowth's transformational potential.

Our findings imply two divergent strategies for engendering degrowth policy support depending on the audience. For those who are already more likely to follow degrowth, sufficiency engagement does not appear to be a hindrance to building support for eco-social policies that also prioritise improving quality of life and reducing inequality. As such, promoting sufficiency-oriented lifestyles appears viable among more affluent, highly educated, and employed progressives, as opposed to merely engendering environmental concern (Kropfeld et al., 2018; Verfuerth et al., 2019) or promoting "better" consumption. For this group, the focus on consumption is appropriate and arguably necessary, given the excessive emissions associated with affluence (Wiedmann et al., 2020). This strategy aligns with calls for more research on the affluent to accelerate a sustainability transformation, as their visibility and influence could facilitate a shift in values and cultural norms (Gurtner & Moser, 2024; Wiedmann et al., 2020).

The focus on sufficiency might also be practical for developing support for specific ecological policies across a wide range of actors, including those with different political leanings and with lower status. However, while this approach may be important for winning

more immediate action on the necessary fossil fuel phase-out, our findings suggest it could undermine broader societal transformations.

As such, an overreliance on the sufficiency strategy might distance important social goals that are equally relevant for the degrowth movement. While consensus is beginning to converge on the need to end dependence on fossil fuels (McCarthy, 2019), the more fundamental link between anthropogenic activity and capitalism may be more easily accepted amongst those on the political left. However, focusing on sufficiency behaviours may be too narrow for building momentum around social policies across a broader spectrum of people. This approach may further reinforce misperceptions that degrowth is solely focused on consumption restrictions, which already exists amongst some socialists (Huber, 2022; Nineham & Huber, 2023). It may also promote individualised solutions that block system-level change.

For those outside degrowth's typical demographic groups, it might be more fruitful to focus on mollifying concerns surrounding the financial implications of degrowth policies and emphasising what is to be gained. The policies we included, especially WTR and public health insurance, are designed to protect disadvantaged groups (Paulson & Büchs, 2022). However, it is also possible that these same policies may instil financial uncertainty (Khan et al., 2023) come into conflict with aspirations of class mobility (e.g., the "American Dream") (e.g., Bliss, 2018; McIntyre, 2014), or appear politically infeasible (e.g., Trainer, 2021). Financial scarcity and economic disadvantage may make the immediate cost of financing these policies more salient than the potential future benefits (Goldsmith et al., 2020; Mullainathan & Shafir, 2013; Sheehy-Skeffington, 2020). Past work also suggests loss-framed messaging around degrowth, which may have been implied by the tax attribute, can induce fear and be counterproductive for garnering support (Tomaselli et al., 2021). Given the high failure rate of our comprehension check on the tax differential between the "1%" and "99%", it is unlikely our attempt at a more equitable distribution of income tax assuaged these concerns. While degrowth policy deals would ideally be funded through public spending (e.g., based on modern monetary theory, see Olk et al., 2023), and only focus on taxing the wealthy, the DCE methodology was constrained by pay consequentiality (e.g., Zawojska et al., 2019). Accordingly, our results may represent a lower bound to policy support, as support might increase when policies do not impose a personal cost. Additionally, income groups may have opposing interests, as lower income individuals may care more

about redistribution or public provisioning of goods, whereas higher income groups may oppose impositions on their wealth or private property (Paulson & Büchs, 2022). Finally, it is important to note that these demographics may already have a lower environmental footprint, underscoring the need to prioritise sufficiency amongst more affluent groups (Wiedmann et al., 2020).

5.2. Strengths, Limitations & Future Research

This research contributes empirical evidence to the dearth of literature on public perceptions of more detailed degrowth policy proposals, and provides novel insights on individual predictors of support. We have done so using a more rigorous method than those employed previously to systematically measure perceptions. This method allowed us to compare specific versions of each policy proposal, to pinpoint what level of departure from the status quo was most suitable. The within-subject design of a DCE also improves statistical power compared to between-subject designs (Maxwell & Delaney, 2004). Using a U.S. sample, especially one that is skewed to the right and slightly older, we are able to show that at least some degrowth policies are supported within a country and amongst demographics for which such support may be considered less likely.

In particular, we focused on the connection with sufficiency behaviours as a lifestyle change, which has not yet been tested empirically. The latent class and individual probability analyses provided a richer understanding of heterogeneity in attitudes and behaviours amongst U.S. respondents. Similar segmentation analyses have been used in prior work related to climate policies and have been lauded for their ability to assist in more effective messaging (Kácha et al., 2022). This study has uncovered important nuances about the degrowth policies that are more (e.g., fossil fuel restrictions) or less (e.g., advertising limits) preferable compared to the status quo across groups, as well as deeper insights about the characteristics of such groups that can be used for building effective communications around policy.

Finally, our use of a split sample, despite the lack of significant differences, strengthens the reliability of findings in a DCE (Rakotonarivo et al., 2016; Tonsor & Shupp, 2011). Given the political and potentially divisive nature of the growth-vs-environment debate, and degrowth's specific response to this debate, producing a single version of this

study would have presented a challenge. Either we risked alienating respondents with a solely degrowth-oriented framing, or we might have limited the scope of our exploration by using only a sanitised framing which side-stepped the issues around economic growth.

There are also several limitations to this research. First, there were issues with representativeness and generalisability. Despite being representative by gender and income, we under sampled racial and ethnic minorities, less educated, and younger people. It is essential that degrowth researchers empower the voices of the most marginalised groups in society, given the centrality of promoting justice and reducing inequality in degrowth's agenda (Rodríguez-Labajos et al., 2019). Future research should focus on perceptions of those who are disadvantaged, oppressed and have less access to power to promote democratic deliberation of degrowth policies (Howarth et al., 2020; Stirling, 2008). Additionally, while the United States is a large and diverse country, we cannot determine how generalisable these results are to other Western countries, nor can we directly compare to existing Swedish or U.K. studies given the divergence in selected policies and methodologies. Future work should focus on cross-country comparisons of the same policies, as employed by Faure et al. (2022) on energy efficiency policies.

Second, the DCE design limited the attributes we could choose, prohibiting i) policies that would directly influence a participant's income level, e.g., universal basic income, and ii) policies that would not impact all participants, e.g., wealth taxes. Given the role of income in people's support for post-growth ideas (Paulson & Büchs, 2022) and specific policies as we found, future work should probe such policies aimed at wealth redistribution and reducing inequality in a more systematic and detailed manor to reconcile the tensions between lower and higher income groups. Qualitative methods such as Q methodology, which was recently used to elicit perceptions of degrowth within European Parliament (Kallis et al., 2023), could circumvent the limitations on attribute selection.

Third, over 20% (N = 270) of our final sample from the survey research company failed both comprehension checks used for exclusions. This might be indicative of poor data quality from the survey research company, as the failure rate for each comprehension check was much higher amongst this sample than in our pilot data from Prolific.[76] However, it cannot be ruled out that our background information was difficult to follow, especially within the

[76] For the prolific sample, 9% failed the first check on 1.5 degrees, and 9% failed the second check on emissions targets. Meanwhile, amongst the survey research sample, 30% failed the first check, and nearly 37% failed the second check.

degrowth framing. We tried to streamline the facts provided through several rounds of editing and eliciting feedback from academic and non-academic audiences, however, the complexity of the topics covered required a certain amount of detail to provide respondents enough context. Deliberative methods such as workshops or focus groups would be better suited for conveying this background information (Ercan et al., 2022), whereby participants can ask questions and engage with the content for better comprehension.

Fourth, our chosen method of connecting sufficiency and policy preferences did not allow for causal interpretation of the relationship, and our sufficiency measure was self-reported. It also appears that the order of receiving the DCE may have influenced sufficiency engagement responses. Future work should consider ways to explore the transformation pathway that shows causation, for example by experimentally capturing sufficiency behaviours before measuring policy preferences. Future research could also examine how an individual's sufficiency practices may influence others in their community to support degrowth, i.e., by building a common sense of simple living (Kallis et al., 2020), to spark collective movements (Haenfler et al., 2012; Yates, 2015). While social norms messaging appeared ineffective at spurring support for low-consumption governance (Thorman et al., 2020), this research could further explore the role of status in social influence (e.g., Oldmeadow et al., 2003), to contribute more research on affluence and the role high income and high status individuals may play in driving cultural change (Gurtner & Moser, 2024).

More generally, we must recognize that a discrete choice experiment has its limitations when applied to degrowth research, as the method is rooted in neoclassical economic theories. Random Utility Theory (McFadden, 1974), which underpins the DCE design, incorporates assumptions about the maximisation of utility and the insatiability of demand that have led to overconsumption of goods and resources (Jackson et al., 2004). It also ignores the notion of planetary boundaries, assuming that any negative impacts on the environment or other humans are externalities to be internalised within the market (Gómez-Baggethun & Muradian, 2015). Indeed, DCEs are often deployed in environmental economics for the sake of placing a monetary value on environmentally destructive activities or outcomes, e.g., to determine an optimal level of pollution (Masriel et al., 2021). This is evidenced by the typical calculation of "willingness to pay," commodifying goods that are typically outside the market. These assumptions directly oppose the heterodox underpinnings of degrowth, which seeks to protect natural resources from further

commodification (Kallis et al., 2018). Acknowledging potential criticisms of choosing this methodology, I still believe the DCE offers a rigorous starting point for understanding policy preferences more systematically. I have further excluded willingness to pay calculations given the issues outlined here, and because degrowth policy deals are unlikely to be funded through personal taxation (Olk et al., 2023). However, as this does limit interpretability of the results, I have included WTP estimates for the main LCM model in **Appendix K.c**.

5.3. Conclusion

This chapter explores perceptions for degrowth policies amongst a U.S. sample using a discrete choice experiment. We found some significant support for each degrowth policy across a variety of specifications. In particular, fossil fuel restrictions and universal healthcare appear to be the most consistently supported policies, whilst limits to advertising experienced the lowest level of support across the sample. What's more, justifying the policy packages with arguments around the limits to growth and need for societal transformation did not invite protest or significantly reduce support. As political ideology did not influence support for fossil fuel restrictions, this policy should be prioritised both as a means of gaining momentum around degrowth ideas and as a climate mitigation strategy more generally. This policy is an especially important objective in America, which is one of the top emitters globally (European Commission Joint Research Centre, 2022), but where fossil fuel production continues to expand (Milman, 2023).

This study also found a positive yet complex relationship between sufficiency engagement and degrowth policy support, and delineated the individual characteristics for which this association is and is not conducive to the transformation pathway (e.g., Kallis et al., 2020). Across various specifications, our results indicate a significant and generally positive association between engagement in sufficiency behaviours and support for some degrowth policies, especially resource limits. These findings suggest that at least among more affluent, highly educated, and employed progressives, promoting a sufficiency-oriented lifestyle may be a gateway for garnering broader degrowth policy support, which is considered an important precondition for a degrowth transition (Buch-Hansen, 2018; Kongshøj, 2023). The connections between sufficiency, affluence and status should be given more attention in the degrowth literature (Gurtner & Moser, 2024).

However, care must be applied to the topics of sufficiency and financial constraints when promoting degrowth amongst disadvantaged groups as well as those with less altruistic and progressive values. Being more concerned with sufficiency may crowd out support for policies that are less obviously relevant to environment protection, such as universal healthcare and work time reductions, depending on other demographic and value-based factors. As degrowth and the policies it proposes are aimed at reducing inequality, it is essential that the movement engage with those outside of the white, higher income, highly educated and progressive academics and activists who appear to dominate support for degrowth (Kongshøj, 2023).

This study highlights how important it is to understand perceptions of degrowth policies amongst a diverse range of interests, in order to tailor the policies themselves as well as communications strategies surrounding them to overcome perception barriers. Policies such as work time reductions that were designed to benefit disadvantaged groups may actually instil fear or uncertainty. While those in stable positions may find hope in the utopian future these changes promise (e.g., Tomaselli et al., 2021), those who are financially insecure may have a heightened sense of the immediate negative consequences of a degrowth transition (Goldsmith et al., 2020; Mullainathan & Shafir, 2013; Sheehy-Skeffington, 2020), such as losing jobs in polluting industries (e.g., Buch-Hansen & Nesterova, 2023). Even if societal transformation is undeniably worthwhile, scholars should focus adequate attention on alleviating anticipated economic or social burdens amongst less privileged groups throughout the transition process itself.

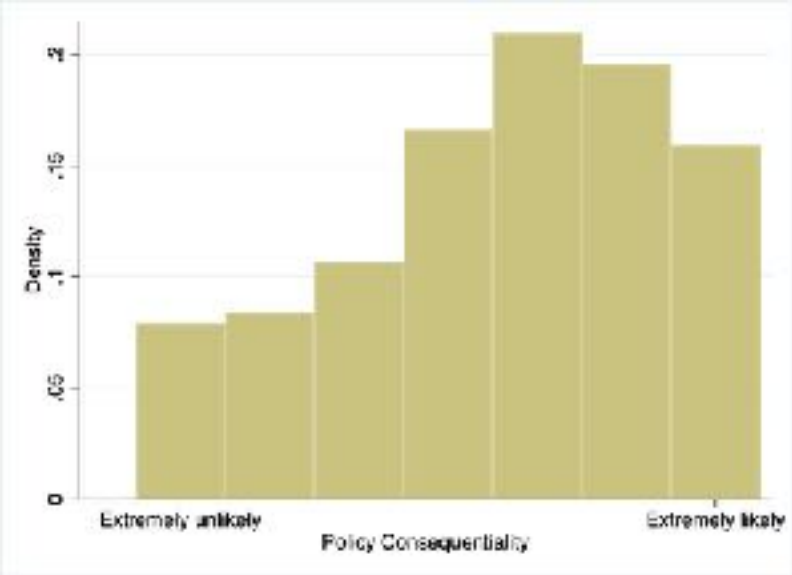
To understand better pathways for garnering social policy support, regularly engaging with everyday citizens can help shape the degrowth agenda to work for the masses, based on lived experiences and not what is theoretically viable. This process also promotes the tenet of democratic deliberation that appears central to degrowth (e.g., Cosme et al., 2017), whilst making degrowth more accessible and relatable. Otherwise, the degrowth movement may risk leaving behind those who could benefit the most from the transformational change it promises.

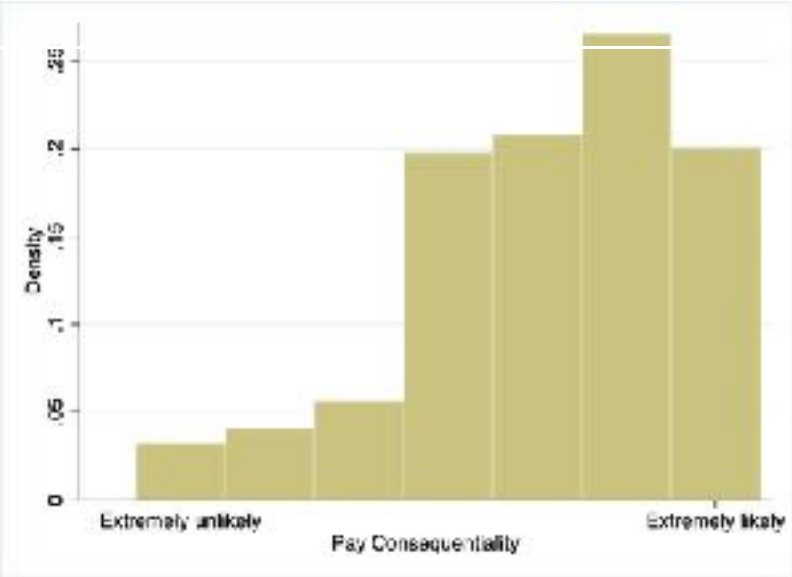
6. Appendix

A. Policy And Pay Consequentiality - Hypotheses & Analyses

Based on best practices associated with a discrete choice experiment, it is considered important to check that the scenario and associated payment vehicles were believable (Johnston et al., 2017). If participants do not believe the context, they will not make decisions that reflect their actual preferences, which diminishes the reliability of stated preference methods (Welling et al., 2022; Zawojska et al., 2019). Further, perceptions of consequentiality are likely to influence participants choices. As such, we pre-registered the following two hypotheses related to consequentiality:

H8: Policy consequentiality beliefs will increase preferences for alternative policies over the status quo.
H9: Pay consequentiality beliefs will increase preferences for alternative policies over the status quo.





Descriptively, **Figure 47** and **Figure 48** indicate that there was moderate to good consequentiality for both measures, as both histograms display a distribution that is weighted toward “Extremely likely” on the 7-point scale.

To test H8 and H9, we selected the simpler MNL model given the auxiliary nature of these hypotheses, i.e., that they are meant to assess the validity of our design choices instead of producing confirmatory results with contributions to the literature. **Table 106** reports the results for the two analyses, where column (1) includes an interaction with policy consequentiality, and column (2) includes an interaction with pay consequentiality.

In column (1), stronger policy consequentiality beliefs were associated with reduced likelihood of selecting the status quo, a preference for expanding Medicaid over universal healthcare, and reduced sensitivity to taxes, all at the 1% level of significance. These findings suggest some evidence in favour of H8 with respect to health insurance policies, but not for any of the other degrowth policies.

In column (2), stronger payment consequentiality beliefs were also associated with a reduced preference for the status quo, at the 1% significance level, and a stronger preference for expanding Medicaid over universal health insurance, at the 5% significance level. However, it did not influence their sensitivity to the tax attribute, nor their preferences for any other degrowth policies. These results also provide some support in favour of H9 with respect to health insurance policies, but for none of the other degrowth policies.

Table 106 - MNL Model Results with Policy and Pay Consequentiality Interactions

	(1)		(2)	
	MNL			
Dependent Variable: Choice	**Policies Selected**		**Payment Vehicle**	
Status Quo	0.673	**	0.798	**
	(0.327)		(0.38)	
Work Time	0.141	***	0.143	**
	(0.052)		(0.067)	
Resource Limits	-0.219	**	-0.092	
	(0.087)		(0.1)	
Ad Limits	0.071		-0.013	
	(0.075)		(0.087)	
Health Insurance	0.589	***	0.474	***
	(0.098)		(0.121)	
Emissions	0.077		-0.019	
	(0.051)		(0.062)	
Taxes	-0.307	***	-0.155	**
	(0.061)		(0.076)	
Status Quo x Consequentiality	-0.238	***	-0.239	***
	(0.064)		(0.071)	
Work Time x Consequentiality	-0.015		-0.014	
	(0.01)		(0.012)	
Resource Limits x Consequentiality	0.015		-0.01	
	(0.017)		(0.019)	
Ad Limits x Consequentiality	-0.023		-0.005	
	(0.015)		(0.016)	
Health Insurance x Consequentiality	-0.082	***	-0.053	**
	(0.019)		(0.022)	
Emissions x Consequentiality	-0.006		0.013	
	(0.01)		(0.011)	
Taxes x Consequentiality	0.032	***	0.000	
	(0.012)		(0.014)	
N	1,012		1,012	
Pseudo R^2	0.03		0.03	

Log Likelihood	-8,569.61	-8,585.67
AIC	17,167.22	17,199.33
BIC	17,265.11	17,297.22

Note: This table displays results from multinomial logit model with interactions for the consequentiality variables. Robust standard errors are reported in parentheses. Columns (1), shows the results when interacting with policy consequentiality, whilst column (2) displays results associated with pay consequentiality. * p <.1, **p <.05, *** p <.01.

