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Resilience to Economic Shocks and the Long Reach of Childhood Bullying

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Abstract
This paper investigates whether people's ability to withstand and adapt to one of the most important economic shocks – job loss – is determined early on in childhood. Using nationally representative longitudinal data that tracks almost 3,000 children into adulthood, we show that the negative effect of unemployment on mental health and life satisfaction is almost four times larger for workers who had been bullied a lot in their early life. We also find zero adaptation to unemployment for these individuals over time. Although the results should be viewed as illustrative and more research is needed, their potential implications for economists and policy makers are discussed.

JEL Classifications**:** D03; I19; J64
Keywords: Resilience, adaptation, happiness, unemployment, childhood, well-being

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1. Introduction

There is a growing body of literature over the last decade on the causes and consequences of human's psychological resilience, especially people's ability to bounce back from significantly bad life events (Rayo and Becker, 2007; Graham and Oswald, 2010; Perez-Truglia, 2012).[1] This recent surge of interest is fuelled by the releases of new longitudinal evidence of hedonic adaptation to negative life shocks, including adaptation to unemployment, disability, and bereavement (Clark et al, 2008; Oswald and Powdthavee, 2008), as well as by the potential implications of how people adapt to bad shocks in life have in public policy and welfare evaluation (Layard, 2006; Loewenstein and Ubel, 2008).

Hedonic adaptation is traditionally described in the literature as the consequence of endogenous reference level, i.e., individuals report their well-being by comparing their current state with the reference level, and the reference level itself adjusts slowly towards the actual level (Frederick and Loewenstein, 1999). Yet little is known, either by economists or psychologists, why certain individuals are better than others at bouncing back from a bad life event and why they are initially hurt less by such a shock.

One of the recent attempts to model psychological resilience in the economics literature has been Graham and Oswald's work on hedonic capital (2010). In their paper, individual's happiness can be distinguished into stocks and flows. This unusual classification of happiness as a stock variable[2] is formalized in their model as "hedonic capital" and can be defined as the stock of psychological resources available to an individual. The introduction of

[1] Although there are also studies showing people habituating to good life events, such as marriage and income, for the purpose of our study we will focus our attention only on adaptation to negative life shocks.
[2] Happiness is commonly viewed as a flow variable rather than a stock variable in the literature. However, there have been a number of studies that view happiness as a potential stock variable (see, for example, Carr, 2004).
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hedonic capital in the modeling strategy represents a major advancement in the study of resilience and hedonic adaptation as it allows the following predictions to be made:

(i) individuals with high levels of hedonic capital will exhibit high psychological resilience, i.e., low volatility of well-being;

(ii) After a negative shock to the level of hedonic capital, individuals substitute towards activities which rebuild their hedonic capital. Happiness therefore adapts, returning asymptotically to its starting point.

More generally, what the hedonic capital model implies is that the degrees of psychological resilience and hedonic adaptation will depend crucially on people's ability to accrue and maintain certain levels of hedonic capital over the life-cycle.

While what constitutes hedonic capital remains an empirical question, according to Graham and Oswald (2010, p.373), it could include "social relationships with partners, friends, and colleagues; health; self-esteem; status; and meaningful work. For some, religious may also play a part." However, their paper is purely abstract and did not provide any empirical evidence to support their predictions. But based on their descriptions of what hedonic capital could look like, one could hypothesize that, like non-cognitive skills, some of these components of hedonic capital may have been formed a long ago in childhood and "set like plaster" by the time individuals reach adulthood (McCrae and Costa, 1999; Brunello and Schlotter, 2011). Currently, econometric evidence of both (i) and (ii) is scarce and the implications of hedonic capital on resilience and hedonic adaptation are imperfectly understood.[3]

[3] A few exceptions are the work by Clark and Lelkes (2005), Bonanno et al (2007), and Boyce and Wood (2011), who respectively show religion, income, and certain personality traits can buffer negative shocks on well-being.

The current article contributes to this small literature by asking a relatively unexplored question: Are people who have previously experienced a significant loss of hedonic capital early on in the life-cycle, e.g., those who have had a relatively tough childhood, destined to be hurt more by economic shocks than others? By focusing on unemployment as an economic shock and childhood bullying as a source for an early loss of hedonic capital, we test two key ideas:

(i) Do individuals who suffered more bullying during childhood exhibit lower levels of psychological resilience following an unemployment shock in adulthood?

(ii) Is hedonic adaptation to an unemployment shock slower and less complete for individuals who suffered more bullying in the past?

To the best of our knowledge, this is the first study of its kind to explicitly test the empirical predictions of the hedonic capital model. The use of childhood bullying as an indicator of an early loss of hedonic capital in one's life, and interacting it with job loss in adulthood, also provides a novel empirical test in its own right. For example, one of the central hypotheses of the life-course models is that the largest return to investing in children is when they are young, and that 'early skills beget later skills' (Heckman et al, 2006; Cunha and Heckman, 2008; Cunha et al, 2010). The same idea may apply with the accumulation of hedonic capital. It is possible that experiences of childhood bullying may not only lower one's happiness as an adult, but also permanently damages one's ability to effectively switch from one activity to another to rebuild hedonic capital following an unemployment shock via early losses of self-

esteem, thus lowering one's capacity to adapt quickly and completely to any future life shocks.[4]

2. Background

2.1.Hedonic adaptation

Although the idea that happiness levels adapt has been explored empirically by psychologists since the 1970s (Brickman et al, 1978), it is only recently that economists have started applying time-series data to study what happens to the path of people's happiness over time following changes in the life events. Clark et al (2008) provide one of the most comprehensive longitudinal findings of its kind. In their study, they show that men and women do not generally adapt to the unhappiness brought about by shocks to their employment status, while adaptation to marriage, divorce, widowhood, and children tends to be complete in a matter of a few years for both genders. A similar set of results are obtained by Frijters et al (2011). For instance, using the quarterly life events data in the Australian panel, they find that unemployment starts off bad and stays bad for men and women.

In other studies, Oswald and Powdthavee (2008) show using the British Household Panel Survey (BHPS) and the German Socio-Economic Panel (GSEOP) that although people's happiness levels bounce back over time following severe disability, the adaptation is far from complete. Di Tella et al. (2010) present more evidence by showing that people living in Germany from 1984 to 2000 take four years to adapt completely to a substantial increase in income. Yet the significant effect of the initial increase in social status on happiness remains after this time. Riis et al (2005) provide further evidence by using an ecological momentary-assessment measure of mood to demonstrate that haemodialysis patients are no less happy

[4] For evidence of a long-term effect of bullying that carries over into adulthood, see, e.g., Kaltiala-Heino et al (2000).

than healthy people, thus implying a complete adaptation to their poor health condition for the individuals in their sample. More recently, Powdthavee (2009, 2012) shows that there is a varying rate of adaptation to disability and unemployment across different domains of satisfaction. For example, there is hardly any adaptation in the domains of satisfaction with health and income for the disabled, while adaptation to the initial drop in the domain of satisfaction with social life is generally complete within the first two years of becoming disabled.

Frederick and Loewenstein (1999) provide an introduction to hedonic adaptation and describe it as a "reduction in the affective intensity of favorable and unfavorable circumstances". More recently, there have been numerous attempts, notably by Easterlin (2005), Rayo and Becker (2007), Wilson and Gilbert (2008), and Truglia and Nicolas (2012), to sketch theories of happiness adaptation. The first, by the economist Richard Easterlin, attempts to explain adaptation to positive events by aspirations rising at the same rate as actual circumstances over time.[5] The second, by two economists, likens hedonic adaptation to the ability of human eye to adjust quickly – for sound reasons of self-preservation – to changes in the amount of light. Rayo and Becker set out a model of how Nature might optimally designed human beings' emotional responses to behave in a similar way. The third, by two psychologists, suggests that hedonic adaptation is not reducible to the type in the sensory system, but is a direct consequence of the human's need to explain and make sense of stimuli. They advocate a model which explains how human beings' affective responses weaken – through processes of rationalization – after one or more exposures to a stimulus. In the fourth paper, Truglia and Nicolas develop a model in which Nature finds it optimal to allow some sensations to adapt strongly (e.g. dopamine) while others to not adapt at all (irritant sense, pain). The authors show that people are less likely to adapt to sensations that

[5] For supporting evidence of rising aspiration catching up with actual circumstances, see Stutzer (2004).

