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Are You Happy While You Work?

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Abstract

Recent work in psychology and economics has investigated ways in which individuals experience their lives. This literature includes influences on individuals' momentary happiness. We contribute to this literature using a new data source, Mappiness (www.mappiness.org.uk), which permits individuals to record their wellbeing via a smartphone. The data contain more than a million observations on tens of thousands of individuals in the UK, collected since August 2010. We explore the links between individuals' wellbeing measured momentarily at random points in time and their experiences of paid work. We explore variation in wellbeing within-individual over time having accounted for fixed unobservable differences across people. We quantify the effects of working on individuals' affect relative to other activities they perform. We consider the effects of working on two aspects of affect: happiness and relaxation. We find paid work is ranked lower than any of the other 39 activities individuals engage in, with the exception of being sick in bed. Although controlling for other factors, including person fixed effects, reduces the size of the association its rank position remains the same and the effect is still equivalent to a 7-8% reduction in happiness relative to circumstances in which one is not working. Paid work has a similar though slightly larger negative impact on being relaxed. However, precisely how unhappy or anxious one is while working depends on the circumstances. Wellbeing at work varies significantly with where you work (at home, at work, elsewhere); whether you are combining work with other activities; whether you are alone or with others; and the time of day or night you are working.

Keywords: happiness; relaxation; work; wellbeing
JEL Classifications: I1; J0; J28

1. Introduction

Paid work is a central part of many people's lives. They spend a considerable part of their waking hours doing paid work or seeking paid work if they do not have it. So it is not surprising to find that studies of individuals' wellbeing indicate that it contributes quite substantially to overall life satisfaction and general happiness, in the United States, the UK and elsewhere in the world (Blanchflower and Oswald, 2011). Its loss through unemployment results in a precipitous decline in wellbeing which — unlike most other changes in personal circumstances — individuals do not recover from until they leave that state (Clark et al., 2008). The measures used to capture wellbeing in these studies are reflexive, in the sense that individuals are asked to reflect back on and evaluate their experiences, usually in a vague, generalized present (e.g. life satisfaction 'these days' or 'nowadays') or the recent past. These are what Kahneman and Krueger (2006: 6) refer to as "global retrospective assessments". In responding to such questions individuals often attach weight to episodes and events which have a eudemonic dimension, that is, aspects of their life that generate a feeling of being worthwhile, leading to a sense of meaning or purpose in life.

However, recent work by psychologists and economists has drawn attention to momentary wellbeing measures, which capture the feelings an individual expresses at the time that she or he is undertaking an activity. Such measures relate to what has been called "experienced utility", which is akin to "a continuous hedonic flow of pleasure or pain" (Kahneman and Krueger, 2006: 4). This hedonic component of wellbeing may be important since expectations regarding the "flow" of pleasure and pain may partially determine the choices individuals make as to what they choose to do at any given moment, and for how long they choose to do it.[1] But it is also important in its own right because it leads to a fuller appreciation of the experienced life that individuals lead. As Kahneman et al. (2004: 1776) argue:

"Quantitative information about time use and the frequency and intensity of stress, enjoyment, and other affective states is potentially useful to medical researchers for assessing the burden of different illnesses and the health consequences of stress; to epidemiologists interested in social and environmental stressors; to economists and policy researchers for evaluating policies and for valuing nonmarket activities; and to anyone who wishes to measure the well-being of society. In particular, economic models that define well-being by the temporal integral of momentary experienced utility require detailed measures of the quality and duration of people's experiences in daily life."

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[1] This issue is the subject of on-going debate. It appears that behaviour is actually determined by individuals' remembered utility - not the duration of episodes of pain or discomfort, but remembrances of the end of particular episodes coupled with the sense of pain or pleasure at the peak and trough of those experiences (Kahneman and Thaler, 2006; Clark and Georgellis, 2004).

Research to date on the experience of employment suggests that the strong positive associations between paid work and retrospective assessments of wellbeing do not translate into positive associations between paid work and momentary, or experienced, wellbeing. Quite the opposite is true, in fact. Under the Day Reconstruction Method (DRM) individuals are asked to reconstruct their activities and experiences of the preceding day. Combining this with a survey tool designed to reduce recall bias, Kahneman et al. (2004) studied 909 women who had undertaken paid work on the reference day. They found "working" was the second lowest scoring activity on positive affect (just above commuting) and the highest scoring activity on negative affect.[2] However, there was substantial variance in the relationship between working and momentary wellbeing depending upon whether the person was at work or working at home, and whom she was with. In the latter case, time with one's boss was rated particularly poorly, while being with other work colleagues was rated much more highly. A related literature indicates that variance in people's happiness over the course of the working day is related to biological processes such as neuroendocrine, inflammatory and cardiovascular activity (Steptoe et al., 2005).

We contribute to the literature on momentary wellbeing by establishing the relationship between working and momentary wellbeing using a new, very large data set for the UK. Unlike the DRM which asks individuals about their feelings yesterday - a procedure which can require a degree of retrospection, with potential for retrospective distortion (Stone et al., 2010) - we obtain instantaneous responses so that individuals report their feelings at the time they are undertaking the activity. We are able to test the sensitivity of our results to the time that elapses between the random request for information and the moment at which the response is provided. We seek to replicate some of the analyses in Kahneman et al. (2004), as well as extending that work in a number of dimensions; something that is made possible by our data source. First, we establish the position of paid work in the rank order of momentary happiness and relaxation for employed people, and compare the momentary wellbeing scores for paid work with scores given for other activities. Second, extending earlier work, we are able to look at the joint effect of activities undertaken simultaneously. We examine the extent to which momentary wellbeing scores for working vary according to the other activities one is also engaged in at the same time. Third, we explore the extent to which the association between paid work and momentary wellbeing varies with three aspects of the individual's environment, namely where one is working, who one is with at the time, and one's personal background characteristics. We compare baseline results, looking at work-related associations with momentary wellbeing across individuals, with analyses using only the variation within individuals over time. The latter analyses account for fixed unobservable

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[2] In their study positive affect is the average of happy, warm/friendly, enjoying myself, whereas negative affect is the average of frustrated/annoyed, depressed/blue, hassled/pushed around, angry/hostile, worried/anxious, criticized/put down.

differences across individuals, which is possible because our data contain multiple observations on individuals over time.