B. Qualitative Focus Group – Description & Participant Characteristics

We conducted three focus groups during the summer of 2022, using a convenience sample of N = 14 participants total from the United States. Each group comprised 4-6 participants, based on recommendations from Breen (2006). The focus group sessions discussed the background of social and ecological issues in the U.S. context, focusing on eliciting feedback about these topics from participants using the same question protocol in each session. The word degrowth was never used. The need for reducing consumption and production to fit within planetary boundaries, as well as inequalities around consumption and needs satisfaction, were provided as background context. The facilitator then introduced five policies, i.e., the four contained in the DCE plus one about universal basic income, which was ultimately dropped from the experiment. Participants gave their feedback about the policies and specific levels included. Overall, there was support for most policies, but scepticism that the U.S. government would ever enact them. See **Table 107** for sample statistics, based on the limited demographic data that was obtained. All participants received a university degree or more.

Table 107 - Demographic Characteristics of Focus Group Participants

	N = 14			
Variable	**Mean**	**SD**	**Count**	**Percent**
Age	42.4	16.8	-	-
Income (in $1,000s)	110.2	59.3	-	-
Political Affiliation	3.7	2.3	-	-
Gender				
Female	-	-	9	64.3%
Male	-	-	5	35.7%
Race and Ethnicity				
White	-	-	10	71.4%
Asian	-	-	-	-
Black	-	-	2	14.3%
Not Otherwise Listed	-	-	2	14.3%
Hispanic or Latin American				

Yes	-	-	2	14.3%
No	-	-	12	85.7%

Note: All participants resided in the United States at the time of the focus group. Income is in thousands. Political ideology ranges from 0 – 10, using the same measure as in our DCE.

C. Econometric Models – Utility Parameters and Probability Functions

The following descriptions were adapted from past DCE papers, including Contu et al. (2016), Kruse and Atkinson (2022).

In choice modelling, the utility of the individual *i* for an alternative choice *j* is given by:

$$U_{ij} = V_{ij} + \varepsilon_{ij} \qquad (1)$$

Further, V_{ij} is given by equation (2), where *X* is the matrix of the *k* attributes. β is the vector of coefficients that will be estimated, with a scale parameter normalized to one.

$$V_{ij} = \Sigma\, \beta_{ikj} X'_{ikj} \qquad (2)$$

For the MNL model, one further assumes that error terms are independently and identically distributed (I.I.D.) to define the random component, using a Gumbel Distribution. The MNL model also implies independence of irrelevant alternatives (IIA) and assumes taste homogeneity across respondents (e.g., Strazzera et al., 2012). The choice probability P for every choice *t* is represented by equation (3), where *X* is a vector of *k* attributes in levels, and β is a vector of utility parameters to be estimated.

$$P_{ijt} = \frac{exp(\beta_k X'_{kjt})}{\sum_j exp(\beta_k X'_{kjt})} \qquad (3)$$

However, this assumption on preference homogeneity might be considered too restrictive, especially in political contexts (Contu et al., 2016; Kruse & Atkinson, 2022). To overcome this restriction, the RPL model relaxes the homogeneity assumption, allowing instead for preference heterogeneity (Hensher & Greene, 2003; Revelt & Train, 1998). This model's utility function assumes a continuous distribution, with a mean value β_k and idiosyncratic random deviation η_{ik} for each respondent *i* and each attribute *K*:

$$U_{ijt} = \beta_k X'_{kjt} + \eta_{ik} X'_{kjt} + \varepsilon_{ijt} \qquad (4)$$

For the RPL model, the choice probability is therefore given by equation (5), where $f(\beta_i \mid \theta)$ represents the density function for the vector of preference parameters β, and allows vector β to follow a random distribution with parameters θ. As the analyst must specify the random distribution, we used a normal distribution for all parameters except tax. We set to this attribute to negative log-normal, based on the assumption in standard economic theory that respondents would not prefer higher taxes.

$$P_{ijt} = \int \frac{exp(\beta_{ik} X'_{kjt})}{\Sigma_j exp(\beta_{ik} X'_{kjt})} f(\beta_i \mid \theta) d\beta_i \qquad (5)$$

The RPL requires a simulated maximum likelihood estimation, whereby the researcher must specify the number of draws. This number can influence the stability and precision of results, such that a sufficiently large number of draws is important (e.g., Czajkowski & Budziński, 2019). Our main models used 500 inter-person Halton-draws, but we ran robustness checks using 1,000 draws to check the stability of our results.

Alternatively, the latent class model is useful if preferences can be seen as relatively homogenous within specified groups, but where there are greater differences between groups (Boxall & Adamowicz, 2002). The LCM provides some benefits over the RPL, in that the researcher does not have to select the distribution function. However, it involves more assumptions on the part of the researcher in specifying the number of classes to model. In the LCM, utility is estimated for distinct classes or groups with the same parameters in each class or segment *s*, such that there is a utility parameter for each segment:

$$U_{ij|s} = V_{ij|s} + \varepsilon_{ij|s} \qquad (6)$$

The unconditional choice probability is given by equation (7), where $Pr_{j|s}$ is the conditional choice probability based on class membership probability h_s:

$$Pr_{ij} = \Sigma_s \, h_s Pr_{j|s} \qquad (7)$$

$Pr_{j|s}$ and h_s are further specified as follows, where Z_s represents the matrix of selected covariates that predict the segment membership probability.

$$Pr_{j|s} = \frac{exp(\beta_{k|s} X'_{kjt})}{\sum_j exp(\beta_{k|s} X'_{kjt})} \qquad (8)$$

$$h_s = \frac{exp(\gamma_s Z_s)}{\Sigma_s exp(\gamma_s Z_s)} \quad (9)$$

Each segment's membership probability is estimated using a simple MNL, assuming a logistic distribution. To further contextualise class allocation, *h* can be conditioned on individual level covariates, including demographics, attitudes, or values collected within the survey (Strazzera et al., 2012). The researcher must also select the relevant covariates for inclusion in the LCM. Given the researcher's control over these covariates, it is important to select individual characteristics that are theoretically relevant (Weller et al., 2020; Wurpts & Geiser, 2014). Membership probabilities can thus be represented as:

$$h_s = \frac{exp(\delta_s W_c)}{\Sigma_{s=1}^{S} exp(\delta_s W_c)} \quad (10)$$

where W_c is a vector of c covariates and δ_s is a vector of coefficients for each individual segment *s*.

D. Covariate Measures Included in Survey

Unless otherwise stated, items in a multi-item scale were averaged to create a composite measure.

Trust in government (a = 0.76):
(Faure et al., 2022; Kettle & Dow, 2016; Kim et al., 2013)

Please report the extent to which you agree with the following statements regarding the US government as a whole, including all branches and localities (1 = Strongly disagree; 7 = Strongly agree):

1. The government takes into account many perspectives when making a decision about policies related to social and/or ecological issues.
2. The government provides all of the available information to the public when making a decision about policies related to social and/or ecological issues.
3. In general, I trust the government.
4. The government is too influenced by industry and private interests to address any social and/or ecological issues. [*reverse coded*]

Political ideology:
(Whitmarsh & Corner, 2017)

In politics people sometimes talk of "left" and "right". Using the scale below, where would you place yourself on the political spectrum? (Left = 0, Right = 10)

Voluntary simplicity beliefs, material simplicity sub-scale (a = 0.65):
(Rich et al., 2020)

Please report the extent to which you agree with the following statements (1 = Strongly disagree; 7 = Strongly agree):

1. I do not need many material things to live a fulfilling life.
2. I do not have many possessions.
3. Keeping up with other people in terms of status and possessions is not important.

Universalism - concern (a = 0.81) & nature (a = 0.87):
(Schwartz et al., 2012)
Please report the extent to which you agree with the following statements (1 = Strongly disagree; 7 = Strongly agree):

1. Protecting society's weak and vulnerable members is important to me.
2. I think it is important that every person in the world have equal opportunities in life.
3. I want everyone to be treated justly, even people I don't know.
4. I strongly believe that I should care for nature.
5. It is important to me to work against threats to the world of nature.
6. Protecting the natural environment from destruction or pollution is important to me.

Statements 1-3 were averaged for Concern values, whereas statements 4-6 were averaged for Nature values.

E. DCE Debrief Questions & Summary of Responses

Climate Beliefs (a = 0.80)
(Kruse & Atkinson, 2022; Zaval et al., 2014)

Please report the extent to which you agree with the following statements (1 = Strongly disagree, 7 = Strongly agree):

1. Climate change is already happening.
2. Climate change is largely caused by nature. [*reverse coded*]
3. Greenhouse Gases such as Carbon Dioxide (CO2) are the main cause of climate change.
4. The rise in Greenhouse Gases such as Carbon Dioxide (CO2) is largely caused by human activities.
5. Our children's generation will be negatively impacted by climate change in the future

Poverty Beliefs
(Kruse & Atkinson, 2022)

In your opinion, which is the bigger cause of poverty today?
Responses options included:

(1) People are not doing enough to help themselves out of poverty.
(2) Circumstances beyond their control cause them to be poor.
(3) Don't know

The responses of the "Don't know" group were set to missing, though observations were not dropped.

a. Rating each policy attribute by personal importance

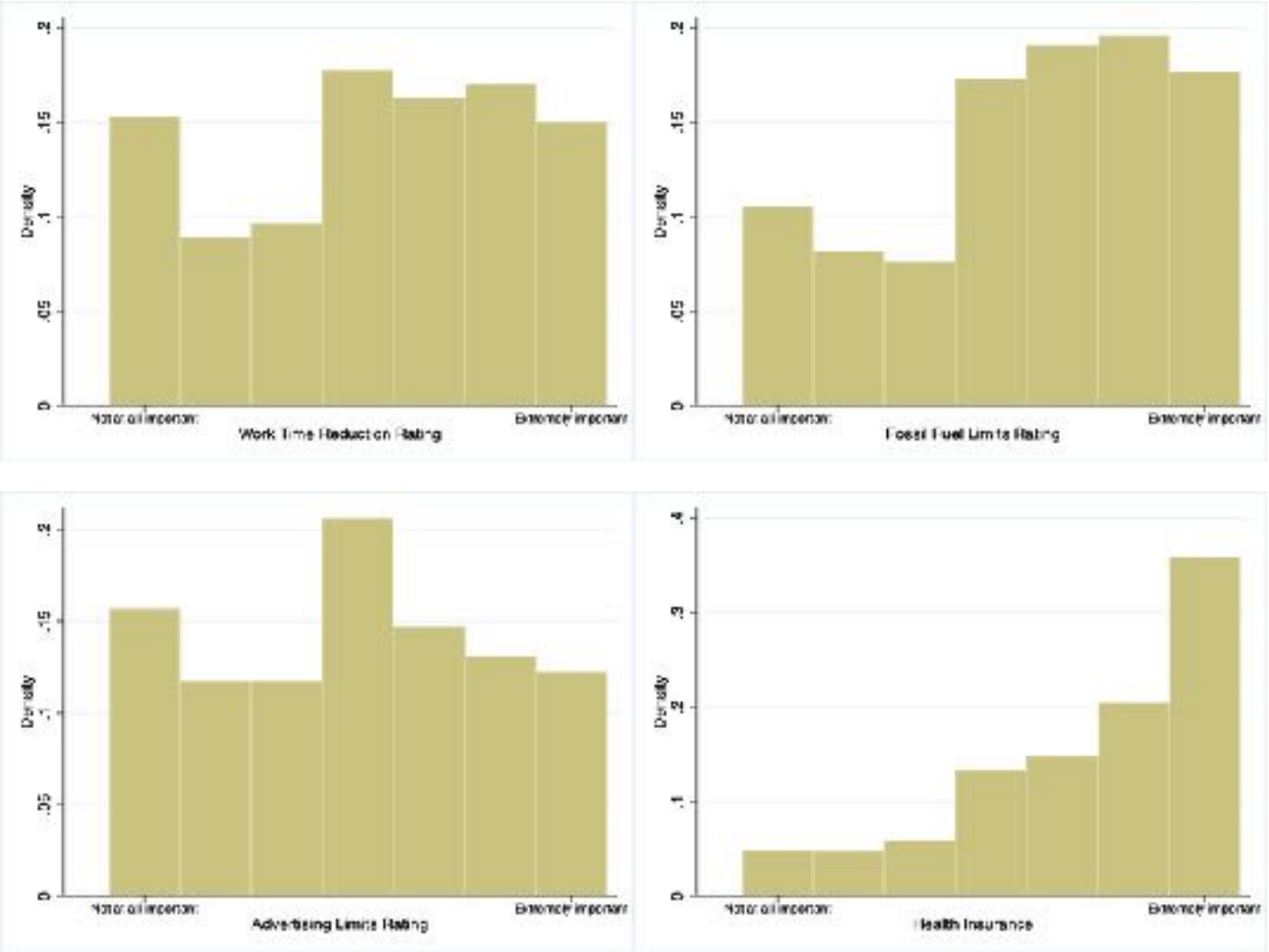
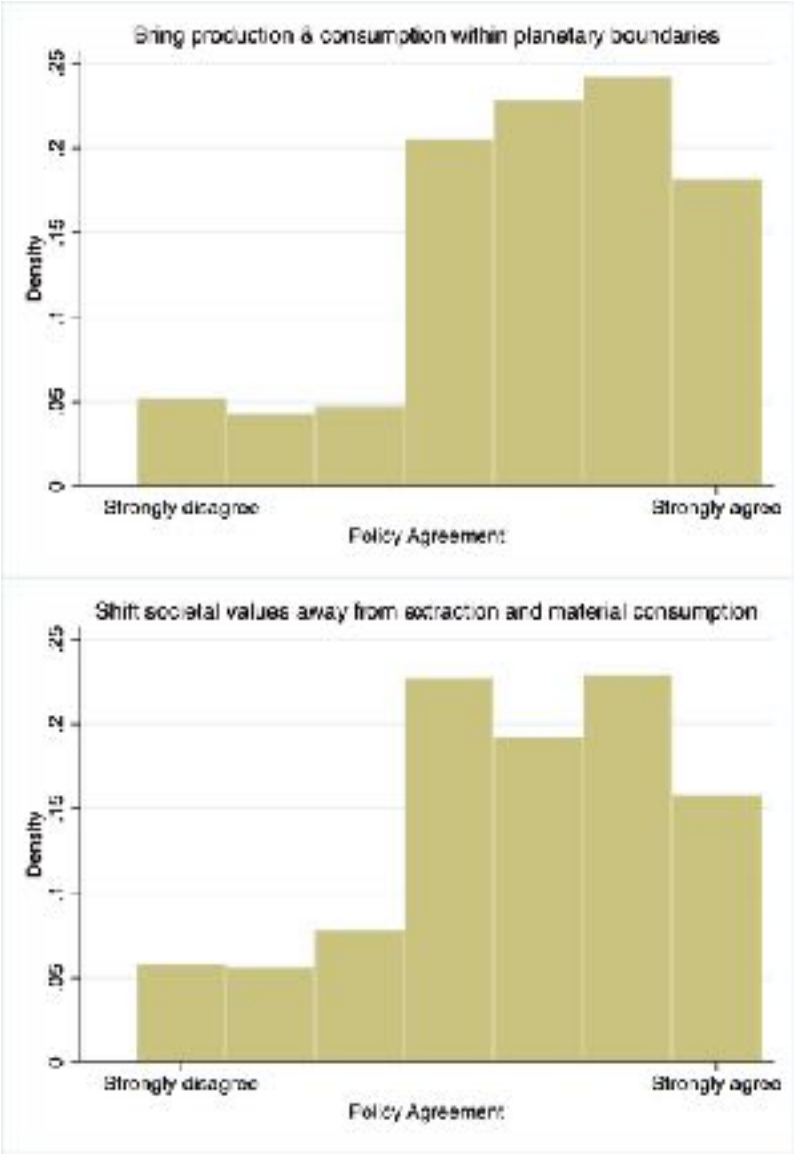


Figure 49 - *"Can you please indicate how important these issues are to you personally, where 1=Not at all important and 7=Extremely important to me."*

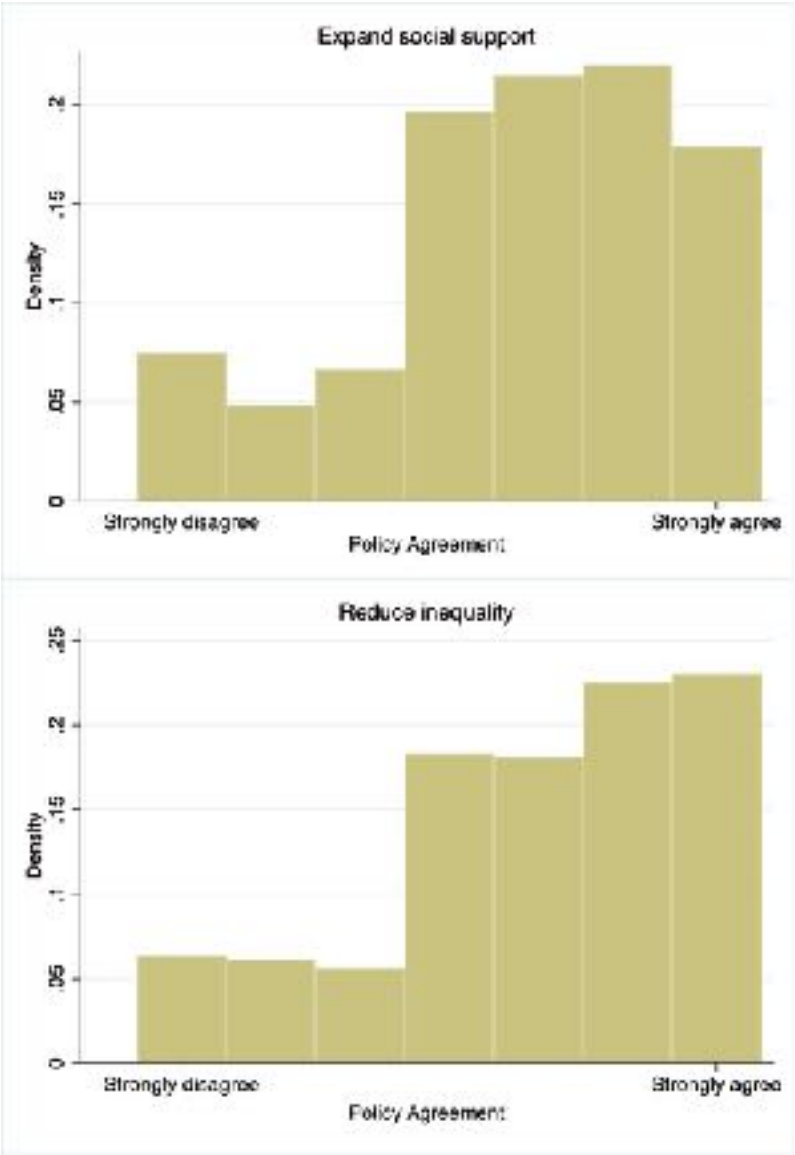
b. Agreement with degrowth's ecological policy objectives