Nature has designed to have strong defensive and warning roles, thus explaining why there is differential rate of adaptation across different life events.

While such models given an account of adaptation, only the paper by Graham and Oswald (2010) discusses why some people are more resilient and better at adapting to different life circumstances than others. They do this by considering the possibility that people have an incentive to endogenously invest in stock-like variables of psychological resources for purposes of survival and reproduction. Testing the predictions of this model will be the main focus of this paper.

2.2. Hedonic capital

To highlight the basic building blocks of Graham and Oswald's hedonic capital model, assume that individuals have a stock of psychological coping resources which has the following properties:

(a) it depreciates at the rate of δ,

(b) individuals call changes to its level investment, denoted by *i*, and

(c) it is affected by exogenous shocks ω.

These properties are summarized in the law of motion of hedonic capital:

$$k_{t+1} = (1-\delta)k_t + i_t + \omega_t . \quad (1)$$

We assume that hedonic capital, *k*, produces a flow of psychological resources, *y*, which is determined by a concave function *f*, individual characteristics *z*, and exogenous shocks *v* as follows:

$$y_t = zf(k_t) + v_t,\ f' > 0,\ f'' < 0. \quad (2)$$

Both parameters *z* and *f* represent how efficiently a given individual uses their stock of hedonic capital. This flow of psychological resources can then be used either directly to generate current happiness, *h*, or as investment to increase the stock of hedonic capital

$$y_t = h_t + i_t. \tag{3}$$

The basic maximization problem is based on the following assumptions about the evolutionary process:

(a) humans want to maximize the quality-adjusted number of offspring produced, and

(b) happier individuals produce higher quality offspring.

The latter assumption is based on findings in the happiness literature that happier people tend to lead more successful lives, e.g., they tend to earn higher incomes, have higher quality social relationships, and are healthier on average (see, e.g., Lyubomirsky et al, 2005). Based on these assumptions, individuals set out to maximize the quality-adjusted number of offspring produced by deciding how to maximize their happiness given the details of their situation. This is through making a choice between devoting psychological resources to current well-being or to invest in hedonic capital, subject to various constraints, e.g., time, feasibility, resources, etc.[6] In other words, happiness is viewed in the hedonic capital model as a device – designed by Nature – to make humans value their lives efficiently.

Solving the model produces several key hypothesis. The **first key hypothesis** is that, in steady state where there are no shocks, the level of hedonic capital will be constant, which in turn implies that happiness will also be constant. Since hedonic capital is depreciating at the rate of δ, individuals may find it optimal to use some of the flow of psychological

[6] Rather than summarize all of the particulars of the hedonic capital model here, we refer readers to the mathematical proof outlined in Graham and Oswald (2010).

resources to maintain the stock of hedonic capital for future uses, e.g., maintaining good social relationships, keeping fit, etc. What this implies is that we should also see a constant level of investment in the stock of psychological resources at a level that makes up for its depreciation. This prediction of constant well-being in steady state is consistent with the idea of a personal base line that is constant over time, i.e., the "set-point" theory in the psychology literature (see, e.g., Heady and Wearing, 1992; Lykken and Tellegen, 1996).

The **second key hypothesis** is related to the dynamics of well-being following a one-off external shock to the level of hedonic capital (e.g., unemployment, divorce, disability), or ω in equation (1). When individuals come across this type of shock, i.e., a one-off shock that permanently destroys some hedonic capital at time t=0, they will find that the marginal return to investing in new hedonic capital increases and the flow of current psychological resilience falls. Hence, when deciding to allocate the lower flow of psychological resources between well-being and investment, the proportion devoted to investment will be higher. What this implies is that current happiness falls by proportionately more than it would were investment constant, but hedonic capital increases. This continues until all variables are back at their steady-state level. Happiness therefore adapts, returning asymptotically to its set-point level.

However, if there is such a shock that changes both the individual's hedonic capital and the efficiency parameter z – for example, a childhood trauma can cause both an immediate reduction in happiness and a permanent drop in self-confidence (thus lowering one's prospects in getting a good job and stable personal relationships in the future) – then it may be possible that a person will not be able to recover all of the initial drop in well-being and any adjustment, if at all, will be back to a new and permanently lower state (for empirical evidence, see, e.g., Clark et al, 2008). Such a shock will also have a persistent effect on the individual's ability to adapt quickly to subsequent shocks if its effect on the efficiency parameter z is permanent.

The **third key hypothesis** is related to changes in well-being following a temporary shock which has no direct effect on the level of hedonic capital but nevertheless interrupts the flow of hedonic resources (e.g., a short-run illness of someone close to the individual), or v in (2). Following a shock of this type, the individual allows the stock of hedonic capital to initially fall, so freeing up psychological resources to deal with the event. When the event has passed, the individual then devote more time rebuilding the stock of hedonic capital. The implication of this process is that hedonic capital is used to smooth individual's affective response to shocks. In other words, high levels of hedonic capital imply higher psychological resilience, i.e., low volatility of well-being.

While the first prediction of an individual-specific psychological "set-point" is well contested in the psychology literature, there is little evidence to support or reject the second and third hypotheses of the hedonic capital model. We aim to fill this research void by focusing our attention on the impact of childhood bullying on people's psychological resilience and their ability to bounce back from joblessness in adulthood.

2.3. The consequences of childhood bullying

Previous studies in this area tend to focus on the long-term impacts of childhood bullying on the victim's mental health in early teenage years, educational attainment in secondary school, and social relationships in early adulthood years. For example, Olweus (1993) show that high levels of early victimization predicted poor physical health for boys and girls and poor mental health for girls in their early teens. Similarly, according to a cohort study of Australian students by Bond et al (2001), the incidence of self-reported depression and anxiety in year 9 (age 13-14) is strongly predicted by the experience of childhood bullying in year 8 (aged 12-13).

Hugh-Jones and Smith (1999) provide more evidence. They report that one-half of former victims who were able to recall their past experiences of victimization have problems maintaining good personal relationships in adulthood. McNamara and McNamara (1997) report that victims of childhood bullying tend to be overprotective as parents, which may inhibit the development of conflict resolution skills in their children and, consequently, placing them at greater risk of becoming the next generation of victims. Smith et al. (2004) compared victims of childhood bullying and find that, irrespective of gender, continuing victims have fewer friends, are more likely to be absent from school, like other pupils less and dislike breaks.

By contrast, empirical evidence on the economic impacts of childhood bullying is relatively scarce. One notable paper is a study by Brown and Taylor (2008) on the effects of childhood bullying on the educational attainment and earnings in the UK. Using the National Child Development Study (NCDS), the authors find the impact of school bullying on the educational attainment at age 16 to be negative, sizeable and statistically significant; the effect of one standard deviation increase in bullying on having no O levels at age 16 is approximately 0.9%, which is similar to the effect of an increase in class size by one standard deviation. In addition, they also find that being bullied at school lower wages received during adulthood directly as well as indirectly through educational attainment. Lasse and Bjorkqvist (2005) provide further evidence by showing that 29% of those individuals with long term unemployment problems in a Finnish data had been bullied at least once a week during childhood.

Previous studies in this area are thus clear on one point: there are significant and long-term detrimental effects of childhood bullying on the individual and the society. What we know significantly little about, however, is whether childhood bullying – as a proxy for an early shock to the individual's hedonic capital in childhood – has yet another role to play on

an individual's well-being over the life-course when we interact it with other life shocks experienced later in adulthood.

3. Data and empirical strategy

3.1. Data

Our data set comes from the youth sample and the main adult sample of the British Household Panel Survey (BHPS). The BHPS is nationally representative of British households, contains over 14,000 adult individuals aged 16 and over, and has been conducted between September and Christmas each year since 1991 (Taylor et al, 2002). The youth sample – all children aged between 11 and 15 years – was first introduced to the BHPS in 1994 (Wave 4), and currently consists of around 800-1,400 person-year observations of youths in any given survey wave. These adolescents continue to be interviewed as part of the youth survey until they turn 16 before entering the main adult sample.

