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THE DETERMINANTS OF WELL-BEING PRIORITISATION OVER THE LIFE CYCLE

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Abstract

Recently, a novel attempt has been made to estimate priorities for the different aspects of subjective well-being, in order to understand where resources might best be allocated. However, the determinants of, and life cycle trends for prioritisation have yet to be studied. This paper - the first to study these issues - finds no consistent evidence of variation in priorities over the life cycle, unlike the 'mid-life crisis' observed for levels. Life satisfaction is the most valued aspect of well-being throughout life. However, people overestimate the value placed by others on happiness. Well-being priorities are strongly influenced by well-being levels, and individual fixed effects such as personality, health level, and smoking frequency. The separation of aspects into cognitive and affective factors may provide additional insight into how individuals generate priorities, and hence inform the optimal targeting of policy.

1 Introduction

After decades of focus by economists on improving incomes and production, more recent work has highlighted that increasing income does not necessarily translate to any marked improvement in an individual's level of subjective well-being. This is especially true when examining

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time series data: mean happiness remains unchanged, even when income increases (e.g. Easterlin, 2005). Subsequent research has uncovered important determinants of subjective well-being, such as relative comparison (Clark and Oswald, 1996; Ferrer-i-Carbonell, 2005); unemployment (Clark and Oswald, 1994); and other non-pecuniary factors (Blanchflower and Oswald, 2004b).

As a result of earlier research, the UK Office for National Statistics (ONS) now measures four aspects of subjective well-being. These are: happiness yesterday; satisfaction with life; worthwhileness of life; and anxiety yesterday. It is clear that the collection of these data is designed to help inform policymakers of the factors that improve an individual's overall quality of life. However, limited work has been done to establish which of these well-being measures is considered important to individuals. Ultimately, if economies are to shift their attention to improving societal welfare, it is important to understand the relative significance of each aspect of well-being in order to allow for informed policy decisions.

O'Donnell and Oswald (2015) appear to be the first to obtain weightings for the four aspects of well-being, in order to estimate the linear approximation of a 'change in well-being' function. The weights they collect correspond to f_h, f_s, f_w, and f_a in the following expression:

$$\Delta W \cong K[f_h(h - h_0) + f_s(s - s_0) + f_w(w - w_0) - f_a(a - a_0)] \tag{1}$$

where h, s, w and a refer to happiness, life satisfaction, worthwhileness, and anxiety, respectively. Of the four samples they collect, three give the highest weighting to life satisfaction (f_s).

These data represent a first attempt at estimation. As such, these three samples were taken from economics students, business students, and professional economists. They are therefore likely to be unrepresentative of the wider population. Since the focus of the study was to estimate weights alone, no attempt was made to uncover how these weights might be determined, and whether they are different for different individuals.

Given that previous research on the determinants and life cycle trends of well-being has been plentiful (see Dolan, Peasgood, and White, 2008, for a review of the economic literature on well-being), a natural extension would be to link these ideas to the determination of well-

being priorities. This paper appears to be the first study of its kind to address these issues.

This study has two main aims. First, it extends the findings in O'Donnell and Oswald (2015) by uncovering which well-being aspects are given highest priority over the life cycle. Second, it provides an initial attempt to understand what determines the rank ordering of well-being aspects. Neither of these issues has previously been explored in the literature. I find that the non-linear 'mid-life crisis' dip observed in well-being levels does not reliably translate to a corresponding relationship for well-being prioritisation. However, the middle-aged focus more on their own level of well-being in their determination of happiness and anxiety. Individual characteristics have a strong influence on which aspect is given highest priority.

The trends and determinants of subjective well-being have been studied for a number of years, in both economics and psychology. A large number of general findings have emerged as a result of this research. Relative comparisons based on income have strong effects on well-being levels (e.g. Clark and Oswald, 1996; Dolan, Peasgood, and White, 2008; Ferrer-i-Carbonell, 2005), suggesting that the traditional economic focus on increasing income per capita (past some threshold) may have little impact in terms of increasing per capita well-being.

A wealth of economic studies have shown the negative impact of unemployment and poor labour market outcomes on well-being (e.g. Frey and Stutzer, 2002; Oswald, 1997; L. Winkelmann and R. Winkelmann, 2008). These seem to be linked less with a loss of income than a psychological loss. The same can be said for a reduction in levels of health. Other personal circumstances and lifestyle choices also have a significant influence on levels of subjective well-being. Most notably, this includes marriage (Blanchflower and Oswald, 2004a), exercise (Ferrer-i-Carbonell and Gowdy, 2007), and diet (Mujcic and Oswald, 2016).

In addition to these situational factors, personal characteristics also affect well-being. The Big Five personality factors Extraversion and Neuroticism are strongly linked to well-being levels; the former positively and the latter negatively (Diener and Lucas, 1999). Subsequent research has shown that finer-grained measures may have more explanatory power (Dolan, Peasgood, and White, 2008). Still, it is clear that individual characteristics shape well-being.

One of the most prominent and consistent findings is that there is a U-shape in well-being over the life cycle in cross-sectional data, and whilst controlling for factors such as health and income (e.g. Blanchflower and Oswald, 2004a; Ferrer-i-Carbonell and Gowdy, 2007). This

pattern is consistent with the theory of a 'mid-life crisis' in psychology (e.g. Brim, 1976), and may be generated partly as a result of forecasting error (Schwandt, 2016). The U-shape for happiness and life satisfaction has been shown to hold across a number of different countries, and when taking into account cohort effects (Blanchflower and Oswald, 2008). This rules out the explanation that the observed mid-life dip in well-being is being caused by generational differences in the trajectory of happiness over the life cycle. The U-shape holds longitudinally within individuals (Cheng, Powdthavee, and Oswald, 2015). Evidence of a mid-life crisis has also been found in primates (Weiss et al., 2012). Some recent studies (e.g. Frijters and Beatton, 2012; Kassenboehmer and Haisken-DeNew, 2012) have highlighted issues with this pattern due to unobserved heterogeneity (such as interviewer effects), reverse causality, and fixed effects. Despite this, the majority of evidence points towards the presence of a U-shape over the life cycle.

The remainder of this paper is organised as follows. Section 2 uses data from the UK Annual Population Survey (APS) to analyse life cycle patterns for well-being levels, in order to form expectations for prioritisation behaviour. It then discusses how prioritisation may be determined by well-being levels. Section 3 presents evidence obtained from the online survey data collected for O'Donnell and Oswald (2015). Section 4 presents evidence obtained from a new online survey designed to address shortcomings of the data from Section 3, and estimates the model proposed in Section 2. Section 5 provides a discussion of the results, and how the difference between cognitive and affective measures of well-being may help to explain them. Finally, Section 6 summarises the findings of the paper, and concludes.

2 Background and Expectations

2.1 Well-being levels across the life cycle

To understand how we might expect individuals to prioritise well-being *a priori*, I look at the life cycle patterns of well-being levels using data from the 2013-14 UK Annual Population survey (Office for National Statistics. Social Survey Division, 2014). The four well-being questions asked to respondents are as follows (each is scored on a scale from 0-10):

1. "Overall, how happy did you feel yesterday?"

2. "Overall, how satisfied are you with your life nowadays?"
3. "Overall, to what extent do you feel the things you do in your life are worthwhile?"
4. "Overall, how anxious did you feel yesterday?"

Figure 1 plots fitted third-order polynomial curves in age to reported levels of happiness yesterday, life satisfaction, worthwhileness of life, and anxiety. We see that happiness and life satisfaction exhibit a U-shape across the life cycle, and anxiety is hump-shaped. No additional controls were used - this is a pattern found in raw data.[1] According to these data, it does seem that the middle-aged are, in fact, suffering from lower levels of well-being than the young and old.

The pattern for worthwhileness is somewhat more ambiguous. The overall life cycle pattern could be described as a 'late wave'. However, when separating for gender, we see that males seem to experience an increasing level of worthwhileness with age, whilst females suffer a sharp decline in later life. Further investigation reveals that this pattern disappears (i.e. the female curve looks more similar to the male curve) when looking only at those with good or very good levels of general health. From this, it appears as though females may be factoring health more highly in their evaluation of worthwhileness than males.[2]

When controls are added (Table 1), we see that the U-shape is still present. Worthwhileness becomes U-shaped, in a similar fashion to happiness and life satisfaction. The estimates in Table 1 are obtained using both OLS (i.e. assuming cardinality of well-being responses) and ordered logit (i.e. assuming ordinality only). Both estimation methods offer similar interpretations in terms of direction, which is consistent with Ferrer-i-Carbonell and Frijters (2004).

Gender differences over the life cycle are minimal for levels of life satisfaction and worthwhileness. They are significantly different for happiness and anxiety, though gender differences in anxiety are more pronounced. Anxiety levels drop off much more rapidly for males after middle age, whereas they peak closer to the age of 60 for females. All four of the life cycle relationships in Table 1 point to a middle-aged dip in subjective well-being (i.e. a U-shaped pattern for levels of happiness, life satisfaction, and worthwhileness; and a hump-shaped pattern for levels of anxiety).

