THE UNIVERSITY OF MELBOURNE

FACULTY OF BUSINESS & ECONOMICS

Melbourne Institute Working Paper Series

Working Paper No.14/10

Personality, Well-being and Heterogeneous Valuations of Income and Work

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MELBOURNE INSTITUTE®
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Melbourne Institute Working Paper No. 14/10

ISSN 1328-4991 (Print)

ISSN 1447-5863 (Online)

ISBN 978-0-7340-4225-5

July 2010

***** The authors would like to thank the Faculty of Business and Economics, The University of Melbourne, for funding of this project through a Faculty Research Grant (2009). We would also like to thank Michael A. Shields, Anthony Scott and participants of the Melbourne Institute Workshop for valuable comments. This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this paper, however, are those of the authors and should not be attributed to either FaHCSIA or the Melbourne Institute.

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Abstract

People differ in their basic levels of happiness and in the way they value income and work. Using Australian longitudinal data and a random coefficient approach, this paper investigates whether personality traits explain the heterogeneity in these valuations. We find that differences in subjective well-being are driven by Emotional Stability. Women's valuations of income depend on their score of Openness to Experience and men significantly differ in their valuations of work across the spectrum of Emotional Stability and Conscientiousness. Our study directly tests predictions of Self-Determination Theory and contributes to the debate on the assumption of homogeneous agents in economic theory.

JEL-Classification: I31, D00, C23

Keywords: random coefficient model, personality traits, heterogeneity, subjective well-being, income and work, preferences

1 Introduction

This paper investigates the role of the 'Big Five' personality traits as a major source of heterogeneity in subjective well-being (SWB) and in its relationship with income and work. Using a high quality longitudinal data set from Australia, we test two hypotheses: (1) There is a substantial degree of association between SWB and personality traits, and these traits constitute the largest part of its explained variation; (2) There is a large degree of heterogeneity in the marginal valuations of income and work, which is associated with some if not all of the 'Big Five' personality traits.

Hypothesis (1) is derived from a 40 year old and ongoing debate in psychology hypothesizing that happiness, for which SWB is one of many measures, and its correlates are strongly related to the 'Big Five' personality traits, especially to the domains of Extraversion, Neuroticism, and Conscientiousness (Steel et al., 2008; Lucas, 2007; DeNeve and Cooper, 1998; Lykken and Tellegen, 1996; Costa and McCrae, 1980). A recent paper by Boyce (2009) has shown that the major source of the commonly acknowledged time-invariant heterogeneity in SWB (e.g. Ferrer-i-Carbonell and Frijters, 2004; Clark et al., 2005; Jones and Schurer, 2009) can be explained by personality traits. Despite a respectable productivity in happiness research among economists, there is surprisingly little attempt to relate SWB with personality data. Notable exceptions are Lucas and Schimmack (2009), Verme (2009), Headey (2008); Headey and Wearing (1989), and Phelps (2001).

Hypothesis (2) borrows liberally from ideas expressed in a broader and increasingly popular literature in economics that models explicitly the role of personality, or non-

cognitive skills, in determining labour market behaviors (Heckman et al., 2006; Krueger and Schkade, 2008a; Borghans et al., 2008a,b). Krueger and Schkade (2008a) find that extroverted workers sort into jobs that require social interaction and experience a higher job satisfaction if their personality traits match the job characteristics. Borghans et al. (2008b) formulate a job assignment model in which people differ by their personality in performing certain tasks, while different jobs require different personality skills. Their study finds that youth sociability affects job assignment in adulthood. Sorting by taste into jobs has a crucial implication for the theory of compensating wage differentials—wage differentials may not exist if individuals sort into jobs that match their preferences rather than into jobs with the highest financial reward.

We suggest that sorting by taste also takes place in choosing life trajectories that entail high incomes (a proxy for consumption) or low working hours (a proxy for leisure). Psychologists suggest that this form of self selection depends on individual motivations. According to Self-Determination Theory (e.g. Ryan and Deci, 2000), behavior can be intrinsically or extrinsically motivated. An internally motivated individual would derive utility from social interaction and community involvement and little utility from accumulating wealth. Externally motivated individuals derive utility from financial success and high incomes. These so-called *negative* money motives have been associated in the literature with people who want money to overcome self-doubt or to feel superior to others. People may pursue money however for positive goals. *Positive* money motives are associated with a quest for autonomy, security, and pride of oneself by getting just compensation for effort (E.g. Srivastava et al., 2001; Carver and Baird, 1998).

These motivational differences can broadly be captured by the 'Big-Five' personality traits. Gordon (2006) found that individuals who received little emotional support in childhood, and thus are more likely to develop neurotic traits in later life, tend to value income more in adulthood than individuals who experienced intimate relationships with their parents. Indeed, individuals who excessively value money have been linked with emotional instability (See Gardarsdottir et al., 2008, for an overview). Similar arguments can be made about heterogeneity in the valuations of work (see Section 2).

We are not the first to propose that there should be systematic differences in preferences over consumption (e.g., Barsky et al., 1997) or leisure (e.g., Boadway et al., 2002), but to the best of our knowledge this study is the first to explicitly test whether preference heterogeneity depends on the 'Big Five' personality traits.

The consequence of our hypothesis is that predictions from standard microeconomic models, which often assume an identical utility function for all consumers, may not be the most suitable framework to predict individual's reaction to prices and wages. We do not question that individual utility is increasing in consumption or leisure. We rather suggest that for some individuals, once they achieved a minimum level of standard of living, the utility function flattens out almost immediately, while for others, it steadily increases thereafter.

The Australian Household, Income and Labour Dynamics Survey (HILDA) allows us to test both hypotheses, since data on the 'Big Five' are available in addition to a SWB indicator and a large set of control variables. The two assumptions we have to make is that SWB contains genuine information about the quality of human lives (Oswald and

Wu, 2010; Krueger and Schkade, 2008b) and that it is a good proxy for experienced, i.e. ex-post, utility. To be able to do so, we follow Layard et al. (2008) who assumes that objective, unobserved utility, is linearly transformed into reported utility, so that concavities of the effect of income or leisure on experienced utility are not picking up concave transformations from unobserved to experienced utility. Oswald (2008)'s results on the linear transformation of objectively measured height on self-reported height data provides some confidence in making the linearity assumption.

Our empirical approach refrains from estimating SWB with (conditional) fixed effects models, since we believe that in short panels there is too little variation in both SWB and socioeconomic status data to identify parameters of interest. More importantly, we explicitly model the influence of time-invariant factors (personality) on SWB and thus we cannot rely on fixed effects models. Instead, we model life satisfaction using a random coefficient framework (Hsiao and Pesaran, 2008), which does not solve the problem of endogeneity in income or work-hours, but which enables us to model unobserved heterogeneity by estimating a distribution for parameters of interest. This empirical strategy does not warrant a causal interpretation of income or work-hours. Readers interested in causal effects of income on happiness are referred to Powdthavee (2010), Headey et al. (2004), or Frijters et al. (2004a).

The main findings from our study are: (1) The most influential 'Big Five' personality trait in determining SWB is Emotional Stability; (2) Men and women differ significantly in their assessments of and weighting of personality traits in determining SWB; and (3) the marginal utility of income is significantly higher for women who score very high on

Openness to Experience, relative to women who score very low on this trait. The marginal disutility of work is significantly larger for men who score low on Conscientiousness or at the top end of Emotional Stability, ceteris paribus.[1]

Our results will prove useful to the economic literature as we demonstrate the use of the 'Big Five' personality traits and show in the context of SWB the predictive power of these traits (see for instance Borghans et al., 2008a, for a similar goal). One result that stands out is the role of Emotional Stability, which is closely linked to mental health, in overall SWB. This finding highlights the importance of public provision of mental health care services to the community, a subject of intense debate in the current Australian health care reform.[2]

The evidence of systematic differences in marginal utilities of income is at odds with Layard et al. (2008), who found no systematic differences in marginal utilities of income across several countries. Our results, however, are in line with a broader literature that suggests systematic differences in choice behavior due to heterogeneous preferences over risk (e.g. Dohmen et al., 2010; Caliendo et al., 2007) and inter-temporal consumption (Blundell et al., 1994).

Heterogeneous valuations of income and work imply that individuals react differently to wages and prices. Some individuals' labor supply decisions may respond less to financial incentives given their personality. If a significant fraction of workers sort into jobs that fit their personal preferences for sociability, degree of responsibility or location, then

[1]Throughout this paper, the terms marginal utility of income and marginal disutility of work refer to ex post or experienced utility rather than utility evaluated ex ante; see Section 2 below.

[2]See for instance several recent interviews with Patrick McGorry, Australian of the Year 2010 and Professor in Psychiatry, www.abc.net.au/sundayprofile/stories/2800855.htm (accessed 23 July 2010).

extraordinarily large financial rewards would be needed to induce them to take a job that implies a mismatch between their own and the job's characteristics. In Australia, financial incentives are used to attract teachers, doctors and nurses to hard-to-staff areas or institutions. For example, under the current Rural Health Workforce Strategy, a doctor who relocates from a major city to a very remote area is eligible for a relocation grant of $120,000 and an annual incentive payment of up to $47,000. However, despite these substantial incentive payments, shortage of rural doctors remain.[3] Similar observations can be made about the role of salary incentives to the retention of qualified teachers (Hanushek et al., 2004; Frijters et al., 2004b) or nurses (Frijters et al., 2007; Shields, 2004).

The plan of this paper is as follows. We start in Section 2 by structuring our ideas on the heterogeneity in preferences over income and work. Section 3 outlines the random coefficient model. Section 4 introduces the data and gives insight into the psychometric properties of the personality data. Section 5 provides descriptives statistics of the sample data while Section 6 discusses the estimation results. Section 7 concludes.

2 Preferences, 'Big Five' Personality, and Subjective Well-being

Psychology research has shown that measures of SWB contain genuine information about the quality of human lives (Oswald and Wu, 2010; Krueger and Schkade, 2008b; Csikszentmihalyi and Csikszentmihalyi, 2006). A person's own evaluation of his or her life is

[3]It has been reported that Australian rural hospitals are forced to employ locum doctors to fill the gap of doctor shortage, paying them up to three times the salary of a regular doctor. In some instances locum doctors from New Zealand are being flown in for short-term assignments. See `www.abc.net.au/news/stories/2010/07/07/2947458.htm` (accessed 20 July 2010).

strongly correlated with both mental and physical health (Diener et al., 1999). Therefore, it is relatively safe to consider SWB as a reliable instrument to assess individual well-being. The 'Big Five' personality traits, especially the domains of Extraversion, Neuroticism, and Conscientiousness (Steel et al., 2008; Lucas, 2007; DeNeve and Cooper, 1998; Lykken and Tellegen, 1996; Costa and McCrae, 1980), are known to exert a strong influence on human well-being. A recent study by Lodi-Smith et al. (2010) found that Conscientiousness is an important predictor of health and longevity. Individuals who are high on Conscientiousness (or high in Emotional Stability) are more likely to attend check-up visits at GPs and to follow medical regimes in case of illness. Accumulatively over the life cycle, highly conscientious individuals would be in better health, thus have a higher SWB, and may even live longer than others. This idea is illustrated in Figure 1.