We make use of both the youth and the adult samples in our analysis. In our youth sample, which consists of every child aged between 11 and 15 in Wave 4 through to Wave 18, we are primarily interested in the "fear of being bullied" variable. This is a variable which is derived from asking every child aged 11-15 since 1994: "*How much do you worry about being bullied at school? Not at all = 0; a little = 1; a lot = 2.*" Note that our data on childhood bullying is elicited differently from those elicited in the previous literature – e.g., the NCDS asks the mother of each individual is bullied by other children when the child is aged 7 and when the child is aged 11 (Brown and Taylor, 2008). Yet we believe that the respondents in our youth sample, who are aged 11-15 at the time of the interview, are old enough to respond to this question in a meaningful manner. In addition to this, by asking individuals about their *fear* of being bullied, we may be able to pick up the adverse effect of

living and studying in an intimidating environment on individual's well-being even if she does not consider herself to be a direct victim of bullying. Across the entire youth sample, 30% reported "a little" fear of being bullied, while 7% reported "a lot of fear" of being bullied.

Our main sample consists of all adults aged 16 and over who had previously been interviewed in the youth survey. For example, adolescents who were 15 years old in Wave 4 of the BHPS would have been aged 29 when they were interviewed as adults in Wave 18. We investigate whether (i) people who had been suffering more bullying in the past exhibit lower levels of psychological resilience in the future, i.e., higher drops in subjective well-being following an economic shock; and (ii) hedonic adaptation following the shock is slow and incomplete for people who suffered more bullying in the past. There are potentially many negative life events which we could use to test hypotheses (ii) and (iii); for example, bereavement, disability, unemployment, etc. However, given the relatively young age of our adult sample (**aged between 16 and 29 years old**), it seems that the most appropriate life shock – in terms of observed cases – is the unemployment shock on individuals.

Our measures of subjective well-being, which we use as the dependent variables, are (i) mental health (or inversed GHQ-12 scores), and (ii) life satisfaction. The mental health score is derived from the General Health Questionnaire (GHQ-12) score. The scale is considered by many medical scholars and other researchers as a good proxy for mental stress and strain (see, e.g., Guthrie et al., 1998). Recent applications of GHQ include Clark and Oswald (2002), Pevalin and Ermisch (2004), Robinson et al (2004), Oswald and Powdthavee (2007), and Powdthavee and van den Berg (2011). Individuals indicate on a 4-point scale from 1 (*no more than usual*) to 4 (*much more than usual*) how often over the past few weeks they had lost sleep over worry, felt constantly under strain, felt they could not overcome difficulties, been feeling unhappy and depressed, been losing confidence, and been feeling

like a worthless person. Individuals were also asked to indicate on a 4-point scale from 1 (*better than usual*) to 4 (*much less than usual*) on how often over the past few weeks that had felt that they were playing a useful part in things, felt capable of making decisions, been able to enjoy day-to-day activities, been able to concentrate, been able to face up to problems, and been feeling reasonably happy. We use the Caseness score of GHQ, which has a cut-off threshold of 3. This is the BHPS variable HLGHQ2, with a scale running from 0 (best mental health) to 12 (worst mental health). However, for simplicity, we have decided to reverse the original HLGHQ2 coding so that the value of 0 represents the worst mental health and 12 is the best mental health.

Responses to the life satisfaction question are elicited using the following question: *"All things considered, how satisfied or dissatisfied are you with your life overall using a 1-7 scale? 1 = very dissatisfied, ..., 7 = very satisfied"*. By definition, life satisfaction is constructed with an aim to elicit the respondent's past, present, and future global well-being (Diener et al., 1985). It has been shown in the literature to represent a measure of cognitive well-being as opposed to measures of affect well-being such as the GHQ-12.

Summary statistics of the key variables can be found in Appendix A. A quick glance at the table informs us that individuals who had been bullied more in the past have worse mental health, less satisfied with life, more likely to be unemployed, have worse health, are less extravert, more neurotic, and have less income, on average.

3.2.Empirical strategy

In order to test the implications of hedonic capital model on an individual's psychological resilience, let us assume the following micro-econometric equation of an adult's well-being:

$$AW_{it} = \alpha_0 CB\_1_i + \alpha_1 CB\_2_i + \beta U_{it} + \gamma(CB\_1_i \times U_{it}) + \lambda(CB\_2_i \times U_{it}) + X_{it}^{'}\theta + \varepsilon_{it}, \quad (4)$$

where t = 16, …, 29 years old. AW_{it} is self-reported well-being score of adult i at time t; U_{it} is a dummy variable representing the respondent's unemployment status at time t; $X_{it}^{'}$ is a vector of socio-economic status of the respondent; and ε_{it} is the error term. The childhood bullying indexes, CB_1_i and CB_2_i, are dummy variables representing "low" and "high" levels of average experiences of childhood bullying across the ages of 11 to 15 years old, respectively. These are constructed by taking within-person averages of the "fear of being bullied" variable we have of them as youths, B_{it}, i.e., $\overline{B}_i = \{x \mid 0 \le x \le 2\}$, in order to generate the CB variables, where $CB\_1_i = 1$ if $0 < \overline{B}_i \le 1$, and $CB\_2_i = 1$ if $1 < \overline{B}_i \le 2$. We then link these two dummies with other information we have on them as adults. Of the adult sample, 49% had experienced *little* bullying ($CB\_1_i = 1$) and 8% had experienced *a lot* of bullying ($CB\_2_i = 1$) when they were interviewed in the youth survey. Both childhood bullying parameters, α_0 and α_1, are expected to be negative and statistically significant, with $\alpha_0 \le \alpha_1$. The parameter β represents the main effect of unemployment on the respondent's well-being, while the interaction coefficients γ and λ are expected to be negative and statistically significant – with $\gamma > \lambda$ – if people who had suffered more bullying in the past exhibit lower levels of psychological resilience, i.e., higher drop in well-being following an unemployment shock.

To test whether adaptation to unemployment is slower and less complete for people who suffered more bullying in the past, equation (5) can be extended to include lead and lag variables as followed:

$$
\begin{aligned}
AW_{it} = {} & \alpha_0 CB\_1_i + \alpha_1 CB\_2_i + \beta_{+1} U_{it+1} + \beta_0 U_{it} + \beta_{-1} U_{it-1} + \beta_{-2} U_{it-2} + \beta_{-3} U_{it-3} + \\
& \gamma_{+1}(CB\_1_i \times U_{it+1}) + \gamma_0(CB\_1_i \times U_{it}) + \gamma_{-1}(CB\_1_i \times U_{it-1}) + \gamma_{-2}(CB\_1_i \times U_{it-2}) + \\
& \gamma_{-3}(CB\_1_i \times U_{it-3}) + \lambda_{+1}(CB\_2_i \times U_{it+1}) + \lambda_0(CB\_2_i \times U_{it}) + \lambda_{-1}(CB\_2_i \times U_{it-1}) + \\
& \lambda_{-2}(CB\_2 \times U_{it-2}) + \lambda_{-3}(CB\_2_i \times U_{it-3}) + X_{it}^{'}\theta_i + \varepsilon_{it},
\end{aligned}
\tag{5}
$$

Here, U_{it+1} represents a dummy variable that takes a value of 1 if the individual will be unemployed at year $t+1$. If there is a lead or a potential endogenous effect to becoming unemployed, then we would expect to see this one-year lead coefficient to be negative – assuming that it is undesirable to becoming unemployed or to remain in the same job. The lead coefficient should, however, be zero if unemployment is unexpected by the individuals. The adaptation effects to being unemployed are captured by three lagged variables: Unemployed at $t-1$, Unemployed at $t-2$, and Unemployed at $t-3$. Unemployment of one to two **consecutive** years is identified by $U_{it}=1$ and $U_{it-1}=1$. Longer lags are defined analogously. If there is zero hedonic adaptation to unemployment, then we would expect the sum of the later values of (or the lagged coefficients) to be zero or negative and statistically significant. However, if there is adaptation then the sum of the later values of to be positive; we will observe individuals "bounce back" from being jobless. If hedonic adaptation is complete, then we would expect the sum of the later values of β to be positive, statistically insignificant, and at least of the same size as β_0 In other words, being unemployed for many consecutive years is the same as not being unemployed at all.

The inclusion of interaction terms with the stock-like variables adds another dimension to our analysis as it allows us to test whether (i) there is an endogenous effect to becoming unemployed that varies by experience of childhood bullying, and (ii) hedonic adaptation to unemployment shock is slower and less complete for people who suffered more bullying in the past, i.e., whether the sum of later values of γ and λ is negative and statistically

significant – which would indicate an impeding effect from having been bullied as a child on one's ability to adapt to an unemployment shock in adulthood.