[1] This is in contrast to Easterlin (2006), who claims that the U-shape only arises when control variables are

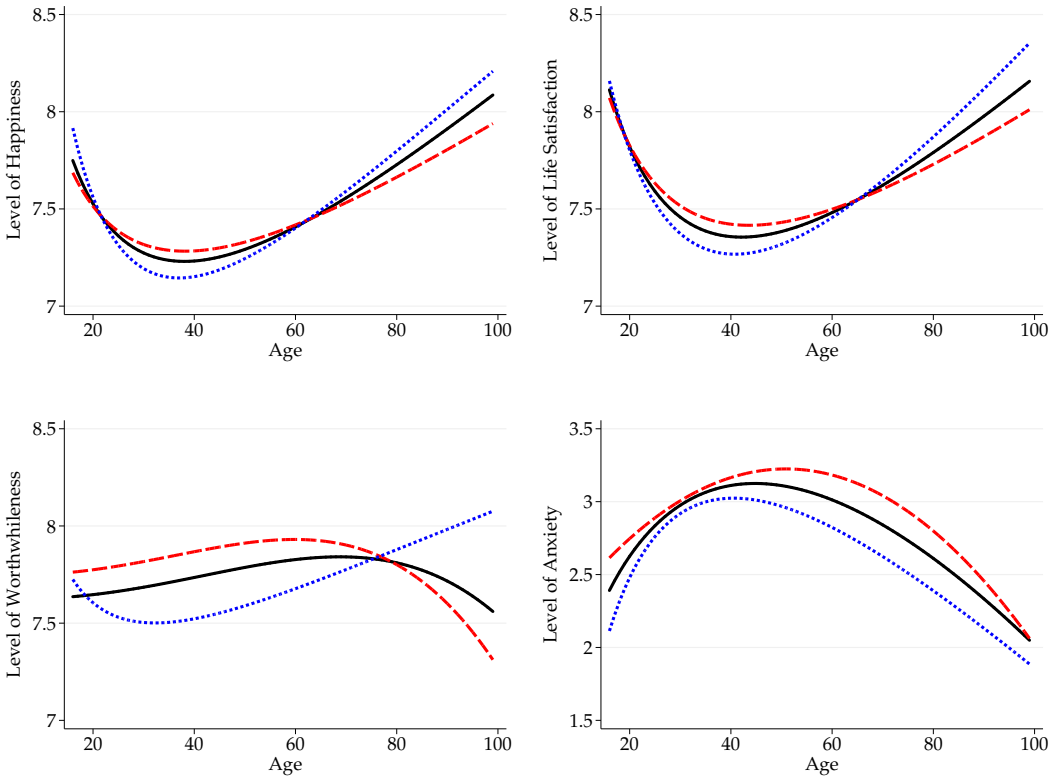


Figure 1: 3rd order polynomial age curves for levels of well-being, from UK APS, 2013-14. Solid black line = raw data; dashed red line = females; dotted blue line = males. n=165,122.

Table 1: The quadratic life cycle relationship of well-being levels, APS 2013-14

	OLS				Ordered Logit			
	Happiness	Life Satisfaction	Worthwhileness	Anxiety	Happiness	Life Satisfaction	Worthwhileness	Anxiety
Age	-0.0551***	-0.0818***	-0.0428***	0.0409***	-0.0591***	-0.103***	-0.0618***	0.0318***
Age^2	0.000659***	0.000896***	0.000530***	-0.000412***	0.000713***	0.00115***	0.000769***	-0.000338***
Male	0.165	-0.0476	-0.185	-1.011***	0.218	0.0224	-0.283*	-0.695***
Age * Male	-0.0140*	-0.00267	-0.00607	0.0449***	-0.0167**	-0.00868	-0.00592	0.0318***
Age^2 * Male	0.000186**	4.63e-05	9.76e-05	-0.000586***	0.000202**	0.000115	9.47e-05	-0.000402***
General health (reverse)	-0.538***	-0.510***	-0.382***	0.634***	-0.474***	-0.612***	-0.467***	0.413***
Net pay	9.70e-07	1.71e-06***	1.57e-06***	1.42e-06	3.98e-07	2.57e-06***	2.00e-06***	1.44e-06**
Married, living with spouse	0.340***	0.452***	0.347***	-0.108***	0.314***	0.570***	0.436***	-0.0717***
Married, separated	-0.0996**	-0.254***	0.0405	0.0497	-0.0395	-0.251***	0.0765**	0.0095
Divorced	-0.00705	-0.0598**	0.0401*	0.0295	0.0273	-0.0385	0.0941***	-0.00675
Widowed	-0.246***	-0.364***	-0.0552	0.014	-0.168***	-0.371***	-0.00151	0.00714
Were/still in civil partnership	0.0548	0.482***	0.191**	0.285	0.172	0.612***	0.240**	0.133
Mixed	-0.112	-0.209***	-0.0216	0.195	-0.0955	-0.260***	3.19e-05	0.112
Indian	0.197***	-0.0823*	-0.0159	0.112	0.190***	-0.0946*	-0.0172	0.0607
Pakistani	-0.133	-0.232***	-0.0077	0.347***	-0.00897	-0.189**	0.0555	0.166**
Bangladeshi	0.316**	-0.168	0.0963	0.125	0.353***	-0.0832	0.275**	0.0127
Chinese	-0.0249	-0.283***	-0.381***	-0.0691	-0.113	-0.409***	-0.530***	0.0264
Other Asian	0.381***	0.142*	0.115	0.220*	0.357***	0.164*	0.168*	0.134
Black	-0.0777	-0.458***	-0.0468	0.247***	3.08e-05	-0.534***	-0.0157	0.114**
Other ethnicity	-0.082	-0.127**	-0.0929	0.312***	-0.0145	-0.120*	-0.0709	0.191***
Constant	9.261***	10.07***	9.242***	1.017***	-	-	-	-
Observations	67324	67324	67324	67324	67324	67324	67324	67324
R^2	0.052	0.098	0.061	0.036	-	-	-	-

Standard errors and ordered logit cut constants omitted for brevity. Robust s.e. used for OLS. *** p<0.01, ** p<0.05, * p<0.1

2.2 Determining well-being prioritisation

Given that individuals in general do not have large amounts of empirical data about well-being in society, it seems natural to believe that they will utilise information about their own levels of well-being in determining how to prioritise a given well-being aspect. On its own, this suggests that well-being priorities may exhibit a U-shape or hump-shape similar to that shown in Figure 1. However, own well-being is likely to be combined with personal beliefs about what constitutes optimal policy when determining social priorities. These beliefs will be influenced by (limited) knowledge about the well-being levels of others, as well as by individual fixed effects.

Let P_i^A represent the well-being priority for aspect A, given an individual i.[3] The priority given to a particular aspect of well-being depends upon a function of one's own well-being level L_i, and a function of the expected level of others' well-being $L_{\neg i}$. Hence, priority can be represented in the following way:

$$P_i^A = a_i f(L_i^A) + b_i g(E_i[L_{\neg i}^A]) \tag{2}$$

where a_i and b_i are constants.

One's level of well-being at any given point in life is influenced by factors such as regret from forecasting error, and optimism (Schwandt, 2016). These factors contribute to the underlying U-shape of happiness and life satisfaction over the life cycle. This life cycle trend is implicitly contained within L_i. L_i also captures much of what constitutes preferences in terms of choice utility. Whilst there are some exceptions, what people choose in a decision scenario largely corresponds to what provides them with the highest level of subjective well-being (Benjamin et al., 2012).

We can estimate a general form of this relationship, given that we have data on levels and beliefs about others' levels. I assume there is some commonality in how priorities are formed, which allows us to take parameters across individuals as constant:

$$P_i^A = \beta_0 + \beta_1 (L_i^A)^{\beta_2} + \beta_3 (E_i[L_{\neg i}^A])^{\beta_4} + \epsilon_i \tag{3}$$

included in a quadratic regression of well-being on age.

[2]This could be due to evolutionary reasons, such as fertility, and ability to nurture offspring.

[3]In practice, this priority can either represent a weighting, or a simple ordinal ranking.

One hypothesis about the values of β_1 and β_2 can be formed by considering the possibility that the marginal impact of an extra unit of well-being affects overall priority. For example, if we were to assume a standard concave value function (i.e. displaying diminishing marginal returns), the value of an additional unit of well-being would diminish as well-being level increases. This would suggest that individuals with a low level of well-being for a given aspect would prioritise that aspect more highly than someone with a higher level.[4] In other words, this would imply $f(L_i^A)$ is decreasing in L_i^A, suggesting that $\beta_2 \in (0, 1)$.

Given this supposition, I hypothesise that priority will be allocated to those well-being aspects for which the corresponding level is lower (i.e. $\beta_1 < 0$). Therefore, if well-being priority was determined by own levels alone, then based on the APS data in Section 2, we would expect that the middle-aged place higher priority on the increase of happiness and life satisfaction; and reduction of anxiety. We may expect the opposite for worthwhileness, given the nature of the relationship for worthwhileness levels in Figure 1.

However, one expects that individuals would account for others' needs, in addition to their own. Given the arguments above about one's own level of well-being, we might expect that the same inverse relationship would hold between beliefs about others' level of well-being, and one's priority for a given aspect. Thus, β_2 and β_4 are likely to be similar, with $\beta_3 < 0$. It is not clear whether individuals would place more weight on their own well-being, or their expectations about others' well-being. However, given own levels are more available and salient, a sensible hypothesis would be that $|\beta_1| > |\beta_3|$. That is, I expect own levels of well-being to be more important in determining well-being priority for a given aspect than others' levels of well-being.

It is important to note the implicit assumption that all priorities are independent. However, if we ask individuals to form a rank ordering, or to provide weights that add up to a fixed sum, the priority of one of the four aspects will be determined by the other three. Therefore, it is possible that estimated parameter values for one of the four aspects will be largely different from the rest.

There are many variables representing individual differences and fixed effects that are subsumed into the error term. Easily observable determinants of well-being (such as income, em-

[4] For example, we might expect that an increase in happiness by one point on a 0-10 scale would be more desirable to someone with a happiness level of 4 than someone with a happiness level of 8.

ployment status, and marital status) can be collected in order to eliminate at least some of the omitted variable bias that may otherwise arise from estimation of (3). These variables may also influence priorities aside from their influence on levels. The greater the impact these variables have on prioritisation, the less likely we are to see the 'mid-life crisis' pattern of well-being levels reflected in priorities.