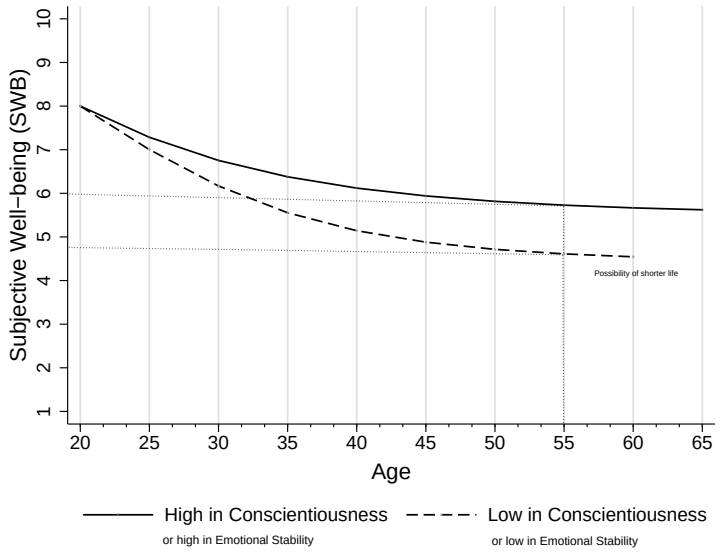


Figure 1: Differences in SWB over life cycle by personality

Measures of SWB have also been used in the literature to proxy experienced utility and therefore to assess marginal utilities of income (Layard et al., 2008) and leisure. Two assumptions are crucial for self-reported happiness to serve as a proxy for utility. First,

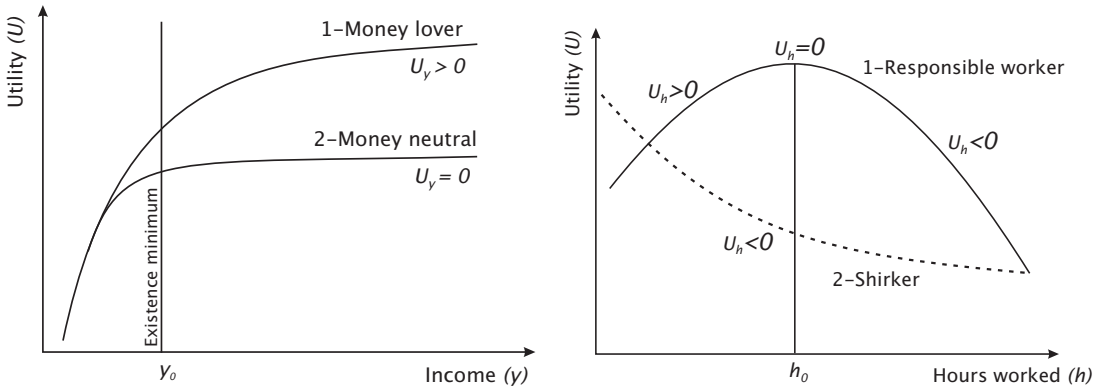
one needs to assumes that experienced, or ex post, utility is more accurate in predicting behavior than utility evaluated ex ante (Kahneman, 1999). Second, one must assume that people transform their objective utility linearly into reported utility, so that concavity in the utility of income or leisure is not the result of concavity of reported utility in objective utility.[4]

In this paper, 'utility' in the expressions 'marginal utility of income' and 'marginal disutility of work' should be understood to mean experienced or self-reported utilities. We use the concept marginal utility to empirically test whether individuals significantly differ in their marginal valuation of money (a proxy for consumption) (e.g., Barsky et al., 1997) and work (e.g., Boadway et al., 2002). To a large degree, these differences depend on personality characteristics (Borghans et al., 2008a). Self-Determination Theory (Ryan and Deci, 2000) states that individuals are either intrinsically or extrinsically motivated. Some personalities derive great pleasure from money because they associate external reward and recognition from it (extrinsic motivation), whereas others are indifferent to further gains once a level of minimum existence is achieved. For the latter group non-monetary motivations, such as communal involvement or intimate social relationships matter more than money for their wellbeing.

Figure 2 illustrates our idea of personality-related differences in experienced utilities in income (y) and work (h). Figure 2a shows two individuals, a *money lover* (person 1) and

[4]Oswald (2008) makes this point clear: the empirical literature claims to have found concavity of utility in income, but theoretically this concavity of reported utility in income (R(y)) could be the result of translating objective utility (H) into reported utility (R). One needs to show that the transformation function R(y) = R(H(y)) is linear, to be able to interpret concavity in reported utility as a decreasing marginal utility in income. Oswald (2008) shows evidence from an experiment linking self-reports of height with objective measures of height that a linear transformation could be reasonable. We follow Layard et al. (2008) by assuming linearity of this transformation.

someone who is *money neutral* (person 2). Person 1, like Scrooge McDuck[5], derives at any level of income a strictly positive marginal utility. Satiation does not occur for the Scrooge—the more money he has the happier he feels. Thus, $U_y > 0$ for all y. What type of personality can best describe Scrooge McDuck? He focusses his life on making money and does not attempt to make friends or to maintain any relationship. He may even be emotionally unstable, as he tends to fall into a depression during periods of inactivity or when lacking challenges in terms of treasure hunting (see Rosa, 2005). We thus expect an individual who is low on Emotional Stability or low on Conscientiousness to exhibit these *negative* money motives.



(a) Preferences over income (b) Preferences over work

Figure 2: Differences in preferences over income and work

However, a money lover can also be someone who has positive money motives. Money is associated with independence, security and pride in oneself and with just compensation for effort (see Srivastava et al., 2001; Carver and Baird, 1998, for an overview). One could argue that this relates to the modern woman, who seeks a break from traditional roles, who pursues her own career and pays herself for a high standard of living. The character 'Carrie Bradshaw' in Sex and the City typifies such a person. The personality trait that

[5]Rosa (2005) provides an overview of the development of Scrooge McDuck's personality.

best characterizes Carrie Bradshaw is Openness to Experience, that involves creativity, depth, and departure from traditional views of life.[6] However, she is also notorious for her excessive consumerism. Hence, we would expect women who are high on Openness to Experience to have a higher marginal utility of income than women low on this trait, ceteris paribus.

In contrast, person 2, who is money neutral, experiences no further increase in utility beyond an income level that ensures some socially defined level of minimum existence (set at y_0 in Figure 2a). The utility function of person 2 flattens out quickly such that the marginal utility of income is equal to zero beyond the minimum existence level ($U_y = 0$ for $y > y_0$). Person 2 possibly derives utility from intimate social relationships or involvement in community life. Individuals who make extensive social investments in family, religion, and volunteer work are more likely to be agreeable, conscientious and emotionally stable (Lodi-Smith and Roberts, 2007). In practice, we expect to see a distribution of the marginal utilities of income that range between the two extremes represented by persons 1 and 2.

Similar arguments can be made for the heterogeneous marginal disutility of work and the idea is illustrated in Figure 2b, which depicts two individuals, persons 1 and 2. Person 2 dislikes any amount of work independent of the duration or content of the job, i.e., $U_h < 0$ at all h. This so-called 'shirker' (Shapiro and Stiglitz, 1984) in conventional labor economics is epitomized by Donald Duck, an individual who is low on Conscientiousness; he dislikes responsibility, is low on dependability and organization. In contrast, someone

[6]The internet is replete with personality tests that identify whether one's personality is close to Carrie's. For an overview of the character, see `www.xroads.virginia.edu/~UG03/johnson/public_html/Satc/carrie.html`.

high on Conscientiousness would experience smaller levels of the pains of work due to the greater degree of efficiency at work (Spencer, 2003). Such an individual, illustrated as person 1 in Figure 2b, would experience low levels of utility for being out of work, and would experience an increase in utility for increasing hours of work as long as the amount of work is below a threshold (h_0); beyond the threshold he would start disliking further increases in work, i.e., $U_h > 0$ for $h < h_0$, $U_h = 0$ for $h = h_0$, and $U_h < 0$ for $h > h_0$. We call such an individual the 'responsible worker.'

3 Econometric Model

Our econometric model accommodates a test of the two hypotheses illustrated in Figures 1 and 2: (1) individuals differ in their baseline happiness by observable as well as unobservable characteristics; (2a) the marginal utility of income differs across individuals and may not be strictly positive as assumed by standard economic theory; and (2b) the marginal utility (disutility) of leisure (work) hours differs across individuals and may not be strictly positive (negative) as assumed by standard economic theory.

Although we expect that differences are partially explained by personality differences, some proportion of the heterogeneity will remain unexplained. Thus, an estimation method needs to account for the unobserved variation in the estimated marginal utilities. Random coefficient models are a convenient tool to allow for heterogeneous intercept and slope coefficients under the assumption that this heterogeneity is due to stochastic variation (Hsiao and Pesaran, 2008).

Let there be N individuals and an individual i is observed T_i times in the data. We begin

with a utility function of the form:

$$U_{it} = U_i(y_{it}, l_{it}, X_{it}), \tag{1}$$

which states that the utility of individual i at time t depends on income, y_{it}, and leisure, l_{it}, and the individual's socio-economic and demographic characteristics, X_{it}.

Note that we have allowed the utility function to be individual-specific by attaching a subscript to the function $U_i(\cdot)$. In particular, we wish to allow for the possibility that individuals of different personality traits respond differently to changes in income and leisure. To implement the model, we specify a linear utility function of the form:

$$U_{it} = \mu_{1i} + \mu_{2i} y_{it} + \mu_{3i} l_{it} + X_{it}\beta + \varepsilon_{it}, \tag{2}$$

where μ_{1i}, μ_{2i} and μ_{3i} are random variables that vary between individuals and ε_{it} is an i.i.d. error term. We refer to μ_{1i} as the baseline happiness[7], and μ_{2i} and μ_{3i} the marginal utility of income and leisure, respectively.[8]

We postulate that these random coefficients depend on observed as well as unobserved characteristics of individual i.

$$\mu_{1i} = \alpha_1 + Z_{1i}\gamma_1 + v_{1i}, \tag{3}$$

$$\mu_{2i} = \alpha_2 + Z_{2i}\gamma_2 + v_{2i}, \tag{4}$$

$$\mu_{3i} = \alpha_3 + Z_{3i}\gamma_3 + v_{3i}, \tag{5}$$

where Z_{1i}, Z_{2i} and Z_{3i} are vectors of time-invariant variables that explain individual

[7]From here onwards happiness, life satisfaction and subjective wellbeing (SWB) are used interchangeably.

[8]The inclusion of hours worked in (2) implies that individuals do not have complete flexibility in choosing their work hours, a phenomenon that is common among salaried workers; see Wooden et al. (2009).

differences and includes person i's personality traits.[9] The disturbances v_{1i}, v_{2i} and v_{3i} are assumed to follow a trivariate normal distribution with zero mean and covariance matrix Ψ, where

$$\Psi = \begin{bmatrix} \psi_{11} & \psi_{12} & \psi_{13} \\ & \psi_{22} & \psi_{23} \\ & & \psi_{33} \end{bmatrix}.$$

Substituting (3)–(5) into (2), we obtain our main estimating equation:

$$U_{it} = \alpha_1 + Z_{1i}\gamma_1 + \alpha_2 y_{it} + \alpha_3 l_{it} + X_{it}\beta + (Z_{2i}y_{it})\gamma_2 + (Z_{3i}l_{it})\gamma_3 + \lambda_{it}, \tag{6}$$

where the composite error, λ_{it}, is given by

$$\lambda_{it} = v_{1i} + v_{2i}y_{it} + v_{3i}l_{it} + \varepsilon_{it},$$

where ε_{it} is i.i.d. $N(0, \sigma^2)$.

Of particular interest to this study is the marginal utilities of income and work. To demonstrate the effect of personality traits on marginal utilities, we predict the marginal utilities of individuals who differ markedly on a particular personality trait using (4) and (5). The calculation is not straightforward since the expressions in (4) and (5) include the random terms, v_{2i} and v_{3i} which have means zero but are unlikely to take the value of zero for individuals who score high (or low) on a particular personality trait.