The remainder of the paper is as follows. Section Two introduces our data, how the survey is undertaken, the measures of momentary wellbeing and the activities recorded. Section Three presents our empirical strategy for describing and analysing the data. Section Four presents our results. Section Five concludes.

2.   The Mappiness Data

We use a new data source, Mappiness (www.mappiness.org.uk), which permits individuals to record their wellbeing via a smartphone. The data contain more than a million observations on tens of thousands of individuals in the UK, collected since August 2010. Individuals who have downloaded the app receive randomly timed "dings" on their phone to request that they complete a very short survey.

The survey asks individuals to rate themselves on three dimensions of momentary wellbeing, stating how happy, how relaxed, and how awake they feel. Each score is elicited by means of a continuous slider (a form of visual analogue scale — see Couper et al. 2006). The ends of each scale are labelled "Not at all" and "Extremely", and an individual positions him or herself on the scale by drawing a fingertip across the screen. Having completed this phase the individual is asked whether they are alone and, if not, whom they are with. They are then asked whether they are indoors, outdoors, or in a vehicle, and whether they are at home, at work, or elsewhere (with the instruction "If you're working from home, please choose 'at home'"). Finally, they are asked what they were doing "just now". The respondent chooses all that apply out of 40 response options, including "Working, studying", and/or "Something else". The complete survey is reproduced in Appendix A.

Together with the responses to the survey, the app transmits the satellite positioning (GPS) location of the individual and the precise time at which the survey was completed. It also records the time elapsed between the random "ding" and response, thus allowing analysts to distinguish between immediate, "random" responses and delayed responses. Individuals complete a short survey about their personal, work and household characteristics when registering for Mappiness. We use some of this information to characterise different types of respondent, e.g. in relation to their household wealth..

In this paper we focus on two of the three measures of wellbeing, namely happiness and relaxation. (Un)happiness can be treated as an indicator of positive or negative affect whereas the relaxed scale relates to what Warr (2007) describes as mental arousal.

3. Empirical Strategy

We explore the links between individuals' wellbeing measured momentarily at random points in time and their experiences of paid work. We consider the effects of working on two aspects of affect: their happiness and how relaxed they say they are. Figure 1 presents the distributions of the two wellbeing measures for all respondents (the distributions for workers and non-workers separately are indistinguishable).
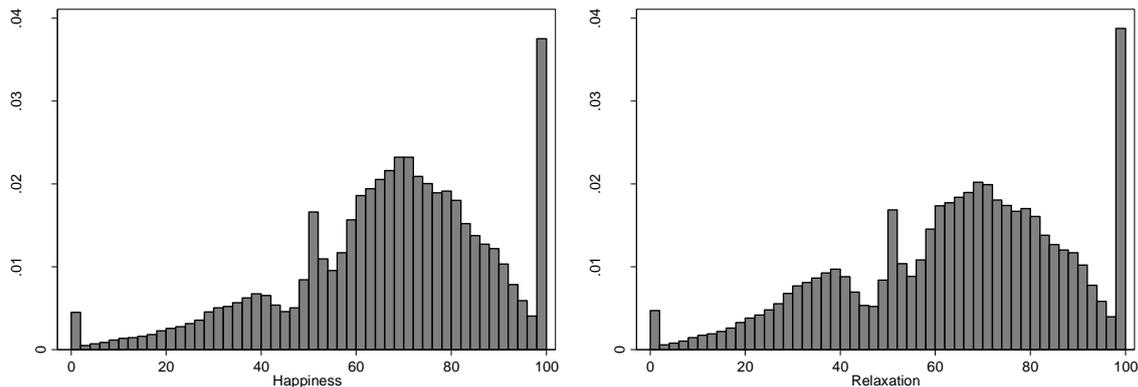
Figure 1. Distributions of 'happy' and 'relaxed' responses, full sample

One can see that the distribution of momentary wellbeing is skewed on both the dimensions of happiness and relaxation. There is also a notable spike in both cases at the top of the scale, suggesting some sort of right truncation with individuals scoring as high as they possibly can. One way to tackle this issue is to supplement simple ordinary least squares estimation with interval regression estimates. We test the sensitivity of our results to both procedures.

One of the attractive features of the Mappiness data collection process is that individuals provide a response when randomly requested to do so during the course of the day. They are asked to record the activities they are currently engaged in after they have rated their current happiness and state of relaxation. One advantage of this approach is that it minimises focusing biases associated with DRM and other methods which entail some degree of reflection and, possibly, introspection. It also overcomes recall bias in relation to what one is doing or how one feels when one is doing it.

The purpose of the random "ding" is to elicit responses which are random with respect to the activity an individual is undertaking and how the individual is feeling. However, individuals do not always respond, and may respond after some delay. Non-response and delay prior to a response might both be non-random, and could be related to types of activity or mood. As is usual in experience sampling studies, we restrict our analyses to responses given within a

defined period of the signal being sent. We fix this at 1 hour. We find our results are not sensitive to varying this period.

The population of Mappiness respondents differs in a number of ways from the population at large. As one might expect from a survey conducted with smartphones, respondents are wealthier than the population at large: the median household income category is £40,000 – £56,000, and the midpoint of this range is approximately double the figure for the UK as a whole. They are also relatively young: 66% are aged 35 or under, and 95% are aged 50 or under, compared to 29% and 56% respectively in the UK adult population. Seventy-seven per cent of participants are in employment and 14% are in full-time education. These groups are over-represented relative to the UK adult population, in which the proportions are respectively 57% and 4%, primarily at the expense of retired people, who constitute 1% of participants but 22% of the population. Participants' sex ratio is nearly balanced, at 53% male, compared to 49% in the UK adult population (MacKerron, 2012).

The unrepresentativeness of Mappiness users may mean that the correlations we report below cannot be extrapolated to the population at large. However, although the magnitude of effects may differ in the population at large, there are no theoretical reasons to suspect that the results presented below would be overturned if the survey was completed by a group of individuals who were more representative of the population as a whole. As we show below, paid work is associated with low scores on momentary happiness and relaxation. Since our respondents are drawn from the upper echelons of the income distribution where job quality is better, and since we know from other work (Kahneman et al., 2004) that the nature of the job can affect responses to these sorts of questions, this might lead us to expect that the association between paid work and momentary wellbeing is, if anything, upwardly biased compared to potential estimates for the population at large.