In particular, two of the Big Five personality factors - Extraversion and Neuroticism - are strongly linked to subjective well-being levels (Diener and Lucas, 1999). The most clear link is between Neuroticism and anxiety. Since Neuroticism captures sensitivity to negative affect (McCrae and John, 1992), more Neurotic people will suffer the most from high anxiety levels. Therefore, individuals with higher Neuroticism would see greater value in addressing factors that would reduce anxiety levels (i.e. giving higher priority to anxiety). Extraversion is linked to responsiveness to positive outcomes, such as rewards. Hence, one would expect those high in Extraversion to prioritise happiness more than others.

3 Survey 1

To provide a first indication of the pattern of well-being priorities across the life cycle, I use data from a short online survey. The survey was administered in mid-2014, using participants recruited from Amazon Mechanical Turk (MTurk). This sample was one of the four used in O'Donnell and Oswald (2015). Individuals were asked to prioritise the four standardised aspects of well-being by allocating points to each aspect, where the sum of points was constrained to 100. The exact text of the well-being weighting task is provided in the Appendix.

In addition, a limited set of demographic data was obtained. Demographic questions were asked at the end of the survey, in order to avoid any potential priming effects (although such effects would be unlikely in this case). 306 responses were collected in total. Each respondent was paid $1, and mean survey completion time was 7.4 minutes. The mean age of the sample was 32. 60% were male. 79% of respondents were U.S. nationals.

Figure 2 shows the mean weighting given to each aspect of well-being. Happiness is valued the highest, followed by life satisfaction, worthwhileness, and anxiety (in that order). The rank ordering of well-being aspects in this survey is preserved across all but the final age band (Figure

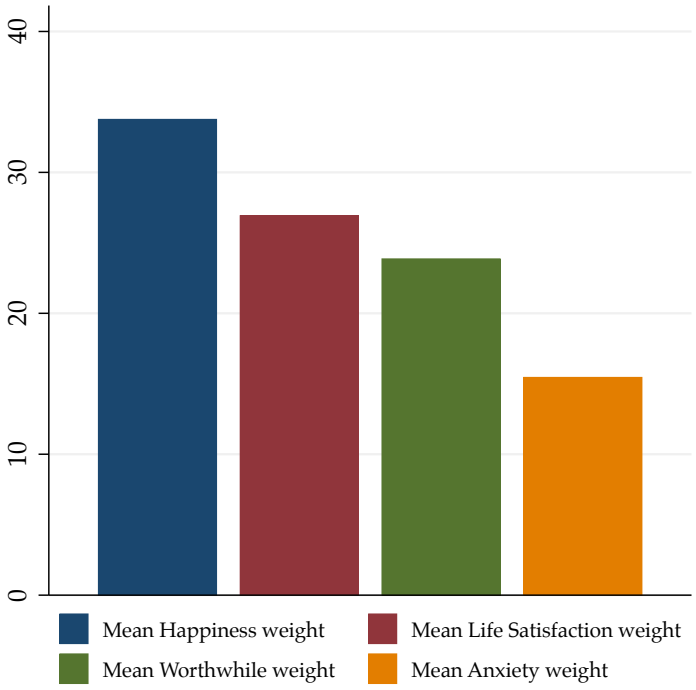


Figure 2: Mean weighting given to each of the four aspects of subjective well-being in survey 1. n=306.

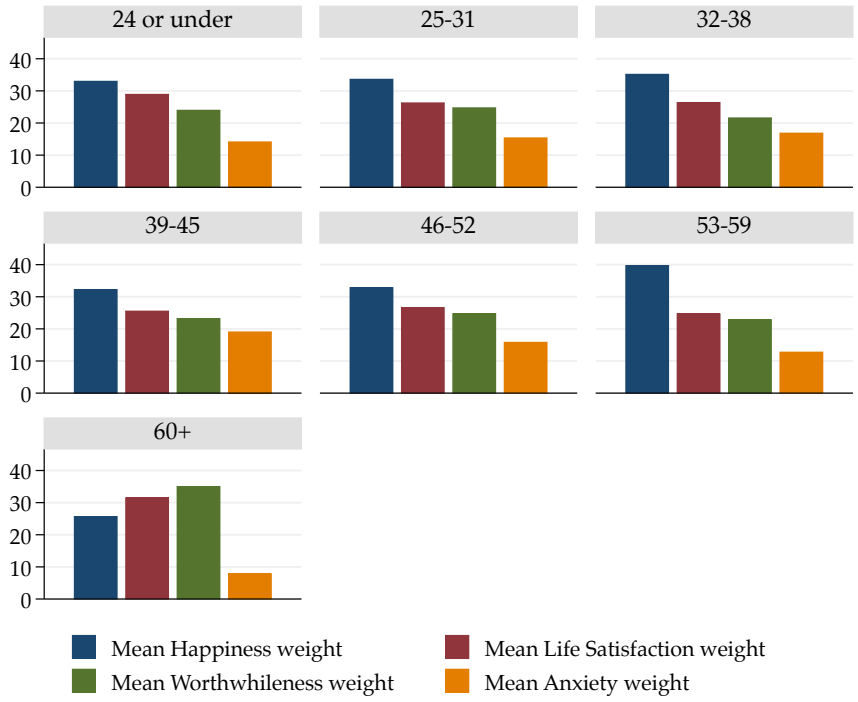


Figure 3: The rank ordering of well-being priorities in survey 1 is largely the same across age bands.

3). Worthwhileness is given much higher priority by those aged 60 or above, but data at this end of the age range is sparse.[5] Mean relative weightings, however, do not remain constant across bands.

Figure 4 shows a third-order polynomial fit to the weighting for each aspect of well-being over the life cycle. A cubic polynomial is used to account for non-linearity, without constraining the shape to be a parabola. Weights for happiness and anxiety follow a hump shape across the life cycle. In contrast, weights for life satisfaction and worthwhileness follow a U-shape across the life cycle. This implies that middle-aged individuals care relatively more about policies that increase happiness and reduce anxiety than the young or the elderly. The 95% confidence intervals displayed on the curves show that the trend is noisier towards the upper end of the age range. This is due to the shortage of data from older individuals.

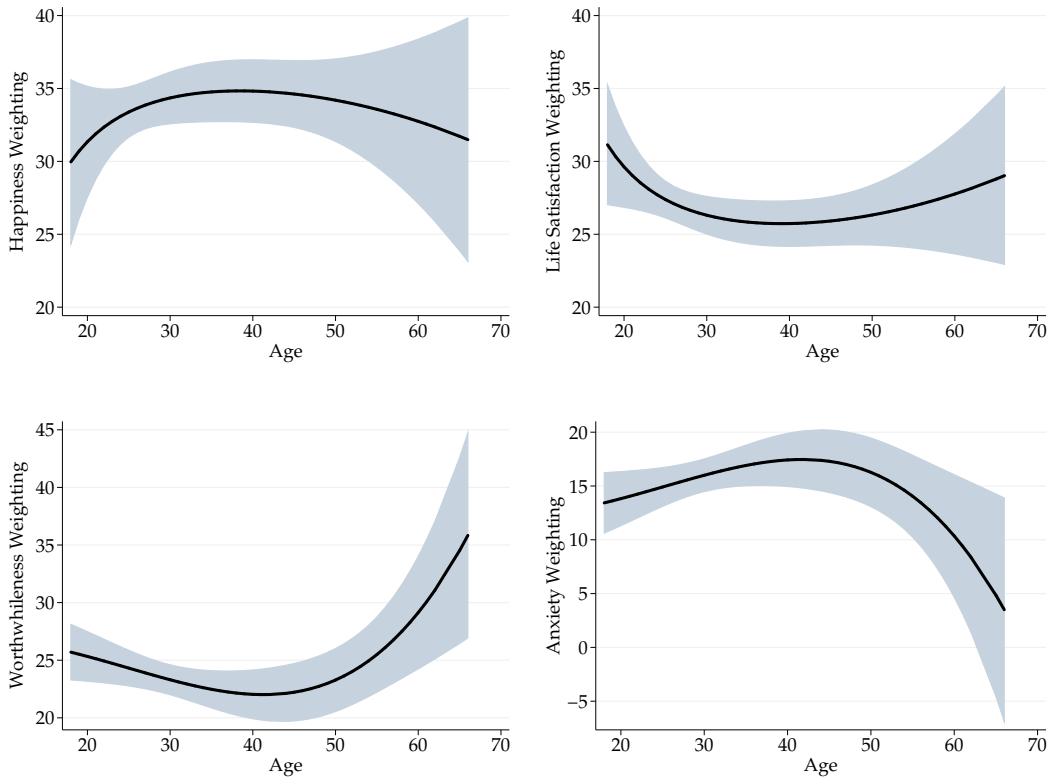


Figure 4: 3rd order polynomial age curves fitted to well-being weightings, with 95% confidence intervals. n=306.

In order to ascertain the strength of these parabolic relationships, I estimate a quadratic

[5] For example, only 6 responses are obtained from those aged 60 or above.

relationship in age, using OLS with robust standard errors. Specification 1 in Table 2 shows the raw quadratic relationship between age and well-being weightings. The quadratic term is not statistically significant for happiness, but is significant for life satisfaction, worthwhileness, and anxiety.

Specification 2 in Table 2 adds gender interaction terms to separate the relationship for males and females. Men place higher weight on happiness and life satisfaction, and therefore, less weight on worthwhileness and anxiety than women. The results for males in this sample suggest a flatter life cycle weighting profile than for females. This is particularly true for both happiness and worthwhileness, where the curvature is being driven primarily by females. Despite this, the polarity of the quadratic relationships remains the same, even when separating for gender.

The significance of the gender difference in worthwhileness weightings may be reflecting the unusual pattern observed in the APS data in Figure 1. Recall that the level of worthwhileness for females was somewhat hump-shaped over the life cycle, in contrast to a U-shape for males. The hypothesis that individuals are prioritising aspects that they are deficient in is consistent with a stronger U-shape for females in terms of the importance they place on worthwhileness around middle age.