Let $\upsilon = [v_{1i}, v_{2i}, v_{3i}]'$. By assumption, υ is jointly normal with mean zero and variance covariance matrix Ψ. We predict v_{1i}, v_{2i} and v_{3i} using empirical Bayes prediction (Rabe-Hesketh and Skrondal, 2008, Chapter 4.8), which uses the observed values of U_{it} (i.e., the likelihood) as well as the prior distribution of υ. Combining the prior distribution with

[9] As an extension of this benchmark model, we also estimate a model that includes in addition to person i's personality traits also his or her partner's personality traits. This sub-sample is restricted to all married (or de facto) individuals for whom data on their partners is available (n=19,753 for men and n=19,463 for women). The main conclusions do not change. Results are available upon request.

the likelihood yields the posterior distribution:

$$\text{Posterior}(\upsilon \mid (U_{i1}, \ldots, U_{it})) \propto \text{Prior}(\upsilon) \times \text{Likelihood}(U_{i1}, \ldots, U_{it} \mid \upsilon). \tag{7}$$

The empirical Bayes prediction $\hat{v}_{1i}$, $\hat{v}_{2i}$ and $\hat{v}_{3i}$ are obtained by taking the mean of (7) after substituting maximum likelihood estimates of the model parameters, β, α, γ and Ψ. Having obtained $\hat{v}_{2i}$ and $\hat{v}_{3i}$. we can find out whether the marginal utilities of income and leisure differ across the distribution of personality traits by calculating the marginal utilities of income (and separately of leisure) for each possible value that each personality trait can take. That is, let the personality trait of interest be Tr, then the predicted marginal utilities of income and work for each value $j \in 1, \ldots, 7$ of trait Tr are given as:

$$\hat{\mu}_{2i} \mid_{Tr=j} \times \Delta y = (\hat{\alpha}_2 + Z_{2i} \mid_{Tr=j} \hat{\gamma}_2 + \hat{v}_{2i} \mid_{Tr=j}) \times \Delta y, \tag{8}$$

$$\hat{\mu}_{3i} \mid_{Tr=j} \times \Delta l = (\hat{\alpha}_3 + Z_{3i} \mid_{Tr=j} \hat{\gamma}_3 + \hat{v}_{3i} \mid_{Tr=j}) \times \Delta l. \tag{9}$$

We set $\Delta y = 50,000$ and $\Delta l = 20$, which equal roughly one standard deviation in respectively annual household income and weekly hours worked in our main estimation sample. In computing (8) and (9), we have set all variables in the vectors Z_{2i} and Z_{3i} other than the personality trait of interest to be at their respective sample means.

Similar calculations are also made for predicting baseline SWB:

$$\hat{\mu}_{1i} \mid_{Tr=j} = \hat{\alpha}_1 + Z_{1i} \mid_{Tr=j} \hat{\gamma}_1 + \hat{v}_{1i} \mid_{Tr=j} . \tag{10}$$

Standard errors for $\hat{\mu}_{1i} \mid_{Tr=j}, \hat{\mu}_{2i} \mid_{Tr=j}$, and $\hat{\mu}_{3i} \mid_{Tr=j}$ are bootstrapped using Stata 11.0 and bias corrected confidence intervals are reported.

4 Data

To implement (6), we make use of seven waves of HILDA data (2002 to 2008). HILDA is a broad, general purpose longitudinal survey designed to obtain detailed information about household structure and formation, income and economic well-being, and employment and labour force participation. The data consist of a large nationally representative sample of Australian households, and are collected both in face-to-face interviews and self-completion questionnaires covering all household members aged 15 years and older. In Wave 1 of the HILDA survey, 7,682 households were interviewed and a sample of 13,969 successful interviews were obtained. These individuals were followed in subsequent waves.[10]

A proxy for experienced utility

In this study, we follow the majority of happiness studies (e.g., Clark et al., 2008a; Layard et al., 2008) by approximating the happiness or utility of individuals with subjective well-being (SWB) data.[11] The dependent variable of our happiness regression equation is taken from the single-item measure of "overall life satisfaction." The exact wording of the question, asked in every wave of HILDA, is as follows:

> "All things considered, how satisfied are you with your life? Again, pick a number between 0 and 10 to indicate how satisfied you are."

For ease of interpretation, we follow Headey and Wooden (2004) by re-scaling the scores to

[10] A more detailed description of HILDA can be found in Wooden and Watson (2002) and various issues of HILDA Annual Reports, which are available on line from `www.melbourneinstitute.com/hilda/areport.html`.

[11] See Section 2 for a discussion of the validity of this approach.

run from 0 to 100. This re-scaling enables us to discuss the results in terms of percentage points of SWB.

Personality traits

In the self-completion questionnaire of wave 5 of HILDA, respondents were asked about their personality traits based on the Big-Five Personality Inventory (Goldberg, 1981). The version used in the HILDA survey is derived from Saucier (1994), as it consists of 30 of Saucier's original 40 items plus an additional six items identified by the HILDA team. Ultimately, 28 of these 36 items are used to construct five aggregate scores of personality; 8 items were discarded due to their ambiguity by loading onto several dimensions (Losoncz, 2009). The five dimensions—Extraversion, Agreeableness, Conscientiousness, Emotional Stability (Reverse of Neuroticism), and Openness to Experience (Intellect or Culture)—represent personality at the broadest level of abstraction, from which more specific personality characteristics can be distinguished (see, e.g., John and Srivastava, 2001). Each trait is scored from 1 to 7, with a high score indicating that the personality trait describes the individual very well. The five scales are composed by taking the average of the following items listed in Table 1, where (R) indicates the reverse score[12]:

Table 1: 'Big Five' personality traits and their items

Extroversion	**Emotional stability**	**Conscientiousness**	**Openness**	**Agreeableness**
Talkative	Envious (R)	Orderly	Deep	Sympathetic
Quiet (R)	Moody (R)	Systematic	Philosophical	Kind
Extroversion	Jealous (R)	Inefficient (R)	Creative	Cooperative
Shy (R)	Temperamental (R)	Sloppy (R)	Imaginative	Warm
Bashful (R)	Fretful (R)	Disorganised (R)	Complex	
Lively	Touchy (R)	Efficient	Intellectual	

For instance, an extrovert is characterized by a mixture of being talkative, lively and

[12]The survey instrument as shown to the interviewee in the self-completion questionnaire is presented in the Supporting Material Appendix.

bashful (among others), while an emotionally stable individual tends to be the opposite of being envious, moody, and fretful. Conscientious individuals are characterized as being efficient, organized, and systematic; an open person as being deep, creative, and complex; and an agreeable person as being sympathetic, kind, and cooperative.

The five identified dimensions have reasonably good psychometric properties. A detailed analysis of these properties by Losoncz (2009) has shown that the five dimensions have adequate internal consistency with α-scores ranging between 0.74 for Extraversion and 0.81 for Emotional Stability, while all other dimensions lie in between these scores.[13]

We note that these personality-related questions were only asked in wave 5 (2005) of HILDA. For our purpose, we assume that these personality traits remained relatively stable between the years 2002 and 2005.[14] We justify this assumption on the basis of viewing traits as enduring behavioral dispositions. This is not an uncontested assumption, however. Research has shown that Neuroticism, Openness, and Extraversion decline from the late teens to the early thirties, whereas Agreeableness and Conscientiousness appear to increase (see e.g., Costa and McCrae, 1997; Helson et al., 2002). Nevertheless, dramatic rank-order or mean-level changes in personality are highly unlikely after early adulthood and changes usually occur over a long period of time that may span decades (Roberts and DelVecchio, 2000). The data do not allow us to directly test the stability assumption. However, we are able to perform a sensitivity check by restricting our sample to three waves from 2006 to 2008. This restriction means that personality is measured

[13]We performed a principal component analysis regarding the identification of factors within each dimension and the factor loadings of each variable used to construct the dimension. The results are presented in Table A4 in the Appendix. Although there are minor glitches, overall the internal reliability of these scores are highly satisfactory, see also Losoncz (2009).

[14]It is not necessary to assume that these traits were unchanged throughout the sample period (2002–08), since events after 2005 could not affect the observed measures of personality traits in 2005.

before changes in income, work-hours and happiness scores are observed, thus personality cannot be the result of prior changes in life satisfaction or earnings.

Income

The income measure we use is disposable income (in A$1,000) that we construct from household disposable income.[15] Household disposable income in HILDA is the difference between two aggregate components: gross income (i.e., income from market and non-market, e.g., welfare payments, sources) and estimated taxes, the latter were computed based on the particular circumstances of each household (see Headey, 2003). In some instances this difference results in non-positive values. In our estimation we deleted 418 observations that had negative or zero disposable income.

Hours worked

In economics, utility is assumed to depend on income and leisure. Hours worked have generally been ignored in the income-happiness debate.[16] Pouwels et al. (2008) hypothesized that the effect of income on happiness is underestimated if working hours are omitted in the empirical specification. Greater income is typically associated with longer hours of work, however the latter is usually associated with disutility (Layard, 2005). Therefore we include hours worked explicitly in the model.[17]

[15] In a sensitivity analysis we replace disposable income with equivalised household income by using the modified OECD scale: weights of 1 for the first adult, 0.5 for subsequent adults (aged over 14) and 0.3 for each child (see e.g., Clark et al. (2005)); the results remain unchanged.

[16] A notable exception is a recent study by Booth and Van Ours (2009), which examine the role of part-time work on happiness.

[17] Given the data on hours worked in HILDA, we could deduce leisure hours using the relationship $T - h_i$, where T is the total amount of time available (e.g., 168 hours a week) and h_i is the number of hours worked. However, instead of deducing leisure hours this way, we directly use the HILDA variable "hours per week usually worked in all jobs" in the estimation. Since T is a constant for all individuals, the inclusion of leisure hours or hours worked in the estimation changes the sign of the coefficient but otherwise makes no difference.

Stressful life events

A number of major life events is included in the list of explanatory variables for SWB, as these have been considered highly influential in determining baseline happiness (Clark et al., 2008b). Binary variables were constructed for the following events that happened in the past year: (i) Death of a spouse/friend/family member; (ii) Victim of violence/property crime; (iii) Serious illness to oneself/family member; (iv) Retired or out of labour force; (v) Change job; (vi) Major worsening of financial situation.

In addition, a number of other variables, including demographic, employment, health, industry and education variables, are used in the estimation. These variables are a relatively straightforward application of the relevant variables in the HILDA data set.

5 Descriptive Statistics

Table 2 presents information about our estimation sample. After removing observations with missing values, we end up with an unbalanced panel of 5,269 men and 6,018 women generating respectively 30,132 and 34,794 observations over the seven-year period. We note that observations were distributed rather evenly over the seven waves. Almost half of all individuals (44.8% of men, 46.4% of women) were observed in all seven waves of the panel, while another 34% of both men and women were observed for at least five waves.