Figure 50 - *"The US government should create policies that:"*

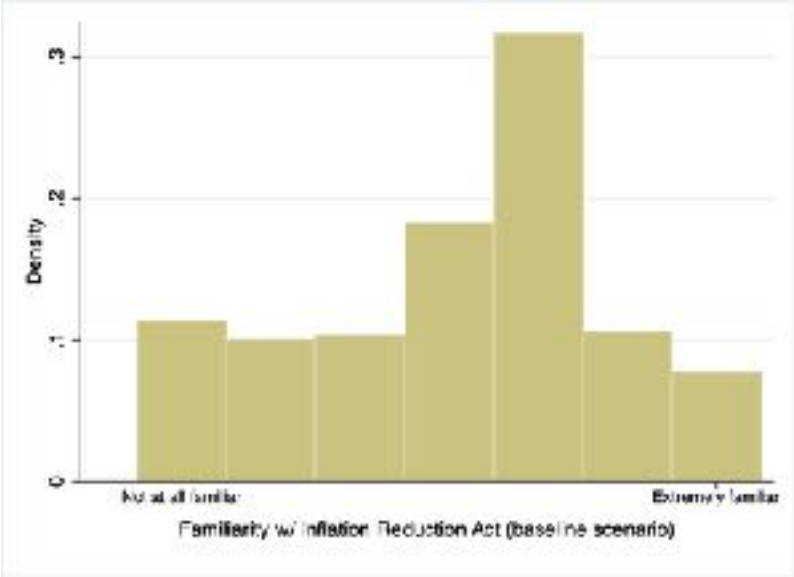


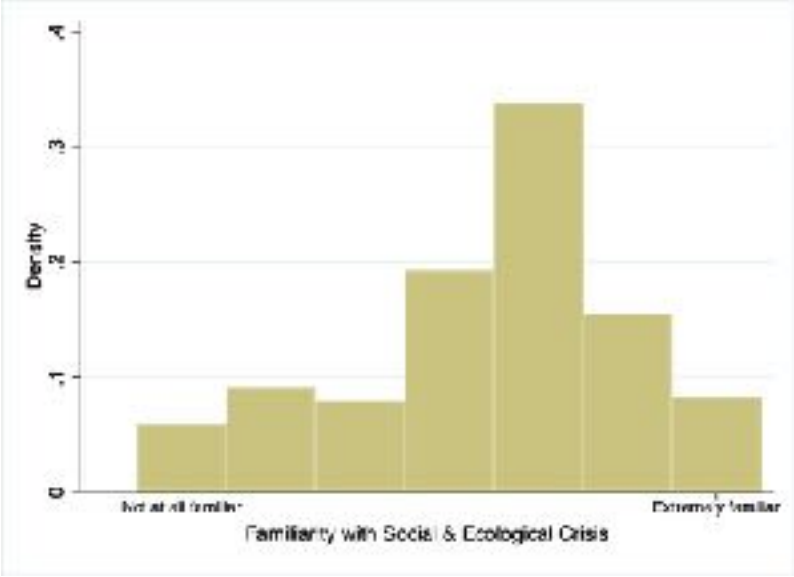
c. Agreement with degrowth's social policy objectives

Figure 51 - ***"The US government should create policies that:"***

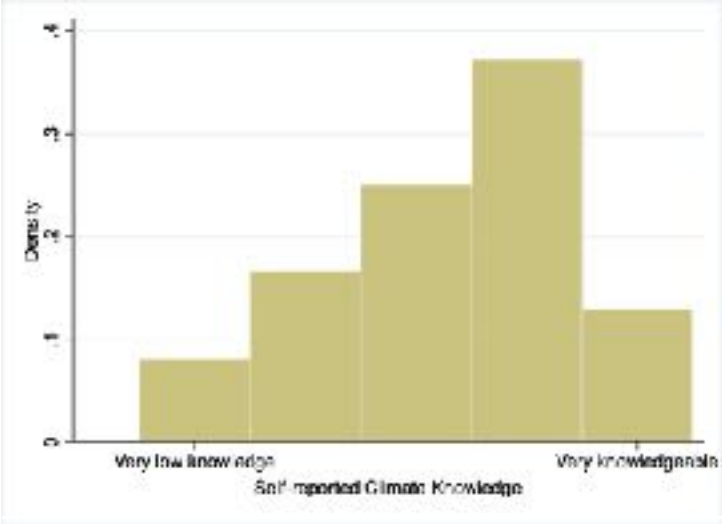


d. Familiarity with social & ecological crisis / Inflation Reduction Act (baseline scenario)





e. Climate Knowledge



F. End-of-Survey Debrief for Control Group

The control group received the following text at the end of their survey, to accommodate for the streamlined background information they received.

"*We varied the depth of information provided in the introductory text regarding the social and ecological crisis: you did not receive information about an appeal by the Intergovernmental Panel on Climate Change (IPCC) to transform economic systems, in affluent societies like America, by reducing consumption and production and expanding social support to solve this crisis. This is a policy objective that would shift societal priorities away from excessive consumption and resource depletion, while providing more social support to ensure that these changes do not reduce quality of life.*"

G. Survey Ordering Effects - Multinomial Logit

To determine if the survey order influenced respondents' choices, we first tested the effect on respondent's selection of policy packages. **Table *108*** displays the results of an MNL with an interaction for each attribute and a dummy indicating the survey order. None of the interaction terms were significant. We inferred from these results that receiving the sufficiency questions did not prime or influence responses to the policy support questions.

Table 108 – MNL Model Results with Survey Order Interactions

Dependent Variable: Choice	MNL (Coeff)	
Status Quo	0.127	
	(0.354)	
Work Time	0.08	
	(0.056)	
Resource Limits	-0.071	
	(0.093)	
Ad Limits	0.032	
	(0.082)	
		**
Health Insurance	0.315	*
	(0.105)	
Emissions	0.096	*
	(0.055)	
Taxes	-0.163	**
	(0.064)	
Status Quo x Survey Order	-0.362	
	(0.225)	
Work Time x Survey Order	-0.006	
	(0.036)	
Resource Limits x Survey Order	-0.049	
	(0.058)	
Ad Limits x Survey Order	-0.045	
	(0.052)	
Health Insurance x Survey Order	-0.075	
	(0.066)	
Emissions x Survey Order	-0.031	
	(0.035)	
Taxes x Survey Order	0.006	
	(0.041)	
N	1,012	
Pseudo R^2	0.02	
Log Likelihood	-8622.65	

AIC	17273.29
BIC	17371.18

Note: This table displays results from a multinomial logit model, interacting each attribute with the survey order variable. Robust standard errors are reported in parentheses. The survey order variable is a binary variable for sufficiency questions first (0) or DCE first (1). *** p<0.01, ** p<0.05, * p<0.1.

H. Balance Checks Comparing Two Experimental Groups by Demographics and Characteristics

Table 109 - T-Test Comparing Framing Treatment Groups

Variable	Difference	T-Statistic	P-Value
Income	0.07	(0.6)	(0.551)
Age	-0.20	(-0.18)	(0.86)
Race	0.04	(0.91)	(0.361)
Political Identity	0.10	(0.55)	(0.584)
Climate Knowledge	-0.08	(-1.13)	(0.259)
Climate Beliefs	-0.10	(-1.24)	(0.214)
Trust in Government	-0.02	(-0.30)	(0.763)
Voluntary Simplicity	0.01	(0.12)	(0.903)
Universalism (Concern)	0.03	(0.37)	(0.714)
Universalism (Nature)	-0.02	(-0.24)	(0.809)
N	1,012		

Note: Difference contains the mean differences by treatment group, while t-statistic and p-value reports the results of the t-test. As all p-values are above 0.05, none of the differences by group are statistically significant.

Table 110 - ANOVA for Categorical Variable by Treatment Group

Variable	Partial SS	df	F	Prob>F
Gender	0.003	1	0.01	0.9138
Education	0.123	1	0.1	0.7522
Race & Ethnicity	0.336	1	0.84	0.361
Hispanic	0.111	1	1.43	0.2321

Note: Partial SS is the partial sum of squares, df is the degrees of freedom, and F is the F-statistic of the ANOVA. Prob>F represents the p-value or probability of a significant difference across the categories of a

variable. As all p-values are above 0.05, treatment does not significantly predict any differences by category for any of the variables.

I. Demographic Comparison between Sample and U.S. General Population

Table 111 - Demographic Statistics - Sample vs. U.S. Population

Demographic	Sample Median	U.S. Population Median
Age	47	38.9
Income	$50,000 - $74,999	$74,580

Demographic	Category	Sample %	U.S. Population %
Gender	Female	51.0%	50.40%
	Male	48.8%	49.60%
Race & Ethnicity	Asian	2.2%	6.3%
	Black	8.1%	13.6%
	White	86.3%	75.5%
	North American Indigenous	0.9%	1.3%
	Native Hawaiian/Pacific Islander	0.1%	0.3%
	Not otherwise listed	2.5%	3.0%
	Hispanic	8.5%	19.1%
Education	High school graduate or higher	97.7%	89.1%
	Bachelor's degree or higher	52.4%	34.3%

Note: The top panel compares continuous variables, whereas the bottom panel includes categorical variables. Categories were split up depending on availability of U.S. data and may not be as granular as our surveyed categories (e.g., education). While we recorded participants' gender (i.e., how they identify), we could only find suitable U.S. data on sex. All data on the U.S. population are originally sourced from the U.S. Census Bureau Vintage 2022 dataset. Specific values for race & ethnicity, education, and gender were obtained from the U.S. Census Bureau QuickFacts (2022). Age and income values were obtained from summary webpages, entitled "America is Getting Older" (US Census Bureau, 2022) and "Income in the United States: 2022" (US Census Bureau, 2022), respectively.

J. LCM with Framing Treatment as Covariate

Table 112 - LCM-3 Results with Framing Treatment as Covariate

Variable	Class A		Class B		Class C	
Status Quo	-1.19	***	2.25	***	-3.03	***
	(0.31)		(0.85)		(0.27)	
Work Time	-0.01		-0.26		0.09	***
	(0.05)		(0.18)		(0.02)	
Resource Limits	-0.29	***	0.19		-0.11	***
	(0.08)		(0.34)		(0.04)	
Ad Limits	-0.06		-0.35		-0.03	
	(0.08)		(0.31)		(0.03)	
Health Insurance	-0.01		0.00		0.25	***
	(0.1)		(0.38)		(0.05)	
Emissions	-0.01		-0.33		0.07	***
	(0.05)		(0.25)		(0.02)	
Taxes	-0.30	***	-0.26		-0.12	***
	(0.06)		(0.21)		(0.03)	
Class Membership Function						
Constant	0.18		-		1.26	***
	(0.19)		-		(0.13)	
Framing Treatment	0.00		-		-0.07	
	(0.23)		-		(0.18)	
Mean Prob	0.21		0.18		0.61	
Pseudo R^2	0.25		-		-	
N	1,012		-		-	
Log Likelihood	-6,582.79		-		-	
AIC	13,215.58		-		-	
BIC	13,390.37		-		-	

Note: This table shows the results of a latent class model with 3 classes. Class B is the reference group, so the covariate estimates should be interpreted relative to this class. Framing Treatment is binary, with control (0) and treatment (1). *** p<0.01, ** p<0.05, * p<0.1.

Table 113 - LCM-4 Results with Framing Treatment as Covariate

	Class A		Class B		Class C		Class D	
Status Quo	-1.23	***	2.24	***	-2.81	***	-34.39	
	(0.29)		(0.84)		(0.29)		(82.23)	
Work Time	-0.01		-0.26		0.11	***	0.09	
	(0.05)		(0.18)		(0.03)		(0.26)	
Resource Limits	-0.29	***	0.19		-0.11	***	-0.29	
	(0.08)		(0.33)		(0.04)		(0.33)	
Ad Limits	-0.05		-0.34		-0.05		0.43	
	(0.07)		(0.3)		(0.03)		(0.36)	
Health Insurance	-0.01		0.00		0.27	***	-0.28	
	(0.1)		(0.36)		(0.05)		(0.51)	
Emissions	-0.01		-0.32		0.07	***	0.47	***
	(0.05)		(0.23)		(0.02)		(0.17)	
Taxes	-0.30	***	-0.26		-0.04		-9.66	
	(0.06)		(0.21)		(0.03)		(40.31)	
Class Membership Function								
Constant	0.21		-		1.14	***	-1.08	***
	(0.19)		-		(0.14)		(0.23)	
Framing Treatment	0.00		-		-0.03		-0.61	
	(0.23)		-		(0.18)		(0.37)	
Mean Prob	0.22		0.18		0.55		0.05	
	0.26		-		-		-	
N	1,012		-		-		-	
Log Likelihood	-6,522.15		-		-		-	
AIC	13,112.30		-		-		-	
BIC	13,350.03		-		-		-	

Note: This table shows the results of a latent class model with 4 classes, A, B, C, and D. Class B is the reference group, so the covariate estimates should be interpreted relative to this class. Framing Treatment is binary, with control (0) and treatment (1). *** p<0.01, ** p<0.05, * p<0.1.

K. Robustness Checks

a. MNL

Table 114 – MNL Model Results with Sufficiency Interactions

	MNL			
	(1)		(2)	
Dependent Variable: Choice	Binary		Continuous	
Status Quo	-0.17		1.463	***
	(0.163)		(0.375)	
Work Time	0.058	**	0.046	
	(0.026)		(0.061)	
Resource Limits	-0.234	***	-0.42	***
	(0.043)		(0.099)	
Ad Limits	-0.1	***	-0.064	
	(0.038)		(0.087)	
Health Insurance	0.22	***	0.372	***
	(0.051)		(0.11)	
Emissions	0.083	***	0.119	**
	(0.026)		(0.057)	
Taxes	-0.173	***	-0.298	***
	(0.032)		(0.074)	
Status Quo x Sufficiency	-0.797	***	-0.548	***
	(0.226)		(0.091)	
Work Time x Sufficiency	0.024		0.006	
	(0.036)		(0.014)	
Resource Limits x Sufficiency	0.171	***	0.068	***
	(0.058)		(0.023)	
Ad Limits x Sufficiency	0.125	**	0.007	
	(0.052)		(0.02)	
Health Insurance x Sufficiency	-0.033		-0.042	*
	(0.066)		(0.025)	
Emissions x Sufficiency	-0.066	*	-0.017	

	MNL	
	(1)	(2)
Dependent Variable: Choice	Binary	Continuous
	(0.035)	(0.013)
Taxes x Sufficiency	0.037	0.036 **
	(0.041)	(0.017)
N	1,012	1,012
Pseudo R^2	0.05	0.07
Log Likelihood	-8,386.36	-8,169.29
AIC	16,800.72	16,366.58
BIC	16,898.61	16,464.47

Note: This table displays results from a multinomial logit model, interacting each attribute with the sufficiency behaviours variable. In column (1) the variable is treated as binary, whereas in the column (2) it is treated as a continuous average of engagement in the 12 items, ranging from 1 (Never) to 7 (Always). Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

b. RPL

Table 115 - RPL Model Results with Political Ideology Interactions (1K Draws)

	(1)	(2)
	RPL	
Dependent Variable: Choice	Coeff (SE)	S.D.
Status Quo	-5.423 ***	3.786 ***
	(0.398)	(0.367)
Work Time	0.268 ***	0.377 ***
	(0.06)	(0.043)
Resource Limits	-0.097	0.508 ***
	(0.076)	(0.06)
Ad Limits	0.012	0.008
	(0.015)	(0.034)
Health Insurance	0.678 ***	0.744 ***
	(0.108)	(0.066)
Emissions	0.266 ***	-0.25 ***

	(1)		(2)
	RPL		
Dependent Variable: Choice	**Coeff (SE)**		**S.D.**
	(0.053)		(0.04)
Taxes	-2.042	***	-2.012
	(0.295)		(0.176)
Status Quo x Political ID	0.407	***	-
	(0.058)		-
Work Time x Political ID	-0.041	***	-
	(0.011)		-
Resource Limits x Political ID	-0.022	*	-
	(0.013)		-
Ad Limits x Political ID	-0.013	**	-
	(0.006)		-
Health Insurance x Political ID	-0.097	***	-
	(0.018)		-
Emissions x Political ID	-0.041	***	-
	(0.009)		-
Taxes x Political ID	0.017	***	-
	(0.007)		-
N	911		-
Pseudo R^2	0.28		-
Log Likelihood	-5,685.27		-
AIC	11,412.54		-
BIC	11,557.14		-

Note: This table displays results from a random parameters logit model, interacting each attribute with the political identity variable. 1,000 inter-person Halton Draws were used. Robust standard errors are reported in parentheses. Column (2) shows the standard deviations associated with the RPL model's coefficients, displayed in column (1). The political ideology variable is continuous, from 0 (Left) to 10 (Right). Otherwise, all details are consistent with the RPL in **Table 102**, columns (2) and (3). *** p<0.01, ** p<0.05, * p<0.1.