3.1 Limitations of survey 1

There are a number of limitations with the findings from this simple first survey. First, and most importantly, the sample does not stratify for age. This results in highly noisy data at the upper end of the age range. 80% of respondents were below the age of 39, which means that the patterns observed after middle age are likely to be inaccurate. Whilst data acquired from MTurk have been shown to be reliable (Mason and Suri, 2012), a more age-representative sample is required to draw meaningful conclusions about life cycle patterns. Due to the novel nature of the question posed, large randomised datasets with data on well-being priorities currently do not exist. However, stratification in a smaller-scale survey is feasible.

Second, no randomisation was used in the order of well-being statements. This may result in bias due to order effects. The overall mean ordering of well-being priorities from the MTurk sample differs from the other samples used in O'Donnell and Oswald (2015), even though the same ordering of aspects was shown to each sample in that paper. In these other samples,

Table 2: The relationship between age and well-being weights. Weightings for the importance of happiness yesterday and anxiety are hump-shaped across the life cycle, whilst weightings for life satisfaction and worthwhileness of life are U-shaped.

	Specification 1				Specification 2			
	Happy	Satisfaction	Worthwhile	Anxiety	Happy	Satisfaction	Worthwhile	Anxiety
Age	0.577	-0.621**	-0.928**	0.972**	1.249*	-0.369	-1.695***	0.815
	(0.420)	(0.305)	(0.379)	(0.391)	(0.654)	(0.459)	(0.521)	(0.666)
Age^2	-0.00701	0.00744**	0.0124**	-0.0129***	-0.0149*	0.00504	0.0220***	-0.0121
	(0.00541)	(0.00370)	(0.00488)	(0.00478)	(0.00811)	(0.00533)	(0.00651)	(0.00785)
Male	-	-	-	-	21.68	9.312	-26.00*	-4.995
					(15.57)	(11.76)	(13.44)	(15.59)
Age * Male	-	-	-	-	-1.16	-0.355	1.433*	0.0823
					(0.844)	(0.636)	(0.729)	(0.836)
Age^2 * Male	-	-	-	-	0.0138	0.00324	-0.0185**	0.00144
					(0.0106)	(0.00779)	(0.00928)	(0.0102)
Constant	23.18***	38.43***	39.59***	-1.206	10.41	32.05***	53.97***	3.566
	(7.563)	(5.668)	(6.880)	(7.214)	(12.34)	(8.744)	(9.792)	(12.75)
Observations	306	306	306	306	306	306	306	306
R^2	0.006	0.013	0.022	0.017	0.012	0.023	0.034	0.023

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

the mean happiness weighting drops to third in the rank ordering, after life satisfaction, and worthwhileness. Whilst this may suggest that order effects are unlikely to have had a substantive impact on the results, it is important to note that these other samples came from students and professional economists. It is possible that they are less susceptible to order effects than those responding quickly to an online survey.

Finally, these data do not allow us to understand how priorities are formed, due to the absence of individual fixed effects and well-being levels. Although the results from survey 1 resemble the non-linear life cycle patterns for well-being levels from the APS data in Section 2, we do not know the extent to which levels are contributing to the prioritisation process. Collecting data on well-being levels would allow us to assess how much the observed weightings depended on individuals' own subjective well-being. In addition, individual fixed effects influence subjective well-being (Ferrer-i-Carbonell and Frijters, 2004). Therefore, their inclusion is likely to explain further variation in priorities.

4 Survey 2

4.1 Design

To address the limitations of the first survey, and allow for estimation of the model proposed in Section 2.2, a second online survey was designed. In order to resolve some of the noise around the extremes of the age range, the sample was stratified equally amongst seven age bands (see Table 3).[6]

Table 3: The difference in age distribution between survey 1 and survey 2.

	Num of observations	
	Survey 1	Survey 2
24 or under	73	40
25-31	105	40
32-38	68	40
39-45	23	40
46-52	18	41
53-59	13	40
60 or over	6	40
	306	281

[6] Although the survey was designed so that 40 observations were collected in each age band, one age band received 41 responses. Rather than discarding data, I include this extra observation in the analysis.

The main task asked individuals to rank the four well-being aspects ordinally, rather than assigning weighting points. Whilst this has the disadvantage that we do not obtain information about the relative strength of a priority, it simplifies the task and prevents arbitrary weights from being assigned. To compensate for the lack of a numerical measure of weighting for each aspect, I asked respondents how sure they were of each rank position they decided upon. Certainty was recorded on a three-point scale: not at all sure; somewhat sure; and very sure.

The starting order of the four aspects was randomised for each respondent, which eliminates the problem of potential order effects. The ranking task requires that individuals drag the aspects in the ordering they desire, with a mechanism to prevent skipping ahead without moving any item.

In order to estimate a form of expression (3), participants were asked about their levels of well-being, and their beliefs about others' well-being levels and priorities. The measures used for levels are identical to those used in the APS. Information on individual fixed effects was captured by collecting data on basic demographic information; as well as employment status, marital status, children, health, education, income, and Big Five personality factors using the 20 item mini-IPIP personality inventory (Goldberg et al., 2006). All of these variables are included as they have been found to be associated with levels of well-being. Statements from the mini-IPIP measure of personality were presented in a random order to each participant.

Time preference has been shown to vary across the life cycle. Empirically, the discount factor appears to be positively correlated with age and income (Green et al., 1996). Since income peaks around middle-age, the evidence would suggest that the discount factor should be relatively high at this point in the life cycle.[7]

Hence, differences in time preference over the life cycle may influence prioritisation. I use the smaller-sooner vs larger-later task developed by Coller and Williams (1999) in order to elicit time preferences. Since I do not use task-specific incentives, this measure is likely to be biased towards patience (i.e. a lower discount rate, and therefore higher discount factor). Therefore, an item on smoking frequency was also included. Reimers et al. (2009) find that smoking behaviour is strongly related to time preference. Smokers prefer smaller-sooner monetary payoffs

[7] The majority of evidence for increasing discount factors comes from experiments that deal with monetary gains. The same effects do not hold for the discounting of emotional experiences (Löckenhoff and Rutt, 2015).

over larger-later ones, suggesting that the propensity to smoke would make a good proxy for impatience.

4.2 Results

Responses to the survey were collected in May 2016, again using participants recruited from MTurk. The mean survey completion time was 6.04 minutes. Each respondent was paid $2.50. Approximately 40% of respondents were male (112 of the 281). All but 5 respondents were U.S. nationals.

There are key differences in the results from survey 2 when compared to the those from survey 1. First, the mean rank ordering of the well-being aspects has changed. Figure 5 shows that happiness is now the lowest ranked aspect of well-being on average.[8] The relative rankings of the other three aspects remain unchanged, so that life satisfaction now receives the highest priority, followed by worthwhileness, and anxiety. Figure 6 shows that this relative ranking is preserved across age bands. The fact that life satisfaction is the highest priority well-being aspect is consistent with all of the non-MTurk samples in O'Donnell and Oswald (2015). However, in those samples, happiness is given higher priority than anxiety, which is not the case in the present data.

Figure 5 also plots beliefs about how others would rank the four aspects. The overall mean ordering of beliefs is consistent with the order generated from own mean ranking. However, t-tests of the difference between mean rankings for each aspect show that, on average, people overestimate the ranking others give to happiness. This is compensated by underestimates in the beliefs about others' worthwhileness and anxiety rankings.

Second, the non-linearity of well-being priorities across the life cycle found in survey 1 is not replicated by the data from survey 2. The third-order polynomial age curves in Figure 7 show little evidence of non-linearity. Table 4 confirms this finding by fitting a quadratic in age, with identical specifications to those in Table 2 for survey 1. An ordered logit model is used instead of OLS, since survey 2 asks for ordinal rankings, and it is not clear whether the distance between the rankings is perceived as being the same. There are no significant age trends for any

[8] Whilst the survey had individuals rank the aspects from top to bottom, so that 1 represented the highest ranking, labelling in the analysis has been reversed to show 4 as the highest ranking.

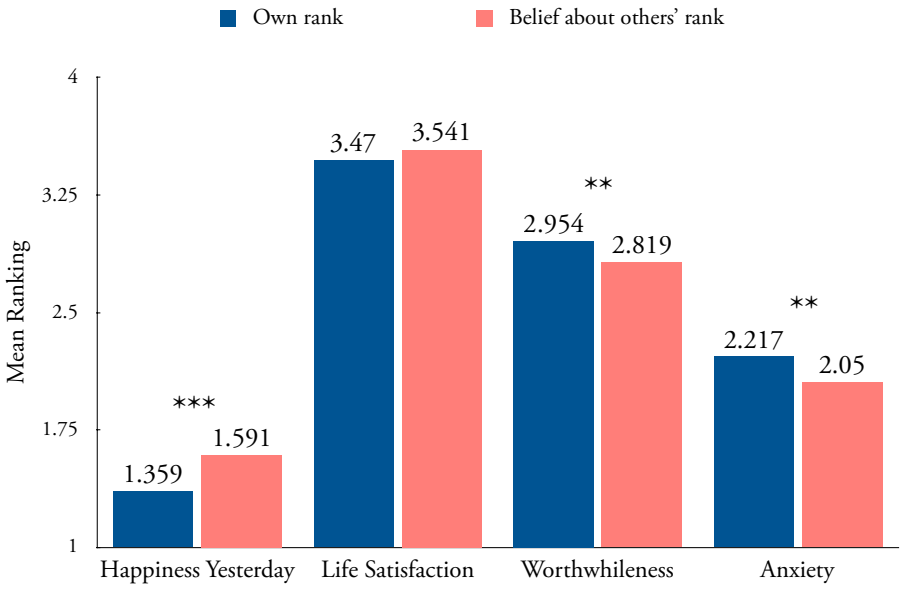


Figure 5: Means of well-being priority rankings from survey 2, where 4 represents the highest rank. Stars indicate significance of a t-test for a difference in means between own ranking, and beliefs about others' ranking. *** p<0.01, ** p<0.05, * p<0.1

of the well-being aspects.