Table 3 presents two distributions of the re-scaled indicator of SWB. The first is a distribution across all observations (columns 2 and 3), while the second distribution (columns 4 and 5) reports the within-individual average of SWB across the time-periods for which the individual is observed. In a nutshell, one can state that Australians are generally a

Table 2: Descriptive statistics: Sample

		Men		Women	
		Freq.	Per cent	Freq.	Per cent
Individuals observed	once	113	2.14	132	2.19
	twice	183	3.47	163	2.71
	three times	267	5.07	291	4.84
	four times	538	10.21	578	9.6
	five times	670	12.72	766	12.73
	six times	1,136	21.56	1,295	21.52
	seven times	2,362	44.83	2,793	46.41
Individuals observed	in 2002	4,038	13.4	4,670	13.4
	2003	4,195	13.9	4,855	14.0
	2004	4,427	14.7	5,093	14.6
	2005	5,071	14.7	5,773	16.6
	2006	4,427	14.7	5,084	14.6
	2007	4,064	13.5	4,702	13.5
	2008	3,910	13.0	4,617	13.3
Total number observations		30,132		34,794	
Total number individuals		5,269		6,018	

happy lot. Almost 70% of both men (68%) and women (69%) reported life satisfaction scores of 70 and above, while very few (2% of men, 3% of women) reported a score of 40 or less. Looking at the individual averages of life satisfaction across time, one can see a greater proportion of individuals reporting high levels of life satisfaction, i.e. 70 and above (79% of men, 81% of women), than when averaging over all observations. One interpretation is that most people who reported low scores did so because of an 'off' year and were reporting higher scores in other years.[18] Summary statistics of all variables used in the estimation are presented in Tables A1 in the Appendix. We note that the sample statistics appear reasonable and are within expectations.

Figures 3 and 4 present scatter plots of average SWB scores and respectively average

[18]Descriptive statistics reported in Table A1 in the Appendix provide evidence for this interpretation. The average life satisfaction score for men in the sample is around 79 with a standard deviation across individuals of 14 points, while the average of the individual-specific variation in life satisfaction across the waves is 8 points, or 10% of the average life satisfaction scores. Similar patterns hold for women in the sample.

Table 3: Distribution of subjective well-being scores

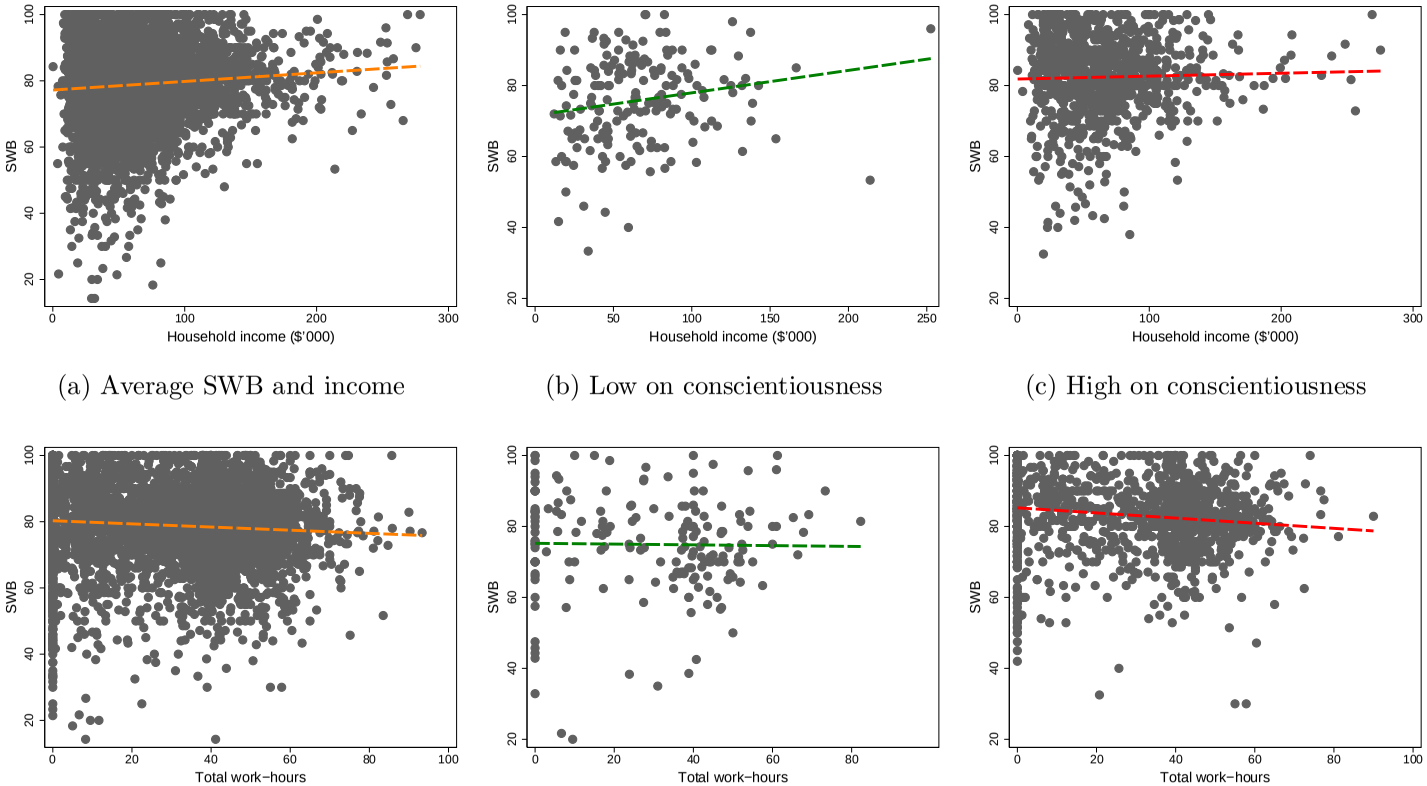
	Men				Women			
SWB	All sample		Individual avg.		All sample		Individual avg.	
score range	Freq.	Per cent	Freq.	Per cent	Freq.	Per cent	Freq.	Per cent
0–10	6	0.1	0	0.0	6	0.1	2	0.0
11–20	11	0.2	5	0.1	26	0.4	3	0.1
21–30	30	0.6	10	0.2	44	0.7	9	0.2
31–40	64	1.2	21	0.4	94	1.6	33	0.6
41–50	242	4.6	90	1.7	272	4.5	96	1.6
51–60	315	6.0	241	4.6	323	5.4	239	4.0
61–70	1,034	19.6	721	13.7	1,071	17.8	748	12.4
71–80	1,716	32.6	1,792	34.0	1,820	30.2	1,891	31.4
81–90	1,104	21.0	1,709	32.4	1,359	22.6	2,062	34.3
91–100	741	14.1	680	12.9	989	16.4	935	15.5
All	30,132	100.0	5,269	100.0	34,794	100.0	6,018	100.0

income and hours worked for the full sample (Figures 3a, 3d, 4a, 4d) and separately for high and low values of selected personality traits (Figures 3b, 3c, 3e, 3f for men and Figures 4b, 4c, 4e, 4f for women). The dashed line in the figure is the predicted well-being from a linear regression of average SWB on either average household income or total hours worked per week. The slight upward-sloping dashed line in Figures 3a and 4a suggests that men and women with incomes at the higher end of the income distribution on average report up to five points higher on life satisfaction than individuals at the lowest end of the income distribution (78 versus 83 points).

More remarkable differences are observed for individuals at the extreme end of some personality traits. For instance, Figure 3b reveals that, for men low on Conscientiousness (scores of 1 or 2), differences in life satisfaction scores between men at the highest and the lowest end of the income distribution are up to 12 points. This difference is 1.5 times greater than the individual-specific variation in life satisfaction in our sample. In sharp contrast, this difference is almost 0 for all individuals high on Conscientiousness

(scores of 6 or 7), as depicted in Figure 3c. A very similar pattern emerges for women across the dimension of Extraversion. One possible explanation could be that for highly conscientious men, achievement of self-control and dependability weighs higher in the utility assessment, while achievement measured in income weighs little. For women, a similar argument could be made regarding Extraversion. For women high on Extraversion one could hypothesize that achievement of regular social interactions weighs stronger in the utility assessment than achievements measured by income.

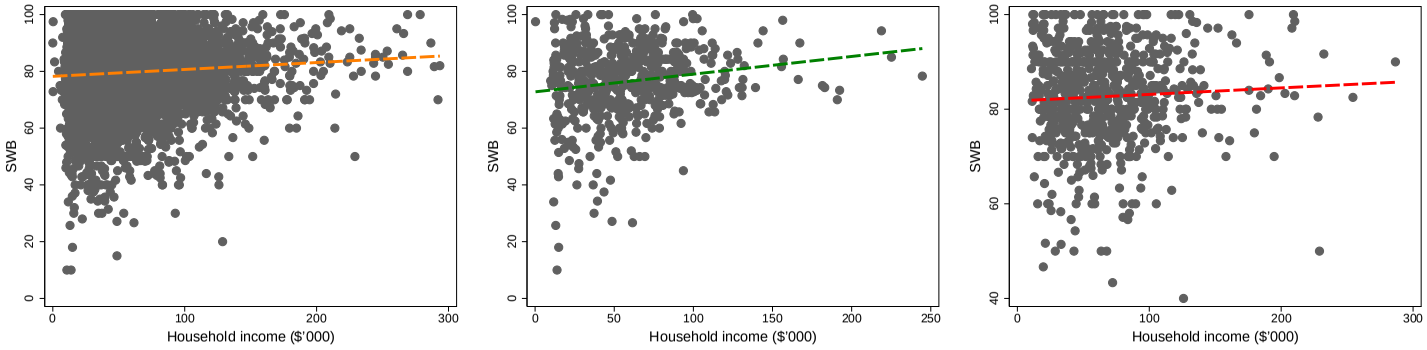
A similar pattern can be seen for the difference of life satisfaction for individuals at the highest and lowest ends of the hours worked distribution, though for different personality traits. For both men and women the difference in life satisfaction between individuals at the highest and lowest ends of the hours worked distribution is respectively 5 and 8 points. However, this difference is almost zero for individuals who are low on Emotional Stability (scores of 1 or 2). In contrast, the difference is 10 points for individuals who are high on Emotional Stability (scores of 6 or 7). One interpretation could be that individuals who score very low on Emotional Stability coincide with mental health problems. A strong link between low Emotional Stability and depression, for instance, has been shown in a Swedish twin study (Kendler et al., 2007, 2006). Thus, severe emotional problems may dominate overall well-being assessments and thus environmental conditions such as income may not play any additional role.



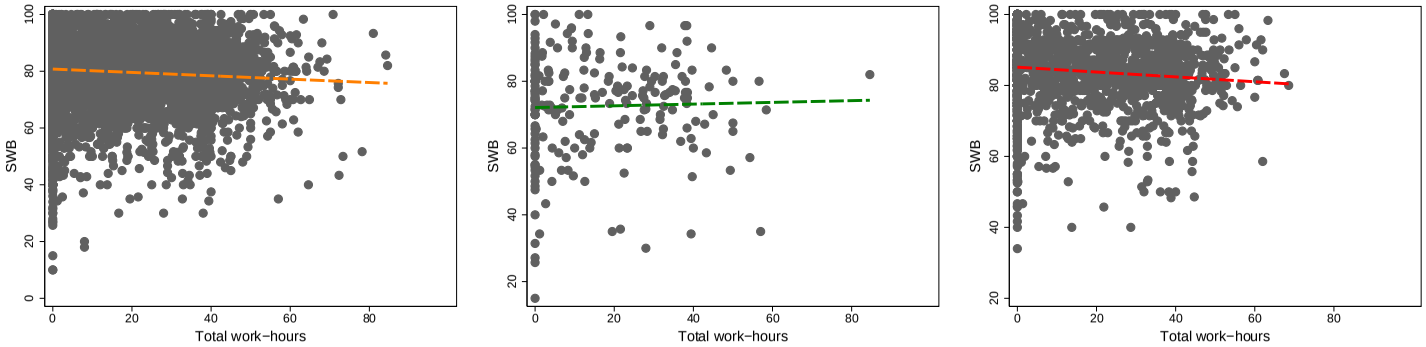
(a) Average SWB and income (b) Low on conscientiousness (c) High on conscientiousness

(d) Average SWB and work hours (e) Low on emotional stability (f) High on emotional stability

Figure 3: Average SWB and income and work hours for men



(a) Average SWB and income (b) Low on extroversion (c) High on extroversion



(d) Average SWB and work hours (e) Low on emotional stability (f) High on emotional stability

Figure 4: Average SWB and income and work hours for women

The next section shows that these differences within some dimensions of personality traits still hold for comparable groups after controlling for covariates. We emphasize, however, that differences in the marginal utility of income or disutility of work emerge only through relatively large changes in income or worked hours (i.e., one standard deviation of the sample mean).