Table 116 - Robustness Checks for RPL Model w/ Sufficiency Interaction (Binary)

	(1)		(2)		(3)	
	RPL					
Dependent Variable: Choice	1K Halton Draws		Dropping Low Income		Dropping High Income	
Panel A: Coefficients						
Status Quo	-2.000	***	2.282	**	1.508	*
	(0.283)		(0.928)		(0.786)	
Work Time	0.044		0.028		-0.029	
	(0.044)		(0.031)		(0.04)	
Resource Limits	-0.339	***	-0.844	***	-0.638	***
	(0.06)		(0.166)		(0.165)	
Ad Limits	-0.125	***	-0.179		-0.097	**
	(0.042)		(0.12)		(0.045)	
Health Insurance	0.19	***	0.454	***	0.289	***
	(0.054)		(0.148)		(0.102)	
Emissions	0.093	**	0.098		0.134	
	(0.046)		(0.07)		(0.114)	
Taxes	-2.033	***	-0.804	**	-0.948	***
	(0.421)		(0.325)		(0.188)	
Status Quo x Sufficiency	-2.055	***	-1.376	***	-1.133	***
	(0.536)		(0.239)		(0.185)	
Work Time x Sufficiency	0.035		0.005		0.02	*
	(0.084)		(0.006)		(0.011)	
Resource Limits x Sufficiency	0.241	***	0.139	***	0.103	***
	(0.083)		(0.037)		(0.039)	
Ad Limits x Sufficiency	0.147	**	0.026		0.011	*
	(0.063)		(0.028)		(0.006)	
Health Insurance x Sufficiency	0.032		-0.056	*	-0.022	
	(0.057)		(0.033)		(0.018)	
Emissions x Sufficiency	-0.077		-0.013		-0.021	
	(0.054)		(0.015)		(0.025)	
Taxes x Sufficiency	0.102		0.081	***	0.073	***
	(0.088)		(0.028)		(0.016)	

	(1)	(2)	(3)
		RPL	
Dependent Variable: Choice	1K Halton Draws	Dropping Low Income	Dropping High Income
Panel B: Standard Deviations			
Status Quo	4.175 ***	3.989 ***	3.872 ***
	(0.296)	(0.331)	(0.314)
Work Time	-0.379 ***	0.42 ***	0.387 ***
	(0.038)	(0.043)	(0.043)
Resource Limits	0.49 ***	-0.459 ***	-0.5 ***
	(0.063)	(0.079)	(0.078)
Ad Limits	-0.023	-0.101 *	0.018
	(0.083)	(0.057)	(0.013)
Health Insurance	0.799 ***	0.763 ***	0.791 ***
	(0.066)	(0.076)	(0.069)
Emissions	0.276 ***	-0.27 ***	0.245 ***
	(0.047)	(0.051)	(0.053)
Taxes	1.62 ***	0.897 ***	0.971 ***
	(0.185)	(0.187)	(0.067)
N	1,012	723	945
Pseudo R^2	0.27	0.28	0.27
Log Likelihood	-6,415.56	-4,524.66	-6,016.06
AIC	12,873.12	9,091.32	12,074.11
BIC	13,019.95	9,231.09	12,219.52

Note: This table displays results from random parameters logit models, interacting each attribute with the binary sufficiency behaviours variable. Model 1 uses a higher number of inter-person Halton draws (1,000) than our main model to check stability. Model 2 drops participants with incomes less than $35,000. Model 3 drops participants with incomes above $99,999. Otherwise, all details are consistent with the RPL in **Table 99**, columns (1) and (2). In the latter two models, 500 inter-person Halton Draws were used. *** p<0.01, ** p<0.05, * p<0.1.

c. LCM

Table 117 – LCM-3 Model Results - Excluding Participants who Received DCE First

Variable	Class A	Class B	Class C
Status Quo	-0.17	0.95	-2.07 ***

Variable	Class A		Class B	Class C	
	(0.44)		(4.38)	(0.24)	
Work Time	0.03		-2.31	0.08	***
	(0.08)		(14.13)	(0.03)	
Resource Limits	-0.28	**	-1.64	-0.10	**
	(0.14)		(5.32)	(0.05)	
Ad Limits	-0.11		-1.48	0.00	
	(0.11)		(7.05)	(0.04)	
Health Insurance	0.03		-1.49	0.27	***
	(0.18)		(2)	(0.05)	
Emissions	0.07		-2.04	0.07	**
	(0.09)		(1.24)	(0.03)	
Taxes	-0.40	***	-1.63	-0.13	***
	(0.12)		(7.51)	(0.03)	
Class Membership Function					
Constant	2.34	**	-	3.22	***
	(1.19)		-	(0.95)	
Sufficiency	-0.89	**	-	-0.36	
	(0.4)		-	(0.3)	
Education	-0.62		-	0.20	
	(0.39)		-	(0.28)	
Employment	-0.25		-	-0.20	
	(0.27)		-	(0.21)	
Age	0.00		-	-0.75	**
	(0)		-	(0.33)	
Mean Probability	0.17		0.13	0.70	
N	497		-	-	
Pseudo R^2	0.23		-	-	
Log Likelihood	3,308.05		-	-	
AIC	6,678.10		-	-	

Variable	Class A	Class B	Class C
BIC	6,872.82	-	-

Note: This model includes only participants who received the sufficiency engagement questions first. This analysis was done to determine whether the differences by survey order (i.e., that receiving the DCE first significantly increased self-reported sufficiency engagement) had an influence on our models. We chose the LCM as it is our main specification. All other details are the same as the main LCM specification in **Table 100**.
*** p<0.01, ** p<0.05, * p<0.1.

Table 118 - Latent Class Model Results (4 Classes and Covariates)

Variable	Class A	Class B	Class C	Class D
Status Quo	-1.04 ***	2.15 **	-3.56 ***	0.97
	(0.31)	(0.89)	(0.33)	(1.09)
Work Time	-0.01	-0.28	0.08 **	0.16
	(0.05)	(0.19)	(0.04)	(0.17)
Resource Limits	-0.29 ***	0.16	-0.20 ***	0.37 **
	(0.08)	(0.37)	(0.05)	(0.17)
Ad Limits	-0.07	-0.41	-0.02	-0.11
	(0.08)	(0.35)	(0.04)	(0.16)
Health Insurance	0.04	0.07	-0.05	1.73 ***
	(0.1)	(0.44)	(0.06)	(0.36)
Emissions	-0.01	-0.38	0.05 *	0.20 *
	(0.05)	(0.28)	(0.03)	(0.12)
Taxes	-0.30 ***	-0.26	-0.17 ***	0.09
	(0.07)	(0.22)	(0.05)	(0.15)
Class Membership Function				
Constant	0.63	-	1.76 ***	1.18
	(0.74)	-	(0.64)	(0.86)
Sufficiency	0.70 ***	-	0.47 **	0.44
	(0.25)	-	(0.21)	(0.32)
Education	-0.15	-	-0.18	-0.56 *
	(0.24)	-	(0.19)	(0.3)
Employment	-0.30	-	-0.30 **	-0.37 *
	(0.19)	-	(0.15)	(0.22)
Age	0.09	-	0.06	0.02
	(0.26)	-	(0.21)	(0.31)
Mean Probability	0.20	0.18	0.50	0.12
N	1,012	-	-	-
Pseudo R^2	0.26	-	-	-
Log Likelihood	-6,501.78	-	-	-
AIC	13,089.56	-	-	-

Variable	Class A	Class B	Class C	Class D
BIC	13,390.21	-	-	-

Note: Robust standard errors are reported in parentheses. Class B is the reference group. Employment was split into three categories, (1) "Unemployed" for those retired or not in work, (2) "Alternatively Employed" for students and caregivers, and (3) "Employed" for full-time, part-time or self-employment. Age was simplified into two categories, under 42 representing Gen Z and Millennials, and over 42, representing Gen X and older. Education was split by with and without a college degree. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 119 - Main LCM Model – Using Baseline MNL as Starting Values

Variable	Class A		Class B		Class C	
Status Quo	-1.21	***	-11.38	***	1.73	*
	(0.22)		(0.41)		(0.97)	
Work Time	0.00		0.11	***	-0.26	
	(0.04)		(0.03)		(0.16)	
Resource Limits	-0.21	***	-0.12	***	0.08	
	(0.06)		(0.04)		(0.29)	
Ad Limits	0.00		-0.05		-0.35	
	(0.05)		(0.03)		(0.27)	
Health Insurance	0.04		0.29	***	-0.06	
	(0.07)		(0.05)		(0.29)	
Emissions	-0.03		0.09	***	-0.20	
	(0.03)		(0.02)		(0.18)	
Taxes	-0.22	***	-0.12	***	-0.38	*
	(0.04)		(0.03)		(0.21)	
Class Membership Function						
Constant	-0.13		-		-1.58	***
	(0.47)		-		(0.56)	
Sufficiency	0.23		-		-0.42	**
	(0.17)		-		(0.2)	
Education	0.02		-		0.24	
	(0.17)		-		(0.19)	
Employment	-0.11		-		0.24	*
	(0.12)		-		(0.14)	
Age	-0.12		-		-0.12	
	(0.17)		-		(0.19)	
Mean Probability	0.32		0.50		0.19	
N	1,012		-		-	
Pseudo R^2	0.25		-		-	
Log Likelihood	-6,586.25		-		-	
AIC	13,234.51		-		-	

Variable	Class A	Class B	Class C
BIC	13,451.26	-	-

Note: This model uses the parameter estimates for each parameter from a multinomial logit analysis (without any interactions) as the starting values for the attributes in the LCM. Robust standard errors are reported in parentheses. All other details are the same as the main LCM specification in **Table 100**. *** p<0.01, ** p<0.05, * p<0.1.

Table 120 - Individual Probability Analysis Results (70% Threshold) – LCM-3 (with Covariates)

	Mean Values			Significance Level		
Variable	Class A	Class B	Class C	T-Test: Class A and B	T-Test: Class A and C	T-Test: Class B and C
Age	49.61	60.28	48.73	***		***
Income	3.35	3.66	4.03		***	**
Gender	1.42	1.56	1.48	**		*
Education	3.13	3.32	3.52		***	**
Employment	2.26	2.29	2.45		***	**
Race/Ethnicity	2.91	3.00	2.97			
Hispanic Ethnicity	1.96	1.98	1.88		***	***
Political Identity	5.65	7.28	4.79	***	***	***
Climate Beliefs	4.72	3.61	5.33	***	***	***
Climate Knowledge	3.14	3.35	3.35	*	**	
Voluntary Simplicity	4.93	4.88	5.19		**	***
Ecological Policy Agreement (Degrowth)	4.52	3.11	5.44	***	***	***
Social Policy Agreement (Degrowth)	4.50	3.33	5.46	***	***	***
Trust in Government	3.56	2.62	3.73	***		***
Universalism - Concern	5.30	5.00	5.83	**	***	***
Universalism - Nature	5.19	4.64	5.78	***	***	***
Poverty Beliefs	1.48	1.29	1.58	***	**	***
N	**157**	**153**	**594**			

Note: Class allocation is based on whether an individual has greater than 70% probability of being in a particular class, which means that not all participants were sorted into a class category (N = 904). The first set of columns under “Mean Values” indicates the mean level of each variable within the class indicated at the top of the column. The second set of columns under “Significance Level” indicates the significance associated with the t-test comparing each pair of classes. *** p<0.01, ** p<0.05, * p<0.1.

Table 121 - Willingness to Pay Calculations - LCM-3 With Covariates

	Class A		Class B	Class C	
Work Time	12.34		403.98	316.62	***
	(69.56)		(456.65)	(99.95)	
Resource Limits	399.98	***	245.03	381.43	***
	(119.01)		(522.07)	(136.27)	
Ad Limits	77.81		564.33	83.57	
	(103.78)		(652.12)	(108.6)	
Healthcare	18.39		77.20	861.95	***
	(133.67)		(595.55)	(229.88)	
Emissions	13.31		511.42	226.95	***
	(68.95)		(651.42)	(84.08)	

Note: Robust standard errors are reported in parentheses. WTP was calculated with the delta method, using a ratio of (the absolute value of) each attribute's coefficient over the monetary attribute's coefficient. The monetary attribute uses the sample's average tax dollars, that is the average amount of tax dollars that the sample would owe in general, not based on each individual's income. This model includes covariates of sufficiency behaviours, age, employment, education. The model used the *searchStart* function in R's Apollo package to search for starting values. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

7. Transparent Changes from Pre-Registration

1. Description of change: Hypothesis 1 – "There will be support for degrowth policies compared to the status quo" was not pre-registered.
    a. Rationale**:** This was not necessarily intentional, but rather the pre-registration was focused on the experimental manipulation and the other individual characteristics that might influence support. Measuring baseline support was thus implied, but not explicitly addressed, so I have included an explicit hypothesis and noted it as exploratory.
    b. Effect of change on study results: As the baseline would have been included anyway to contextualise the moderation results, this does not explicitly change the results. However, it does include additional analyses which could increase the probability of Type I error. This is why we note that this analysis is exploratory and applied a stricter significance criterion using a Bonferroni adjustment (0.05 / 4 exploratory analyses) = 0.0125.
2. Description of change: In our original hypotheses and analysis plan, we planned to analyse willingness to pay. In this thesis, I have not included any measures of willingness to pay in the main text (only in **Appendix K**). I therefore have changed the wording of hypotheses to indicate support for policy attributes and alternatives to the status quo as opposed to predicting WTP.
    a. Rationale: Willingness to pay is not necessarily reported for every specification included in papers using a DCE (e.g., see Faure et al., 2022). Other theoretical issues and tensions around using WTP in the degrowth context were outlined in **Section 5.2**.
    b. Effect of change on study results: We do not believe this has any direct effect on the results, but rather reduces the amount of information provided in the main text. This may also slightly reduce the interpretability of our findings, which can be easier with monetary values, and the ability to interpret effect sizes, but also reduces the volume of information for readers to process.
3. Description of change: We pre-registered a hypothesis related to the sufficiency (deconsumption) behaviours measure (i.e., H4 in our pre-registration, H2 in the current paper), but we did not specify in our analysis plan how we would test it. While this is not a "change" to our pre-registration, we want to ensure transparency about this omission. With choice data, the main way to test for group differences would be to include a variable as an interaction effect, so an MNL or RPL with interaction was somewhat implied by our hypothesis. However, we further chose to use the LCM model interacting sufficiency and other covariates.
    a. Rationale: At the time of pre-registration, we were unsure of how best to test this effect, and instead focused on pre-registering the differences by treatment group. Given the significant interactions obtained in the RPL with sufficiency interaction, and the lack of significance associated with the treatment effect, we wanted to further explore the heterogeneity based on sufficiency

engagement using a different model that provided additional context. We thus ran the LCM including sufficiency engagement as a covariate.

   b. Effect of change on study results: By introducing the additional LCM analysis with sufficiency engagement, we did raise the risk of Type I error. This is why we noted that this analysis was exploratory and applied a stricter significance criterion using a Bonferroni adjustment (0.05 / 4 exploratory analyses) = 0.0125. Our chosen methods for analysis, that is, using a binary interaction in both RPL and LCM specifications, also influences the results by making the differences in sufficiency less granular. This could increase the risk of Type I error compared to using a continuous measure, as significant effects may be harder to pick up when the differences are more incremental. However, we included both binary and continuous version of the MNL and RPL for transparency and robustness.

4. Description of change: We pre-registered the use of quotas to ensure representativeness, along dimensions of gender, political ideology, age group, and race and ethnicity. However, these quotas had to be abandoned during the data recruitment process on the request of the market research firm.
   a. Rationale: The firm collecting our data asked us to end the use of quotas, as they believed they were overly restrictive on their sample and thus excluding too many viable participants.
   b. Effect of change on study results: Abandoning the use of our quotas resulted in a sample that was less representative of the U.S. population than originally desired, especially with respect to race and ethnicity, as noted in **Section 4.1.** Otherwise, we do not believe it changed the nature of our results.

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Chapter 6
How environmental psychologists can engage with system-level processes

Abstract: In the field of environmental psychology, the limitations of individual behavioural approaches in addressing climate change have become increasingly clear. Despite its focus on the individual as a unit of analysis, the discipline must strive for systemic and structural solutions in addressing the climate crisis to make meaningful impact. This piece considers how exactly environmental psychologists can engage with system-level processes in their work. We integrate past research and contemporary discourses in the field to identify specific roles that researchers can play to drive system-level change. Roles most relevant to this thesis include: t*he liaison*, who contributes to work in neighbouring disciplines by studying perceptions of transformative system-level agendas; and the *democratic catalyst*, who facilitates direct and democratic means of transforming our system by focusing on policy support measures and deliberative methods. This piece is intended to provide research-driven insights to environmental psychologists who intend to make a meaningful societal impact, by moving beyond disciplinary norms. It also provides reflexive insights into the process of conducting research with this goal in mind.

Keywords: system-level change, climate mitigation, critical environmental psychology

Disclaimer: This paper is an adapted and amended version of a paper that has been submitted to the journal Global Environmental Psychology for review:

> *Sabherwal, A., O'Dell, D. (2024). How environmental and social psychologists can engage with system-level processes. Under Review.*

The date of submission was 03/01/2024, and revisions were received on 01/04/2024. The journal version was co-authored with fellow PhD student Anandita Sabherwal. We contributed equally to the article. In the journal version, each of the four main roles for an environmental psychologist (as highlighted with colour in the figure) are developed in separate, fleshed out sections. In the version included below, I have streamlined the two sections on Synthesizer and Mobilizer roles, as Anandita's research relates more closely to them. As they are less relevant to this thesis, I have just provided a brief overview of each. I have focused specifically on the roles that have been exemplified within the preceding chapters, that is Liaison and Democratic Catalyst. This editing was done to improve cohesion of the overall thesis. The version below also includes more reflection specifically associated with the process of writing this thesis, as well as edits I made independently based on comments from reviewers of the journal article. However, there may be some overlap with Anandita's thesis (not yet submitted).

Another version of this chapter also appears as a chapter in a German-language book "Psychology in Crisis - Critical Environmental Psychological Contributions to Socio-Ecological Transformation." This book is edited by Sascha Kuhn and Lisa Reuter and published by Psychosozial-Verlag. It is due for publication in German around November 2024.

1. Introduction

The predominant environmental psychological approaches to climate mitigation have focussed primarily on the individual, identifying various psychological factors that limit or enable individuals' action on climate change (Gifford, 2011; Gurtner & Moser, 2024a; Schmitt et al., 2020). Environmental psychology is defined as a discipline concerned with the interplay between humans and the environment, both built and natural (Steg & De Groot, 2019). Yet the field appears more preoccupied with advancing theory on psychological drivers than exploring external influences (e.g., Schmitt et al., 2020). It tends to prioritise behaviours that are easily assessed with straightforward psychological antecedents, such as self-reported recycling behaviour (Whitmarsh et al., 2021). Meanwhile, behaviours that may be more complex and difficult to assess might actually have more meaningful impact on emissions reduction (e.g., installing solar panels) (Nielsen, Cologna, et al., 2021; Wynes & Nicholas, 2017). At a deeper level, the emphasis on psychological factors can function to obscure the underlying structural and institutional forces on consumption that contribute to the climate crisis (Gurtner & Moser, 2024a; Hagmann et al., 2023), as outlined in the **Literature Review (Chapter 2),** and even exacerbate detrimental effects on the environment (Adams, 2021).

This chapter explores the following question: how can a science that focuses on individual psychology and behaviour engage with system-level processes to contribute to transformative change? This change involves at least two components, that is, transforming the discipline of psychology to pursue more impactful research with a critical lens, and transforming our wider social and economic systems to avoid climate catastrophe whilst ensuring a better quality of life for all. By engaging with system-level processes, we mean considering the contextual, structural, institutional, and ideological influences (as outlined in the **Literature Review**) that can influence individual behaviours (Gurtner & Moser, 2024a; Nielsen et al., 2024), instead of directing interventions at isolated individual actions. This exploration does not endeavour to pit individual versus system-level approaches against each other, but rather champions research engaging at multiple levels, whilst incorporating systemic influences (e.g., Sniehotta et al., 2017).

In pursuing a thesis on degrowth within a psychological and behavioural science department, my research agenda has required me to reflect upon this question since its inception. While there are undercurrents within psychology regarding the need for more

research on degrowth and other systems-oriented approaches to sustainability (Gurtner & Moser, 2024a; Krpan & Basso, 2021), it can be difficult to design a rigorous psychological research project that engages at the system level and is still theoretically coherent. Indeed, over the course of my thesis, pursuing the linkages between degrowth and individual consumption reduction has often been mired by the lack of theories that connect individual behaviours or attitudes to macro-level concepts. While psychological and behavioural science theories may take into account the immediate environmental context (e.g., COM-B model) or social influences (e.g., theory of planned behaviour), they often neglect the institutional (e.g., lack of public infrastructure) or ideological (e.g., neoliberalism) forces influencing beliefs or behaviours (e.g., Schmitt et al., 2020). As such, it may be useful for psychologists to pursue multi-disciplinary research avenues that are less constrained by the bounds of psychological theory. Further, typical methodological decisions, including commonly used outcome variables associated with attitudes or behaviours, often limit the scope of research implications.