Our starting point will be the bivariate relationship between reporting paid work and the two wellbeing measures for the Mappiness population as a whole. Because the average individual responds about 60 times, we are able to account for unobservable fixed differences across individuals. We will therefore also present this bivariate relationship in a person fixed effects model. Comparison between this model and the simple OLS model will tell us whether, and to what degree, the correlation between paid work and wellbeing is biased by fixed differences between workers and non-workers responding to the survey. For completeness we will also present the random effects interval regression equivalents of these initial simple models.

The remainder of the analysis will be confined to individuals who at the time of their registration with Mappiness said that they were in paid work. This helps overcome one of the drawbacks of the Mappiness data in the context of this study, namely the fact that the activity

individuals tick when working is actually labelled "Working, studying". Roughly one in seven respondents said they were students when registering for Mappiness, but these individuals are dropped from analyses once we have presented the initial all-respondent models.

Throughout we account for person fixed effects so that we are presenting estimates of variance in wellbeing within individuals over time and how this relates to work and other activities.

Our period of observation begins in August 2010, roughly two years after the onset of the biggest financial crisis and economic recession experienced by Britons in the post-War period. Our window of observation ends in September 2011, shortly before the return to official recession. Although there is little cyclical variation in underlying macro-economic conditions over this period, there is great uncertainty about prospects for the economy generated, in part, by disagreements over the appropriate government policy response, and partly by uncertainty in the global economy and particularly the Euro zone. This is reflected in quite sharp movements in the London Stock Exchange.

The models we present are of the following type:

$$H_{it} = \alpha_i + \beta W_{it} + \beta E_{it} + \beta W_{it*} \beta E_{it} + \beta X_{it} + \varepsilon_{it}$$

where H is happiness or relaxation of individual i at time t; W is working, E are other activities undertaken at the same point in time, with the following argument capturing their interaction; the β are parameters to be estimated; α_i is the person fixed effect; and ε_{it} is the error term. Other right-hand side control variables in the X vector include companionship and location type dummies, time indicators (month, day of week, time of day) and the number of responses an individual has given previously. Variants of the basic model interact the work activity with location type and companionship. Standard errors are clustered at the person level to account for non-independent repeat observations and a robust estimator is deployed to account for heteroskedasticity.

The response variables are scaled from 0 − 100, so coefficients can be interpreted as percentage changes.

4. Results

Table 1: Raw associations between wellbeing and work

	Happy (0 – 100)			Relaxed (0 – 100)		
	OLS	*RE*	*FE*	*OLS*	*RE*	*FE*
All						
Working, studying (dummy)	-7.73 (52.62)	-8.40 (237.54)	-7.81 (67.79)	-11.97 (74.63)	-12.74 (329.30)	-11.96 (93.82)
Constant	68.65 (456.64)	67.30 (753.34)	68.67 (2380.24)	67.20 (444.09)	65.50 (722.59)	67.20 (2105.96)
Model Fit	R^2=0.03	p>chi^2=0.0000	p>f=0.0000	R^2=0.05	p>chi^2=0.0000	p>f=0.0000
Workers						
Working, studying (dummy)	-8.38 (55.38)	-8.80 (235.25)	-8.18 (64.45)	-12.70 (77.61)	-13.22 (322.60)	-12.42 (88.81)
Constant	69.06 (417.35)	67.62 (688.77)	69.00 (1984.61)	67.65 (410.45)	65.81 (659.72)	67.57 (1764.42)
Model Fit	R^2=0.03	p>chi^2=0.0000	p>f=0.0000	R^2=0.06	p>chi^2=0.0000	p>f=0.0000

Notes:
(1) t-stats in parentheses.
(2) All models run on 1,622,453 observations for 26,700 individuals. Average N observations per individual is 60.8 with a maximum of 1287.
(3) Worker models run on 1,321,279 observations for 20,946 individuals. Average N observations per individual is 63.1 with a maximum of 1207.

Table 1 presents bivariate relationships between engaging in paid work and the two measures of momentary wellbeing, happiness and being relaxed. The top panel presents the results for all individuals in the data set, whilst the bottom panel presents results for those who said they were in paid work when they registered for Mappiness. In each case we present OLS, random effects interval regression and person fixed effects models. Across all models, engaging in paid work is associated with lower momentary wellbeing. Looking at the association with happiness first, it seems that engaging in paid work is associated with a reduction of around 8%. The effect is similar irrespective of the estimation technique deployed. A comparison of the OLS and person fixed effects models indicates that the negative association between paid work and happiness is similar whether one compares across individuals or only within individuals over time.[3] The effects are slightly larger for the sub-population who said they

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[3] The similarity between the random effects and fixed effects results suggests that the propensity of individuals to identify work episodes is not correlated with unobserved differences across individuals that might bias their wellbeing responses. Put differently, the number of work episodes recorded by individuals is uncorrelated with their individual propensity for happiness or relaxation.

were in paid work when they registered with Mappiness, suggesting that studying is somewhat less damaging to happiness than paid work is. A very similar pattern of results is apparent in the relaxation models in the lower half of the table, although it is clear that the size of the effects is somewhat larger than is the case for happiness. Saying you are working lowers relaxation scores by over 10% relative to not working.[4]

In Table 2 we see how working compares to the correlations with other activities. The most pleasurable experience for individuals is love-making and intimacy, which raises individuals' happiness by roughly 14% (relative to not doing this activity). This is followed by leisure activities such as going to the theatre, going to a museum and playing sport. Paid work comes very close to the bottom of the happiness ranking. It is the second worst activity for happiness after being sick in bed, although being sick in bed has a much larger effect, reducing happiness scores by just over 20%. Turning to relaxation, a similar picture emerges, but this time the negative correlation with work is larger and closer in size to the effect of being sick in bed.

Not all work is the same, of course. How you feel during periods of work will depend upon when you are doing the work; where you are working and whom you are working with; what else you are doing during that work; and the quality of the work you are undertaking.

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[4] Since respondents may change employment status over time we reran the estimates on the subset of observations obtained in the first week after Mappiness registration, that is, when we can be most certain of respondents' work status. If we confine the estimates to those who said they were working on registration (212,056 observations for 20,513 individuals) we find that the pattern of results is similar to that reported in the lower panel in Table 1 but the negative association between working and wellbeing is larger. Taking the OLS results, the coefficient for working in the happiness equation reported in column 1 is -9.95 instead of -8.38. The coefficient for working in the relaxation equation reported in column 4 is -16.53 instead of -12.70. This is unsurprising since change in employment status over time introduces some measurement error into our estimates.