6 Estimation Results

After estimating numerous variants of (6), we present in Table 4 selected coefficient estimates from our preferred model (labelled as Model I). For comparison, we also include corresponding coefficient estimates from a linear model using OLS. Full estimation results are available in the Appendix in Table A2. For the interpretation of the magnitude of the various effects discussed below, it bears to note that the dependent variable is the re-scaled SWB that ranges from 0 to 100 and thus all marginal effects can be interpreted as percentage point changes.

Comparing our preferred model I with the simple linear model estimated using OLS, we can see a significant degree of heterogeneity between individuals—the residual variance of our preferred model is about half of that under OLS. Thus loosely speaking, by allowing for individual-specific heterogeneity, we are able to reduce the unexplained variation of the model under OLS by almost 50 per cent.

As a specification test, we compared Model I with three alternative models with identical explanatory variables except that each has a different and more restricted random component specification. Table A3 in the Appendix shows that all three alternative models

are strongly rejected by the data. This result shows the importance of allowing for individual heterogeneity not only in the baseline SWB but also in the marginal utilities of income and leisure.[19]

As a sensitivity check, we also estimated our model with alternative definitions of income (e.g. natural logarithm transformation or equivalised household income) and on various sub-samples (e.g. all married, all employed, or all observations taken from 2005 onwards). Parameter estimates are relatively stable across these restrictions (see Tables A5 and A6 in the Supporting Material Appendix).

For brevity, Table 4 only presents coefficient estimates of parameters of interest. Using the estimates, we see that the baseline level of SWB and the marginal utilities of income and hours worked for men and women are normally distributed around the respective mean vector of $[56.73, 0.0359, 0.0111]$ and $[58.8244, 0.0127, -0.0511]$, with a variance-covariance matrix whose elements are given in Table 4 under 'random component estimates.'

On average, men are reported to have a small, but positive marginal utility of income: An additional A$50,000 for men (1 standard deviation in the sample) implies an increase in SWB by 1.7 percent on average. For women, the effect is on average zero. Women on average have a marginal disutility of work, whereas for men this marginal effect is on average positive. Both effects, however, are not statistically significant from zero.

Other factors affecting SWB include age, marital status, health, employment, educa-

[19]Model II in Table A3 is a straightforward random intercept model, in which only the baseline SWB is assumed to be heterogeneous. Models III and IV, in addition to specifying a random intercept, also specify a random parameter for respectively income and hours worked. Since Models II, III and IV are nested versions of Model I, we can test the restrictions placed on the nested models by using the likelihood ratio test. For example, consider testing Model II against I. We can write the null hypothesis as $H_0 : \psi_{22} = \psi_{33} = \psi_{12} = \psi_{13} = \psi_{23} = 0$. The χ^2-test provides a conservative test in this case. A complete listing of the parameter estimates are provided upon request from the authors.

Table 4: Estimation results: Random Coefficient versus OLS

	Men				Women			
	Model I		OLS		Model I		OLS	
Variable	**Coef.**	**SE**	**Coef.**	**SE**	**Coef.**	**SE**	**Coef.**	**SE**
Personality traits								
Extroversion	1.2646**	0.2458	1.1899**	0.3070	1.1489**	0.1873	1.1332**	0.2123
Agreeableness	1.8284**	0.2797	1.6760**	0.3596	1.2532**	0.2443	1.4268**	0.2810
Conscientiousness	0.9127**	0.2636	1.1990**	0.3207	0.5902**	0.2050	0.5041*	0.2368
Emotional stability	2.0938**	0.247	1.9869**	0.3422	2.4219**	0.2039	2.2663**	0.2455
Openness	-0.6046*	0.2522	-0.2709	0.3287	-0.9776**	0.2038	-0.7647**	0.2392
Household income and interaction with personality traits								
Household income (/1000)	0.0359*	0.0179	0.0748**	0.0239	0.0127	0.0164	0.0216	0.0220
Extroversion	0.0012	0.0020	0.0007	0.0026	-0.0029†	0.0017	-0.0026	0.0022
Agreeableness	-0.0015	0.0024	-0.0021	0.0030	0.0000	0.0026	0.0011	0.0034
Conscientiousness	-0.0003	0.0021	-0.0041	0.0027	0.0005	0.0019	0.0000	0.0024
Emotional stability	-0.0015	0.0022	-0.0032	0.0030	-0.0022	0.0019	-0.0029	0.0023
Openness	-0.0019	0.0021	-0.0022	0.0027	0.0060**	0.0019	0.0049†	0.0026
Hours worked and interaction with personality traits								
Total work hours	0.0111	0.0409	0.0178	0.0542	-0.0511	0.0447	-0.0388	0.0581
Extroversion	-0.0050	0.0048	-0.0033	0.0062	-0.0028	0.0045	-0.0034	0.0057
Agreeableness	0.0032	0.0057	0.0069	0.0077	0.0065	0.0065	-0.0011	0.0085
Conscientiousness	0.0026	0.0052	-0.0014	0.0067	-0.0026	0.0050	0.0004	0.0063
Emotional stability	-0.0096*	0.0049	-0.0078	0.0067	-0.0069	0.0050	-0.0037	0.0068
Openness	-0.0024	0.0051	-0.0073	0.0066	0.0074	0.0051	0.0065	0.0066
Intercept	56.7300**	2.1121	55.8840**	2.5470	58.8244**	1.8167	58.9532**	2.1527
Random component estimates								
Var(Intercept) ($\hat{\psi}_{11}$)	128.2		–		108.8		–	
Var(Income) ($\hat{\psi}_{22}$)	.0010		–		.0005		–	
Var(Hours worked) ($\hat{\psi}_{33}$)	.0190		–		.0140		–	
Cov(Inter., income) ($\hat{\psi}_{12}$)	-.230		–		-.1900		–	
Cov(Inter., hours) ($\hat{\psi}_{13}$)	-.782		–		-.6170		–	
Cov(income, hours) ($\hat{\psi}_{23}$)	-.0010		–		-.0013		–	
Residual variance ($\hat{\sigma}^2$)	86.436		165.721		97.85		174.093	
Log likelihood	-134,804.9		–		-134406.7		–	
Adjusted R^2	–		0.190		–		0.180	
Number observations	30,132				34,794			
Number individuals	5,269				6,018			

Significance levels: †: 10% *: 5% **: 1%

tion, and major life events.[20] It is noteworthy to stress though that the most important variables in terms of their contribution to the explained variation in SWB, as measured by increments in the adjusted R^2 obtained from an OLS model, are in descending order of relevance (for men): Personality traits (0.054), health changes from the previous

[20]Table A7 in the Supporting Material Appendix shows results of Wald-test statistics of joint statistical significant of blocks of variables subsequently added to the model. Except for the block of education dummy variables, occupation dummy variables, and the interaction of work-hours with personality traits, all other estimates of the influence of dummy variable regressors are statistically significant at at least the 10% significance level. Since we seek to test explicitly for the heterogeneous marginal utilities of leisure, we leave these interactions in the model. Also, we leave education dummy variables in the model, since there is consistent empirical evidence that education and life satisfaction are strongly correlated. Our final model includes all variables listed in this tables, except for the occupation dummy variables.

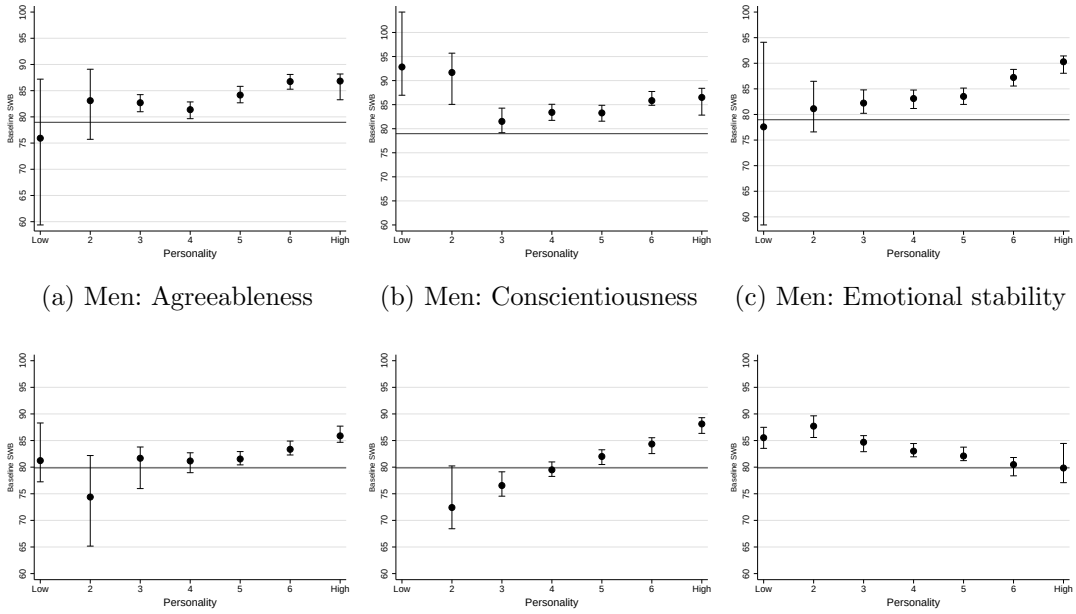
year (0.038), marital status (0.022), and major life events (0.020). All other variables contribute less than 0.003 to the explained variation of SWB (see Table A7 in the Supporting Material Appendix). Age, income, health and marital status together explain only less than 10% of the variation in SWB, a result that has been demonstrated elsewhere (e.g., Andrews and Withey, 1976).

We turn next to the testing of Hypotheses (1), (2a), and (2b). Figures 5–7 show the mean predicted baseline SWB, marginal utility of income and hours worked based on respectively (10), (8) and (9). Also shown in the Figures are the corresponding 95% bias corrected confidence intervals constructed from bootstrapped standard errors. For brevity the results are illustrated with a subset of personality traits.[21]

We find strong evidence in favor of Hypothesis (1). The largest differences in SWB across the spectrum of personality traits are identified for Emotional Stability, equally for men and women (Figures 5c and 5e, where the horizontal line represents sample means). The difference in average SWB between groups of men at the bottom end of Emotional Stability (a score of 2) and at the top end (a score of 7) is almost 10 percentage points, while for women the difference is even greater at 15.5 percentage points. For men this difference is equivalent to the effect of a severe deterioration of health in the past year (-8.7 with standard error 0.63), while for women it is 1.3 times the effect of such a deterioration (-11.8 with standard error 0.55).

Smaller, yet statistically significant, differences are obtained for Agreeableness for both

[21]The full set of results for all personality traits are reported in Figures 8, 9, and 10 for men and in Figures 11, 12, and 13 for women in the Appendix. Standard errors of all marginal utilities are bootstrapped using STATA 11.0 with 100 repetitions. Reported are the bias corrected 95% confidence intervals. Each repetition takes 15 minutes. At the time of writing we are running the bootstrapping routine on 1,000 repetitions.