3.3.Hypotheses

Based on the predictions of the hedonic capital model, we can estimate equations (4) and (5) using random effects (RE) and fixed effects (FE) to test the following hypotheses:

i. Previous experiences of childhood bullying are important predictors of subjective well-being (e.g., mental health and life satisfaction) of the adults;
ii. People who suffered more bullying in the past exhibit lower levels of psychological resilience, i.e., higher drop in well-being, in response to a shock in unemployment;
iii. Hedonic adaptation following an unemployment shock is slow and incomplete for people who suffered more bullying in the past.

Although (i) is an important hypothesis in its own right, we are naturally more interested in finding evidence to support hypotheses (ii) and (iii).

4. Results

Are people who suffered more bullying in the past hurt more by unemployment than others? Figures 1 and 2 provide a first pass at this question. By comparing the raw means of mental health and life satisfaction of the employed and the unemployed across different categories of childhood bullying, we arrive at the conclusions that (i) the unemployed have, on average, worse mental health and lower life satisfaction than the employed in each of the childhood bullying categories; (ii) for both the employed and the unemployed, having been bullied more in the past significantly contributes to individuals reporting lower mental health and life satisfaction scores as adults; and (iii) the drops in well-being are noticeably larger – in that

the trend lines are steeper – for the unemployed than for the employed as we move across the childhood bullying categories. What (ii) and (iii) are implying is that unemployment hurts more for those who reported to have been bullied more often in the past (or that the well-being gap between the employed and the unemployed gets wider as we move across different categories of childhood bullying). Thus, we have in Figures 1 and 2 some raw data evidence that people with a lower stock of hedonic capital – whether it is caused by or a reflection of childhood bullying – also possess a lower level of psychological resilience, on average.

Table 1 moves to econometric evidence. The dependent variables are mental health (measured cardinally on the 0 to 12 scale) and life satisfaction (measured cardinally on the 1 to 7 scale).[7] Standard control variables are entered into the equations, including age, age-squared, gender, employment status (other than unemployment), marital status, income, education dummies, health dummies, number of children, homeownership status, region, and wave dummies. Since victims of bullying are typically different in terms of personality traits compared to non-victims – e.g., low levels of conscientiousness and high levels of neuroticism are typical identifiers of victims of childhood bullying (see, e.g., Tani et al, 2003), we also control for the Big Five personality traits (extraversion, agreeableness, openness, neuroticism, and conscientiousness), as well as their interactions with the unemployment variable, thus allowing for for the possibility that the well-being effects of unemployment vary by people of different personality types rather than by experiences of childhood bullying.[8]

In the RE estimation (columns 1 and 4), the coefficients on *Bullying index = 1 (a little)* are -0.130 and -0.100, while the coefficients on *Bullying index = 2 (a lot)* are more negative

[7] All the paper's results can be replicated with ordered estimators. But, as in the paper by Luttmer (2005), as a pedagogical device and for ease of reading we here use cardinal methods.

[8] These additional stock-like variables, which were obtained in Wave 15 of the BHPS, are entered with the same values across all waves for each respondent. For example, if respondent *i* has responded with a score of 14 on the extraversion scale in Wave 15, her extraversion score will be 14 in every other wave while she is still in the panel.

at -0.787 and -0.351 in the mental health equation and the life satisfaction equation. This implies that, ceteris paribus, people who had been bullied more often in the past have worse mental health and lower life satisfaction as adults. The standard errors are precisely estimated, so that at conventional levels the null hypothesis of zero is rejected for all four coefficients.

Consistent with the previous literature, the unemployed have on average worse mental health and are less satisfied with life compared to the employed (see, e.g., Clark and Oswald. 1994; Winkelmann and Winkelmann, 1998). The estimated main effects of unemployment are -0.547 in the mental health equation, and -0.157 in the life satisfaction equation. The standard errors on the coefficients are 0.177 and 0.078, so that we can reject the null hypothesis of zero at conventional levels in both equations.

An interaction term for *Unemployed* × *Bully = 1 (a little)* is negative at -0.185, although statistically insignificantly different from zero, in the mental health equation. The same interaction term is -0.140 and marginally significant at the 10% level in the life satisfaction equation. By contrast, an interaction term for *Unemployed* × *Bully = 2 (a lot)* is negative, statistically significant, and sizeable in each of the well-being equations. The coefficients on *Unemployed* × *Bully = 2 (a lot)* are -1.380 [*S.E.*=0.324] and -0.380 [*S.E.*=0.144] in mental health and life satisfaction equations, respectively. These variables and their coefficients make it possible to read off the extent of unemployment effects by different degrees of childhood bullying. Consider, as a benchmark, an unemployed individual who reported no fear from bullying between the age of 11 and 15. Other factors held constant, the effects of unemployment on mental health and life satisfaction are -0.547 (on the 0 to 12 scale) and -0.157 (on the 1 to 7 scale). However, if the unemployed had been bullied a lot in the past, then the effects of unemployment on mental health and life satisfaction are respectively $-0.547-1.380=1.926$ and $-0.157-0.380=-0.536$, which are approximately **three times** larger than the effects of unemployment on the well-being of

those who had never been bullied during childhood. The standard errors of these sums are 0.307 and 0.136, so that we can also reject the null hypothesis of zero at the 1% level.

Quantitatively similar results are obtained when we take the individual fixed effects into account. Columns 2 and 4 in Table 1 produce the following results for, say, an unemployed person who had experienced a lot of fear of being bullied in the past. For these individuals, the total effects of an unemployment shock on mental health and life satisfaction are almost **four times** larger than the main unemployment effects at $-0.477-1.658=-2.134$ and $-0.127-0.466=-0.592$, respectively. By contrast, we find the effect of unemployment on life satisfaction to be statistically insignificantly different from zero for those who had not had any experience of having been bullied as a child; the main effect of unemployment for this group is -0.127, with a standard error of 0.085. It is also worth noting that the results are robust to controlling for the interactions between unemployment and the Big Five personality traits. What this suggests is that the degree of psychological resilience of an unemployed person depends more on his childhood experiences than on his personality traits as an adult.

Columns 3 and 6, in which the two *CB* dummies are replaced by the mean childhood bullying index (averaged across ages, from 11 to 15 years old), produce the main unemployment effects of -0.514 in the mental health equation and -0.157 in the life satisfaction equation. The interaction term *Unemployed* $\times$ *Average bullying index* is negative and statistically significant at -0.636 in the mental health equation, and -0.208 in the life satisfaction equation. What this implies is that a shock in unemployment lowers mental health by approximately 0.5-point for those who had not previously been bullied, 1.2-points for those who had been bullied a little in the past, and 1.8-points for those who had been bullied a lot during childhood. In terms of life satisfaction, the drops in well-being from becoming unemployed are approximately 0.16 for those who had not been bullied between the age of 11

and 15; 0.36 for those who had been moderately bullied in the past; and 0.57-life-satisfaction-points for those who had been severely bullied as a child.

These extra drops in well-being for individuals had been bullied in the past are quantitatively important as well as statistically significant. Take, for example, the gap in mental health between the unemployed with a bullying index of 0 (no bullying) and the unemployed with the bullying index of 2 (a lot of bullying) in Column 2 of Table 1. The difference in the mental health score here is -1.658, with a statistically well-determined standard error of 0.365. Given the distribution of the mental health score, this is a large effect. It is approximately the same effect as becoming disabled, or a move from having an "excellent" health to having a "very poor" health, or having up to 8 children in the household.

The next question of interest is whether adaptation to unemployment slow and incomplete for those who had been through more bullying in the past. To answer this question, a fixed effects specification of equation (5) is estimated on a sample in which at least five years of mental health and life satisfaction are consecutively observed.[9] Given that the table produces a large number of coefficients, for ease of interpretation we report in Table 2 only the implied well-being effect of unemployment by degrees of childhood bulling at different periods of time, e.g., $\sum_{k}^{K}\gamma_{t-k}$ and $\sum_{k}^{K}\lambda_{t-k}$. We also construct graphical representations of Table 2's estimates and display them as Figures 3 and 4.[10]

When we compare the dynamics of well-being across different categories of childhood bullying, we can see that there is some evidence of a one-year anticipation effect for the moderately bullied but not for the non-victims and the severely bullied. This is a surprising result, considering that the severely bullied are the most likely to be unemployed and the moderately bullied are the least likely to be unemployed in our raw data set – see

[9] The random effects specification is available upon request.
[10] The estimated coefficients of equation (5) can be found in Appendix B.