Table 2. Happiness and relaxation in different activities (fixed effects regression models)

Happy (0 – 100)			**Relaxed (0 – 100)**		
Activities (in rank order)	*coeff*	*t*	*Activities (in rank order)*	*coeff.*	*t*
Intimacy, making love	14.20	(44.4)	Intimacy, making love	12.30	(37.8)
Theatre, dance, concert	9.29	(29.6)	Birdwatching, nature watching	7.12	(12.7)
Exhibition, museum, library	8.77	(25.0)	Exhibition, museum, library	6.88	(17.3)
Sports, running, exercise	8.12	(45.5)	Hunting, fishing	6.63	(4.39)
Gardening, allotment	7.83	(22.8)	Sleeping, resting, relaxing	6.52	(55.8)
Singing, performing	6.95	(17.5)	Meditating, religious activities	6.35	(14.2)
Talking, chatting, socialising	6.38	(75.2)	Gardening, allotment	6.26	(16.4)
Birdwatching, nature watching	6.28	(11.4)	Drinking alcohol	6.14	(51.9)
Walking, hiking	6.18	(37.0)	Theatre, dance, concert	5.62	(15.2)
Hunting, fishing	5.82	(3.98)	Hobbies, arts, crafts	5.42	(21.0)
Drinking alcohol	5.73	(54.0)	Talking, chatting, socialising	5.18	(63.5)
Hobbies, arts, crafts	5.53	(22.5)	Watching TV, film	5.17	(64.5)
Meditating, religious activities	4.95	(11.2)	Walking, hiking	4.96	(26.5)
Match, sporting event	4.39	(15.2)	Computer games, iPhone games	4.19	(28.7)
Childcare, playing with children	4.10	(19.4)	Listening to music	3.82	(28.2)
Pet care, playing with pets	3.63	(17.1)	Reading	3.73	(29.5)
Listening to music	3.56	(27.6)	Other games, puzzles	3.33	(10.3)
Other games, puzzles	3.07	(11.1)	Pet care, playing with pets	3.25	(14.7)
Shopping, errands	2.74	(25.1)	Singing, performing	2.89	(5.93)
Gambling, betting	2.62	(2.82)	Listening to speech/podcast	2.49	(14.0)
Watching TV, film	2.55	(36.3)	Sports, running, exercise	2.33	(9.66)
Computer games, iPhone games	2.39	(18.4)	Browsing the Internet	1.85	(17.1)
Eating, snacking	2.38	(37.1)	Drinking tea/coffee	1.82	(17.4)
Cooking, preparing food	2.14	(22.0)	Eating, snacking	1.78	(26.3)
Drinking tea/coffee	1.83	(18.4)	Childcare, playing with children	1.52	(7.26)
Reading	1.47	(13.3)	Match, sporting event	1.38	(4.31)
Listening to speech/podcast	1.41	(9.62)	Cooking, preparing food	1.10	(9.93)
Washing, dressing, grooming	1.18	(11.5)	Gambling, betting	0.79	(0.84)
Sleeping, resting, relaxing	1.08	(11.4)	Texting, email, social media	0.65	(6.26)
Smoking	0.69	(3.16)	Smoking	0.20	(0.80)
Browsing the Internet	0.59	(6.13)	Shopping, errands	0.14	(1.13)
Texting, email, social media	0.56	(5.64)	Washing, dressing, grooming	0.14	(1.18)
Housework, chores, DIY	-0.65	(-6.59)	Housework, chores, DIY	-2.76	(-24.3)
Travelling, commuting	-1.47	(-16.2)	Admin, finances, organising	-4.03	(-21.4)
In a meeting, seminar, class	-1.50	(-9.01)	Travelling, commuting	-4.52	(-44.3)
Admin, finances, organising	-2.45	(-14.2)	In a meeting, seminar, class	-4.54	(-23.9)
Waiting, queueing	-3.51	(-22.7)	Waiting, queueing	-5.43	(-30.1)
Care or help for adults	-4.30	(-7.75)	Care or help for adults	-5.96	(-9.65)
Working, studying	**-5.43**	**(-44.0)**	**Working, studying**	**-9.29**	**(-68.8)**
Sick in bed	-20.4	(-67.9)	Sick in bed	-14.5	(-43.2)
Something else (version < 1.0.2)	-1.00	(-5.43)	Something else (version < 1.0.2)	-2.37	(-12.3)
Something else (version >= 1.0.2)	-2.31	(-13.6)	Something else (version >= 1.0.2)	-3.40	(-19.7)
Person fixed effects	Yes		Person fixed effects	Yes	
Constant	65.6	(978)	Constant	64.1	(931)
Observations	1,321,279		Observations	1,321,279	
Number of groups	20,946		Number of groups	20,946	

Table 3. Work and time interactions

Variable	Happy (0 – 100)		Relaxed (0 – 100)	
	coeff.	*t*	*coeff.*	*t*
Working, studying	-5.44	(-45.02)	-8.26	(-62.74)
× Mon – Fri before 6am	-4.24	(-2.71)	-10.37	(-4.61)
× Mon – Fri before 8am	2.63	(3.62)	2.17	(2.89)
× Mon – Fri after 6pm	-2.59	(-13.15)	-2.90	(-13.73)
× Mon – Fri after 8pm	-0.05	(-0.17)	-1.13	(-3.97)
× Sat, Sun, bank holiday	-2.37	(-8.54)	-3.60	(-12.56)
Month and year dummies	Yes		Yes	
Hour × day of week dummies	Yes (Figure 2a)		Yes (Figure 2b)	
No. of prior responses dummies	Yes		Yes	
Person fixed effects	Yes		Yes	
Constant	63.57	(42.77)	65.23	(37.94)
Observations	1321479		1321479	
Number of groups	20946		20946	

Notes:
(1) Model run for respondents in paid work only.