(a) Men: Agreeableness (b) Men: Conscientiousness (c) Men: Emotional stability

(d) Women: Agreeableness (e) Women: Emotional stability (f) Women: Openness

Figure 5: RCM: Baseline SWB across selected personality traits, by gender

men and women—more agreeable individuals are on average 5 percentage points more satisfied with their life than less agreeable individuals (Figures 5a and 5d). In contrast, women who are very Open to Experience are on average 7 percentage points less satisfied than women at the other end of the spectrum (Figure 5f). Men who score in the medium range of Conscientiousness are on average less satisfied than men at either extreme (Figure 5b), which is consistent with Lodi-Smith et al. (2010)'s finding that highly conscientious individuals have better health, and hence higher SWB.

Our results are consistent with findings from the psychology literature with respect to all personality traits except for the negative correlation between Openness to Experience and SWB. However, other studies too could not replicate the positive relationship reported in DeNeve and Cooper (1998) (e.g. Diener and Seligman, 2002, who find no association). In our case, the construct of Openness to Experience is dominated by being philosoph-

ical, complex, and deep, which are traits that correlate positively with Neuroticism. In other studies being creative and imaginative dominate the score, and these traits do not correlate as strongly with Neuroticism.

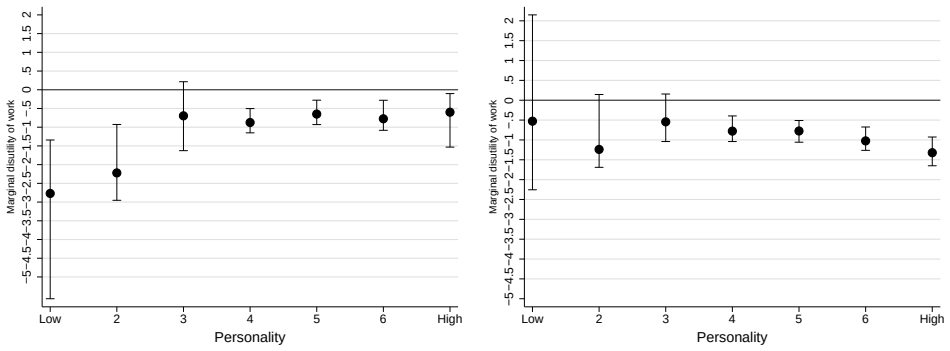
We also find evidence for Hypotheses (2a) and (2b). Men and women differ significantly in their marginal utilities of income and work across some personality traits. Even though there are no statistically significant differences within each of the personality traits in marginal utilities of income for men, there are significant differences in the marginal utility of work. For women, the reverse holds—there are statistically significant differences in the marginal utility of income but not of work.

One can see significant differences in the marginal utility of work across the spectrum of Conscientiousness for men (Figure 6a). Individuals who score very low on Conscientiousness (the 'shirker') on average experience a marginal disutility of 2.8 percentage points for an extra 20 hours a week of work, while individuals who score in the middle to high range on that trait (4 to 7) experience a decrease in utility of 0.6 percentage points (the 'responsible worker'). This is a statistically significant difference of 2.2 percentage points. Such a difference is almost three quarter of the effect of divorce or separation on SWB (-3.16 with standard error 0.48).

A similar but less extreme result is obtained for Emotional Stability (Figure 6b). An extra 20 hours a week of work would lower SWB by 0.5 percentage points for men who score relatively low on Emotional Stability (a score of 3). The decrease is 1.4 percentage points for men high on that trait (a score of 7). This is a statistically significant difference of almost one percentage point, which is about half of the effect of widowhood on SWB

(-2.01 with standard error 0.88).

The robustness of our results is corroborated using data on ratings of the importance over life domains. Men who score very high on Emotional Stability are much more likely to rate involvement in local community as highly important compared to other men. Men who score very high on Conscientiousness are more likely to regard their financial situation as important and thus may have a greater interest in performing well in their job than other men.[22]



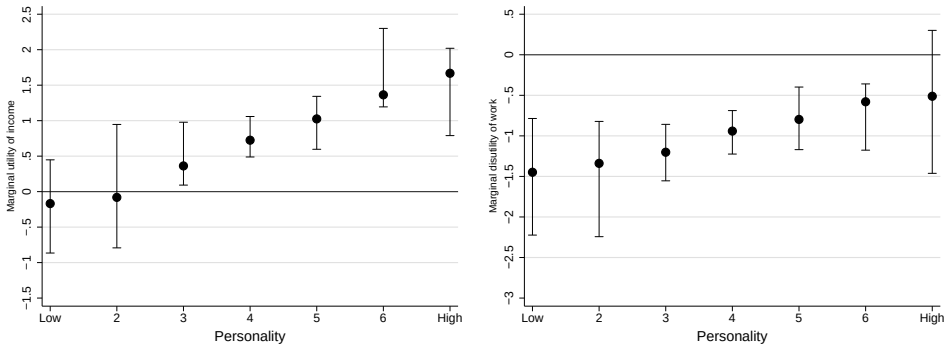
(a) Conscientiousness (b) Emotional stability

Figure 6: RCM: Marginal disutility of work for selected personality traits, men

The most striking and robust result is that for women who score very high on Openness to Experience, an extra $50,000 of annual income is associated with an increase in SWB of 1.7 percentage points, whereas there is no effect whatsoever for women at the other end of the spectrum (Figure 7a). This difference of 1.7 percentage points is statistically significant and is equivalent to half the effect of divorce or separation on SWB (-3.38 with standard error 0.44). Consistently, women high on Openness to Experience also derive less disutility from work, but the differences are not statistically significant (Figure 7b).

[22]These results are provided upon request. Importance of life domains data is available in HILDA in wave 1.

We believe that this finding identifies the modern independent career woman—the 'Carrie Bradshaw' type—who is well educated and engages in meaningful employment. There is evidence elsewhere in the data to support this claim. Comparing importance ratings over life domains between women who score very high and very low on Openness to Experience, one can see that a substantially larger number of women who score high on Openness to Experience rate their employment and work situation to be very important than women who score low on this trait.[23]



(a) Marginal utility of income (b) Marginal disutility of work

Figure 7: RCM: Marginal utilities for Openness to Experience, women

Our results suggest that the assumption of a strictly positive marginal utility of income and negative marginal utility of work is perhaps correct for the mid ranges of all personality traits. However, at the extreme ends of each personality trait, a significant amount of variation exists and statistically speaking this variation cannot be distinguished from a zero marginal utility. For instance, for men at the lowest end of Conscientiousness or Extraversion, marginal utilities of income range between -2.5 to 4, so that on average one observes a zero marginal utility, even though a significant amount of individuals possibly derive negative utility from income. Similar patterns are observed for women. Likewise,

[23]Results are available upon request.

there is a wide variability of marginal utilities of work, ranging from -1.5 to 0.7, for individuals who are low on Extraversion.

Finally, we establish that the differences in marginal utilities are not the result of comparing individuals located at different points (due to different incomes or hours worked) of the utility function. Querying the data, we find that men high on Conscientiousness work 3.5 hours longer per week and thus should derive greater disutilities of work, if at all. There are no differences in earnings or hours worked for men high and low on Emotional Stability. Women high on Openness to Experience work less and earn less than women who are low on this trait, but these differences are small.[24]

7 Conclusions

The results of this study emphasize the importance of Emotional Stability, the reverse of Neuroticism, in determining subjective well-being (SWB). Low Emotional Stability has consistently been associated with mental health problems such as depression and anxiety (Kendler et al., 2007, 2006). This result lends support in the current debate on the potential social cost of neglecting mental health care provision in Australia's public insurance system.

Our results do not lend support to the notion of a strictly positive marginal utility of income or a strictly negative marginal utility of work, assumptions that are common place in standard economic theory. Importantly, women and men differ significantly in their marginal utilities and a small subset of personality traits explains vast differences

[24]See Table A8 in the Supporting Material Appendix.

in them.

For example, women differ significantly in their marginal utilities of income across the trait of Openness to Experience, which correlates with an attitude of being independent and career-minded. We labeled this observation the 'Carrie Bradshaw' effect. On the other hand, we found that men who score very low on Conscientiousness or in the medium range of Emotional Stability have the largest marginal disutility of work. High Emotional Stability and low Conscientiousness are traits that can be associated with the 'shirker' (Shapiro and Stiglitz, 1984), who requires to be paid an efficiency wage so as to be motivated to work, but the shirker is not ubiquitous. Our results also contradict the findings of Layard et al. (2008) who found no heterogeneity in marginal utilities of income in their cross-country comparisons.

These results show that personality traits can be powerful predictors of well-being and evaluations of life domains. Heterogeneous valuations of income and work imply that individuals will react differently to wages and prices. If a significant number of workers have personality traits that strongly bias their preferences towards nonfinancial aspects of jobs such as sociability, degree of responsibility, and location, then extraordinarily large financial rewards would be needed to induce them to choose a job with characteristics that do not match with their preferences.

In many countries, financial incentives are used to attract teachers, doctors and nurses to hard-to-staff areas or institutions. However, these incentive programs are doomed to failure if the targeted individuals share certain traits that place little emphasis on the financial aspects of a job. The Australian federal government, for example, provides

up to A$120,000 in financial incentives for doctors to relocate to very remote areas of Australia, in addition to an annual incentive payment of up to A$47,000. Despite these non-trivial sums, rural hospitals continue to face doctor shortage, so much so that locum doctors from New Zealand have to be flown in for short-term assignments.[25] Similarly, the small role of salary bonus payments has been documented in relation to the retention of qualified teachers in disadvantaged schools (Hanushek et al., 2004; Frijters et al., 2004b) and nurses (Frijters et al., 2007; Shields, 2004).

Bibliography

Andrews, F.M. and S.B. Withey, *Social indicators of well-being*, New York: Plenum Press, 1976.

Barsky, Robert B., Miles S. Kimball, F. Thomas Juster, and Matthew D. Shapiro, "Preference Parameters and Behavioral Heterogeneity: An Experimental Approach in the Health and Retirement Study," *The Quarterly Journal of Economics*, 1997, *112* (2), 537–79.

Blundell, Richard, Martin Browning, and Costas Meghir, "Consumer Demand and the Life-Cycle Allocation of Household Expenditures," *The Review of Economic Studies*, 1994, *61* (1), 57–80.

Boadway, Robin, Maurice Marchand, Pierre Pestieau, and Mara del Mar Racionero, "Optimal Redistribution with Heterogeneous Preferences for Leisure," *Journal of Public Economic Theory*, 2002, *4* (4), 475–498.

Booth, Alison L. and Jan C. Van Ours, "Hours of Work and Gender Identity: Does Part-time Work Make the Family Happier?," *Economica*, 2009, *76* (301).

Borghans, L., A.L. Duckworth, J.J. Heckman, and B. ter Weel, "The Economics and Psychology of Personality Traits," *Journal of Human Resources*, 2008, *43* (4), 972–1059.

Borghans, Lex, Bas ter Weel, and Bruce A. Weinberg, "Interpersonal styles and labour market outcomes," *Journal of Human Resources*, 2008, *43* (4), 816–858.

Boyce, Christopher, "Understanding fixed effects in human wellbeing," *Journal of Economic Psychology*, 2009, *31*, 1–16.

[25] See `www.abc.net.au/news/stories/2010/07/07/2947458.htm` (accessed 20 July 2010).

Caliendo, Marco, Frank M. Fossen, and Alexander S. Kritikos, "Risk attitudes of nascent entrepreneurs: New evidence from an experimentally validated survey," *Journal Small Business Economics*, 2007, *32* (2), 153–167.