Instead of merely suggesting that environmental psychologists should not follow these disciplinary norms, the following sections set out the specific roles environmental psychologists can play to drive system-level change (see **Figure 55**) as a guide for future researchers who may face similar dilemmas. These roles target different elements of research, for example methods (e.g., liaison, synthesizer), object of study (e.g., mobilizer, democratic catalyst), and personal behaviour (e.g., mentor, activist). Though this thesis explores transformative change through the framework of degrowth, this question is not exclusive to degrowth research and may apply to all environmental or even social psychologists.

Exploring this question also serves to link environmental psychology with critical social psychology, an overlap that has been considered promising but underexplored (Kühn & Bobeth, 2022). Critical social psychology (CSP) focuses on the role of identity and group membership within societies, and the relation these formations have with power and inequality (Kühn et al., 2020). Previous work has noted important considerations from CSP that apply to environmental psychology, namely, in connecting environmental psychology with research on social inequality and justice (Kühn & Bobeth, 2022).

The roles outlined below primarily relate to CSP by shifting focus from blaming consumers to empowering individuals as citizens. To relate to the broader themes of this

thesis, connecting environmental and critical social psychology also centres around the role of consumption, given that CSP draws upon Erich Fromm's critiques of the culture around consumption (Kühn et al., 2020). Fromm (1955) diagnosed consumption as a form of alienation, in which people consume to feel some form of freedom and empowerment despite their lack of power or political influence in public affairs. Shifting the focus from consumers to citizens, as done in **Projects 1-3**, echoes Fromm's ideas around shifting from an existence based on "having" to one based on "being," that is, engaging in active participation and connection with others (Fromm, 1976). This also closely resonates with the objectives of degrowth, in engendering more community-oriented, democratic and participatory values in society (Buch-Hansen & Nesterova, 2023). As such, this chapter builds on the **Literature Review (Chapter 2)** by highlighting the specific sub-disciplines of psychology (i.e., critical, environmental) that are particularly pertinent to future research on degrowth and charts out avenues for exploration.

2. Overview of Roles

Figure 55 outlines six roles that may be pursued to engage with system-level processes and societal transformations. Other roles have been identified in previous work, including investor, member of an organisation, and of course, citizen (e.g., Nielsen, Nicholas, et al., 2021). However, we developed these specific positions based on what emerged through the thesis process, as two PhD students attempting to apply a critical and structural lens to environmental psychological research, and identifying underexplored research avenues. This section briefly introduces four of the roles, which relate less closely to the central aims of this thesis.

First, it is important to consider the ways in which academic researchers interact with others in their daily work. Researchers rarely works in isolation, as academic contracts typically involve a range of commitments. Teaching and mentoring are vital to any educational institution, whether through paid or invisible labour (Social Sciences Feminist Network Research Interest Group, 2017). Working as teachers or mentors, exposing the structural and institutional level factors of our economic system that are often overlooked in psychology, can be highly impactful for influencing future research agendas and promoting more growth critical worldviews amongst students and mentees (Urai & Kelly, 2023). While knowledge is not a sufficient condition for spurring action toward change (Longo et al.,

2019), the **Literature Review (Chapter 2)** highlighted how knowledge about the relations between economic growth and environmental sustainability is a key factor that contributes to growth critical values amongst scientists (Lehmann et al., 2022). However, critiques of capitalism's growth imperative are not included in most mainstream psychology courses, requiring a concerted effort from critical thinkers to ascertain or disseminate this perspective. Others have pointed out that educating about the climate crisis and how to engage as citizens, not just consumers, represents an important social tipping area for bringing about disproportionately large impacts after passing a certain threshold (Gurtner & Moser, 2024a; Otto et al., 2020).

Second, though the neoliberal influence in academia disincentivises activism (Urai & Kelly, 2023), and scholars may rightfully fear repercussions from their institutions or prospective funders (Dablander et al., 2023), the role of activism in academia is essential for changing harmful norms and practices (Steinberger, 2022; Urai & Kelly, 2023). This includes confronting the disciplinary biases (e.g., toward individual level interventions) that have undermined meaningful action on the climate crisis (Chater & Loewenstein, 2022; Fremstad & Paul, 2022). Such initiatives can work toward both disciplinary and societal transformation. Environmental psychologists can also drive societal change by partaking in activism, e.g., by joining marches and protests, in their personal capacity (Dablander et al., 2023).

Third, environmental psychologists can act as synthesizers, exploiting the discipline's individual lens to examine collective influences on individuals. Psychology is uniquely equipped to investigate systemic influences on individual pro-environmental action, broadening the explanation of behaviour beyond psychological barriers to incorporate societal-level drivers (Adams, 2021). Such avenues of research can attribute the responsibility for climate change, and (in)action, to systemic entities and powerful elites, empirically demonstrating how individual psychology is situated in (and therefore impacted by) diffuse societal forces (Schmitt et al., 2020). This approach harnesses the power of individual level insights (Chater & Loewenstein, 2022), whilst avoiding the common pitfall of placing all responsibility on the individual (Carrington et al., 2016; McDonald et al., 2017).

Fourth, environmental psychologists can be mobilizers of collective action, focusing on the ways in which individuals act to demand social and climate justice. Understanding and addressing structural barriers to climate activism, often derived from political and

economic systems, is under researched in psychology (Gurtner & Moser, 2024a). However, identifying such constraints is critical to empowering and sustaining collective action. As a starting point, environmental psychology has adapted social psychological models to investigate the motivators of collective climate action (Cohen-Chen & Van Zomeren, 2018; Fritsche et al., 2018). Given the field's insights on intergroup differences, environmental psychologists can also disaggregate the feasibility, access and preference of different forms of collective action among diverse socio-demographic contexts (Sabherwal & Kácha, 2021).

In the following sections, I expand upon the two roles that have been demonstrated by the research presented in previous chapters. That is, environmental psychologists can act as a liaison with other disciplines and a catalyst for democratic participation. It is worth noting that all six roles included **Figure 55**, even the description of an educator above, are underpinned by a normative component of what society ought to be, which may be viewed as undermining scientific objectivity (Gurtner & Moser, 2024a). While this may go against some academics' views, the sense of urgency for averting the climate crisis and the scientific base of evidence that motivates this agenda suggests that this normativity is not merely a subjective agenda, but necessary to prevent climate catastrophe (IPCC, 2022).

Figure 55 - The Roles of an Environmental Psychologist for System-Change

Note: The authors created this figure. In conceptualizing it, we were inspired by the visualisation style of Nielsen, Nicholas, et al. (2021).

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3. Liaising with other disciplines to promote transformative change

Environmental psychologists can play a pivotal role in agendas for transformative system-level change set out by other disciplines by studying how individuals within a variety of demographic groups perceive and support such agendas. As explicated in **Project 1 (SPM)**, Lakoff (2010) outlined how individuals often lack the appropriate frames to understand environmental issues or proposed solutions. Further, humans struggle to understand global, system-level processes, to make connections across various domains, and to connect common root causes. It is likely more cognitively challenging to recognise capitalism's role in

creating various socio-ecological crises than it is to accept individual responsibility for causes and solutions. This is exemplified by the preoccupation with an ethical consumption gap between consumers' intentions and behaviours, instead of diagnosing the constraints to ethical consumption under capitalism (e.g., Carrington et al., 2016). Psychologists, often unknowingly, reinforce this individualisation in their work. Yet they are particularly well-suited to understand and help overcome these cognitive obstacles to engaging with systems and structures, as other social science disciplines may fail to consider such human tendencies. These are by no means the only barriers to taking action (Schmitt et al., 2020), but environmental psychologists can be useful within interdisciplinary and transdisciplinary research teams that may focus more heavily on institutional barriers. Working across disciplines may pose certain challenges, e.g., with communication or funding (Wullenkord & Hamann, 2021), and may be less beneficial for career trajectories within academic departments ("Come Together," 2021; Nielsen et al., 2024). However, it could also attract the attention of influential figures such as policymakers and social movements who may engage less with psychological research on its own (Gurtner & Moser, 2024a). It also may facilitate further research collaborations with policymakers on the topic of degrowth, to overcome its weakness in operationalising and practically implementing the agenda (Polewsky et al., 2024).

The bottom-up nature of the degrowth movement indicates that general citizen support is a necessary precondition for change (Buch-Hansen, 2018), yet not enough work has attempted to understand how the general public might engage with this transformative process (e.g., Kongshøj, 2023). Psychological research has elicited perceptions of the name 'degrowth' (Drews & Reese, 2018; Krpan & Basso, 2021), appropriate frames and avenues for communicating post-growth ideas to the public (O'Dell et al., 2023; Tomaselli et al., 2021), attitudes toward the growth-versus-environment debate (Drews et al., 2019; Drews & van den Bergh, 2016) and impediments to studying such attitudes (Drews et al., 2018). I encourage more environmental psychologists to design research agendas addressing such perception gaps, in particular by pinpointing differences in class, race, and perceived status, as these perspectives are currently lacking in degrowth research (Schmelzer et al., 2022). **Projects 1-3** were motivated by this gap, yet much more work is needed to develop a comprehensive and democratic understanding of the general public's views on degrowth's policy agenda. In particular, a wider geographic reach, within both the Global North and

Global South regions, should be included in future research agendas, as degrowth's policy proposals will have to be tailored to address the needs and cultural practices of each specific locality (Rodríguez-Labajos et al., 2019).

Further, environmental psychologists should focus on deep framing related to values and worldviews (Corner & Randall, 2011) as executed in **Project 1 (SPM),** embarking on a mission to build new frames in the public consciousness that shift values toward enabling a post-growth, sustainable, and just future. Beyond superficial messaging, it is crucial to recognize that institutions and cultural traditions are laden with frames (Lakoff, 2010; Murcia & Acosta, 2023), meaning the dominant cognitions and frames in society are inherently linked to our existing economic system (Dietz et al., 2003). In interdisciplinary teams tackling cultural and institutional change, psychologists can apply their experimental and perceptual expertise toward identifying these existing counterproductive frames and facilitating new ones required to embrace such changes.

As an example, in exploring new economic models not governed by annual increases in GDP, psychologists could focus their research on breaking the intrinsic link in people's minds between growth and progress (Jackson, 2021). For instance, some suggest reframing the economic system around the idea of balance in ensuring a social floor and an ecological ceiling (e.g., Raworth, 2017), the effectiveness of which can be tested using experimental research methods. This may also be done through policy by blocking the source of counter-productive framing, for example, by replacing ever-present marketing materials around wants and acquisitiveness with public messaging based around needs satisfaction and having "enough."

4. Facilitating and catalysing democratic participation

Environmental psychologists can also play a pivotal role in investigating ways to achieve environmentally impactful transformations that encourage democratic participation. As demonstrated by this thesis, one common pathway for change is through government policy. Prior work has highlighted the impact that high-SES individuals can have in the realm of public policy, given their greater access to those in power and lobbyists (Nielsen, Nicholas, et al., 2021). However, it is vital to also integrate the voices of those who will be impacted by policy changes but who hold less power in shaping such decisions (Howarth et al., 2020; Stirling, 2008; Thorman et al., 2020). Psychological research can facilitate this

process. While an individual-level focus has been co-opted to obfuscate systemic and institutional responsibility (Chater & Loewenstein, 2022; Gurtner & Moser, 2024; Lamb et al., 2020), it might also imply that psychologists can promote the agency and influence of everyday people. There is a rich psychological literature on motivation (Griskevicius & Kenrick, 2013; Kenrick et al., 2010; Maslow, 1943) and the basic needs of autonomy (Doyal & Gough, 1991) or participation (Cruz et al., 2009; Max-Neef et al., 1991). Instead of treating these as neutral psychological processes, environmental psychologists can explicitly treat individuals as political agents who play a role in democratically driving change (Wullenkord & Hamann, 2021).

One simple way to normalize more democratic and civic-orientated research agendas is to diversify outcomes measures (e.g., Nielsen et al., 2024), for example replacing private consumer behaviours with public-facing policy support measures. Asking participants to rate various environmental policies creates a more consequential self-report measure than merely asking about individual behaviours often too small for real mitigation potential (Wynes & Nicholas, 2017). If enacted, these policies could shift the institutional landscape toward much more substantial emissions reductions than voluntary individual behavioural approaches, given the constraints associated with behavioural lock-in (Heindl & Kanschik, 2016; Mundaca et al., 2019; Sanne, 2002) and socio-spatial inequalities associated with urban development (e.g., Mela & Toldo, 2019).

To catalyse democratic debates, researchers should move beyond policies in mainstream discourse, instead incorporating fringe policies, such as wealth taxes or private jet bans, as well as eco-social policies that address both human needs satisfaction and planetary boundaries (Khan et al., 2023; Kongshøj, 2023; Lee et al., 2023). In this way, environmental psychologists can help drive policy and democracy forward by sharing early inputs on emerging and ambitious policy proposals. Psychologists can further shape policies in more favourable directions through qualitative analysis, identifying reasons they may be unpopular.

To address system-level transformations and in keeping with critical psychological principles (Fox et al., 2009), promoting democracy should not be in service of upholding capitalist or individualistic values. Rather, critical environmental psychologists should foster radical democracy, or “an ensemble of diverse practices and discourses that are constituted by those committed to different emancipatory struggles” to organise the social and political

desires of the many (Malherbe, 2023, p. 2). While individual factors such as worrying about climate change are associated with policy support on average (Bouman et al., 2020), environmentally-conscious people with lower SES backgrounds may support environmental policy initiatives less than higher SES counterparts (Eom et al., 2018). This reduced policy support is mediated by a lower sense of control. Traditional psychological research might suggest interventions to "enhance" an individual's sense of control. However, a more critical approach might suggest that such insights on barriers should direct research toward creating the conditions for empowering low status individuals, in particular by breaking down structural impositions that limit their autonomy or exploring other non-traditional avenues for democratic participation.

To promote democratic deliberation even further, research methods can expand beyond the limited scope of surveys, instead facilitating conversations and dynamic exchanges via deliberative methods (Ercan et al., 2022). Asking participants to consider complex policy problems in a survey limits their ability to understand the discourse's broader context. Indeed, this is a limitation of the methodologies employed in the preceding chapters when eliciting policy perceptions. In citizen's assemblies or juries such as the U.K. Climate Assembly (Cherry et al., 2021; Climate Assembly UK, 2020), a small but representative group from the general public are given greater context and information than is typically available in a short survey (Capstick et al., 2020). Deliberative workshops, similar to focus groups, can also provide a less formal way of engaging in such deliberation (Myant & Urquhart, 2009). While this thesis was mostly concerned with establishing the rigorous baseline of policy preferences that was lacking in the literature, future work should build on these findings with participatory and dynamic approaches. These methods could explore why, for example, sufficiency-oriented individuals with lower SES backgrounds were less supportive of universal healthcare or work time reductions.

Active and democratic participation might engender a greater sense of agency in deliberating crucial policy debates, not just through a more comprehensive understanding of the context, but also from greater involvement in the decision-making process by providing a forum for feeding back recommendations. Various psychological studies have demonstrated that the relevant concepts of perceived effectiveness (Cojuharenco et al., 2016), participative efficacy (Bamberg et al., 2015; Hamann & Reese, 2020; van Zomeren et al., 2013), and sense of control (Eom et al., 2018) are important determinants of environmental

collective actions and policy support. What's more, direct involvement in democratic processes such as policy recommendations can mitigate the extractive logic of survey research traditionally used in psychology (Ercan et al., 2022; Reinharz & Davidman, 1992). The rich output of data from deliberative research on the public acceptability of policies can form a social mandate to provoke governments' policy planning (Howarth et al., 2020), further reinforcing the consequentiality of such research agendas.

5. Conclusion

Presenting the various roles embedded in **Figure 55** is not meant to overwhelm environmental psychologists with even more work or invisible labour. Nor should it be assumed that any of these roles can apply to all environmental psychologists. Each role likely comes with its own challenges, for example, in identifying appropriate outlets for research findings, in communicating system-level agendas effectively to a diverse audience, or in gaining access to research participants of lower status and privilege. However, overcoming these challenges will serve to break down established norms and expand the discipline's potential.

This chapter builds upon prior connections between environmental psychology and CSP (Kühn & Bobeth, 2022) and commentaries from environmental psychologists (Gurtner & Moser, 2024a; Nielsen, Cologna, et al., 2021; Nielsen et al., 2024, 2024; Whitmarsh et al., 2021) to highlight the specific means through which academics can disrupt the status quo, engaging more critically and politically in meaningful research that contributes to societal transformations. Likely due to a growing frustration amongst practitioners of the discipline, several pieces have been published in recent years on how to tailor environmental psychological and related research to heighten its impact (e.g., Nielsen, Cologna, et al., 2021), to better address climate change (e.g., Whitmarsh et al., 2021) and facilitate mitigation (e.g., Nielsen et al., 2024), and to generate knowledge to support social change strategies (Gurtner & Moser, 2024b). While this chapter overlaps with many of the recommendations made by these other papers, we contribute to this literature by concretely characterising how environmental psychologists can perform the kind of research for which others have advocated. The perspective is shifted to the *researcher*, and not just the research itself, empowering academics to subvert disciplinary norms and explore a plurality of active roles to take in transforming society. For example, while others have pointed out

the need for interdisciplinary research in climate mitigation and adaptation (Nielsen et al., 2024; Whitmarsh et al., 2021), we specify how psychologists can make unique contributions by targeting interdisciplinary teams focused on transformative agendas (e.g., degrowth). And while others have emphasized the need for more research on the role of citizens (Gurtner & Moser, 2024b; Nielsen et al., 2024), we specify how practitioners can drive democratic deliberation, motivate policy discussions, and empower citizens as political agents. We hope this commentary motivates a sense of agency amongst psychologists, to enact the higher priority research objectives detailed by other experts in the field (e.g., Nielsen et al., 2024).

In developing this thesis, it has become clear that while psychology is not fully equipped to solve the complexity of the socio-ecological crisis, there are unique disciplinary contributions environmental psychologists can offer to build a research agenda that sets its sights on transformative, system-level change. Psychologists, for instance, provide an insightful lens through which to view the world. To enhance the impact that environmental psychologists might have, we can situate psychological processes within larger systems, identifying sources of societal influence. To drive impactful action, we can contribute our expertise to more ambitious projects involving interdisciplinary teams and undertake research that promotes democratic values and participation. The urgency of the climate crisis demands that we no longer let disciplinary boundaries and historical precedent restrict our contributions. Instead, we must build a discipline that not only embraces change, but actively works in its service.