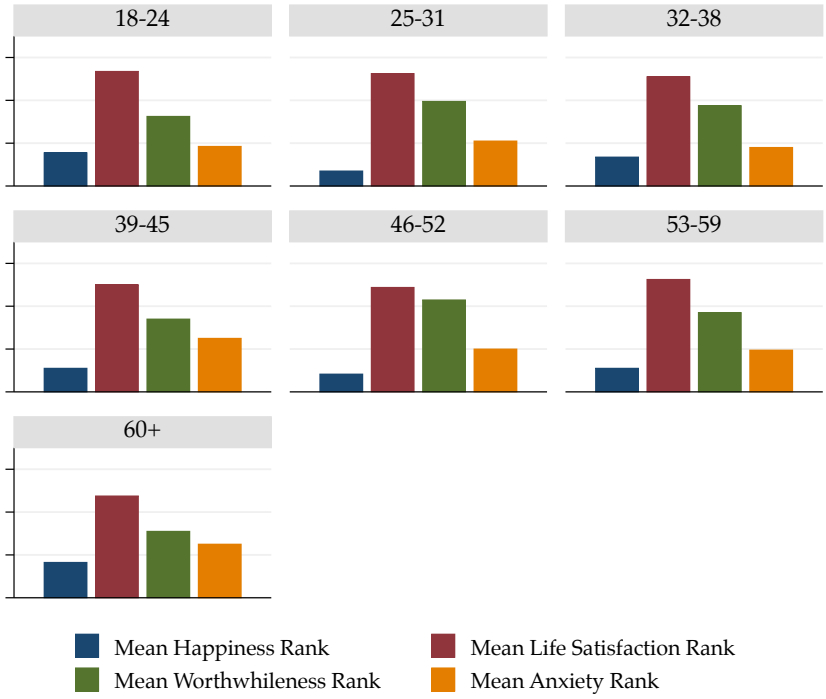


Figure 6: Happiness falls to the bottom of well-being priorities for all age groups in survey 2.

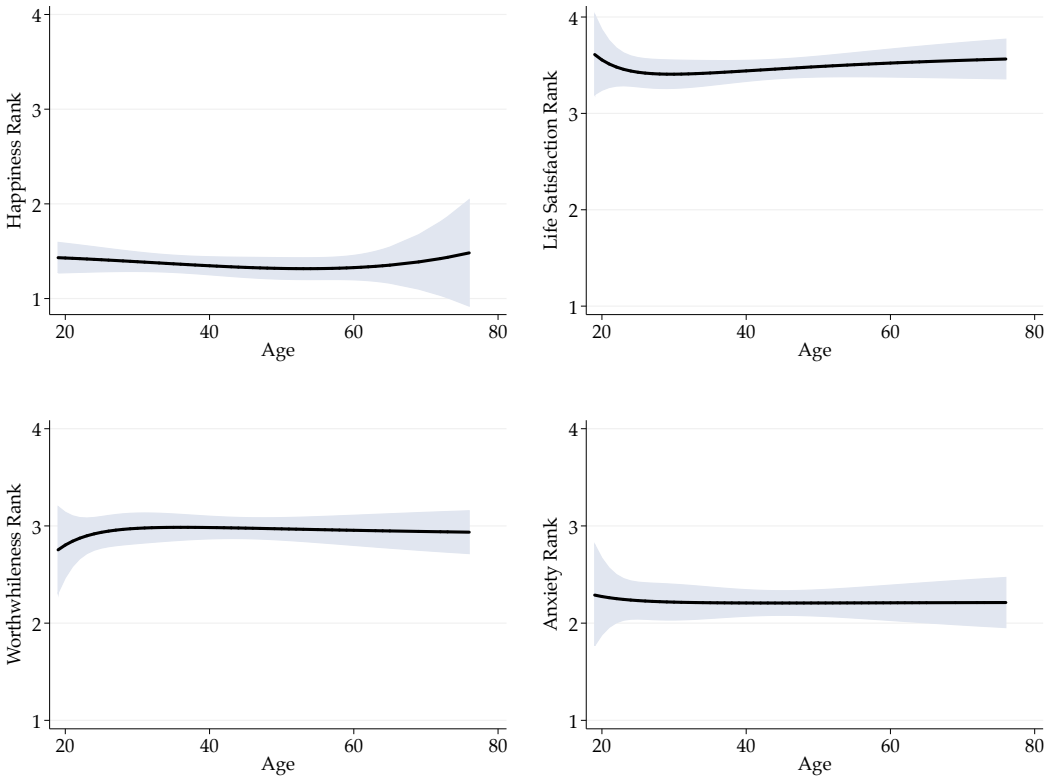


Figure 7: 3rd order polynomial age curves fitted to well-being ranks from survey 2, with 95% confidence intervals. n=281. Rankings appear to be constant over the life cycle.

Table 4: The relationship between age and well-being rankings from survey 2 (ordered logit). Rankings are consistent across the life cycle.

	Specification 1				Specification 2			
	Happy Rank	Satis Rank	Worth Rank	Anxiety Rank	Happy Rank	Satis Rank	Worth Rank	Anxiety Rank
Age	-0.0331	0.00534	0.00989	-0.0166	-0.0973	0.045	0.0834	-0.0901
	(0.0600)	(0.0547)	(0.0525)	(0.0507)	(0.0824)	(0.0737)	(0.0752)	(0.0683)
Age^2	0.000306	-5.39e-05	-7.35e-05	0.000181	0.000945	-0.000443	-0.000831	0.000933
	(0.000696)	(0.000630)	(0.000605)	(0.000581)	(0.000941)	(0.000831)	(0.000857)	(0.000770)
Male	-	-	-	-	-2.925	1.759	3.131	-3.028
					(2.421)	(2.254)	(2.155)	(2.082)
Age * Male	-	-	-	-	0.145	-0.0713	-0.143	0.119
					(0.121)	(0.112)	(0.107)	(0.103)
Age^2 * Male	-	-	-	-	-0.00138	0.000712	0.00146	-0.00131
					(0.00141)	(0.00130)	(0.00123)	(0.00119)
Constant 1	0.153	-3.706***	-2.840***	-1.625	-1.141	-2.723*	-1.212	-3.525**
	(1.195)	(1.168)	(1.088)	(1.032)	(1.680)	(1.584)	(1.561)	(1.437)
Constant 2	1.899	-1.969*	-0.795	0.494	0.624	-0.983	0.845	-1.354
	(1.209)	(1.111)	(1.059)	(1.024)	(1.687)	(1.544)	(1.550)	(1.421)
Constant 3	3.456***	-0.293	1.356	1.546	2.19	0.696	3.009*	-0.283
	(1.286)	(1.101)	(1.062)	(1.029)	(1.743)	(1.540)	(1.560)	(1.417)
Observations	281	281	281	281	281	281	281	281

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Figure 8 plots the gender-separated fitted quadratic curves from the second specification in Table 4. Whilst gender differences were not statistically significant in the regression, the graphs do indicate a difference in ranking patterns over the life cycle between males and females. The dotted blue and red curves in Figure 8 represent fitted curves for all rankings that respondents rated at least *somewhat sure*, in order to exclude uncertain responses. Doing this appears to suggest that the priority given to worthwhileness increases over the life cycle. It also shifts the priority for anxiety upwards. For females, we see that happiness ranking decreases over the life cycle. This suggests that a more naive or uncertain individual might undervalue anxiety and worthwhileness, in favour of happiness.[9]

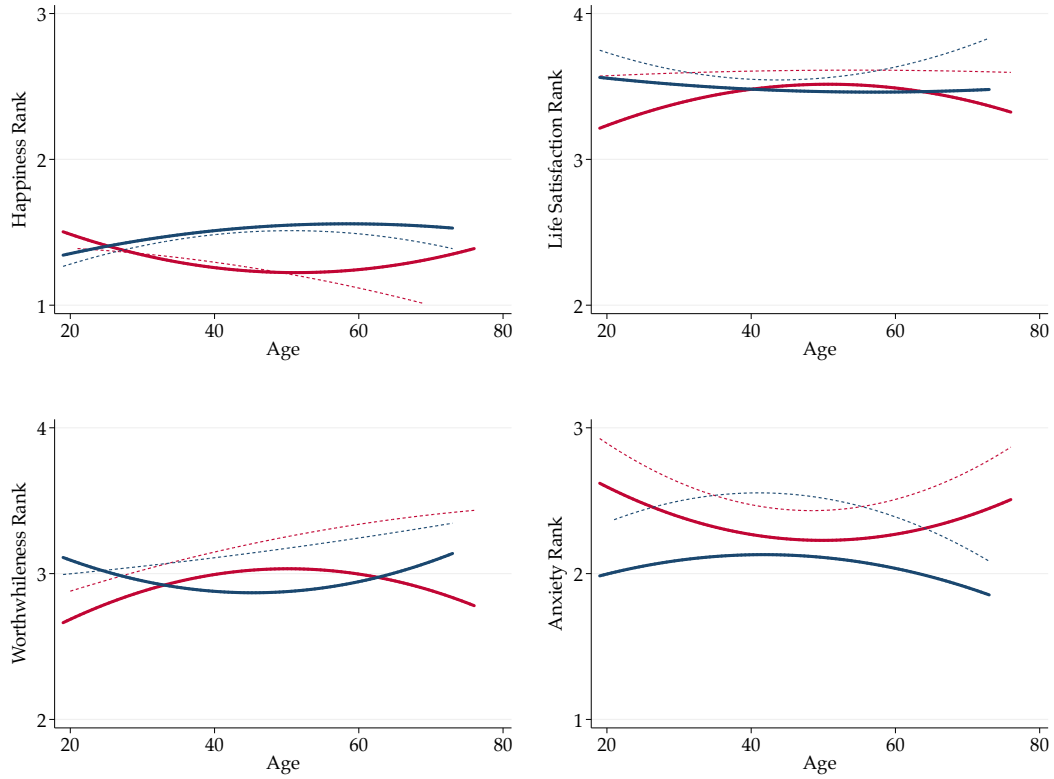


Figure 8: Quadratic age curves to show gender differences in well-being rank (survey 2). Solid blue and red curves are for males and females, respectively. Dashed blue and red curves are for those males and females that were at least somewhat sure of their ranking.