Carver, C.S. and E. Baird, "The American dream revisited: Is it what you want or why you want it that matters?," *Psychological Science*, 1998, *9*, 289–292.

Clark, A.E., F. Etilé, F. Postel-Vinay, C. Senik, and K. Van der Straeten, "Heterogeneity in Reported Well-Being: Evidence from Twelve European Countries," *Economic Journal*, 2005, *115* (502), C118–C132.

_ , P. Frijters, and M.A. Shields, "Relative Income, Happiness, and Utility: An Explanation for the Easterlin Paradox and Other Puzzles," *Journal of Economic Literature*, 2008, *46* (1), 95–144.

Clark, Andrew E., Ed Diener, Yannis Georgellis, and Richard E. Lucas, "Lags and Leads in Life Satisfaction: A Test of the Baseline Hypothesis," *Economic Journal*, 2008, *118*, F222–F243.

Costa, P.T. and R.R. McCrae, "Influence of extraversion and neuroticism on subjective well-being: Happy and unhappy people," *Journal of Personality and Social Psychology*, 1980, *38*, 668–678.

Costa, P.T. Jr. and R.R. McCrae, "Longitudinal stability of adult personality," in J. Johnson Hogan and S. Briggs, eds., *Handbook of personality psychology*, San Diego: Academic Press, 1997, pp. 269–290.

Csikszentmihalyi, M. and I.S. Csikszentmihalyi, *A life worth living: Contributions to positive psychology*, New York: Oxford University Press, 2006.

DeNeve, K.M. and H. Cooper, "The happy personality: A meta-analysis of 137 personality traits and subjective well-being," *Psychological Bulletin*, 1998, *124*, 197–229.

Diener, E., E.M. Suh, R.E. Lucas, and H.L. Smith, "Subjective well-being: Three decades of progress," *Psychological Bulletin*, 1999, *125*, 276–302.

Diener, Ed and Martin E.P. Seligman, "Very happy people," *Psychological Science*, 2002, *13* (1), 81–84.

Dohmen, Thomas, Armin Falk, David Huffman, Uwe Sunde, Júrgen Schupp, and Gert G. Wagner, "Individual Risk Attitudes: New Evidence from a Large, Representative, Experimentally-Validated Survey," *Journal of the European Economic Association*, 2010, *forthcoming.*

Ferrer-i-Carbonell, A. and P. Frijters, "How important is methodology for the estimates of the determinants of happiness?," *Economic Journal*, 2004, *114*, 641–659.

Frijters, Paul, John Haisken-DeNew, and Michael A. Shields, "Money does matter! Evidence from increasing real incomes in East Germany following reunification," *American Economic Review*, 2004, *94* (3), 730–741.

_ , **M.A. Shields, and S. Wheatley-Price**, "To teach or not to teach? Panel data evidence on the quitting decision," IZA Discussion Paper 1164, IZA 2004.

_ , **Michael A. Shields, and Stephen Wheatley Price**, "Investigating the quitting decision of nurses: panel data evidence from the British National Health Service," *Health Economics*, 2007, *16* (1), 57–73.

Gardarsdottir, R.B., J. Jankovic, and H. Dittmar, "Is it as good as it gets? Materialistic values and well-being," in H. Dittmar, ed., *Consumer society, identity, and well-being: The search for the good life and the body perfect*, London and New York: Psychology Press, 2008, pp. 71–94.

Goldberg, L.R., "Language and individual differences: The search for universals in personality lexicons," in L. Wheeler, ed., *Review of personality and social psychology*, Vol. vol. 2, Beverly Hills, CA: Sage, 1981, pp. 141–165.

Gordon, R.M., *An expert look at love, intimacy and personal growth*, Allentown, PA: IAPT Press, 2006.

Hanushek, Eric A., John F. Kain, and Steven G. Rivkin, "Why Public Schools Lose Teachers," *Journal of Human Resources*, 2004, *39* (2), 326–354.

Headey, B., "How Best To Impute Taxes And Measure Public Transfers?," Discussion Paper 2/03, HILDA Project, Melbourne: Australia 2003.

_ , "Life Goals Matter to Happiness: A Revision of Set-Point Theory," *Social Indicators Research*, 2008, *86*, 213–231.

_ **and M. Wooden**, "The Effects of Wealth and Income on Subjective Well-Being and Ill-Being," *Economic Record*, 2004, *80* (s1), s24–s33.

_ , **R. Muffels, and M. Wooden**, "Money Doesn't Buy Happiness.... Or Does It? A Reconsideration Based on the Combined Effects of Wealth, Income and Consumption," *Social Indicators Research*, 2004, *87* (1), 65–82.

Headey, Bruce and Alexander Wearing, "Personality, life events, and subjective well-being: toward a dynamic equilibrium model," *Journal of Personality and Social Psychology*, 1989, *57*, 731–739.

Heckman, James, Jora Stixrud, and Sergio Urzua, "The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes atid Social Behavior," *Joumal of Labor Economics*, 2006, *24* (3), 411–482.

Helson, R., C. Jones, and V.S.Y. Kwan, "Personality change over 40 years years of adulthood: Hierarchical linear modeling of two longitudinal samples," *Journal of Personality and Social Psychology*, 2002, *83*, 752–766.

Hsiao, Cheng and M. Hashem Pesaran, "Random Coefficient Models," in L. Matyas and P. Sevestre, eds., *The Econometrics of Panel Data*, Springer Netherlands, 2008, pp. 185–213.

John, O.P. and S. Srivastava, "The Big-Five Trait Taxonomy: History, Measurement, and Theoretical Perspectives," in L.A. Pervin and O.P. John, eds., *Handbook of Personality: Theory and Research*, 2nd ed. ed., New York: Guilford Press, 2001, chapter 4, pp. 102–138.

Jones, Andrew M. and Stefanie Schurer, "How does heterogeneity shape the socioeconomic gradient in health satisfaction?," *Journal of Applied Econometrics*, 2009, *DOI 10.1002/jae.1134, published online 14 Dec 2009.*

Kahneman, Daniel, "Objective happiness," in Danile Kahneman, Ed Diener, and N. Schwartz, eds., *Danile Kahneman, Ed Diener, and N. Schwartz, eds.*, New York: Russell Sage Foundation, 1999, p. 213242.

Kendler, K.S., C.O. Gardner, M. Gatz, and N.L. Pedersen, "The sources of co-morbity between major depression and generalized anxiety disorder in a Swedish national twin sample," *Psychological Medicine*, 2007, *37*, 453–462.

_ **, M. Gatz, C.O. Gardner, and N.L. Pedersen**, "Personality and major depression: A Swedish longitudinal population based twin study," *Archives of General Psychiatry*, 2006, *63*, 1113–1120.

Krueger, Alan and David Schkade, "Sorting in the labour market: Do gregarious workers flock into interactive jobs?," *Journal of Human Resources*, 2008, *43* (4), 859–883.

Krueger, Alan B. and David A. Schkade, "The reliability of subjective well-being measures," *Journal of Public Economics*, 2008, *92*, 18331845.

Layard, R., *Happiness: Lessons from a New Science*, London: Allen Lane, 2005.

_ **, G. Mayraz, and S. Nickell**, "The marginal utility of income," *Journal of Public Economics*, 2008, *92*, 1846–1857.

Lodi-Smith, Jennifer and Brent W. Roberts, "Social investment and personality: A meta-analysis of the relationship of personality traits to investment in work, family, religion, and volunteerism," *Personality and Psychology Review*, 2007, *11* (1), 68–86.

_ **, Joshua Jackson, Tim Bogg, Kate Waltond, Dustin Woode, Peter Harms, and Brent W. Roberts**, "Mechanisms of health: Education and health-related behaviours partially mediate the relationship between conscientiousness and self-reported physical health," *Psychology and Health*, 2010, *25* (3), 305 –319.

Losoncz, Ibolya, "Personality traits in HILDA," *Australian Social Policy*, 2009, *8*, 169–198.

Lucas, Richard E., "Personality and the Pursuit of Happiness," *Social and Personality Psycholgy Compass*, 2007, *1* (1), 168–182.

_ **and Ullrich Schimmack**, "Income and well-being: How big is the gap between the rich and the poor?," *Journal of Research in Personality*, 2009, *43* (1), 75–78.

Lykken, D. and A. Tellegen, "Happiness is a Stochastic Phenomenon," *Psychological Science*, 1996, *7*, 186–189.

Oswald, Andrew J., "On the curvature of the reporting function from objective reality to subjective feelings," *Economics Letters*, 2008, *100* (3), 369–372.

_ **and Stephen Wu**, "Objective confirmation of subjective measures of human well-being: Evidence from the US," *Science*, 2010, *327* (5965), 576–579.

Phelps, Charlotte D., "A clue to the paradox of happiness," *Journal of Economic Behavior and Organization*, 2001, *45*, 293–300.

Pouwels, Babette, Jacques Siegers, and Jan Dirk Vlasblom, "Income, working hours, and happiness," *Economics Letters*, 2008, *99*, 72–74.

Powdthavee, Nattavudh, "How Much Does Money Really Matter? Estimating the Causal Effects of Income on Happiness," *Empirical Economics*, 2010, *forthcoming.*

Rabe-Hesketh, S. and A. Skrondal, *Multilevel and Longitudinal Modeling Using Stata*, 2nd ed. ed., Stata Press, 2008.

Roberts, Brent and Wendy F. DelVecchio, "The Rank-Order Consistency of Personality Traits from Childhood to Old Age: A Quantitative Review of Longitudinal Studies," *Psychological Bulletin*, 2000, *126* (I), 3–25.

Rosa, Don, *The life and times of Scrooge McDuck*, York, PA: Gemstone Publishing, 2005.

Ryan, R.M. and E.I. Deci, "Self-determination theory and the facilitation of intrinisic motivation, social development, and well-being," *American Psychologist*, 2000, *55*, 68–78.

Saucier, G., "Mini-Markers: A brief version of Goldberg's unipolar Big-Five markers," *Journal of Personality Assessment*, 1994, *63*, 506–516.

Shapiro, C. and J. Stiglitz, "Equilibrium Unemployment as Worker Discipline Device," *American Economic Review*, 1984, *74* (3), 433–444.

Shields, Michael A., "Addressing nurse shortages: what can policy makers learn from the econometric evidence on nurse labour supply?," *Economic Journal*, 2004, *114* (499), F464–F498.

Spencer, David A., "Love's Labor's Lost? The disutility of work and work avoidance in the economic analysis of labor supply," *Review of Social Economy*, 2003, *61*, 235–250.

Srivastava, A., E.A. Locke, and K.M. Bartol, "Money and subjective well-being: It's not the money, it's the motives," *Journal of Personality and Social Psychology*, 2001, *80*, 959–971.

Steel, P., J. Schmidt, and J. Shultz, "Refining the Relationship Between Personality and Subjective Well-Being," *Psychological Bulletin*, 2008, *134* (1), 138–161.

Verme, Paolo, "Happiness, freedom and control," *Journal of Economic Behavior and Organization*, 2009, *71*, 146–161.

Wooden, M. and N. Watson, "The Household, Income and Labour Dynamics in Australia (HILDA) Survey: An Introduction," *Australian Social Policy*, 2002, *2001–02*, 79–100.

_ **, D. Warren, and R. Drago**, "Working Time Mismatch and Subjective Well-being," *British Journal of Industrial Relations*, 2009, *47* (1), 147–179.