Figure 2. Hour × day of week dummies for a) happiness and b) relaxation. Only daytime values are plotted.

a.
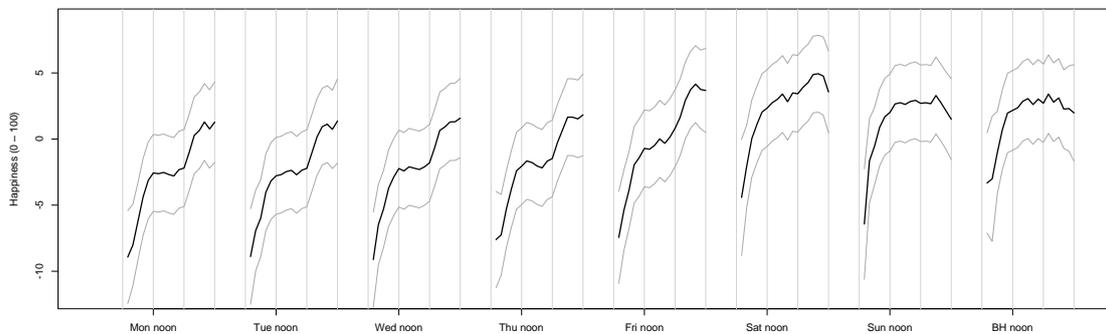
b.
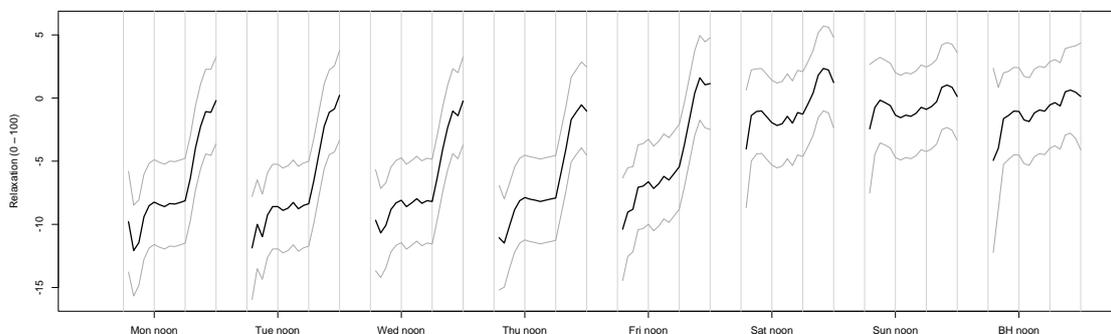
We begin with a variant of Table 1 which distinguishes between when you are doing the work, that is, the time of day and when during the week. The results are presented in Table 3. Having conditioned on month of the year and continuous time (captured using hour of the day and day of the week), those working between 8am and 6pm on a weekday suffer a 5% reduction in their happiness (coefficient of -5.44, t-stat=45) compared with not working. But this negative effect rises by nearly a half when the individual is working before 6am in the morning, after 6pm at night, or at the weekend. The negative effects of paid work on happiness are a little lower if the individual is working between 6am and 8am in the morning, perhaps capturing the effect individuals feel as they leave night shifts or begin their working day. Similar results — of somewhat greater magnitude — are apparent when one looks at how relaxed people are feeling while they work.

In Table 4 we turn to where and with whom you are working. Evidence from a recent field experiment in which opportunities to work at home were randomly assigned to workers indicated not only that workers randomly assigned to work at home were more productive than those assigned to remain on company premises, but that they were also more satisfied with their work, had higher psychological attitude scores and were less likely to quit the firm (Bloom et al., 2012). Kahneman et al. (2004: 1779) show working at home is associated with greater enjoyment, and that this is not related to feelings of time pressure during working episodes.

When we distinguish between working at home, working at work, or working in a vehicle, we find that the negative association between paid work and happiness is twice as large when that work is undertaken at work, compared to working at or from home (Table 4 Panel A).[5] Similar patterns emerge in Panel B with respect to relaxation, but they are a little more pronounced.

Whom you are with also matters a great deal. There are psycho-social benefits of being in the company of other people. Layard (2003) presents evidence from DRM data to show that individuals prefer being with almost anybody compared to being on their own. The exception is being with their boss: being with the boss is the only circumstance that is deemed worse than being on one's own.[6] In contrast, individuals are happier when they are working with their peers (Layard, 2003; Kahneman et al., 2004).

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[5] The total effect of working at work of -6.49 in the right hand column is relative to a scenario in which the individual does not report work, and is obtained by summing the main effects from working and being at work with the interaction of the two (-1.53 + -4.09 + -0.88 = -6.49 after rounding).

[6] A recent study for Denmark finds that having an unsupportive boss leads to a large increase in the probability of voluntary quits (Cottini et al., 2011).

Table 4: Work interactions with place and people

Panel A: Happiness

	Basic effect		Interaction with 'working, studying'		Total effect
	coeff.	*t*	*coeff.*	*t*	*coeff. sum*
Working, studying	-1.53	(-6.62)			
At home (baseline)	—		-1.38	(-5.83)	-2.90
At work	-4.09	(-32.15)	-0.88	(-3.45)	-6.49
In a vehicle	-2.31	(-27.17)	1.59	(3.50)	-2.25
Spouse, partner, girl/boyfriend	5.91	(49.18)	-2.06	(-7.08)	2.32
Children	1.40	(8.20)	0.01	(0.04)	-0.11
Other family members	2.94	(26.22)	-0.82	(-2.12)	0.59
Colleagues, classmates	0.64	(4.98)	-0.87	(-4.44)	-1.76
Clients, customers	0.72	(2.12)	0.15	(0.28)	-0.66
Friends	8.19	(78.65)	-1.94	(-6.92)	4.73
Other people participant knows	0.66	(3.80)	-0.45	(-0.60)	-1.32
No. of prior responses dummies	Yes				
Person fixed effects	Yes				
Constant	60.87	(377.96)			
Observations	1321279				
Groups	20946				
Mean, max obs. per group	63.1, 1207				
$F_{30, 20945}$	484.32				

Panel B: Relaxation

	Basic effect		Interaction with 'working, studying'		Total effect
	coeff.	*t*	*coeff.*	*t*	*coeff. sum*
Working, studying	-7.01	(-25.36)			
At home (baseline)	—		0.29	(1.04)	-6.72
At work	-7.64	(-51.56)	2.69	(9.17)	-11.96
In a vehicle	-5.88	(-56.07)	5.16	(9.70)	-7.73
Spouse, partner, girl/boyfriend	5.35	(48.56)	-1.84	(-5.93)	-3.50
Children	-0.84	(-4.67)	1.22	(3.14)	-6.63
Other family members	1.86	(15.64)	0.18	(0.34)	-4.98
Colleagues, classmates	-1.27	(-8.61)	0.20	(0.92)	-8.08
Clients, customers	-1.62	(-3.80)	0.85	(1.44)	-7.78
Friends	6.03	(56.51)	-0.40	(-1.26)	-1.38
Other people participant knows	-1.76	(-8.85)	1.05	(1.41)	-7.72
No. of prior responses dummies	Yes				
Person fixed effects	Yes				
Constant	59.82				
Observations	1321279				
Groups	20946				
Mean, max obs. per group	63.1, 1207				
$F_{30, 20945}$	575.75				

We find that, compared to being alone, individuals are happiest when they are with their friends, followed by when they are with their partner. However, the positive effect of being with partners and friends is significantly diminished when one is working, as indicated by the negative interaction effects in Panel A.