Appendix A. What this implies is that those who had been bullied a lot more often in the past are no more likely to experience a significant drop in well-being one year prior to becoming unemployed when we compare them with those who had not experienced some form of bullying in childhood.

While those who had gone through a lot of bullying in the past report, on average, the sharpest drop in mental health and life satisfaction in the first year of unemployment (t=0), their well-being continues to drop in every year that they remain unemployed. For example, the unemployment effect on mental health in the first year of becoming unemployed is −2.239 [*S.E.*=0.685]; −2.353 [*S.E.*=1.068] in the second year of unemployment; −2.858 [*S.E.*=1.365] in the third year of unemployment; and −3.020 [*S.E.*=1.634] in the fourth year of unemployment. In other words, there is zero adaptation to unemployment for those who had been bullied a lot during childhood. By contrast, people who had not been bullied at all between the age of 11 and 15 report a significant drop in mental health only in the first year of becoming unemployed. What this suggests is that adaptation to unemployment is complete within the first year for these individuals.

One natural concern is that unemployment is endogenous to childhood experiences. Hence, in order to make a further case of our findings, we follow the research of Kassenboehmer and Haisken-DeNew (2009) and Fujiwara (2012) and split the unemployment shock into unemployment by redundancies and unemployment by other reasons, e.g., dismissed, left for health reason, or temporary job ended, etc. Assuming that redundancies – which make up to around 15% of the unemployed – represent exogenous changes in employment status, we re-estimate a fixed effects specification of equation (4) on mental health and life satisfaction and report the results in Table 3. Consistent with previous studies, those who became unemployed by redundancies report, on average, significantly larger drops in well-being compared to those who became unemployed for other reasons.

More importantly, we continue to find unemployment shocks – redundancies or otherwise – to hurt more, on average, for those who had been bullied more often in the past. For example, while an exogenous unemployment shock lowers mental health for those who had never been bullied as a child by approximately 0.3-point, the negative effect is much larger at −3.262 [*S.E.*=0.783] for those who had reported a lot of fear of being bullied as a child.

It seems interesting to go a little further and provide some evidence to explain why childhood bullying has a long-lasting impression on a victim's psychological resilience. Here, we ask whether changes in childhood bullying is also associated with significant losses in self-esteem for the respondents when they were aged between 11 and 15 years old. To do this, Table 4 estimates fixed effects self-esteem regression equations on the BHPS Youth sample. The dependent variable is the self-esteem score (measured cardinally on the 6 to 24 scale) reported by the respondents when they were aged between 11 and 15 years old.[11] The independent variables of interest are the "fear of being bullied" dummies, which, unlike our analysis on the effects of average childhood bullying on the well-being of an adult, are allowed to vary from year to year in the youth sample. Controlling for a wide range of youth and parental characteristics, fear of childhood bullying is associated significantly with losses of one's self-esteem. The effect is linear and monotonic; the coefficients on *Fear of being bullied: a little* and *Fear of being bullied: a lot* are -0.302 [*S.E.*=0.065] and -0.621 [*S.E.*=0.124]. It is also sizeable. For example, to almost compensate a youth for having a lot of fear of being bullied, he or she needs 16 or more extra number of close friends. With such a significant loss early on of self-confidence for those who had been bullied more often in the past, we now have more evidence to support the hypothesis that childhood bullying alters our ability to accrue future hedonic capital in a fundamental and permanent way.

[11] The self-esteem variable is a combined score from the following questions: I feel I have a number of good qualities; I certainly feel useless at times (reversed); I am a likeable person; I am inclined to feel I am a failure (reversed); I don't have much to be proud of (reversed); I am as able as most people. The scale is from 6 (low self-esteem) to 24 (high self-esteem). For a recent use of this variable, see Powdthavee and Vernoit (2012).

5. Conclusions

This paper makes one of the first attempts to estimate the interaction effect between a childhood experience and an economic shock experienced in adulthood on the well-being of an adult. Consistent with the predictions of the hedonic capital model, an unemployment shock is associated with a significant drop in both mental health and life satisfaction of workers. However, in our fixed effects specification, the drop in well-being is estimated to be almost **four times** larger for workers who had been bullied a lot more often in the past. These same individuals are also less likely to adapt to such a significant drop in well-being brought about by the unemployment shock over time. On the contrary, there is some evidence to suggest that their well-being may continue to drop even further the longer they remain in unemployment.

There are at least two important implications of our results. The first is purely descriptive. What we have presented here is one of the first empirical evidence to support the predictions made by the heavily-abstract hedonic capital model (Graham and Oswald, 2010). The results are also consistent with the general predictions made by the traditional life-course models, e.g., the work by Heckman and co., by providing new evidence to back the idea that people's psychological resilience and ability to adapt quickly and completely to negative life shocks can be determined early on in their childhood.

The second is normative: whenever and wherever possible, policy makers will like to be able to identify those individuals who are destined to be suffering the most from shocks to their economic circumstances. In terms of the current paper's subject matter, we have strong evidence to suggest that experiences in childhood matter a great deal to people's ability to cope and adapt to shocks in unemployment that take place later on in adulthood. Obviously,

one natural objection to our results is that the effects of childhood bullying on future psychological resilience may not be entirely causal. Some individuals may have certain idiosyncratic traits that make them more vulnerable to childhood bullying, while at the same time prevent them from maintaining a high level of psychological resilience as an adult. While it would be ideal to come up with a variable that we could use to instrument for the extent of bullying during childhood, it is not possible to do so in our youth data set. This is simply because the BHPS Youth sample contains very limited information about the youth's characteristics, such as test scores, tastes, body mass index (BMI) at each stage of development, as well as peer groups and the school environment of the child.[12] Nevertheless, we believe that it is perhaps more important for policy makers to know which childhood indicators could be used to effectively identify children who are at the highest risk of growing up to be without the necessary resilience skills to cope with future life shocks. Policies on unemployment benefits, unemployment insurance, and severance pay may have to be redesigned with a much longer memory of a worker's life in mind. The ability to identify individuals with potentially low psychological resilience from the population thus becomes the key to optimal policy design. In short, even if our indicator of childhood bullying is nothing more than just a mirror reflection of something else that is unobserved about the child, then at least it serves its purpose as a detective device which can be used to gauge early a child's ability to adapt to negative shocks in the future.

[12] According to the study by Brown and Taylor (2008) on the National Child Development Study (NCDS), individuals who were more prone to be bullied at aged 7 were male, wore glasses at 7, were unattractive at 7, had erratic movement at 7, had low birth weight, of certain personality types at 7, preferred to spend time alone at 7, recently moved in to the region at age 7, and family had financial problems at age 7.

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Figures 1 & 2: Mental health and life satisfaction of the employed and the unemployed by categories of childhood bullying