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Chapter 7

General Discussion

This chapter synthesizes findings from the preceding empirical chapters to explicate learnings and clarify contributions to existing literature. It discusses implications for research in consumption, degrowth, and societal transformation more broadly, as well as implications for policy and the degrowth movement's strategy. It also outlines the limitations of the thesis and suggest priorities for future research avenues.

1. Summary of research questions and aims

This thesis has examined how institutional changes relate to individual-level consumption reduction via marketing, regulating consumption, and sweeping policies for societal transformation. The **Literature Review** tackled the ecological and societal impacts associated with persistent economic growth under a capitalist system, demonstrating why less and not just greener consumption and production are necessary. It traced through scholarship on consumption behaviours, including the various levels of influence at the individual, social, and institutional or ideological levels that drive overconsumption, as well as the dominant narrative in psychological research to reduce consumption through voluntary behaviour change. It identified that one main weakness of this literature is the limited scope that voluntary behavioural and lifestyle changes can have on climate mitigation whilst maintaining a system in which excessive levels of in consumption and production are locked in for the sake of economic growth (Sanne, 2002; Wiedmann et al., 2020). The **Literature Review then** explored the systemic and institutional changes outlined in the degrowth literature, demonstrating the highly ambitious agenda and relevant policy initiatives, but also the shortage of work relating to consumption or perceptions from the general public (e.g., Kongshøj, 2023).

Principally, this literature review coalesced around one main gap, that more academic research was needed to define the role of the individual in a system-level agenda toward degrowth, especially with respect to consumption reduction practices. It was unclear from academic literature whether individual sufficiency behaviours would inhibit or promote the

broader societal transformation needed to bring about degrowth (e.g., Brownstein et al., 2022; Sniehotta et al., 2017). Detailing these two respective bodies of literature sought to demonstrate the chasm between them, but also the complementarity of their shortcomings. Perspectives from disciplines including environmental psychology and ecological economics have thus been integrated in this thesis to wholistically link individual and system-level change for societal transformation, with the aim of breaking down an ostensibly false dichotomy in sustainability research. A psychological and behavioural approach was taken given the bottom-up nature of the degrowth movement and the fact that some form of aggregate consumption reduction is considered necessary in both literatures for avoiding climate catastrophe (e.g., IPCC, 2022).

While scholars have increasingly acknowledged the need for both approaches (K. Nielsen et al., 2020; van Vuuren et al., 2018; Winterich et al., 2023), little work before this thesis systematically integrated them from a behavioural perspective. This thesis aimed to concretely link reduced consumption practices that limit consumerism and promote sufficiency with system-level change, in the form of public policies that transform society toward one that prioritises sustainable welfare in line with degrowth.

These aims led to the development of three empirical projects to answer the following research questions:

1. a) How does degrowth relate to individual consumption practices? b) What are the behavioural responses to information about degrowth as a form of societal transformation?
2. a) How does the public respond to environmental risk regulation aiming to reduce consumption of products? b) Do perceptions about the essential nature of consumption change by the level of risk and product domain?
3. a) Is there public support for degrowth policies, and b) does sufficiency behaviour act as a pathway to increasing support? c) How does support for these policies differ by individual characteristics?

1.1. Summary of Contributions

Project 1 focused on persuasive communications in consumer and citizen contexts as an avenue for promoting voluntary consumption reduction and the broader agenda of degrowth. Before targeting institutional levers for facilitating consumption reduction (e.g., through policy), we wanted to explore if existing institutions, especially those in the private sector that drive economic growth via profit accumulation, could be used as a vehicle for

promoting voluntary change. We partnered with an emerging startup to ground our communications in a realistic branding context. **Project 1** contributes to academic literature in the following ways: 1) by applying a critical lens to the sufficiency-promoting marketing agenda, 2) by exploring the nuances and uncovering distinctions between communicating about degrowth in both commercial and non-commercial contexts, and 3) by exploring the connection between individual behaviours and values and system-level agendas of green growth and degrowth. Considering that our degrowth (versus green growth) messaging had little influence on consumption practices, this paper suggests that agendas for consumption reduction and communications about degrowth are better served via public and civic-oriented institutions than private sector interventions. While our degrowth messaging positively influenced growth critical values, the lack of influence on voluntary, private consumption behaviours also gives further weight to targeting institutional change.

Accordingly, **Project 2** on PFAS consumption shifted focus to regulations that directly target consumption as a means of institutional change for consumption reduction, as opposed to interventions promoting voluntary change. Engaging with the various theories on human needs and conspicuous consumption provided a deeper understanding of motivations for consumption. It also investigated the association between individual human needs and societal-level functioning. Exploring sufficiency in a novel context with close and ongoing input from policymakers also improved the policy relevance of this thesis. Project 2 contributes to the literature by 1) connecting the technical concept of essential use to human needs theories in psychology, 2) by synthesizing the various needs theories to suggest a hierarchy of consumption types relevant for regulation in the context of environmental crises, 3) by testing these categories and eliciting perceptions of consumption regulations amongst a representative sample of the general public in two different countries, and 4) by eliciting feedback from the general public on need versus non-need based consumption in the face of environmental risk, the literature on which is mostly conceptual or based on modelling (Brand-Correa & Steinberger, 2017; Druckman & Jackson, 2010; O'Neill et al., 2018; Vita et al., 2019; Vogel et al., 2021). Finally, we also contribute to emerging literature on the perceptions of PFAS and the application of essential use (Cousins et al., 2019; Karinen et al., 2024), underscoring the importance of a more democratic and inclusive regulatory process. Ultimately, this project indicates that a more comprehensive set of eco-social policies that can synergistically target environmental degradation, inequality, and human

needs satisfaction should be explored to reduce consumption and production in more equitable ways.

Project 3 focused on more comprehensive institutional change targeting not just consumption reduction, but further transforming the wider economic system to combat the socio-ecological crisis. It also studied the interplay between sufficiency behaviours and these eco-social policies, exploring whether voluntarily practicing sufficiency lifestyles could facilitate degrowth policy support. **Project 3** contributes to the literature by 1) systematically measuring support amongst the general public for degrowth policies using a rigorous design (DCE) in an understudied context, 2) providing empirical evidence to fill the central gap identified in the literature, relating individual sufficiency behaviour with degrowth policy support, 3) exposing individual socio-demographic and value-based differences in perceptions of these policies, and 4) testing how the framing of degrowth policy packages influenced people's preferences. Empirical evidence on these perceptions is essential for building strategy to mobilize broader support for degrowth (Buch-Hansen, 2018; Buch-Hansen & Nesterova, 2023). The results uncovered broader support for degrowth policies than would have been expected in the United States and found some evidence of a positive link with sufficiency behaviours, most consistently for fossil fuel restrictions. The results also suggest that focusing on sufficiency and consumption may undermine support for the movements socially oriented policies and could even hinder its expansion beyond its current base, of leftist academics and activists with some privilege.

Overall, this thesis contributes to the literature by 1) systematically examining the role of individual consumption practices and sufficiency within degrowth research, which was previously missing (e.g., Trainer, 2024); 2) facilitating a more bottom-up approach to degrowth, by making the movement more relevant to individuals daily lives; 3) providing more detailed and nuanced insights on perceptions of degrowth policies, which can be used to design a more inclusive agenda.

1.2. Addressing Research Questions

1.2.1. RQ1

With respect to RQ1a on the relation between degrowth and individual consumption practices, the relationship appears tenuous and dependent on context. Communicating about degrowth's objectives in the commercial context had either an insignificant or

inconsistent effect on the consumption-oriented outcome variables in Studies 1 & 2 of **Project 1 (SPM)**, including purchase intentions, willingness to donate time, and intentions to consume less. While overall it appears that degrowth has little relation to individual's consumption practices, certain results suggest that sufficiency-promoting marketing could stimulate greater consumer demand. While it could result in less consumption of other brands, there was no significant increase in one's intentions to consume less. The compatibility with degrowth's societal objectives, especially of downscaling and de-commodifying consumption, is therefore questionable. While the non-commercial context appeared more compatible for relating degrowth to individuals, the consumption-oriented outcome variable (i.e., carbon footprint calculator) was still insignificant.

Results from Project 3 suggest that it is not just context-dependent, but that the relationship also depends on a person's demographics and values. While practicing sufficiency appeared to be positively and robustly associated with support for fossil fuel caps across demographic groups, the link with policies that address degrowth's social objectives was less consistent. In particular, it was only amongst sufficiency-oriented individuals who held higher levels of privilege and more progressive values that the more eco-social policies like work time reductions and universal healthcare provisioning were appealing (**Project 3**).

For RQ1b, **Project 1's** individually targeted communications around sufficiency and degrowth engendered growth critical values in a non-commercial context, but had less influence when coming from a commercial sender. However, in the commercial context, those with higher than average green consumption values were either more (Study 1) or less (Study 2) motivated to purchase from the brand following the Degrowth ad. This inconsistency might signal that the intended behavioural goal is unclear when a profit-oriented actor is communicating about consumption reduction. Given the inherent goal of marketing to stimulate demand, interventions promoting reduced consumption by brands do not appear suitable for sharing information about the degrowth agenda. While the non-commercial context may be more useful for broadening abstract worldviews away from growth imperatives, communicating about degrowth's system-level focus did not appear to influence the more concrete private consumption behaviours or mobilize support for policy initiatives.

1.2.2. RQ2

With respect to RQ2a, results from **Project 2** suggest that people in the United Kingdom and United States appear open to government regulation of consumption (and production), when the products pose a potential risk to humans and the environment, as in the case of PFAS. Respondents somewhat agreed or agreed with these regulations on average, which did not significantly differ by product type. What's more, regulations were viewed as significantly more necessary when the risk associated with PFAS was higher. People viewed functional products as more essential and needed than experiential products. While essentiality and perceived need were not influenced by risk level directly, there was some evidence that experiential products were perceived as relatively more essential when risks were high (though not replicated), and that this effect was primarily driven by low-status individuals (which was replicated).

1.2.3. RQ3

Finally, for RQ3a, common degrowth policy proposals including work-time reductions, public health insurance (i.e., universal basic services), and especially fossil fuel restrictions received support amongst a U.K. (**Project 1**) and U.S. (**Project 3**) audience. Universal basic income was considered somewhat acceptable in the U.K. sample. While there was only limited support for advertising restrictions over the status quo in the United States, this policy received more support in the United Kingdom. Meanwhile, wealth taxes were not well supported in the United Kingdom.

For RQ3b, our results from the DCE suggest that engaging in sufficiency behaviours was associated with greater support for specific policies and amongst certain demographics, but may not be the ideal pathway for mobilizing broad-based support. That is, there was consistent evidence on the link between sufficiency engagement and fossil fuel restrictions, a primarily ecological policy. And among more affluent, highly educated, and employed leftists, engaging in sufficiency was associated with support for other eco-social policies, including work time reductions and universal healthcare. However, the link between sufficiency practices and the policies that also targeted social issues was less consistent amongst the general sample. What's more, those who were most likely to engage in sufficiency behaviours, but who had lower incomes, lower educational attainment, less

formal employment, and were further to the right politically, did not prefer these policies to the status quo. In summary, sufficiency behaviour will be necessary for the degrowth transition, but promoting such behaviours through voluntary means may not be the best avenue for spurring broad support for societal transformation.

With respect to RQ3c, support for eco-social policies outside of fossil fuel restrictions varies substantially depending on demographic and individual characteristics, especially those related to societal status and values. This research provides empirical evidence that the degrowth agenda and policies may lack broader appeal, especially among those whom it seeks to benefit the most. Across studies, left-wing political ideology appeared to be the most consistent predictor of support across both socially and ecologically oriented policies. Income was also an important predictor, though the direction of support appears to depend on a person's sufficiency orientation and the type of policy (e.g., redistributive versus ecological). Other important demographic factors that were associated with policy support include age, employment, and education, along with Hispanic or Latin American ethnicity and gender. Other relevant values include green consumption values (Haws et al., 2014), material simplicity values (Rich et al., 2020), believing poverty was outside of one's control (Kruse & Atkinson, 2022), and utopian impulse (Basso & Krpan, 2022).

2. Theoretical & Conceptual Implications

2.1. Relation between individual and system-level change

Examining the body of evidence produced by this thesis, the majority of our findings point to a complex relationship between individual and system-level change. We examined the specific case of policy levers, which may be limited in its representation of system-level change. However, the results might imply that efforts to voluntarily change behaviour toward consuming less do not necessarily pave the way for transforming society. Targeting consumption through individual-level interventions is unlikely to yield meaningful reductions at scale, or spur the cultural shift needed for degrowth.

Findings from the preceding chapters suggest that the traditional individualised approach to sustainability is not only less promising than previously believed due to its limited mitigation potential (e.g., Kallis et al., 2020), but that it might actually undermine the systemic changes needed for any societal transformation, degrowth or otherwise.

Narrowly studying psychological barriers to pro-environmental behaviour can ignore and distract from socio-structural level barriers, such as power relations, which are arguably more influential (Schmitt et al., 2020). Our findings also bolster critiques within behavioural science that i-frame solutions have undermined more substantive changes at the policy and institutional levels (Andreas & Jabakhanji, 2023; Chater & Loewenstein, 2022). This will not come as a surprise to most degrowth advocates. For example, in his incisive critique of green growth and mainstream environmental approaches that promote individually-oriented solutions, Kohei Saitō suggests "that thinking such [individual] actions are effective countermeasures can prevent us from taking part in the larger actions truly necessary to combat climate change" (Saitō, 2024, p. 1). However, this thesis provides some of the first empirical evidence for these claims in the specific case of consumption reduction within degrowth.

This might challenge the increasingly commonplace notion within academia and in IPCC's latest report (IPCC, 2022) that for successful climate mitigation, both individual and system-level changes are needed simultaneously (Brownstein et al., 2022; Gurtner & Moser, 2024; K. Nielsen et al., 2020; K. S. Nielsen et al., 2024). However, instead of calling into question the importance of all behavioural approaches, it may rather serve to specify the types of behaviours that are pivotal in driving system change. For example, while private, market-oriented consumption behaviours may not be as suitable for motivating system change, other actions such as climate citizenship behaviours (e.g., voting, political engagement, environmental stewardship) and collective action behaviours (e.g., protesting, joining movements or organizations) could still be crucial for such transformations (e.g., Stern et al., 1999). Indeed, we found that participants perceived the distinction between green growth and degrowth more easily in the citizen context in **Project 1 (SPM)**. And while neither account influenced information seeking about consumption practices, it did influence their policy support and values – though not necessarily in the same direction.

2.1.1. Degrowth's System-level Approach Inhibits Engagement

One reason for the discord between individual action and system change is that degrowth's focus on the system might disengage individuals. In **Project 1 (SPM)**, the Degrowth framing around "the system" appeared less successful in spurring policy support

than the Green Growth framing. While public policy represents an s-frame solution (Chater & Loewenstein, 2022), exercising support or opposition for these policies and advocating for change is an important individual-level action that amplifies citizen engagement outside of the private sector. While blaming the climate crisis on the faults of our economic system, and proposing solutions that would change that system, may reasonably demotivate private consumption changes (e.g., Brownstein et al., 2022), it is surprising that it did not spur greater support for changing policy. Changing the system may have instilled fear in participants, for whom neoliberal ideology has inhibited their ability to imagine alternatives (e.g., Türken et al., 2016). Additionally, degrowth may have appeared to threaten existing ways of life, triggering system-justifying tendencies, whereby those with low status rationalise the existing institutional arrangements (Jost & Hunyady, 2005). While a myriad of reasons could explain this disconnect, it is important to recognize that simply shifting focus to "the system" is unlikely to bring about the kind of consciousness needed to build momentum around degrowth.

As such, consumption reduction under degrowth remains a paradox. That is, drastically less consumption appears necessary to fit within planetary boundaries (IPCC, 2022; Rockström et al., 2009; Trainer, 2021). However, directly targeting consumption at the individual level, especially through voluntary means, is not necessarily the way to spur broader societal changes. Perhaps this reinforces a central argument of this thesis, such that institutional changes to facilitate lower levels of consumption are more productive than promoting voluntary behaviour changes. And while spreading the word about the need for system change may stimulate growth critical values in abstract, it may also inhibit behavioural or political engagement to fight for such changes. It is clear that more work is needed to disentangle this paradox further. Some first attempts at nuancing this relationship are included in the following sections.

2.1.2. Disconnect between Micro and Macro Motivations

Consumption reduction at the individual level does not necessarily relate to societal objectives for ending growth imperatives or changing the system. As outlined in the **Literature Review (Chapter 2)**, deconsumption behaviours are associated with a variety of different motivations and lifestyle movements, which may be inspired by personal reasons or societal objectives. For example, while such behaviours may reduce environmental impacts,

there are often personal benefits motivating practices like voluntary simplicity (e.g., to fulfil psychological needs non-materially) (Boujbel & d'Astous, 2012; Etzioni, 1999), anticonsumption (e.g., for consumer empowerment) (Balderjahn et al., 2020; Zavestoski, 2002), and minimalism (e.g., for freedom from accumulation) (Bertolini, 2000; Boutroy, 2020). As such, micro (i.e., personal) and macro (i.e., societal) attitudes toward consumption are not necessarily connected to each other (Iyer & Muncy, 2016), as discussed in **Project 1 (SPM)**.

The disconnect between levels of motivation could imply that consumption reduction per se is not necessarily relevant to degrowth, but rather depends on the person's motivation for undertaking such behaviours. Buying fewer goods, e.g., to save money or have more free time, might improve a person's well-being (Boujbel & d'Astous, 2012; Claborn & Brooks, 2019; Kasser, 2017) essentially carving out a concrete utopia within one's own life (Bossy, 2014). However, the ability to engage in these lifestyle changes often requires a certain level of privilege (Heindl & Kanschik, 2016). Such behaviours are therefore only compatible with societal transformation if explicitly linked with political aims of a broader movement to inspire change (Bossy, 2014). Otherwise, as Saitō (2024) warns, once these individuals realize they can achieve their personal goals within the current system, there is less incentive to fight for a different system, effectively crowding out macro-level objectives (Werfel, 2017).

Especially given the structural barriers to consumption reduction under capitalism (M. Carrington et al., 2021; Sanne, 2002; Verfuerth et al., 2019), degrowth supporters who actively work toward changing our system may lead higher emissions lifestyles than those who believe we should maintain economic growth objectives. Anticonsumption attitudes, including those that are entirely individually motivated like tightwadism (i.e., avoidance of pain when spending money, Rick et al., 2008), were found to be associated with lower carbon footprints than having strong environmental concern (Kropfeld et al., 2018). While these findings may suggest that promoting environmental concern is less conducive to consumption reduction than anticonsumption attitudes, they may also imply that promoting anticonsumption attitudes for personal reasons (e.g., for more family time), may be less conducive to bringing about the conditions for degrowth than focusing on motivations outside of oneself.

While this thesis and prior works (Dugar, 2017) used deconsumption and sufficiency somewhat interchangeably, our findings might suggest that it is only sufficiency, which entails external social and ecological motivations, that should be considered relevant for the degrowth paradigm. These motivations are further underpinned by values (e.g., Schwartz, 1992; Schwartz et al., 2012), which present an important avenue of future exploration.