Working with other family members and with colleagues follows the same pattern, albeit with lower effect sizes. We are unable to distinguish between bosses and co-workers; the effect is therefore likely an average of the two effects which, as noted above, may pull in opposite directions.

Turning to relaxation in Panel B, the only statistically significant interactions with working relate to being with a partner and being with one's children. Time spent with a partner is associated with greater relaxation compared with being alone, but the interaction of working and being with one's partner is negative and statistically significant. Being with children, whilst positively associated with momentary happiness (Panel A) is associated with being less relaxed than when alone (Panel B). However, contrary to expectations, the interaction of working and being with children is positive and statistically significant for relaxation compared with working alone. Even so, if one sums up the main effects of working, children and working in the presence of children, the net effect is a reduction in relaxation relative to working with a partner, and the size of the effect is similar to working on one's own.

Working is one of 40 activities Mappiness participants can code when they are asked what they are currently doing. Respondents in paid work report working on 27% (362,170) of response occasions. On 67% of those occasions, this is the only activity reported. On the remainder of occasions, one or more additional activities are reported simultaneously. Table 5 reports the activities which are most frequently combined with working. In certain cases, these activities may represent the nature of the work being undertaken (e.g. in a meeting), while in others they seem more likely to be activities carried on in parallel to work (e.g. listening to music).

Table 5. Top ten activities combined with working

Activity combined with working	Count	% of working occasions
Listening to music	20321	5.6%
Admin, finances, organising	20230	5.6%
Talking, chatting, socialising	19458	5.4%
Drinking tea/coffee	16170	4.5%
In a meeting, seminar, class	15928	4.4%
Texting, email, social media	13921	3.8%
Eating, snacking	11911	3.3%
Browsing the Internet	11324	3.1%
Watching TV, film	7063	2.0%
Reading	5165	1.4%

Table 6 shows that combining work with other activities significantly affects individuals' wellbeing. Eight of the ten activities that are most frequently combined with working significantly alter individuals' happiness relative to only doing work. Reading and Eating/Snacking do not interact with working to alter individuals' momentary happiness. In all eight cases where other activities affect the happiness of individuals who are working, they do so positively, as indicated by the positive and statistically significant interaction effects. The largest positive interaction is with being "In a meeting, seminar or class". However, the main effect associated with this activity is large and negative, which means that the overall net effect of working and being "In a meeting, seminar or class", is not that different from working only (final column in Panel B). Instead, the largest positive net effect of combining work and another activity on happiness relates to "Talking,

chatting, socialising". This is because the overall effect combines a relatively modest interaction effect with a large positive main effect. There are clearly positive psychological benefits of being able to socialise whilst working. It is the only activity that, in combination with working, results in happiness levels that are similar to those experienced when not working.[7]

Turning to relaxation (Panel B), the same eight activities interact positively and significantly with work to ameliorate the negative effect of working on relaxation. Again, the largest positive interaction is with being "In a meeting, seminar or class" but the main effect associated with this activity is large and negative. It is those who manage to combine working with "Watching TV, film" who are most relaxed.

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[7] Using Day Reconstruction Methods, Knabe et al. (2010) show that the unemployed are able to make up for what they term the "sadness" associated with being unemployed by altering what they do over the course of the day. That is, the unemployed take advantage of their unemployment by shifting their activities towards those they enjoy, something the employed are unable to do due to work commitments.

Table 6. Wellbeing effects of work with top ten simultaneous activities

a) Happy

Variable	Basic effect coeff.	t	Interaction with 'working, studying' coeff.	t	Total effect summed coeffs.
Working, studying	-6.60	(-42.67)			
Listening to music	3.38	(24.93)	0.56	(1.96)	-2.66
Admin, finances, organising	-3.64	(-23.25)	2.34	(6.52)	-7.89
Talking, chatting, socialising	6.09	(68.28)	1.04	(5.96)	0.53
Drinking tea/coffee	1.51	(13.70)	1.07	(4.48)	-4.01
In a meeting, seminar, class	-3.70	(-19.26)	4.70	(17.43)	-5.60
Texting, email, social media	-0.03	(-0.28)	1.91	(8.61)	-4.72
Eating, snacking	2.25	(33.24)	-0.40	(-1.48)	-4.75
Browsing the Internet	0.02	(0.17)	2.12	(9.53)	-4.46
Watching TV, film	2.16	(30.37)	2.77	(11.74)	-1.68
Reading	1.18	(33.24)	0.24	(0.66)	-5.18
All other activities and their interactions with working	Yes				
Person fixed effects	Yes				
Constant	66.27	(850.36)			
Observations	1321279				
Number of groups	20946				
Mean, max obs. per group	63.1, 1207				
$F_{83, 20945}$	243.23				

b) Relaxed

Variable	Basic effect coeff.	t	Interaction with 'working, studying' coeff.	t	Total effect summed coeffs.
Working, studying	-11.22	(-66.82)			
Listening to music	3.49	(25.11)	1.05	(3.41)	-6.68
Admin, finances, organising	-5.90	(-33.00)	3.68	(9.99)	-13.45
Talking, chatting, socialising	4.70	(55.08)	1.67	(7.38)	-4.85
Drinking tea/coffee	1.30	(11.31)	1.69	(6.40)	-8.23
In a meeting, seminar, class	-8.38	(-38.65)	8.15	(26.93)	-11.45
Texting, email, social media	-0.03	(-0.29)	1.98	(7.59)	-9.28
Eating, snacking	1.46	(20.19)	0.33	(1.26)	-9.43
Browsing the Internet	1.00	(8.89)	2.91	(10.99)	-7.31
Watching TV, film	4.53	(55.60)	3.91	(14.78)	-2.79
Reading	3.35	(25.57)	-0.46	(-1.05)	-8.33
All other activities and their interactions with working	Yes				
Person fixed effects	Yes				
Constant					
Observations	1321279				
Number of groups	20946				
Mean, max obs. per group	63.1, 1207				
$F_{83, 20945}$	256.83				

Next we turn to the issue of whether the correlation between work and momentary wellbeing differs systematically across different types of individual. To explore this we interact working with individuals' characteristics as provided by respondents when they registered for the survey.