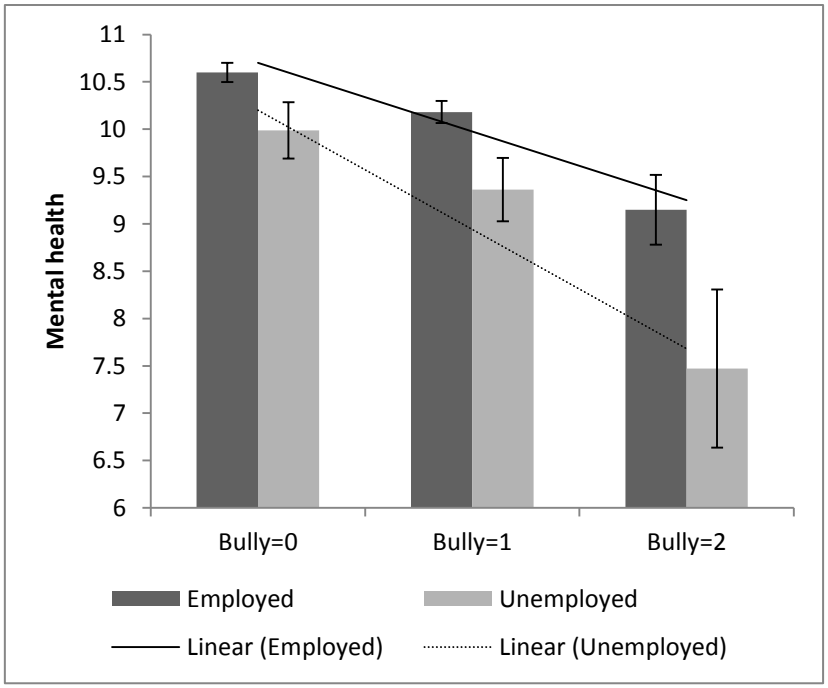


Figure 1: Mental health

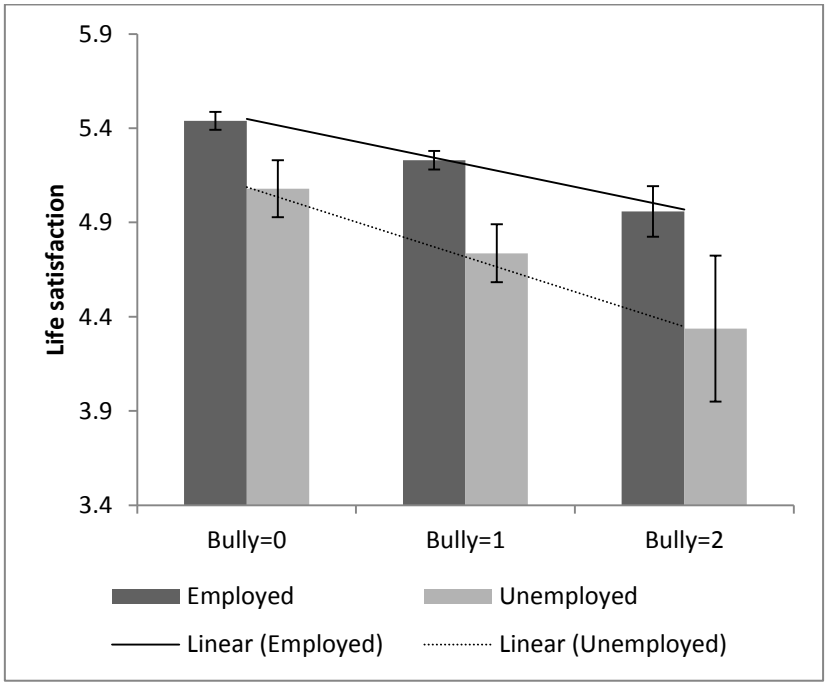


Figure 2: Life satisfaction

Note: 4-standard-error bands (95% C.I.) are reported: two s.e. above and two below. Bully = 0 (no reported fear of being bullied between the ages of 11 and 15). Bully = 1 (bullied a little). Bully = 2 (bullied a lot).

Table 1: Mental health and life satisfaction regression equations with interaction effects between average childhood bullying and unemployment

	Mental health			Life satisfaction		
Variables	**RE**	**FE**	**FE**	**RE**	**FE**	**FE**
Bullying index = 1 (a little)	-0.130*			-0.100***		
	[0.0733]			[0.0376]		
Bullying index = 2 (a lot)	-0.787***			-0.351***		
	[0.135]			[0.0693]		
Unemployed	-0.547***	-0.477**	-0.514***	-0.157**	-0.127	-0.157**
	[0.177]	[0.196]	[0.177]	[0.0786]	[0.0855]	[0.0773]
Unemployed × Bully = 1 (a little)	-0.185	-0.263		-0.140*	-0.141	
	[0.187]	[0.210]		[0.0826]	[0.0908]	
Unemployed × Bully = 2 (a lot)	-1.380***	-1.658***		-0.380***	-0.466***	
	[0.324]	[0.365]		[0.144]	[0.159]	
Unemployed × Average bullying index			-0.636***			-0.208**
			[0.202]			[0.0875]
The implied well-being effect of unemployment by experiences of childhood bullying						
Unemployed and no bullying	*-0.547****	*-0.477****	*-0.514****	*-0.157***	*-0.127*	*-0.157***
	[0.177]	*[0.196]*	*[0.177]*	*[0.078]*	*[0.0855]*	*[0.0773]*
Unemployed and bullied a little	*-0.731****	*-0.739****	*-1.150****	*-0.297****	*-0.267****	*-0.364****
	[0.164]	*[0.182]*	*[0.187]*	*[0.072]*	*[0.079]*	*[0.081]*
Unemployed and bullied a lot	*-1.926****	*-2.134****	*-1.786****	*-0.536****	*-0.592****	*-0.572****
	[0.307]	*[0.342]*	*[0.346]*	*[0.136]*	*[0.149]*	*[0.151]*
Personal characteristics						
Age	-0.215**			-0.136***		
	[0.105]			[0.0459]		
Age-squared	0.00497*	0.00315*	0.00317*	0.00251**	0.00169**	0.00168**
	[0.00254]	[0.00189]	[0.00189]	[0.00110]	[0.000816]	[0.000816]
Male	0.573***			0.0651*		
	[0.0705]			[0.0361]		
Self-employed	0.0844	0.114	0.117	-0.0223	-0.101	-0.101
	[0.210]	[0.229]	[0.229]	[0.0911]	[0.0979]	[0.0979]
Full-time student	-0.0123	0.0497	0.0474	0.0183	0.0143	0.0141
	[0.0643]	[0.0756]	[0.0757]	[0.0289]	[0.0328]	[0.0328]
Disabled	-1.808***	-1.597***	-1.577***	-0.423***	-0.380***	-0.379***
	[0.289]	[0.322]	[0.322]	[0.127]	[0.139]	[0.139]
Inactive in the labor market	-0.153	-0.140	-0.136	-0.0249	0.00248	0.00265
	[0.119]	[0.131]	[0.131]	[0.0528]	[0.0572]	[0.0572]
Married	-0.0225	0.0163	0.0152	0.289***	0.275***	0.275***
	[0.182]	[0.196]	[0.196]	[0.0798]	[0.0849]	[0.0850]
Cohabiting	0.113	0.145	0.141	0.170***	0.141***	0.141***
	[0.0962]	[0.104]	[0.104]	[0.0418]	[0.0445]	[0.0445]
Widowed	0.319	0.525	0.500	-0.293	-0.268	-0.271
	[1.377]	[1.426]	[1.426]	[0.571]	[0.585]	[0.585]
Divorced	0.562	-0.175	-0.119	0.445	0.407	0.420
	[0.913]	[1.000]	[1.000]	[0.406]	[0.415]	[0.416]