2.1.3. Importance of Values & Shifting Culture

Though our findings point to a complex relationship with degrowth and individual behaviour, the role of values was much clearer. The significant differences in position choice from **Project 1 (SPM)** might suggest that communicating about degrowth and the need for system-level change could circumvent behavioural disengagement by focusing on values. The transformation pathway details how daily practices and behaviours can shift values and lead to politicisation (Kallis et al., 2020). However, our research might suggest that this pathway is more viable by directly targeting values, as opposed to behaviours. If behaviours are relevant to the pathway, values should be targeted to shift behaviours, and not vice versa, as both values and incentive structures are important for predicting consumption behaviour (Gurtner & Moser, 2024).

In **Project 3**, the link between sufficiency engagement and degrowth policy support in Class C might have derived from their sufficiency *attitudes* and other values, not their behavioural practices directly. Sufficiency is distinguished from other forms of deconsumption due to its dual motivations for meeting planetary boundaries and ensuring a good quality of life for all (e.g., Jungell-Michelsson & Heikkurinen, 2022). These ecological and altruistic dimensions link closely with the values of climate beliefs, universalism concern, and universalism nature, in addition to material simplicity. Class C exhibited significantly higher levels of all these values than the other groups. They also exhibited the most left-wing political ideology, which predicted support for the three eco-social policies (i.e., WTR, ad limits, healthcare), but not fossil-fuel restrictions. The link between values and political engagement is indeed better established in the literature on climate policy (e.g., Drews & van den Bergh, 2016).

Considering the value-belief-norm model of environmentalism and social movements, engagement in movements will require a person to accept values (i.e., guiding principles) in

line with the movement, believe that these values are being threatened, and believe that their actions are pivotal to neutralize the threat (Stern et al., 1999). Three types of support for social movements outside of committed activism include active citizenship (i.e., political activities with lower risk or commitment), supporting public policies, and changing personal, private behaviour, all of which were explored in this thesis. Our results might suggest that values and private consumption behaviours are less directly linked in the degrowth context. I would argue that this model inadequately addresses the social (e.g., status influence), structural (e.g., growth imperatives), and ideological (e.g., neoliberal) constraints to engaging in the movement (e.g., Schmitt et al., 2020). Nonetheless, activating degrowth-compatible values is still necessary, if not sufficient, for engaging people in the movement, especially for active citizenship and policy support.

It is important to consider the values that overlap between sufficiency and degrowth, for example, self-transcendence and inner satisfaction, as well as those necessary for a cultural shift that may not relate to consumption behaviour. Other relevant degrowth values include empathy, compassion, peacefulness, solidarity, kindness, generosity and tolerance of diversity (e.g., Buch-Hansen & Nesterova, 2023), as well as cooperation and collectivism over competition and individualism (Trainer, 2020). While these values may not directly link to one's daily consumption practices, our results suggest that they may be more pivotal in mobilising momentum around institutional and policy changes to facilitate lower levels of consumption. Others have pointed out that the value of justice can connect knowledge (of global material inequalities) with the motivation for taking action (to mitigate such inequalities) (Dobson, 2003, 2006; Fournier, 2008).

The BUCkET model of motivations for climate action (Brick et al., 2021), which characterises the importance of values, and their disconnection with behaviour, also sheds light on our findings. Brick et al. (2021) propose that core social motives including belonging, understanding (i.e., not just being told facts), controlling (e.g., perceived behavioural control, self-efficacy), self-enhancing, and trusting others are more relevant for spurring action. This model might also suggest the relevance of more socially oriented, collective, and visible intervention points (i.e., citizenship behaviours and collective action) over individual, private behaviours to foster connections with degrowth.

Stimulating new values will be necessary for shifting the culture around consumption, which is arguably more important than shifting individual behaviours. How can we target

values? While outside the scope of this thesis, results from **Project 1 (SPM)** might suggest that communicating about degrowth's objectives and suggesting how individuals can get involved as citizens can stimulate support for prioritizing environmental preservation over economic growth. Accepting this worldview might entail a variety of anti-capitalist values, including supporting the intrinsic rights of nature, upholding the importance of democratic decision-making, and prioritizing quality of life over profit. However, in motivating action, such communications should avoid social marketing techniques that promote specific behavioural outcomes with respect to consumption. Social marketing "has no capacity (a priori) to specify which of a set of cultural values should be targeted or prioritised in an environmental communication" (Corner & Randall, 2011, p. 1011). Such communications should instead focus on values and frames that connect to addressing 'bigger-than-self' problems, i.e., degrowth's eco-social agenda (Crompton, 2010). Providing people with accessible information about the limits to economic growth and the need for societal transformation, whilst empowering them to take part in the changes required through active citizenship, should be further explored for shifting values and rallying support.

2.1.4. Not Just Less, but Different Consumption

Additionally, consumption under degrowth will be both quantitatively and *qualitatively* different (e.g., Gunderson, 2018). While consumption volumes will need to be reduced drastically to meet climate targets (Trainer, 2021), Buch-Hansen & Nesterova (2023) articulate how degrowth will also entail an expansion of certain activities. In terms of consumption and production, this might include more clean forms of energy, nature-based economic activities, and collaborative experiences (Buch-Hansen & Nesterova, 2023). An important objective of degrowth is also to improve well-being, shifting consumption from a desire-driven model to needs-satisfaction model (Koch et al., 2017; Lee et al., 2023; O'Neill et al., 2018). While we have explored needs theories with respect to consumption (e.g., Doyal & Gough, 1991; Max-Neef et al., 1991), this thesis was primarily concerned with the issue of quantity reduction, as opposed to qualitatively different consumption or consumption to improve well-being. Applying traditional techniques of consumption reduction, e.g., targeting private purchasing and consumption behaviours, may be

unsuitable when consumption will be drastically different under a new economic paradigm (Asara et al., 2015).

Instead of focusing on reductions, it may be more fruitful to consider the contexts and conditions in which people's consumption can be consistent with degrowth's objectives. That is, the issue of motivation may be overcome by providing more spaces for people to act as citizens, not consumers (Fournier, 2008). This relates to degrowth literature on real-existing degrowth, i.e., taking learnings from current cultures and territories where there are "imperfect and incomplete processes of resisting growth or adapting to its end through tentative alternatives" (Kallis et al., 2022, p. 2). Practices of consumption in non-growth contexts may be more relevant than attempting to apply consumption reduction in a context that is rife with growth imperatives. Studying consumption practices within existing commons spaces (e.g., parks, public libraries) and perhaps designing interventions to promote community-oriented, public behaviours (e.g., volunteering at a community garden) and non-market activities (e.g., foraging, bartering) may be more in line with the qualitatively different consumption needed for degrowth. In characterising the transformation pathway, Kallis et al. (2020) focused more on community-oriented practices than consumption reduction. They argued that working together to construct and enable our desired worlds is vital in not only changing the world around us but fundamentally changing people and their values. This approach could mitigate concerns around equity in consumption reduction uncovered in **Projects 2 (PFAS)** and **3 (DCE)**, as sufficiency and voluntary simplicity may require privilege (e.g., Heindl & Kanschik, 2016). It may further engender the solidarity needed to feel a sense of purpose in fighting for change (Wahlen & Laamanen, 2015) and to overcome the paralysis that calling for "system change" might trigger (Brownstein et al., 2022; Longo et al., 2019).

2.2. Limits to Framing

Findings from **Projects 1 and 3** suggest that there are limits to coherently framing transformative agendas such as degrowth, and that these frames may only influence certain outcomes. Framing complex, value-laden concepts that depart from the status quo requires deeper modes of framing (Corner & Randall, 2011; Crompton, 2010; Lakoff, 2004). Prior work by Krpan & Basso (2021) found that framing degrowth as promotion instead of

prevention-oriented increased support for the agenda across U.S. and U.K. samples. However, simply shifting the name (Rebirth) did not replicate across the two samples. These results further reflect how, although the name degrowth may prove unpopular and provoke growth-oriented thoughts (Drews & Antal, 2016; Raworth, 2015), superficial shifts in naming or framing may be insufficient for overcoming the barriers to supporting the agenda.

In terms of outcomes, results from **Projects 1 and 3** suggest that deep framing of degrowth objectives and foundational principles can positively influence abstract values but not necessarily more active forms of engagement such as policy support. These results echo findings from Tomaselli et al. (2021), who found that framing degrowth around gain vs. loss and well-being vs. the environment did influence cognitive associations and emotions, but not attitudes or voting intentions. Thus, framing interventions may be useful in controlling the narrative around degrowth and laying a foundation for supporting growth critical ideas generally, but they are unlikely to substantially shift people's underlying views on specific policies or to spur active political engagement.

More importantly, our work highlights the important role of psychology within degrowth research to build up new frames in society for connecting social and ecological crises and solutions (Lakoff, 2010; Murcia & Acosta, 2023). These frames are clearly missing in the public consciousness but are necessary to understand the transformative potential of policies targeting both an ecological ceiling and a social floor (Khan et al., 2023). The dominant frames around policy and society tend to separate social, ecological, and environmental issues, or at least do not connect the root causes of these issues to our underlying economic system (e.g., Murcia & Acosta, 2023). Such cognitive frames are highly influenced by the existing economic system (Dietz et al., 2003). **Project 3** demonstrates this divide, where the most sufficiency-oriented respondents were less likely to support policies that also aimed to improve quality of life.

Paper 1 also highlights how frames are codified in institutions, exemplified in the inherent link between marketing and consumption (Higgs, 2014; e.g., Muncy & Eastman, 1998) as well as the individualisation of climate solutions (e.g., Fremstad & Paul, 2022). These frames can only change when the underlying institutions do (Lakoff, 2010). This limitation presents a catch-22, as it is challenging to communicate about the need to transform such institutions before any changes can take place. Unfortunately, the issue of

lacking appropriate frames is commonplace when dealing with both environmental issues and policy solutions, especially for progressive political agendas (Lakoff, 2010). Lessons may be drawn from conservative communication strategies and policy agendas, as they appear more savvy at harnessing existing frames, but they also benefit from the status quo or even regressive bias of most conservative initiatives (Lakoff, 2010).

Framing is employed throughout this thesis to characterise degrowth without using its name, which has also been criticised for eliciting associations with economic recession (Raworth, 2015). Even in avoiding the name, it is possible that many participants were missing the right schema associated with post-growth values and eco-social policy solutions. What's more, the schema that is readily available might have sent alarm bells linking these policies to austerity and financial instability, given the unwavering link between economic growth and prosperity emblazoned in people's minds (Jackson, 2021). While the means of building these new frames remains unclear, it appears that degrowth policies and principles cannot reach a critical mass until post-growth, eco-social institutions and frames are pervasive in society.

3. Policy Implications

3.1. Social Mandate for Eco-Social Regulations

Across the three empirical projects, evidence emerged of support for government regulation that benefits human health, well-being, and environmental protection, at least among certain groups. This research agenda reinforces claims by Howarth et al. (2020) about the need for a social mandate, whereby society encourages governments or other actors to take action to ensure societal welfare, in order to drive policy change. It also underscores the importance of science in driving this process, by providing the necessary empirical evidence (Davies & Oreszczyn, 2012; Howarth et al., 2020). While we did not engage in direct forms of democratic deliberation, such as citizens' assemblies, all three empirical chapters used policy-oriented outcome variables to elicit people's perceptions of various regulations that seek to address a range of interlinked socio-ecological crises (e.g., Rockström et al., 2009), including climate mitigation, poverty and inequality, and chemical pollution. While a prior study in Sweden (Khan et al., 2023) found lower levels of support for eco-social degrowth policies, especially a maximum income cap, meat tax, and universal

basic income, our findings indicate support for most of the policies tested within the U.S. and U.K. context (see **Table 122** for a summary). These findings have implications for expanding public service provisioning and the necessary phasing out of fossil fuels, as explored in the following sections.

Table 122 - Overview of Policies Tested within Empirical Projects

Policy Proposals	Project 1 SPM	Project 2 PFAS	Project 3 DCE	Evidence of Support?
Work time reductions	X		X	Yes
Universal basic income	X			Yes
Fossil fuel restrictions	X		X	Yes
Limits to advertising	X		X	Mixed
Wealth tax	X			No
Universal basic services (healthcare)			X	Yes
Regulating availability of consumer goods		X		Yes

Note: This table provides a summary of the policies we tested in each project, and indicates whether there was evidence of acceptance amongst the sample, marked by the mean level of acceptance (e.g., Projects 1 & 2) or a significant difference from the status quo (e.g., Project 3).

3.1.1. Public Provisioning Systems

Findings from **Project 2 (PFAS)** suggest that what an individual deemed important or needed to function personally may not entirely overlap with what is necessary for the functioning of society. That is, consumption to satisfy personal needs (especially psychological) or desires may not be the most beneficial for society collectively. While most consumption in capitalist societies is undertaken through private means (e.g., Olk et al., 2023), material consumption of market commodities can often be a pseudo- or inhibiting-satisfier for more psychological needs satisfaction or for others' well-being (Vita et al., 2019). Commodified consumption is often more resource inefficient as well (e.g., Olk et al., 2023). So while someone may perceive some psychological harm from losing access to experiential goods (**Project 2**), this may be no more harm than is typically experienced through inadequately satisfying their own needs or preventing others from doing so.

Indeed, some participants pointed out how satisfying an individual need (or desire) could be to the detriment of collective good, in the case of PFAS or other environmentally destructive consumption activities. Given the diversity of possible satisfiers for a given need (Cruz et al., 2009), there are likely better means of fulfilling such needs that may synergistically satisfy other individual needs (e.g., Brand-Correa & Steinberger, 2017) whilst not impeding collective functioning. The results on aggregate from **Projects 1** and **3** provide evidence of support for policies that can ensure a social floor whilst also maintaining an ecological ceiling (Fuchs et al., 2021; Khan et al., 2023; Lee et al., 2023; Raworth, 2017).

These findings bolster calls for consumption corridors, in which there is both a minimum standard of consumption concerned with needs satisfaction for *individual* functioning, and also a maximum standard to prevent erosion of *collective* functioning (Fuchs et al., 2021). Indeed, many participants noted that satisfying individual needs for the basics (e.g., food, water, and shelter) is also necessary for the functioning of society, but beyond this point, certain types of consumption can impede societal functioning (Project 2). And while people valued function-based consumption over consumption for status or hedonic pleasure when considering what is necessary for society, they did not consider any consumer products as critical for societal functioning. These findings offer windows of opportunity to explore alternatives to consumer capitalism.

Public provisioning of goods and services for needs satisfaction might be an important policy initiative for operationalising consumption corridors (Guillen-Royo, 2020; Lee et al., 2023). Private provisioning systems are a feature of neoliberal governance, in promoting commodification, marketisation, and privatisation, whilst shrinking state intervention into welfare (Birch, 2015; Brown, 2015). While some material consumption appears important for satisfying needs such as subsistence and protection, other psychological or spiritual needs such as affection and belonging are less likely to be fully satisfied through private purchasing behaviours (Druckman & Jackson, 2010; Vogel et al., 2021).

Expanding public provisioning to satisfy needs, e.g., through universal basic services, thus offers an important policy avenue for societal transformation. Findings from **Project 2 (PFAS)** might imply that people can trade off their impediments (of losing access to specific products) for the sake of societal benefit. As such, public provisioning of services to provide essential daily functions, for example through free transport and healthcare, public housing, and democratically controlling the means of production and consumption offer important

policy priorities (Brand-Correa & Steinberger, 2017). While public service provisioning has been characterised as a demand-side approach (Creutzig et al., 2022), it targets a much higher level of the institutional framework for consumption than individual-level interventions within the market. It aims to de-commodify consumption to satisfy needs (e.g., Kongshøj, 2023). Welfare states are often entangled in their own growth imperatives (Corlet Walker et al., 2021), warranting further consideration of how to break such growth dependencies when designing public provisioning systems (Kongshøj, 2023). However, expanding public provisioning of goods and services can lead to lower energy consumption, which is necessary for decarbonisation (Vogel et al., 2021). This thesis bolsters prior work on the benefits of public provisioning systems (e.g., Creutzig et al., 2022; Vogel et al., 2021) by investigating needs-based consumption and perceived essentiality from a psychological and behavioural perspective. It presents preliminary evidence of a social mandate for these systems.

3.1.2. Phasing Out Fossil Fuels

Further, tackling fossil fuel production and consumption might represent the single highest priority policy area given the strong support for restrictions across all specifications and most socio-demographics groups. In the United States, where fossil fuel production is heavily subsidized, these results should be viewed as a social mandate for dismantling economic and political incentives that facilitate the continued industry expansion (Milman, 2023). The cap expressed in the DCE (**Project 3**) was not a green growth market mechanism, such as cap and trade of emissions (US EPA, 2016), but a fixed restriction on ground extraction, in line with degrowth (e.g., Kallis & Martinez-Alier, 2010). People also strongly supported alternatives to fossil fuels, as expanding renewable energy capabilities constituted the most popular green growth policy in the U.K. (**Project 1**). Inaction on the part of policymakers to target fossil fuels has led to activist efforts through divestment (Horowitz, 2023) and civil disobedience (Joshi, 2023), suggesting that this is an issue people will mobilise around. Our findings offer concrete scientific evidence of the social mandate to transition away from fossil fuels. This sort of mandate should be difficult for politicians to ignore, although the latest negotiations in COP-28 suggest that governments are still not ready to act on phasing out fossil fuels (D. Carrington, 2023).

It is unclear from our research whether respondents who supported a cap or ban considered the impact it would have on their own ability to consume fossil fuels. Under a degrowth transition, aggregate energy use would need to be downscaled, such that the current level of excessive energy use cannot be merely replaced with renewable capacities (Alexander & Yacoumis, 2018). However, ending human dependence on fossil fuels would also lift a major source of locked-in, carbon-intensive consumption under the current system (Sanne, 2002). Phasing out fossil fuels is thus a pivotal and well-supported institutional change for facilitating reduced consumption.

3.2. Balancing Objective and Subjective Assessments in Policy Formulation

While human needs are objective and should form the basis for more sustainable and equitable provisioning (Brand-Correa & Steinberger, 2017; Koch et al., 2017), careful and democratic planning is needed to ensure the perspectives of different and especially lower socio-economic groups are considered. While there was support for regulating status or desire-driven goods (**Project 2**), and support for general consumption regulations was greater under high-risk scenarios, the interaction between these factors highlights important nuances to consider in developing policy. Perceptions of harm from losing access to products depends on the risk level and the perceived status of the individual. While people may conceive of experiential products as less essential or needed from an objective perceptive, they may fear some harm associated with losing access to them, perhaps given the compensatory function of conspicuous consumption (Rucker & Galinsky, 2008; Sivanathan & Pettit, 2010; Wang et al., 2022), which appeared to heighten under high risk. In **Project 3 (DCE)**, we also found that the same demographics that are considered most likely to benefit from a degrowth transition in the literature, and who take efforts to reduce their own consumption, do not support the most ambitious policies simultaneously addressing social and ecological crises. Taken together, these results identify the importance of balancing objective standards for creating policy, such as needs satisfaction, income redistribution, and quality of life indicators, with the subjective perceptions and desires of individuals who will be impacted by such policies. Especially given degrowth's emphasis on democratic deliberation, policy planning must reflect and integrate diverse and potentially competing perspectives from the general public. They are unlikely to reach a political forum until they are seen as broadly desirable. Here, psychological as well as deliberative methods are

incredibly valuable in generating the kind of insights needed to weigh these competing factors (Ercan et al., 2022; Howarth et al., 2020; Thorman et al., 2020).