[9] It also suggests that beliefs of these uncertain individuals may be driving the differences between own and others' ranking in Figure 5.

4.3 Model Fitting

In order to investigate how priorities are formed, I estimate a version of equation (3), as discussed in Section 2.2. Since the dependent variables will be ordinal rankings for each of the four well-being aspects, I use an ordered logit framework for estimation. First, as we do not know the nature of the the functions $f(.)$ and $g(.)$ from equation (2), I compare a non-linear specification to a linear specification to establish which is a better fit for the data.

The non-linear specification is based on equation (3):

$$Rank_i^A = \beta_1(L_i^A)^{\beta_2} + \beta_3(E_i[L_{\neg i}^A])^{\beta_4} \tag{4}$$

The linear specification takes $\beta_2 = 1$ and $\beta_4 = 1$, i.e:

$$Rank_i^A = \beta_1(L_i^A) + \beta_3(E_i[L_{\neg i}^A]) \tag{5}$$

These specifications are used in the following ordered logistic log-likelihood function for maximum likelihood estimation (for a given aspect of well-being, A):

$$lnL^A = \sum_{i=1}^{281}\sum_{j=1}^{4} m_{ij}\, ln[F(k_j - Rank_i^A) - F(k_{j-1} - Rank_i^A)] \tag{6}$$

where $k_0 = -\infty$ and $k_4 = \infty$; $m_{ij} = 1$ if the observed value of $Rank_i^A = j$ and 0 otherwise; and $F(.)$ is the c.d.f. of the logistic function:

$$F(x) = \frac{1}{1 + e^{-x}} \tag{7}$$

Table 5 shows maximum likelihood estimates for this model, using both linear and non-linear specifications. In order to determine which model is more appropriate, I make use of the Likelihood Ratio (LR), and the Bayesian Information Criterion (BIC).[10]. The LR test is suitable for testing the validity of nested models. It can be used here, since (5) is a restricted version of (4). The BIC is more general, allowing for comparison of non-nested models. Both tests use information about the maximised likelihood function from which to draw inferences.

[10] A discussion of the BIC method can be found in Burnham and Anderson (2004)

I use both for greater clarity.

The LR test statistic is given by:

$$D = 2(ln\ L_{nonlinear} - ln\ L_{linear}) \sim \chi^2(2) \tag{8}$$

The BIC test statistic is given by:

$$BIC = k\ ln(281) - 2\ ln\ L \tag{9}$$

where k is the number of parameters estimated, and the log-likelihoods are the maximised values after estimation.

A lower BIC score indicates a better model, with any difference greater than approximately 6 indicating a strong preference for the specification with the lower score. In Table 5, we see from the BIC score differences that the non-linear specification is only close to the linear specification for anxiety ranking. Rankings for the other three aspects are better explained by the linear specification. Even for anxiety, the BIC score for the linear specification is lower, suggesting that we should prefer this specification.

The LR statistic is only sufficiently high for anxiety ranking, since

$$\chi^2_{0.05}(2) = 5.991 \tag{10}$$

This leads to the rejection of the null hypothesis that $\beta_2, \beta_4 = 1$. The null is not rejected for each of the other three aspects, suggesting the linear specification is at least as valid as the non-linear specification for these.

The estimates for β_1 are all positive when using the linear specification, which rejects the hypothesis in Section 2.2 that posits people will prioritise well-being aspects in which they are personally deficient. Instead, we see that having a higher level of well-being in a given aspect increases the priority given to that aspect. This relationship is weakest for worthwhileness, and strongest for anxiety. With the exception of the life satisfaction rank, $\hat{\beta}_3 < 0$. Therefore, for these aspects, it appears that whilst priority is increasing in own levels, it is decreasing in the beliefs about others' levels.

Table 5: Maximum likelihood estimates of linear and non-linear ordered logit specifications for well-being rank.

	Linear specification ($\beta_2, \beta_4 = 1$)				Non-linear specification			
	Happy Rank	Satis Rank	Worth Rank	Anx Rank	Happy Rank	Satis Rank	Worth Rank	Anx Rank
$\hat{\beta}_1$	0.152	0.128	0.028	0.221	-9.714	0.152	0.612	1.204
$\hat{\beta}_2$	-	-	-	-	-13.449	0.920	0.005	0.306
$\hat{\beta}_3$	-0.054	0.102	-0.080	-0.119	-10.500	0.002	-0.415	-0.049
$\hat{\beta}_4$	-	-	-	-	-6.961	2.892	0.424	1.466
Constant 1	1.627	-2.520	-3.427	-1.220	0.892	-2.715	-3.408	-0.498
Constant 2	3.391	-0.765	-1.380	1.063	2.645	-0.964	-1.358	1.871
Constant 3	4.944	0.959	0.784	2.185	4.203	0.766	0.807	2.995
Observations	281	281	281	281	281	281	281	281
BIC	459.766	557.555	679.205	702.384	471.115	567.191	690.089	703.025
BIC linear - BIC nonlinear	-11.349	-9.636	-10.884	-0.641	-	-	-	-
LR statistic	-0.0724	1.641	0.392689	10.635	-	-	-	-

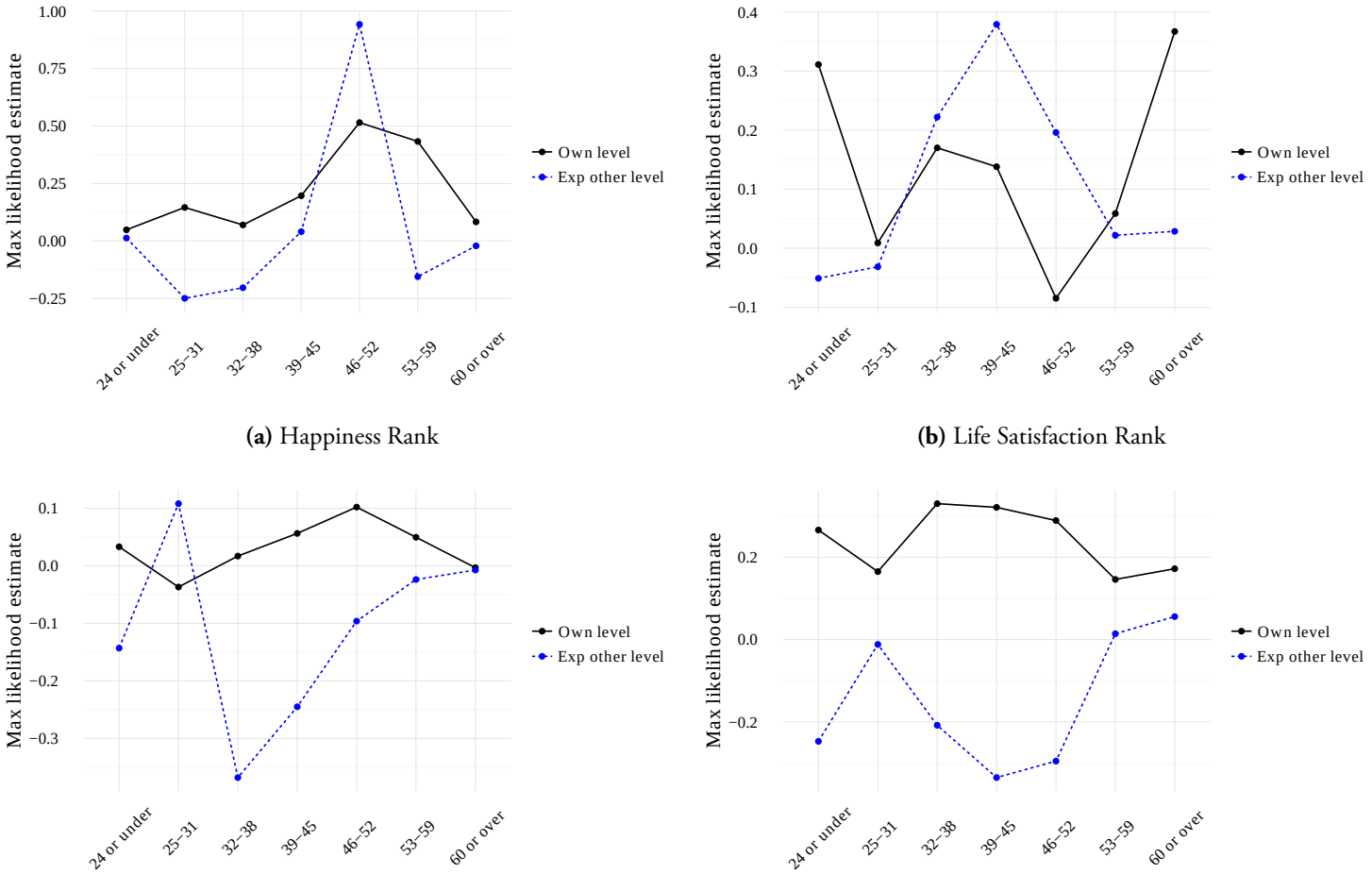
Table 6: Ordered logit models for well-being rank, with linear specification estimated for each age band.