Table 7: Interactions of Work with Individual Characteristics

Variables	Panel A Happy (0 – 100)		Panel B Relaxed (0 – 100)	
	coeff.	t	coeff.	t
Working, studying × household income band	-9.10	(-4.86)	-15.2	(-7.28)
< £8,000	3.44	(3.93)	4.53	(3.75)
£8,000 – £11,999	2.94	(3.26)	0.97	(0.56)
£12,000 – £15,999	-2.03	(-1.15)	-1.84	(-1.06)
£16,000 – £19,999	-0.076	(-0.11)	-0.24	(-0.30)
£20,000 – £23,999	-0.10	(-0.15)	0.19	(0.29)
£24,000 – £31,999	0.83	(1.61)	0.55	(0.99)
£32,000 – £39,999	0.96	(2.17)	1.14	(2.30)
£40,000 – £55,999 (median)	—		—	
£56,000 – £71,999	0.38	(0.93)	0.66	(1.49)
£72,000 – £95,999	0.42	(1.00)	0.014	(0.028)
£96,000 +	0.77	(1.78)	0.94	(1.96)
× male	-0.50	(-1.99)	0.15	(0.52)
× age	0.057	(0.55)	0.058	(0.51)
× age^2	0.00045	(0.34)	0.00079	(0.53)
× married/in a relationship	-2.65	(-8.25)	-1.51	(-4.12)
× has one or more children	0.68	(2.16)	1.29	(3.81)
Constant	69.0	(1963)	67.6	(1748)
Observations	1,286,321		1,286,321	
R-squared	0.042		0.077	
Number of groups	20,247		20,247	

Robust t-statistics in parentheses

Panel A in Table 7 shows the association between happiness and work for different household income groups and demographic characteristics. Interactions between working and household income are jointly statistically significant. Relative to those in the median household income category, the happiness of those in the bottom two income categories is more positive when working, which is consistent with the idea that poorer people should be getting more utility from each pound they earn. It is also possible that they enjoy their leisure time less, making work relatively "less bad".[8] There are no additional happiness returns to working above this point in the

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[8] It is worth recalling that these effects are within-person so do not reflect fixed differences between people in different parts of the income distribution. For the US, Kahneman and Deaton (2010) find a positive association between affect and income which ceases at $75,000 per annum, whereas the association with life evaluation continues to rise with income.

income distribution. Indeed, the coefficients are fairly flat. There are no significant age interactions. Those who are married or in long-term relationships are relatively less happy when working, perhaps because they enjoy life outside work more, whereas those with children are relatively happier working than not working. The results look very similar for relaxation (Panel B), with one exception. Men are slightly less happy when working than women but there is no gender difference in the relationship between working and being relaxed.

These results beg an obvious question. If people are so positive about paid work when reflecting on the meaning and value of their lives, why does it appear to have such an adverse effect on their momentary wellbeing? There are perhaps two potential hypotheses. The first is that work is negatively associated with hedonic wellbeing. That is to say, it really is a disutility as economists traditionally conceive of it, one which requires some form of monetary reward to induce work effort. The alternative proposition is that work can be, and often is, a pleasurable experience, but that it comes mixed with the pain associated with anxiety and stress which emanates from the responsibilities individuals have when working. Kahneman et al. (2004: 1779) show that workers' happiness varies markedly according to whether or not they feel pressure to work quickly.

Table 8: Happiness with relaxed score as a control

Variables	(1)	(2)
Relaxed score	0.59 (186)	0.59 (186)
Working, studying	-0.80 (-12.6)	-0.98 (4.67)
Work*relaxed score	-	0.0031 (1.03)
Constant	28.8 (140)	28.9 (138)
Observations	1,321,279	1,321,279
R-squared	0.447	0.447
Number of user_id	20,946	20,946

Robust t-statistics in parentheses

We try to address this question by running happiness equations which condition on the relaxation scores individuals record. We run two models in Table 8. The first model in column 1 introduces the relaxation score to see if it can eliminate the negative association between happiness and paid work, as one might expect if the paid work effect was wholly due to the stress and anxiety associated with working. The second model interacts paid work with the relaxation score so as to distinguish between more and less relaxing forms of work. We find the introduction of relaxation as a control variable reduces the size of the negative working coefficient quite substantially. The working coefficient remains statistically significant, but it is roughly one-tenth the size of the coefficient presented in Table 1, suggesting that part of the work effect may be due to the worry and stress of work. However, the interaction of work and relaxation, whilst positive, is both small and statistically non-significant. This suggests that, although feeling relaxed is very important for feeling happy, and controlling for relaxation accounts for some of the work effect, working continues to be negatively associated with momentary happiness, regardless of the stress associated with working.

5. Conclusion

In this paper we contribute to the literature on momentary wellbeing using a new data source, Mappiness (www.mappiness.org.uk), which permits individuals to record their wellbeing via a smartphone. The data contain more than a million observations on tens of thousands of individuals in the UK, collected since August 2010. We explore the links between individuals' wellbeing measured momentarily at random points in time and their experiences of paid work. We quantify the effects of working on individuals' affect relative to other activities they perform. We consider the effects of working on two aspects of affect: happiness and relaxation.

We find paid work is ranked lower than any of the other 39 activities individuals engage in, with the exception of being sick in bed. Although controlling for other factors, including person fixed effects, reduces the size of the association its rank position remains the same and the effect is still equivalent to a 7-8% reduction in happiness relative to circumstances in which one is not working. Paid work has a similar though slightly larger negative impact on being relaxed. However, precisely how unhappy or anxious one is while working depends on the circumstances. Wellbeing at work varies significantly with where you work (at home, at work, elsewhere); whether you are combining work with other activities; whether you are alone or with others; the time of day or night you are working; and your personal and household characteristics. Many of these circumstances can be influenced by public policy which may facilitate working conditions conducive to "happier" working, something which economists have recently noted can also improve labour productivity (Oswald et al., 2009).