1. Targeting consumption reduction effectively and equitably

This thesis further reinforces how any efforts toward consumption reduction within a justice-oriented agenda like degrowth must specifically target those who historically and currently consume and pollute the most. Consumerism, materialism, and high-consumption lifestyles are both detrimental to planetary health and the human psyche (Bauer et al., 2012; Kasser, 2002; Soper, 2020; Wiedmann et al., 2020). However, applying a blanket approach to reducing consumption of people across the income and emissions spectrum would be regressive, inequitable, and counter to degrowth's values (e.g., Sandberg et al., 2019). Indeed, degrowth is often criticised for the perception that it would require those who already have less to sacrifice their consumption further (e.g., Huber, 2023). Our findings provide weight to recent calls for more direct engagement with class struggle to align with adjacent political movements (e.g., eco-socialism) that may be more appealing to the working class (Işıkara & Narin, 2023; Löwy et al., 2022).

To target consumption by income group, different strategies must be employed. Public policy should be aimed at curbing consumption of people with high incomes whilst shifting norms around status and consumerism, which may reduce the desire for conspicuous consumption amongst lower income people (e.g., Wiedmann et al., 2020). This approach can help overcome the ideology of excessive consumption (Stuart et al., 2020), and relates to the importance of targeting values mentioned in **Section 2.1.3**. Our findings with respect to the transformation pathway are encouraging given that the most privileged members of society, especially who have the highest income, must be the target of consumption reduction efforts (Gurtner & Moser, 2024; Wiedmann et al., 2020). Yet as has been established, voluntary approaches appear inadequate for the scale of reductions required (e.g., Heindl & Kanschik, 2016).

Therefore, policy is desperately needed to facilitate sufficiency amongst the affluent, but ideally in ways that less directly impact lower income and less privileged groups to avoid backlash. Indirect policies that do not outright restrict consumption of lower SES individuals will likely prove more popular amongst the majority of citizens, outside of the most affluent

groups which represent an outsized influence given their substantially smaller size (Zweig, 2000). These policies should target consumption and purchasing power of high income and high consuming groups. For example, wealth and income taxes, frequent flier levies, and restrictions targeting ultra-luxury items, e.g., yachts, private jets, and first-class flight tickets, may be preferred to generalized limits on fossil fuel consumption or meat taxes. More direct consumption regulations may be necessary to facilitate downscaling of harmful industries under degrowth. However, if they are prioritized over affluence-oriented policies, they are likely to push away working class and lower-status groups who are vital to building popular support around the degrowth movement (Buch-Hansen, 2018). Democratically and shrewdly designed public policy can target specific sectors of the population, i.e., top income earners, whilst shifting norms around publicly acceptable consumption for those less directly influenced by such policies (Peer et al., 2023).

To further shift norms around consumption, these indirect policies can be paired with other policies that reduce institutional influences on consumption, such as limits to advertising, work time reductions, and revitalising the commons. While work time reductions received general support in both **Projects 1** and **3**, support for advertising restrictions was mixed. As such policies have received high approval in citizens' assemblies from the United Kingdom (Climate Assembly UK, 2020) as well as Austria and Germany (Lage et al., 2023), more work should be devoted to refining these proposals and probing reasons for their opposition, to democratically establish the boundaries that advertising may have in our lives.

The findings from **Project 2 (PFAS)** suggest that low status individuals might place greater value on experiential purchasing, either for hedonic pleasure or status compensation, as environmental risks become more apparent. Though individuals with lower SES may be more sceptical of public policy due to heightened lack of control (Eom et al., 2018), or lower trust in government (Carman & Macmillan, 2020; Foster & Frieden, 2017; Schoon & Cheng, 2011), these findings suggest that merely restricting consumption of hedonic and status goods without replacing these voids could lead to discontent and alienation. While consumption to fulfil psychological needs may be less protected in a constrained world (e.g., Lee et al., 2023), this does not mean that regulating such consumption will not result in deprivation without other means of satisfying such needs (Kenrick et al., 2010).

However, it is not necessary for these alternative satisfiers to be material goods. In addition to expanding public provisioning of goods and services (Brand-Correa & Steinberger, 2017), returning public spaces to the commons (e.g., Ostrom, 2015) acts as a means of decommodification, where people can interact to forge social connections and satisfy their psychological needs without private ownership, status consumption, or economic growth (Euler, 2019; Kallis et al., 2020). Working less whilst not earning less money, people may be liberated to spend time doing meaningful activities in their community and outside of the market, through activism, care work, or environmental stewardship (LaJeunesse, 2009; Stuart et al., 2020). If people's needs can be met non-materially, removing advertising of high emissions products and status-driven goods, at least from public spaces if not more pervasively, may further lessen the urge to consume material goods for life fulfilment and (inadequate) needs satisfaction (Marcuse, 1964; Stuart et al., 2020).

The complementarity of these policies is key, as working less without quelling consumeristic influences or providing spaces for de-commodified needs satisfaction will likely lead to increased consumption of carbon-intensive leisure activities, like watching television or long-distance travel (Knight et al., 2013; Stuart et al., 2020). Taking a wholistic approach is more likely to augment consumption in both quantitative and qualitative ways that can facilitate, as opposed to undermine, a degrowth transformation.

4. Limitations

The findings of this thesis come with several limitations, many of which have already been discussed throughout. One main limitation is the policy-driven nature of the research agenda. By applying a psychological and behavioural lens to study institutional and policy levers within degrowth, the research is less driven by psychological theory. While this approach was chosen to fill the research gaps uncovered, it may limit the ability to apply the learnings of this thesis to other scientific domains. The following sections outline additional methodological and philosophical limitations.

4.1. Methodological & Logistical Limitations

Methodologically, the predominant reliance on quantitative research and online experiments narrowed both the depth and scope for drawing conclusions. While quantitative research allows for a greater sample size and breadth of discovery, it does not allow for the

rich and detailed insights generated through qualitative work (Braun & Clarke, 2006; Hennink et al., 2020). Qualitative focus group research did inform attribute formulation in the DCE design (e.g., Coast et al., 2012), and open-text responses were included in most studies. However, these qualitative data were mostly included to provide context for quantitative responses as opposed to generating insights on their own (except for **Project 2**). Additionally, the majority of outcome measures were stated preferences or self-reports. Only two outcome measures were behavioural in nature (**Project 1**), and these were proxies as opposed to real-world actions. **Project 1 (SPM)** initially entailed a field experiment, but this plan became unviable when the startup decided not to launch, reducing the consequentiality of the research project. However, exploring our frames in real-world branding communications might have contributed to the co-optation of the degrowth message under SPM. The use of surveys also limited the scope of democratic deliberation and citizen-engagement, both of which are important principles for policy-oriented research (Howarth et al., 2020; Stirling, 2008; Thorman et al., 2020). Surveys and social science research have been criticized for being more extractive than deliberative methods like citizens' assemblies (Ercan et al., 2022; Reinharz & Davidman, 1992). However, it is difficult to generate deliberative approaches without prior research findings to direct such efforts. Using deliberative methods was also not feasible given the time, money and scale required to achieve something like a citizens' assembly (*How Do I Set up a Citizens' Assembly?*, 2023). Each paper was driven by the unique needs or aims of the grants acquired to fund them. This may have resulted in slightly less cohesion than a traditional, bottom-up research agenda constructed within an already-funded research project.

Related to methodology, the specific measures used throughout the empirical research to probe socio-demographic differences with regard to class and status may be considered imperfect. Antonoplis (2023) outlined several issues in psychology associated with studying socioeconomic status (SES), including missing definitions, insufficient measurement tools, and the variety of measures used for the same construct. In particular, any single aggregate measure, whether constructed through objective (e.g., income, education) or subjective assessments (e.g., life satisfaction, perceived status) is deemed inadequate (Antonoplis, 2023). Instead, measuring each objective component as a separate condition is preferred. We chose a subjective measure of social status for **Project 2 (PFAS)** in line with prior literature on conspicuous consumption tendencies based on subjective status (Wang et al.,

2022), and for the methodological ease of using one aggregate measure for the three-way interaction. However, we recognize that this is not an adequate depiction of socioeconomic status. Project 3 improved upon this strategy by including separate measures for each condition and only discussing differences in SES amongst our latent groups once it was clear that Class A met several conditions, i.e., lower levels of income, education and formal employment.

Online recruitment platforms were used for all data collection, given the online nature of the experiments. While Prolific Academic provided an easy to use and relatively less expensive means of recruiting participants, it limited the degree of representativeness, especially for race, ethnicity, and educational attainment, that might be achieved through more meticulous recruitment processes. Somewhat unexpectedly, using a market research company to improve representativeness and survey quality resulted in lower quality and less representativeness than our Prolific data. Finally, the sole focus on the United States and United Kingdom could be viewed as contributing to the WEIRD problem in psychological research (Henrich et al., 2010; Muthukrishna et al., 2020). That is, psychological and behavioural science studies will often make assertions about far-reaching human phenomena, when primarily sampling participants from Western, Educated, Industrialized, Rich and Democratic societies. For research on downscaling and sufficiency in the Global North, the WEIRD countries are arguably more relevant. However, my cultural and institutional ties, as a U.S. citizen studying in the United Kingdom, as well as geographic requirements associated with grant funding for all three empirical projects, limited the diversity of our participants base and thus generalisability of the findings.

4.2. Philosophical & Ideological Limitations

Beyond these limitations, there are some philosophical tensions to using traditional psychological and economic research methods to study degrowth. The mainstream expressions of these disciplines are influenced by neoliberalism, in promoting capitalist values and maintaining economic growth (Adams et al., 2019; Andreas & Jabakhanji, 2023; Mair, 2020). The vast majority of theories in mainstream psychology, behavioural science, and economics do not account for any ideological underpinnings or critique the wider economic system within which they operate. This ostensibly value-neutral approach

inadvertently upholds capitalist logics and dominant political agendas (Adams et al., 2019; McDonald et al., 2017). Certain sub-disciplines, e.g., critical psychology and Marxian economics, take a more explicitly political approach to overcome such logics. Other disciplines, more often informed by critical approaches and heterodox values (e.g., sociology, anthropology, ecological economics) might be more obviously suited to study the dismantling of our economic system. Especially in the case of the neoclassical economic assumptions of the DCE methodology (**Project 3**), there are limitations to interpreting results generated from these models when applied to a topic that is underpinned by opposing heterodox theories. While I acknowledge these potential criticisms and accept them as limitations, my research approach was to complement the existing work in more critical fields with alternative tools for filling research gaps pertaining to the agenda's relevance and acceptability. I believe there is power in demonstrating to mainstream economists and psychologists, with their own methodologies, that people do not endorse prevailing growth-centric conclusions. Challenging these deeply held assumptions is an important step for pushing degrowth scholarship beyond a fringe idea, and for dismantling the pervasive view that growth is necessary for prosperity both within academia and public policy.

5. Avenues for future research

Based on the findings from this thesis, there are several important avenues for future degrowth research in which the psychological and behavioural sciences can make valuable contributions. First, research should focus on how to communicate about degrowth to build a broad coalition of support, especially among working-class and low-status groups. This touches on issues already mentioned, for example instilling hope instead of fear when describing the degrowth agenda for newcomers (Tomaselli et al., 2021). Instead of using branding communications, non-commercial mediums should be explored. For example, 'subvertising', whereby commercial space is used to critique capitalist organisations (Dekeyser, 2021; Mair, 2024), may be more conducive to expressing degrowth's values. Research agendas should test various frames, emotions, and narratives, but also conduct theoretical and empirical inquiry to identify sources of negative responses to such communication efforts.

Second, continuing the line of research begun in this thesis, more effort is needed to make degrowth relevant for people's everyday lives. As of now, degrowth remains too abstract, preventing many from imagining such a utopian vision concretely. Using interventions such as narratives, vignettes, and visual imagery could provide people with a clearer vision of a degrowth future that can appeal to a broader range of senses, making it both personal and aspirational (e.g., Buch-Hansen & Nesterova, 2023; Wright et al., 2020). These more tangible narratives can be tested both qualitatively and quantitatively to uncover better and more persuasive means of communicating about degrowth. However, given the complexity of transformations required for degrowth, the difficulty in imagining a world beyond capitalism (e.g., Fisher, 2009; Türken et al., 2016), and the limitations to framing we have uncovered, written communications may be insufficient for this task. Collaborating with artists to develop creative forms of expression may improve the stimuli and ultimate depth of research findings (Gewin, 2021; Gould, 2023).

On a more fundamental level, more research is needed to create a more inclusive vision of degrowth, designing policies and alternative institutions that are democratically deliberated, not just by the white, western, academic elite. This is not a simple disciplinary endeavour but will require interdisciplinary as well as non-academic coordination to address. Participatory workshops partnering with local organizations and NGOs, perhaps applying tools from citizen science (Fraisl et al., 2022), may help facilitate this process.

Future research should also explore the mechanisms behind lower levels of support for degrowth policies amongst low income, less educated, and less formally employed people. For example, research agendas may explore whether systems justification theory (e.g., Brandt, 2013) or hierarchy-legitimizing ideologies within social dominance theory (e.g., Sidanius & Pratto, 1999) relate to one's support or scepticism of degrowth. This may also involve explicitly testing the implications of scarcity in the context of degrowth. For example, if financial instability is likely to be less salient in societies with greater social protections (e.g., Sheehy-Skeffington, 2020), how might perceptions of degrowth depend on the social support system of a person's country or local community? Can focusing on policies like jobs guarantees and universal basic services, which expand social protections, act as a gateway for facilitating broader degrowth support, by first mitigating any financial uncertainties (Hickel et al., 2022; e.g., Olk et al., 2023)? Given the role of community-based trust in facilitating more future-oriented decision-making (Jachimowicz et al., 2017), can

messaging around the community-oriented aspects of degrowth (e.g., shared living practices, the commons) make it more appealing amongst this demographic?

More rigorous research should also explore the relationship between individual and societal needs for functioning. This should be done at a theoretical level, trying to pinpoint underlying motivations and identify synergistic satisfiers, but also from a practical perspective to design policy that maximizes functioning at both individual and collective levels. Research might build upon the methodology used by Lee et al. (2023) in other countries and localities outside of Sweden, qualitatively and deliberatively determining locally relevant and contextually-specific needs satisfiers along with the policies needed to protect them.

5.1. Importance of Interdisciplinary Approaches

Future work should prioritise interdisciplinary approaches when studying degrowth and consumption reduction. This thesis exemplifies the importance of interdisciplinary research in addressing the divide between individual and system-level change, and how the psychological and behavioural sciences can complement other disciplines in building an agenda for societal transformation. Using psychological theory and research methods to answer purely psychological questions has led to a disproportionate focus on the individual, pitting psychology and behavioural science against progressive values and transformational agendas (e.g., Gurtner & Moser, 2024). However, this thesis demonstrates the value of extracting insights that are unique to psychological and behavioural research within a topic area that is not obviously about the individual.

Psychologists should not shy away from transformative agendas like degrowth, and instead engage directly with system-level processes (Gurtner & Moser, 2024; Sabherwal & O'Dell, 2023), as outlined in **Chapter 6**. In building a social and political movement for change, results from **Projects 1** and **3** underscore how much more work is needed to probe how the agenda is received and why it may not receive popular support. While psychologists and behavioural scientists can help unlock the leverage points for garnering greater support, it is also important to ensure that heightened engagement in degrowth from these disciplines does not co-opt the transformative potential of the agenda, as in the case of sufficiency-promoting marketing.

6. Conclusion

In integrating the literature on deconsumption and sufficiency at the individual level with degrowth at the system level, psychological and behavioural research tools have uncovered important insights and challenges to the degrowth research agenda and strategy. It is clear that the agenda will need to be made more relatable and personal to increase its viability and desirability. This thesis explored the ways in which consumption might be an avenue for inducing such relatability, focusing on different institutional arenas to facilitate consumption reduction – through marketing, regulations on consumption, and an eco-social policy package. **Project 1** uncovered how commercial marketing appeared unsuitable for shifting behaviour in line with sufficiency or broader degrowth support. Communicating about degrowth's system-level objectives in citizen-oriented contexts should be further explored for spurring growth critical values, but more empowering and concrete communications (e.g., as with green growth) may be better for spurring policy support. **Project 2** found that although people appeared to support restrictions on product availability, viewing functional products as more essential than experiential products, people valued experiential products relatively more under high risk. This was especially prevalent amongst those with low perceived status, suggesting that any such policies must be democratically and equitably designed. Finally, **Project 3** revealed support for eco-social policies in the United States, and though sufficiency behaviours might facilitate ecological policy support, this potential appears limited for policies that tackle social issues and for demographics outside of degrowth's current base. Taken together, these results suggest that while consumption reduction will be necessary under a degrowth future, and sufficiency is a pivotal value to be cultivated for shifting culture, focusing on voluntary individual behaviour change as a universal approach across contexts and demographics is unlikely to spur transformational change, and might even undermine it.

Consumption under degrowth requires not just downscaling, but balance. Efforts to shift consumption patterns must undoubtedly promote sufficiency amongst affluent and privileged groups around the world, for whom reducing consumption levels is necessary. However, living standards, quality of life, and material conditions must be protected and

increased for those with lower status and less privilege. An important means of balancing these objectives will be to change norms and cultural expectations around status and conspicuous consumption, recognising that current patterns of consumption are often unsatisfactory in satisfying human needs. Shifting to a society in which needs are satisfied through less resource and material-intensive means, and in which institutional and ideological pressures to consume are less prevalent, can facilitate such balance at all income levels. Promoting greater-than-self values related to environmental and social protections might also produce support for the institutional changes needed to facilitate less resource-intensive consumption levels.

As such, democratic deliberation of the various policy proposals, including work time reductions, income or wealth taxes, resource limits, and universal basic services, might be a more useful avenue to engage individuals in the degrowth agenda. This approach also serves to empower individuals as citizens, instead of reinforcing their position as consumers. Eco-social policy debates must involve those with lower power and privilege and be communicated effectively to avoid perceptions of top-down austerity governance. As they stand, degrowth's policy objectives are vast in scope and theoretically rich, yet incomplete in their ability to address the concerns and fears of everyday people. The general public appears to vary substantially in their views on degrowth and its policy initiatives, yet social movements must find ways to transcend heterogeneity and fight for common ground. Until the degrowth agenda can integrate the needs, desires, and lived experiences of the individuals whose lives it seeks to transform, its revolutionary utopian vision will remain an academic dream.

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