Age Band	n		Happiness Rank	Life Sat Rank	Worthwhile Rank	Anxiety Rank
≤ 24	40	$\hat{\beta}_1$	0.0487	0.311*	0.0331	0.266**
		$\hat{\beta}_3$	0.0131	-0.0509	-0.143	-0.247
25 - 31	40	$\hat{\beta}_1$	0.146	0.00895	-0.0369	0.165
		$\hat{\beta}_3$	-0.249	-0.0314	0.108	-0.0117
32 - 38	40	$\hat{\beta}_1$	0.0699	0.170*	0.0169	0.330***
		$\hat{\beta}_3$	-0.203	0.222	-0.368**	-0.208
39 - 45	40	$\hat{\beta}_1$	0.197	0.138	0.0563	0.321**
		$\hat{\beta}_3$	0.0408	0.379	-0.245	-0.335
46 - 52	41	$\hat{\beta}_1$	0.515**	-0.0847	0.102	0.289**
		$\hat{\beta}_3$	0.942**	0.196	-0.0961	-0.295*
53 - 59	40	$\hat{\beta}_1$	0.433	0.0588	0.0496	0.146
		$\hat{\beta}_3$	-0.155	0.0219	-0.0238	0.0142
≥ 60	40	$\hat{\beta}_1$	0.0831	0.367***	-0.00327	0.172
		$\hat{\beta}_3$	-0.0210	0.0287	-0.00742	0.0558

Standard errors and constants omitted for brevity. *** p<0.01, ** p<0.05, * p<0.1

With the exception of worthwhileness rank, $|\hat{\beta}_1| > |\hat{\beta}_3|$, suggesting that an individual's priorities are more dependent on their own levels than their beliefs about others. This is consistent with the hypothesis put forward in Section 2.2. For the non-linear specifications, this also holds for three aspects, though this time the exception is happiness (for which the non-linear model is particularly weak, relative to the linear model).

As the linear specification provides a better fit, I estimate this model with separate regressions for each age band. Table 6 shows the estimates for β_1 and β_3 from these regressions. These estimates are plotted in Figure 9. When we look at the relationship between well-being levels and rankings, we see that happiness and anxiety exhibit stronger positive associations around middle age. In contrast, life satisfaction levels have the strongest influence on life satisfaction rank for the young and old. The trend for worthwhileness rank is less clear. These estimates suggest that there may be a common underlying factor that links how individuals think about happiness and anxiety. This corresponds to the same link observed from the priority weighting patterns in survey 1 (see Figure 4). I discuss this link further in Section 5.



(a) Happiness Rank

(b) Life Satisfaction Rank

(c) Worthwhileness Rank

(d) Anxiety Rank

Figure 9: Plot of ordered logit estimates for β_1 (solid black lines) and β_3 (dotted blue lines) by age band, using data from Table 6.

Finally, Table 7 shows estimates from ordered logit regressions, with the inclusion of individual characteristics. As before, we see no substantial evidence of a non-linear life cycle trend in priorities. There is relatively little difference in the estimates for the influence of own and others' levels of well-being between this regression and the estimates from Table 5. Again, own levels are positively related with priorities for all aspects, save for worthwhileness. Worthwhileness level has no significant influence on worthwhileness rank.

Individuals with higher Neuroticism, as expected, leads to a higher priority given to anxiety, at the expense of happiness in particular. The sizes of these estimates are large. For example, the reduction in odds of a high happiness ranking caused by a point increase in Neuroticism is almost three times the magnitude of the increase in odds due to a point increase in happiness level. Surprisingly, however, we do not observe the converse for Extraversion. The most noteworthy personality trait influence, aside from Neuroticism, is that of Agreeableness. More Agreeable people place a higher priority on worthwhileness. It is not immediately clear why this would be the case.

Healthier people also place a higher priority on worthwhileness, relative to the other aspects. This is somewhat intuitive. Worthwhileness of life is a long term evaluation of life quality and value. One would expect that this is only considered of primary importance for those individuals who are free of more primitive concerns like insufficient income or ill health. This is corroborated by the finding that those with a higher level of income also attach a higher priority to worthwhileness, though the magnitude of this relationship is much weaker than that of health level.

Males, those with children, and individuals with a higher level of education place higher priority on happiness and life satisfaction, and lower priority on worthwhileness and anxiety. The preference given to happiness and life satisfaction by males is consistent with evidence from survey 1 (see Table 2). Those who are married or living with a partner place a higher priority on happiness, relative to the other aspects. The unemployed place higher priority on happiness and anxiety. This may be due to the fact that these are shorter term hedonic considerations. As argued for health level and income, longer term evaluations are likely to be considered less important than an immediate improvement in situation for someone who is unemployed.

Perhaps the most surprising results are for smoking frequency. Recall that individuals who

smoke more frequently are found to be more impulsive (Reimers et al., 2009), in that they prefer smaller-sooner payoffs over larger-later ones. Those who smoke more frequently place a higher priority on happiness and worthwhileness than they do on life satisfaction and anxiety. The result for happiness is again intuitive - those who are more impatient are likely to place a higher value on hedonism. However, it is not clear why smokers give a higher priority to worthwhileness, and a significantly lower priority to anxiety.[11]

Table 7: Ordered logit regressions for the determinants of well-being rank, inclusive of full set of control variables.

	Happy Rank	Satis Rank	Worth Rank	Anx Rank
Age	-0.026	0.0219	0.00698	-0.0238
Age^2	0.000161	-0.000226	-2.62E-05	0.00035
Happiness Level	0.117	-	-	-
Happiness Other	-0.0621	-	-	-
Life Satisfaction Level	-	0.182***	-	-
Life Satisfaction Other	-	0.109	-	-
Worthwhileness Level	-	-	-0.0928	-
Worthwhileness Other	-	-	-0.0951	-
Anxiety Level	-	-	-	0.181***
Anxiety Other	-	-	-	-0.101
Agreeableness	-0.207	-0.0319	0.187*	-0.0638
Conscientiousness	-0.149	-0.132	0.0105	0.133
Extraversion	-0.0301	0.052	-0.0255	0.0614
Neuroticism	-0.348**	-0.0675	-0.0764	0.199*
Openness	-0.0503	-0.135	0.0612	0.108
Married/Cohabiting?	0.126	-0.0721	-0.0473	-0.0756
Has children?	0.0917	0.225	-0.0446	-0.385
Employed?	-0.295	0.169	0.209	-0.0276
Male	0.334	0.323	-0.0517	-0.598**
Health Level	-0.11	-0.245	0.462***	-0.214
Income Band	-0.0415	-0.0461	0.0498	0.018
Freq of Smoking	0.197**	-0.0749	0.131*	-0.170**
Education Level	0.0559	0.0351	-0.122	-0.0757
Constant 1	-2.856	-4.203**	-1.217	-1.452
Constant 2	-0.995	-2.441	0.893	0.938
Constant 3	0.596	-0.674	3.173*	2.103
Observations	281	281	281	281
Standard errors omitted for brevity. *** p<0.01, ** p<0.05, * p<0.1				

[11] Whilst a direct measure of discounting was also collected, the data were noisy, with two respondents exhibiting multiple switching points in the task. Inclusion of this variable did not add any meaningful information, and so these additional regressions are omitted from the paper. They are available upon request.

5 Discussion

The non-linear life cycle pattern for well-being priorities obtained from survey 1 does not match the flat profile found in survey 2 when fitting a basic polynomial in age to the data. Yet, there is some indication from the additional results in survey 2 that there may be some general themes underlying the prioritisation process.

Survey 1 shows that middle-aged individuals give a higher weight to happiness and anxiety, and lower weights to life satisfaction and worthwhileness. Despite not finding direct confirmation for these patterns in survey 2, Figure 8 shows that a similar (though not statistically significant) grouping of aspects emerges after separating for gender. The age-band separated models in Table 6 show evidence of a greater correspondence between happiness and anxiety levels, and their respective ranking around middle age.

The reason why this grouping may be occurring was alluded to in Section 4.3. The four aspects of well-being can be grouped by those that measure affective well-being (AWB), and those that measure cognitive well-being (CWB). The former is related to shorter term mood; the latter to a more holistic evaluation of life (Luhmann et al., 2012). The distinction between these forms of well-being is important, as the determinants of each form differ. The key difference between the two is the role that hedonic adaptation (Brickman and Campbell, 1971; Diener, Lucas, and Scollon, 2006) plays in AWB. It is widely accepted in psychology that most positive or negative shocks to happiness are transitory.[12] However, when it comes to CWB measures such as life satisfaction, factors such as income and significant life events can have a permanent impact, despite having a lower short-term variance (Luhmann et al., 2012).

Anxiety and happiness can both be thought of as affective states, and hence forms of AWB. These are feelings and emotions that take place in the short-run, i.e. in response to a particular stimulus or situation. In economic parlance, one might call these 'flow' measures of well-being. In contrast, life satisfaction and worthwhileness of life are wider in their scope of consideration. They require the respondent to take into account their entire life history (or at least a significant portion of it). We may therefore consider them to be 'stock' measures of well-being. It should be noted, however, that happiness cannot be considered exactly equivalent to flow utility (Kimball

[12] Though Easterlin (2005) explains that the data rule out a 'setpoint' of happiness, in the sense that there does not appear to be complete adaptation.

and Willis, 2006). Instead, Kimball and Willis (2006) split affect into *baseline mood* (i.e. long-run happiness), and *elation* (i.e. short-run happiness).

Analysis of the APS well-being data, along with the data from survey 2, confirms this grouping. Table 8 shows the results of a factor analysis on the levels of the four well-being aspects, using the principal factors method with an oblique promax rotation of power four.[13] A rule of thumb states that loadings above 0.32 are significant at the 1% level for sample sizes above 300 (Yong and Pearce, 2013). For the very large APS sample, this threshold is likely to be lower.

The factor loadings for both sets of data support an underlying relationship between life satisfaction and worthwhileness of life, and between happiness and anxiety. Happiness has a significant loading on both factors, which suggests that the measure of happiness in generalised studies captures a more holistic assessment of well-being than short term transitory changes alone. This supports the claim of Kimball and Willis (2006).

Figure 10 plots loadings over the life cycle when we perform factor analysis separately on each age band. There are more age bands in the APS data, due to a higher upper age limit. We see that the loadings on each factor are relatively stable over the life cycle for each aspect of well-being for the APS data.