We are left with the question as to why work appears to have such an adverse effect on individuals' momentary wellbeing. We know that part of the answer is related to anxiety at work. Even though people are so positive about paid work when reflecting on the meaning and value of their lives, actually engaging in paid work comes at some personal cost to them in terms of the pressures and stress they face while working. This suggestion is supported by previous research which shows that workers' happiness varies markedly according to whether or not they feel pressure to work quickly (Kahneman et al., 2004: 1779). But our results suggest that this is not the whole story. First, as Panel A in Table Six indicates, working continues to be negatively corrrelated with happiness, even when it is combined with other activities which are pleasurable. Second, even when one conditions on feelings of relaxation, working continues to be negatively associated with momentary wellbeing. Instead, it appears that work per se is negatively associated with hedonic wellbeing, such that we would rather be doing other things. That is to say, it really is a disutility as economists traditionally conceive of it, one which requires some form of monetary reward to induce work effort.

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Appendix A: The survey instrument
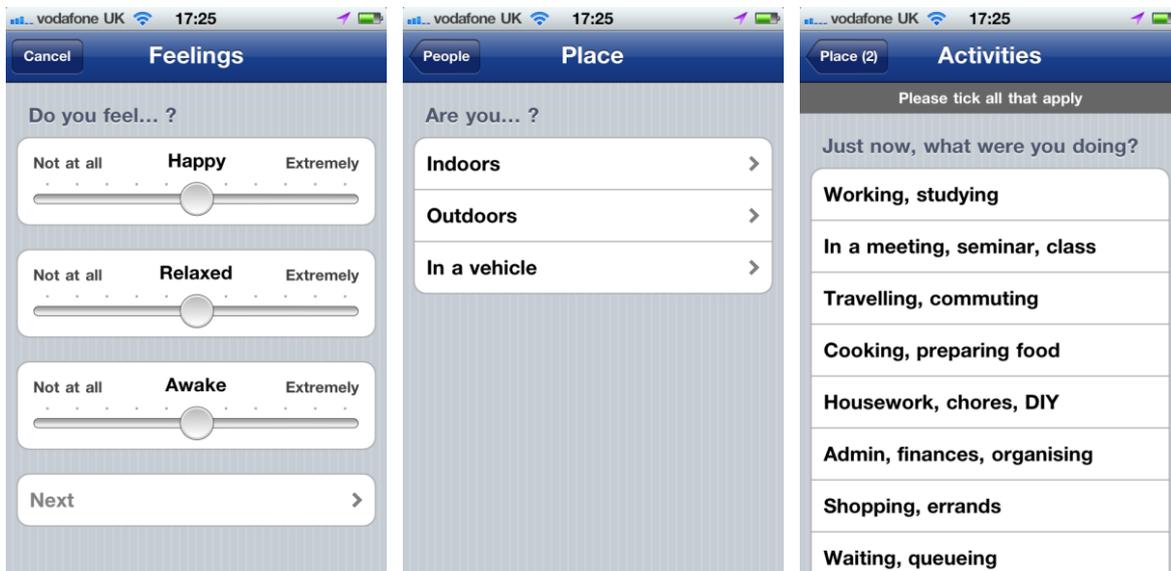
If a signal has been received, the app launches directly into the questionnaire.

The questionnaire spans multiple screens, delineated below by horizontal rules. Tapping an option suffixed by '>' immediately advances to the next screen.

The first screen has a 'Cancel' button that discontinues the questionnaire, and each subsequent screen has a 'Back' button to return to the preceding screen.

THIS SCREEN IS ILLUSTRATED ABOVE

Feelings

Do you feel… ?

Happy (slider: Not at all … Extremely)

Relaxed (slider: Not at all … Extremely)

Awake (slider: Not at all … Extremely)

Next >

People

Please tick all that apply

Are you… ?

Alone, or with strangers only >

Or are you with your… ?

[ ] Spouse, partner, girl/boyfriend
[ ] Children
[ ] Other family members
[ ] Colleagues, classmates
[ ] Clients, customers
[ ] Friends
[ ] Other people you know

Next >

Place

Are you… ?

Indoors >
Outdoors >
In a vehicle >

Place (2)

And are you… ?

At home >
At work >
Elsewhere >

If you're working from home, please choose 'At home'

THE ACTIVITIES LIST IS ADAPTED FROM THE AMERICAN TIME USE SURVEY ACTIVITY LEXICON 2009 (US BUREAU OF LABOR STATISTICS) AND THE UNITED KINGDOM 2000 TIME USE SURVEY (UK OFFICE FOR NATIONAL STATISTICS).

Activities

Please tick all that apply

Just now, what were you doing?

[ ] Working, studying
[ ] In a meeting, seminar, class
[ ] Travelling, commuting
[ ] Cooking, preparing food
[ ] Housework, chores, DIY
[ ] Admin, finances, organising
[ ] Shopping, errands
[ ] Waiting, queueing
[ ] Childcare, playing with children
[ ] Pet care, playing with pets
[ ] Care or help for adults
[ ] Sleeping, resting, relaxing
[ ] Sick in bed
[ ] Meditating, religious activities
[ ] Washing, dressing, grooming
[ ] Intimacy, making love
[ ] Talking, chatting, socialising
[ ] Eating, snacking
[ ] Drinking tea/coffee
[ ] Drinking alcohol
[ ] Smoking
[ ] Texting, email, social media
[ ] Browsing the Internet
[ ] Watching TV, film
[ ] Listening to music
[ ] Listening to speech/podcast
[ ] Reading
[ ] Theatre, dance, concert
[ ] Exhibition, museum, library
[ ] Match, sporting event
[ ] Walking, hiking
[ ] Sports, running, exercise
[ ] Gardening, allotment
[ ] Birdwatching, nature watching
[ ] Hunting, fishing
[ ] Computer games, iPhone games
[ ] Other games, puzzles
[ ] Gambling, betting
[ ] Hobbies, arts, crafts
[ ] Singing, performing
[ ] Something else

Next >

BY DEFAULT, THIS DIGITAL CAMERA SCREEN IS SHOWN ONLY WHEN OUTDOORS

Please take a photo straight ahead

Or tap Cancel to skip this step

Map

Add this photo to the public map?

Yes >
No >

Location

Improving location accuracy

Skip >

THE SURVEY DISMISSES ITSELF IMMEDIATELY AFTER THIS SCREEN IS DISPLAYED

Finished
Thank you!

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