Separated	-0.118	-0.128	-0.127	0.317	0.414*	0.416*
	[0.534]	[0.568]	[0.568]	[0.228]	[0.242]	[0.242]
Ln(real household income)	-0.0116	-0.0142	-0.0150	-0.00654	-0.00941	-0.00970
	[0.0306]	[0.0354]	[0.0354]	[0.0136]	[0.0152]	[0.0152]
Highest qualification: A-level	0.0787	0.406***	0.403***	0.0865**	0.102**	0.101*
	[0.0743]	[0.114]	[0.114]	[0.0355]	[0.0517]	[0.0517]
Highest qualification: Higher degrees	-0.00523	0.256*	0.252*	0.101**	0.0969	0.0956
	[0.0962]	[0.137]	[0.137]	[0.0451]	[0.0613]	[0.0613]
Health: poor	0.00842	-0.0450	-0.0293	0.272**	0.271**	0.274**
	[0.265]	[0.279]	[0.279]	[0.114]	[0.119]	[0.119]
Health: fair	1.150***	0.959***	0.974***	0.578***	0.551***	0.554***
	[0.256]	[0.273]	[0.273]	[0.111]	[0.117]	[0.117]
Health: good	1.624***	1.353***	1.368***	0.818***	0.753***	0.756***
	[0.256]	[0.274]	[0.274]	[0.111]	[0.117]	[0.117]
Health: very good	1.929***	1.639***	1.650***	1.057***	0.952***	0.955***
	[0.259]	[0.278]	[0.278]	[0.112]	[0.119]	[0.119]
Number of children (age<16)	-0.168*	-0.200**	-0.200**	-0.0318	-0.0374	-0.0379
	[0.0876]	[0.0986]	[0.0987]	[0.0386]	[0.0425]	[0.0425]
Homeowner: mortgage	0.258***	0.153	0.158	0.0726*	-0.0361	-0.0348
	[0.0924]	[0.129]	[0.129]	[0.0426]	[0.0555]	[0.0555]
Homeowner: own outright	0.209***	0.188**	0.192**	0.0830***	0.00599	0.00691
	[0.0678]	[0.0942]	[0.0943]	[0.0313]	[0.0407]	[0.0407]
The Big Five Personality Traits						
Extraversion	0.000956			0.0179**		
	[0.0141]			[0.00738]		
Agreeableness	0.0463***			0.0422***		
	[0.0153]			[0.00801]		
Openness	-0.068***			0.000413		
	[0.0134]			[0.00698]		
Neuroticism	-0.164***			-0.056***		
	[0.0115]			[0.00598]		
Conscientiousness	0.0160			0.0298***		
	[0.0147]			[0.00767]		
Interactions with personality variables						
Unemployed x Extraversion	-0.0156	-0.0161	-0.0144	-0.00164	0.000523	0.000730
	[0.0106]	[0.0120]	[0.0119]	[0.00455]	[0.00495]	[0.00494]
Unemployed x Agreeableness	-0.00134	-0.00755	-0.00878	-0.00859	-0.00820	-0.00856
	[0.0187]	[0.0204]	[0.0204]	[0.00842]	[0.00911]	[0.00911]
Unemployed x Openness	0.0105	0.00799	0.0101	-0.00129	-0.00212	-0.00160
	[0.0113]	[0.0115]	[0.0115]	[0.00470]	[0.00480]	[0.00479]
Unemployed x Neuroticism	0.000471	0.00191	0.00149	0.00553	0.00549	0.00537
	[0.0116]	[0.0121]	[0.0121]	[0.00557]	[0.00582]	[0.00582]
Unemployed x Conscientiousness	0.00672	0.0135	0.0122	0.00432	0.00287	0.00286
	[0.0126]	[0.0158]	[0.0158]	[0.00570]	[0.00678]	[0.00677]
Constant	12.14***	8.416***	8.398***	5.222***	3.394***	3.398***
	[1.265]	[0.577]	[0.577]	[0.573]	[0.476]	[0.476]
Observations	12,218	12,052	12,052	11,322	11,101	11,101
Number of individuals	2,737	2,723	2,723	2,708	2,671	2,671
Within R-squared	0.0365	0.0385	0.0374	0.0412	0.0446	0.0442

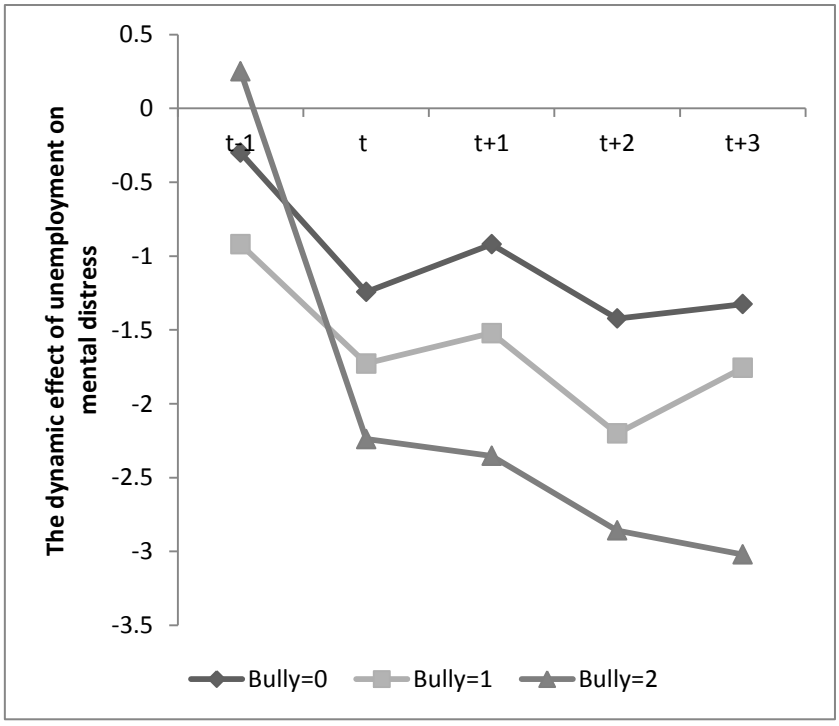
Note: *<10%; **<5%; ***<1%. Standard errors are in parentheses. Additional controls include regional and wave dummies.

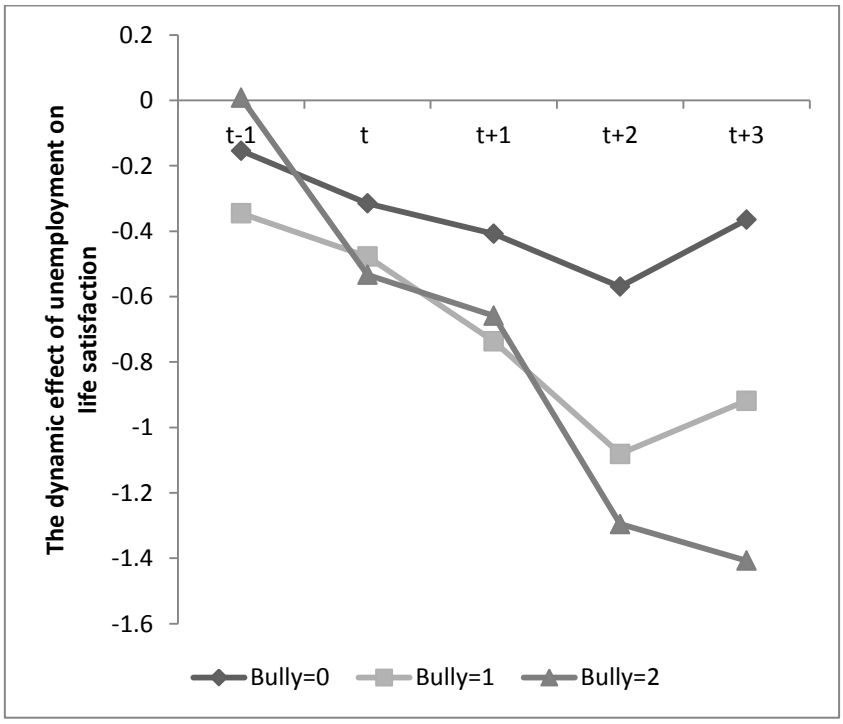
Table 2: The implied well-being effects before unemployment and following unemployment by categories of childhood bullying

	Fixed Effects (FE)		
Mental health	**Bully = 0 (zero bullying)**	**Bully = 1 (a little)**	**Bully = 2 (a lot)**
Unemployment within the next year	-0.301	-0.920**	0.250
	(0.45)	(0.412)	(0.720)
Unemployment for one year	-1.243***	-1.727***	-2.239***
	(0.445)	(0.401)	(0.685)
Unemployment for two years	-0.921	-1.522**	-2.353**
	(0.681)	(0.631)	(1.068)
Unemployment for three years	-1.424	-2.202***	-2.858**
	(0.913)	(0.838)	(1.365)
Unemployment for four years	-1.326	-1.756*	-3.020*
	(1.118)	(1.027)	(1.634)
Life satisfaction	**Bully = 0 (zero bullying)**	**Bully = 1 (a little)**	**Bully = 2 (a lot)**
Unemployment within the next year	-0.154	-0.345**	0.008
	(0.188)	(0.167)	(0.285)
Unemployment for one year	-0.315	-0.478***	-0.533*
	(0.196)	(0.165)	(0.283)
Unemployment for two years	-0.408	-0.737***	-0.659
	(0.280)	(0.246)	(0.439)
Unemployment for three years	-0.569	-1.081***	-1.295**
	(0.367)	(0.324)	(0.541)
Unemployment for four years	-0.365	-0.918**	-1.407**
	(0.438)	(0.392)	(0.638)

Note: *<10%; **<5%; ***<1%. Standard errors are in parentheses. Unemployment for *n* years is calculated from taking a sum of all lagged unemployment coefficients from *t* to *t-n* in equation (5). For the coefficients used to generate this table, see Appendix B.

Figures 3 & 4: The implied well-being effects before and following unemployment by categories of childhood bullying





Note: Year *t* is the year of unemployment. The individuals then remained in unemployment up to year *t*+3.