There are two notable exceptions to this. First, the loading of happiness on the factor representing CWB is increasing over the life cycle in the APS data. Whilst the loadings from survey 2 exhibit more noise, we can see some indication of the same trend. If we relate this to the framework proposed by Kimball and Willis (2006), then the baseline mood component of happiness appears to be dominating the elation component as one ages. Despite not finding evidence of prioritisation differences across the life cycle, if happiness is perceived as being closer to life satisfaction for those that are older, then there may be an implicit increasing preference for CWB over the life cycle.

According to Socioemotional Selectivity Theory (Carstensen, 2006), the young pursue goals that optimise the future. Close proximity to the end of life for older individuals leads them to pursue shorter term goals (Löckenhoff, 2011). This means that even though their discount factors may be lower (Green et al., 1996), the young appear to have longer time horizons than

[13] An oblique rotation was used as opposed to an orthogonal rotation, since we would not expect cognitive and affective forms of well-being to be completely independent from each other. Applying a varimax rotation does not yield qualitatively different results.

Table 8: Factor analysis of well-being levels from APS 2013-14 (n=165,122) and survey 2 (n=281), showing the rotated loadings on cognitive and affective well-being.

	APS 2013-14		Survey 2	
	Factor 1 "Cognitive"	Factor 2 "Affective"	Factor 1 "Cognitive"	Factor 2 "Affective"
Happiness yesterday	0.3460	0.4550	0.4181	0.4833
Life satisfaction	0.6763	0.1379	0.8048	0.1243
Worthwhileness of life	0.7236	0.0042	0.8218	0.0082
Anxiety yesterday	-0.0156	-0.5365	-0.0346	-0.5277

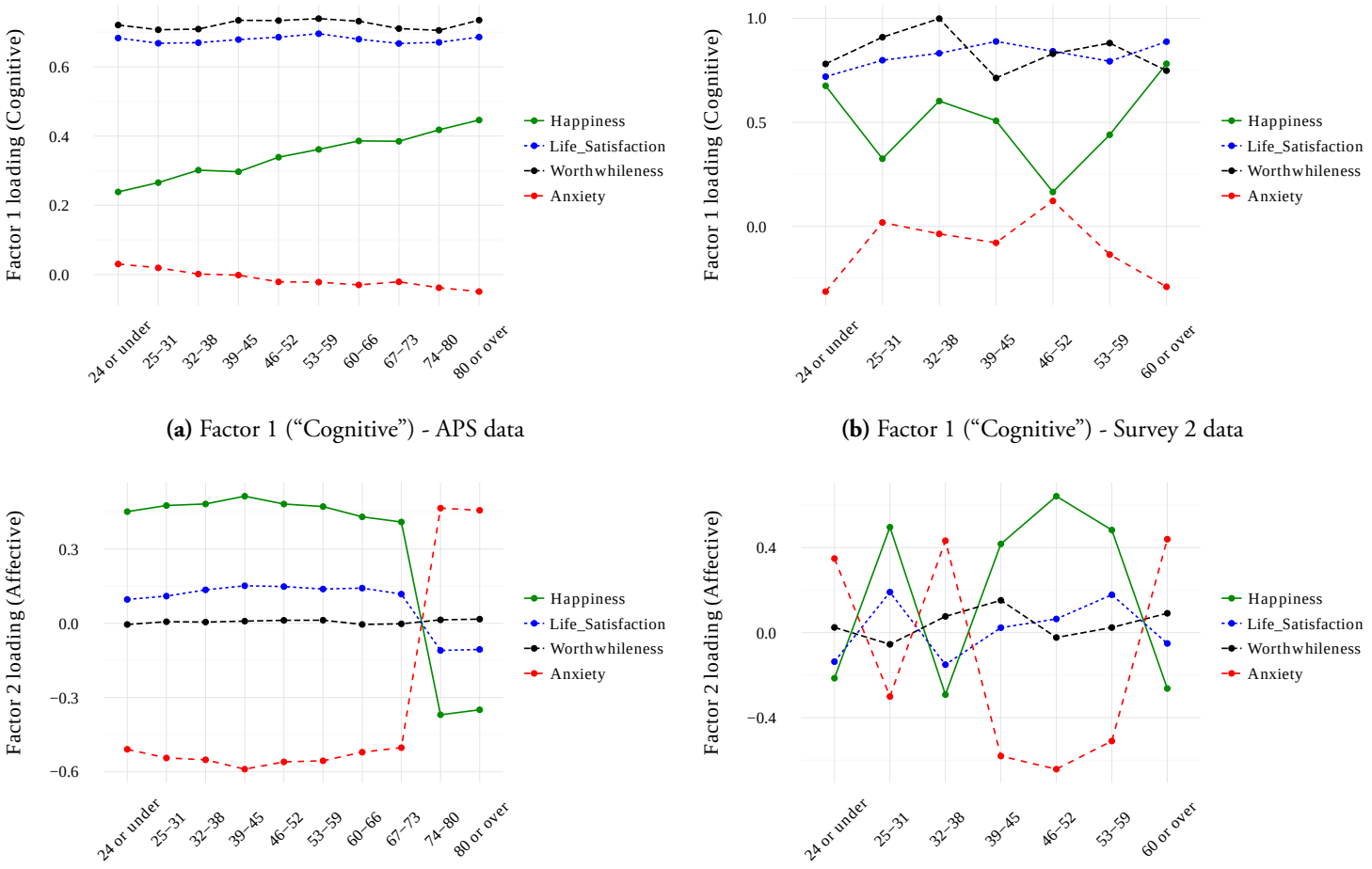
the middle-aged. In light of this, one might expect an increasing preference for AWB policies with age. However, it is also the case that older adults tend to focus further into the past and less into the future than younger adults (Löckenhoff and Rutt, 2015). It is possible that this backward looking evaluation of life may be contributing to an increasing emphasis on CWB with age.

Second, the loadings of happiness and anxiety on the factor representing AWB switch polarity for those aged 74 and above (the survey 2 loadings in Figure 10 (D) are extremely noisy, though one might argue a similar pattern may be present). In other words, happiness begins to correspond to negative affect, and anxiety begins to correspond to positive affect. This is somewhat puzzling. It is unclear whether this can be related to research on older individuals, or whether it is merely an anomaly in the data. The latter seems unlikely, given that the total number of observations from individuals 74 and above in the APS data is 19,308.

6 Summary and Conclusion

In summary, this study finds the following. First, there is no consistent evidence that supports changing well-being priorities over the life cycle. Despite this, older individuals may implicitly be exhibiting a preference for cognitive well-being over affective well-being, due to an increasing factor loading of happiness on cognitive well-being with age.

Second, when an age-stratified sample is used, the mean rank ordering of well-being aspects (from highest to lowest rank) is: life satisfaction, worthwhileness of life, anxiety, and happiness yesterday. The ranking is stable across age groups. On average, individuals overestimate the rank they believe others will give to happiness, and underestimate the rank they believe others will give to worthwhileness and anxiety.



(a) Factor 1 ("Cognitive") - APS data

(b) Factor 1 ("Cognitive") - Survey 2 data

(c) Factor 2 ("Affective") - APS data

(d) Factor 2 ("Affective") - Survey 2 data

Figure 10: Graphs showing factor loadings for each well-being aspect over the life cycle. Data for (A) and (C) is from APS 2013-14. The minimum number of observations for an age band in the APS data was 7,638 for those over 80. Data for (B) and (D) is from survey 2.

Third, an individual with a higher level of happiness, life satisfaction, or anxiety, is more likely to give a higher priority ranking to that respective aspect. This relationship is strongest during middle age for happiness and anxiety. Beliefs about others' levels of well-being generally have less of an impact on prioritisation than own levels of well-being. The fact that life cycle levels of well-being show a mid-life dip, but priorities do not, suggests that levels are being moderated by other factors that also determine prioritisation.

Fourth, individuals with the following characteristics show a clear prioritisation preference for one aspect over the other three: more Agreeable people (worthwhileness); more Neurotic people (anxiety); those married or cohabiting (happiness); healthier people (worthwhileness). Additionally, more frequent smokers (a proxy for impatience) prefer happiness and worthwhileness to life satisfaction and anxiety.

The literature on well-being prioritisation is still in its infancy, but its overall goal is of prime importance: to inform optimal resource allocation when seeking to improve society. As the focus of the developed world shifts from increasing raw incomes to improving the general well-being of its inhabitants, this line of enquiry promises to become increasingly pertinent for public policy. It is important that we understand which aspects people value, how they value them, and why they form these valuations. The findings from this study contribute to this understanding by providing a first attempt to identify determinants of prioritisation over the life cycle.

Appendix

Script for survey 1

WHERE SHOULD SOCIETY FOCUS ITS EFFORTS TO IMPROVE WELLBEING?

We are interested in people's opinions on the quality of a society.

The UK government is collecting information on the four well-being questions on the following page. These measure happiness, satisfaction with life, how worthwhile life is, and people's anxiety. We would like to know your view on the relative importance of these for assessing how well a society is doing.

We would like you to imagine that you have 100 points to allocate as an indication of the importance of measures of well-being. How would you personally allocate the 100 points across the four measures below? [for example, if you believe all four are equally important, you would allocate 25% to each of the four measures]:

- Happiness – "Overall, how happy did you feel yesterday?": Personally I would allocate ..... % of my efforts to improving this.
- Satisfaction – "Overall, how satisfied are you with your life nowadays?": Personally I would allocate ..... % of my efforts to improving this.
- Worthwhile – "Overall, to what extent do you feel that your life is worthwhile?": Personally I would allocate ..... % of my efforts to improving this.
- Anxiety – "On a scale where nought is "Not at all anxious" and ten is "Completely anxious". Personally I would allocate ..... % of my efforts to improving this.

PLEASE REMEMBER THAT YOUR FOUR CHOSEN NUMBERS SHOULD ADD UP TO 100%. THANK YOU FOR YOUR VIEWS

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