Table 3: Fixed effects mental health and life satisfaction regression equations with different reasons for entry into unemployment as independent variables

Variables	Mental health	Life satisfaction
Unemployed: other reasons	-0.399**	-0.163*
	[0.197]	[0.0858]
Unemployed: redundancies	-0.297	-0.0514
	[0.321]	[0.138]
Unemployed: other reasons × Bully = 1 (a little)	-0.265	-0.116
	[0.215]	[0.0932]
Unemployed: other reasons × Bully = 2 (a lot)	-1.630***	-0.385**
	[0.372]	[0.161]
Unemployed: redundancies × Bully = 1 (a little)	-0.0627	-0.126
	[0.451]	[0.192]
Unemployed: redundancies × Bully = 2 (a lot)	-2.966***	-0.716**
	[0.845]	[0.366]
The implied well-being effect of unemployment (averaged across experiences of childhood bullying)		
Unemployed (other reasons)	*-0.765****	*-0.221****
	[0.135]	*[0.058]*
Unemployed (redundancies)	*-1.108****	*-0.298***
	[0.301]	*[0.130]*
The implied well-being effect of unemployment by experiences of childhood bullying		
Unemployed (other reasons) and no bullying	*-0.399***	*-0.163**
	[0.197]	*[0.0858]*
Unemployed (other reasons) and bullied a little	*-0.664****	*-0.279****
	[0.182]	*[0.079]*
Unemployed (other reasons) and bullied a lot	*-2.020****	*-0.548****
	[0.347]	*[0.150]*
Unemployed (redundancies) and no bullying	*-0.297*	*-0.0514*
	[0.321]	*[0.138]*
Unemployed (redundancies) and bullied a little	*-0.359*	*-0.177*
	[0.322]	*[0.135]*
Unemployed (redundancies) and bullied a lot	*-3.262****	*-0.767***
	[0.783]	*[0.339]*
Observations	12,052	11,101
Number of individuals	2,723	2,671
Within R-squared	0.040	0.046

Note: *<10%; **<5%; ***<1%. Standard errors are in parentheses. Control variables are the same as in Table 1.

Table 4: Fixed effects self-esteem regression equation of youths aged 11-15 years old

Variables	Youth's self-esteem
Fear of being bullied: a little	-0.302***
	[0.0653]
Fear of being bullied: a lot	-0.621***
	[0.124]
Youth's age	-0.159
	[0.118]
Number of close friends: 1-5	0.197
	[0.225]
Number of close friends: 6-10	0.418*
	[0.229]
Number of close friends: 11-15	0.434*
	[0.241]
Number of close friends: 16+	0.500**
	[0.249]
How often did you fight with someone in the past month?	
1 day	-0.200***
	[0.0739]
2-5 days	-0.306***
	[0.104]
6-9 days	-0.526**
	[0.228]
10 or more	-0.709***
	[0.230]
How happy are you with:	
Your appearances	0.342***
	[0.0240]
Your school work	0.217***
	[0.0241]
Your family	0.257***
	[0.0301]
Your friends	0.181***
	[0.0328]
Other socio-economic status	
Ln(real household income)	0.0930
	[0.0796]
Father unemployed	0.252
	[0.173]
Mother unemployed	-0.636***
	[0.227]
Father self-employed	0.112

	[0.147]
Mother self-employed	-0.109
	[0.179]
Father inactive in the labor market	-0.429**
	[0.195]
Mother inactive in the labor market	-0.268**
	[0.110]
Father's mental health	-0.0119
	[0.0115]
Mother's mental health	-0.016*
	[0.00958]
Father's education: A-level	-0.162
	[0.271]
Father's education: all higher qualifications	0.0899
	[0.243]
Mother's education: A-level	0.343
	[0.271]
Mother's education: all higher qualifications	-0.0632
	[0.254]
Own home outright	0.164
	[0.244]
Mortgage/Loan on home	0.0201
	[0.191]
Constant	14.10***
	[1.431]
Observations	8,432
Within R-squared	0.153
Number of individuals	2,988

Note: 10%; **<5%; ***<1%. Standard errors are in parentheses. Additional control variables include regional and wave dummies. Self-esteem are measured cardinally on the 6 to 24 scale, ranging from 6 (low self-esteem) to 24 (high self-esteem).

Appendix A: Descriptive statistics

Adult outcomes (aged 16-29 years old)	Average fear of being bullied (aged 11-15 years old)				
	Not at all	**A little**	**A lot**	**z-value 1st H [p-value]**	**z-value 2nd H [p-value]**
Mental health	10.47	10.06	8.875	8.98***	15.73***
	(2.521)	(2.805)	(3.472)	[0.000]	[0.000]
Life satisfaction	5.387	5.113	4.858	8.77***	12.42***
	(0.017)	(0.016)	(0.046)	[0.000]	[0.000]
Unemployed	0.077	0.068	0.094	2.054**	-1.844*
	(0.004)	(0.003)	(0.009)	[0.039]	[0.065]
Self-assessed health	4.045	3.976	3.771	4.88***	8.71***
	(0.011)	(0.010)	(0.029)	[0.000]	[0.000]
Married	0.029	0.014	0.032	5.92***	-0.53
	(0.002)	(0.001)	(0.006)	[0.000]	[0.596]
Big Five Personalities					
Extraversion	14.490	14.493	14.152	-0.58	3.15***
	(0.050)	(0.046)	(0.127)	[0.555]	[0.002]
Agreeableness	15.822	15.867	15.698	-0.87	-0.16
	(0.046)	(0.042)	(0.122)	[0.384]	[0.870]
Openness	14.041	14.440	13.927	-5.82***	0.75
	(0.053)	(0.048)	(0.133)	[0.000]	[0.449]
Neuroticism	10.497	11.829	13.432	-15.82***	-18.97***
	(0.060)	(0.057)	(0.138)	[0.000]	[0.000]
Conscientiousness	14.671	14.446	14.844	2.98***	-1.43
	(0.050)	(0.045)	(0.098)	[0.003]	[0.152]
Men sample outcome					
Ln(real labour income)	8.391	8.226	8.050	5.70***	2.80***
	(0.031)	(0.034)	(0.118)	[0.000]	[0.005]

Note: *<10%; **<5%; ***<1%. Standard deviations are in parentheses. *z*-statistics are based on the Kruskall-Wallis ranksum test for testing H_0: the two populations have equal means. The **1st hypothesis** is testing the averages of the "bullying index: not at all" group against the "bullying index: a little" group, and the **2nd hypothesis** is testing the averages of the "bullying index: not at all" group against the "bullying index: a little" group.

Appendix B: Fixed effects well-being regression equations with one-year lead and three-year lags unemployment variables

Variables	Mental health	Life satisfaction
Unemployed at *t*+1	-0.301	-0.154
	[0.450]	[0.188]
Unemployed at *t*+1× Bully = 1 (a little)	-0.619	-0.192
	[0.476]	[0.185]
Unemployed at *t*+1× Bully = 2 (a lot)	0.551	0.162
	[0.783]	[0.303]
Unemployed at *t*	-1.243***	-0.315
	[0.445]	[0.196]
Unemployed at *t* × Bully = 1 (a little)	-0.484	-0.163
	[0.468]	[0.186]
Unemployed at *t* × Bully = 2 (a lot)	-0.996	-0.219
	[0.753]	[0.312]
Unemployed at *t*-1	0.323	-0.0930
	[0.417]	[0.163]
Unemployed at *t*-1 × Bully = 1 (a little)	-0.117	-0.166
	[0.450]	[0.175]
Unemployed at *t*-1 × Bully = 2 (a lot)	-0.437	-0.0322
	[0.718]	[0.282]
Unemployed at *t*-2	-0.503	-0.161
	[0.420]	[0.171]
Unemployed at *t*-2 × Bully = 1 (a little)	-0.177	-0.182
	[0.456]	[0.174]
Unemployed at *t*-2 × Bully = 2 (a lot)	-0.00205	-0.475*
	[0.680]	[0.254]
Unemployed at *t*-3	0.0980	0.204
	[0.425]	[0.166]
Unemployed at *t*-3 × Bully = 1 (a little)	0.347	-0.0419
	[0.468]	[0.180]
Unemployed at *t*-3 × Bully = 2 (a lot)	-0.260	-0.316
	[0.717]	[0.269]
Observations	3,893	3,637
Number of individuals	1,069	1,057
Within R-squared	0.054	0.066

Note: *<10%;***<1%. Standard errors are in parentheses. Control variables are the same as in Table 1.

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