Table A1: Descriptive statistics for men: variables used in benchmark estimation

	Men					Women				
Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
Life satisfaction	78.967	14.298	0	100	30132	79.865	14.566	0	100	34794
Mean stand. dev. life satisfaction by indiv.	8.120	5.145	0	40.824	30132	8.563	5.502	0	52.92	34794
Age-group 0 to 19	0.071	0.258	0	1	30132	0.068	0.251	0	1	34794
Age-group 20 to 29	0.139	0.346	0	1	30132	0.143	0.35	0	1	34794
Age-group 30 to 39	0.18	0.384	0	1	30132	0.189	0.392	0	1	34794
Age-group 40 to 49	0.214	0.41	0	1	30132	0.214	0.41	0	1	34794
Age-group 50 to 59	0.169	0.375	0	1	30132	0.164	0.37	0	1	34794
Age-group 60 to 69	0.123	0.328	0	1	30132	0.116	0.32	0	1	34794
Age-group 70 to 79	0.081	0.273	0	1	30132	0.079	0.27	0	1	34794
Age-group 80 and older	0.023	0.15	0	1	30132	0.027	0.163	0	1	34794
Married or defacto relationship	0.680	0.467	0	1	30132	0.632	0.482	0	1	34794
Divorced or separated	0.075	0.263	0	1	30132	0.107	0.309	0	1	34794
Widowed	0.02	0.139	0	1	30132	0.073	0.26	0	1	34794
Single	0.226	0.418	0	1	30132	0.188	0.391	0	1	34794
Major city	0.61	0.488	0	1	30132	0.615	0.487	0	1	34794
Inner region	0.254	0.436	0	1	30132	0.255	0.436	0	1	34794
Outer region	0.116	0.32	0	1	30132	0.111	0.315	0	1	34794
Remote, very remote, migratory	0.02	0.139	0	1	30132	0.019	0.135	0	1	34794
Non Australian origin	0.213	0.41	0	1	30132	0.205	0.404	0	1	34794
Aboriginal/Torrest Strait Islander	0.012	0.111	0	1	30132	0.019	0.137	0	1	34794
Religion	0.957	0.204	0	1	30132	0.966	0.18	0	1	34794
Number of children in household	0.592	1.002	0	9	30132	0.644	1.033	0	9	34794
Health is much better	0.036	0.186	0	1	30132	0.051	0.22	0	1	34794
Health is somewhat better	0.113	0.316	0	1	30132	0.129	0.335	0	1	34794
Health is the same	0.728	0.445	0	1	30132	0.679	0.467	0	1	34794
Health is somewhat worse	0.112	0.316	0	1	30132	0.128	0.334	0	1	34794
Health is much worse	0.011	0.103	0	1	30132	0.013	0.114	0	1	34794
Death of a friend/family member	0.196	0.397	0	1	30132	0.207	0.405	0	1	34794
Victim of violence/property crime	0.064	0.245	0	1	30132	0.058	0.233	0	1	34794
Serious illness to oneself/family member	0.209	0.407	0	1	30132	0.239	0.427	0	1	34794
Retired or out of labour force	0.056	0.23	0	1	30132	0.043	0.204	0	1	34794
Change job	0.139	0.346	0	1	30132	0.13	0.336	0	1	34794
Worsening of financial situation	0.029	0.167	0	1	30132	0.028	0.164	0	1	34794
Full-time or part-time employed	0.718	0.45	0	1	30132	0.589	0.492	0	1	34794
Unemployed, but seeking work	0.029	0.169	0	1	30132	0.027	0.162	0	1	34794
Not in the labour force	0.253	0.435	0	1	30132	0.384	0.486	0	1	34794
Full-time study	0.071	0.256	0	1	30132					34794
Postgraduate degree	0.041	0.199	0	1	30132	0.027	0.163	0	1	34794
Graduate diploma	0.045	0.207	0	1	30132	0.061	0.239	0	1	34794
Bachelor degree	0.122	0.328	0	1	30132	0.136	0.343	0	1	34794
Diploma	0.094	0.292	0	1	30132	0.089	0.284	0	1	34794

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... table A1 continued

Variable	Mean	Std. Dev.	Min.	Max.	N	Mean	Std. Dev.	Min.	Max.	N
Any certificate	0.284	0.451	0	1	30132	0.146	0.353	0	1	34794
Finished year 12	0.132	0.339	0	1	30132	0.153	0.36	0	1	34794
Finished year 11 or less	0.281	0.449	0	1	30132	0.388	0.487	0	1	34794
Agriculture	0.037	0.189	0	1	30132	0.016	0.127	0	1	34794
Mining	0.012	0.11	0	1	30132	0.001	0.034	0	1	34794
Manufacturing	0.079	0.27	0	1	30132	0.023	0.149	0	1	34794
Electricity	0.007	0.083	0	1	30132	0.001	0.036	0	1	34794
Construction	0.058	0.234	0	1	30132	0.007	0.086	0	1	34794
Wholesale	0.027	0.162	0	1	30132	0.011	0.106	0	1	34794
Retail	0.059	0.236	0	1	30132	0.062	0.242	0	1	34794
Hospitality	0.022	0.148	0	1	30132	0.025	0.155	0	1	34794
Transport	0.03	0.172	0	1	30132	0.008	0.091	0	1	34794
Communication	0.015	0.12	0	1	30132	0.006	0.078	0	1	34794
Finance	0.02	0.14	0	1	30132	0.018	0.133	0	1	34794
Property	0.058	0.234	0	1	30132	0.046	0.209	0	1	34794
Government	0.03	0.171	0	1	30132	0.022	0.145	0	1	34794
Education	0.033	0.179	0	1	30132	0.067	0.25	0	1	34794
Culture	0.017	0.129	0	1	30132	0.014	0.116	0	1	34794
Personal service	0.021	0.144	0	1	30132	0.017	0.131	0	1	34794
Extroversion	4.281	1.014	1	7	30132	4.537	1.106	1	7	34794
Agreeableness	5.146	0.930	1	7	30132	5.592	0.861	1	7	34794
Conscientiousness	5.01	1.01	1	7	30132	5.214	1.041	1	7	34794
Emotional stability	5.155	1.063	1	7	30132	5.241	1.096	1.333	7	34794
Openness	4.273	1.022	1	7	30132	4.177	1.077	1	7	34794
Household income (/1000)	65.315	48.452	0	1699.029	30132	62.102	48.52	0	1699.029	34794
Total work hours	29.572	23.072	0	120	30132	17.499	19.129	0	126	34794

Table A2: Full estimation results: Random Coefficient versus OLS

	Men				Women			
Dependent variable: life satisfaction (0–100)		**Model I**		**OLS**		**Model I**		**OLS**
Variables	**Coeff.**	**Std. Err.**	**Coeff.**	**Std. Err.**	**Coeff.**	**Std. Err.**	**Coeff.**	**Std. Err.**
Age-group (0,1) Omitted: age 0-20)								
Age-group 20 to 29	-3.9587**	0.4212	-5.2054**	0.5479	-2.1695**	0.3997	-2.1695**	0.3997
Age-group 30 to 39	-5.2095**	0.5002	-6.7080**	0.6405	-3.3480**	0.4731	-3.3480**	0.4731
Age-group 40 to 49	-5.7384**	0.5213	-7.8021**	0.6587	-3.5703**	0.4902	-3.5703**	0.4902
Age-group 50 to 59	-4.6664**	0.5497	-5.5771**	0.6964	-2.9841**	0.5217	-2.9841**	0.5217
Age-group 60 to 69	-1.9375**	0.6008	-1.8626*	0.7452	-0.7000	0.5762	-0.7000	0.5762
Age-group 70 to 79	-0.3555	0.6858	1.1454	0.8660	0.6479	0.6542	0.6479	0.6542
Age-group 80 and older	-0.2474	0.9016	1.4429	1.0629	0.7208	0.8340	0.7208	0.8340
Marital status (0,1) Omitted: single								
Married (incl. de facto)	2.5107**	0.3155	2.9855**	0.4376	2.2460**	0.3120	2.2460**	0.3120
Divorced or separated	-3.1591**	0.4827	-2.5838**	0.7699	-3.3831**	0.4392	-3.3831**	0.4392
Widowed	-2.0107*	0.8761	-0.5293	1.2583	-0.5907	0.5599	-0.5907	0.5599
Remoteness (0,1) Omitted: major city								
Inner region	0.5975*	0.2697	0.6539*	0.321	1.3408**	0.2576	1.3408**	0.2576
Outer region	0.7542*	0.3743	1.5975**	0.4358	1.7626**	0.3586	1.7626**	0.3586
Remote, very remote, migratory	1.0025	0.7354	1.3862†	0.8107	2.2352**	0.7205	2.2352**	0.7205
Personal/household characteristics								
Non Australian origin	-0.7837*	0.3333	-0.6490†	0.3467	-0.3681	0.3191	-0.3681	0.3191
Aboriginal/Torrest Strait Islander	1.7600	1.1563	2.3006†	1.3697	0.7966	0.9352	0.7966	0.9352
Religion	0.0329	0.3405	0.2204	0.4201	0.3416	0.3627	0.3416	0.3627
Number of children in household	0.0034	0.1083	0.0695	0.1452	-0.4217**	0.1086	-0.4217**	0.1086
Health changes over a year (0,1) Omitted: Unchanged								
Health is much better	1.3451**	0.3411	2.6542**	0.4536	2.1002**	0.2837	2.1002**	0.2837
Health is somewhat better	0.7471**	0.2031	0.601*	0.2640	0.4337*	0.1871	0.4337*	0.1871
Health is somewhat worse	-2.3728**	0.2104	-5.0743**	0.3404	-3.4177**	0.1962	-3.4177**	0.1962
Health is much worse	-8.7403**	0.6247	-13.6546**	1.4270	-11.8291**	0.5545	-11.8291**	0.5545
Stressful life events (0,1)								
Death of a friend/family member	-0.2207	0.1568	-0.1706	0.2151	-0.0653	0.1511	-0.0653	0.1511
Victim of violence/property crime	-1.4029**	0.2529	-2.4693**	0.4012	-1.9477**	0.2618	-1.9477**	0.2618
Serious illness to oneself/family member	-0.5493**	0.1559	-1.1146**	0.2191	-0.7702**	0.1474	-0.7702**	0.1474
Retired or out of labour force	-0.4182	0.2832	-0.4309	0.4468	0.3701	0.3040	0.3701	0.3040
Change job	-0.0613	0.1952	-0.8321**	0.2704	-0.0782	0.1960	-0.0782	0.1960
Worsening of financial situation	-5.7199**	0.3847	-9.0618**	0.7691	-5.0097**	0.3819	-5.0097**	0.3819
Employment status (0,1) Omitted: employed								
Unemployed, but seeking work	-3.8104**	0.5173	-5.0763**	0.7995	-2.9962**	0.4825	-2.9962**	0.4825
Not in the labour force	-2.4157**	0.3924	-3.2626**	0.5561	-1.4945**	0.3298	-1.4945**	0.3298
Full-time study	-0.1268	0.4220	1.0801*	0.5354	-0.0950	0.3785	-0.0950	0.3785
Education (0,1) Omitted: year 11 or less								
Postgraduate degree	-0.9961	0.6450	-0.8303	0.6847	-0.9932	0.7071	-0.9932	0.7071
Graduate diploma	-1.0711†	0.6136	-1.1072†	0.6709	-1.1020*	0.5176	-1.1020*	0.5176

Bachelor degree	-1.6213**	0.4383	-1.2472*	0.5094	-1.1114**	0.3901	-1.1114**	0.3901
Diploma	-1.3315**	0.4798	-0.9245†	0.5420	-0.6330	0.4473	-0.6330	0.4473
Any certificate	-0.6767*	0.3389	-0.3112	0.4014	-0.5809†	0.3378	-0.5809†	0.3378
Finished year 12	-0.6960†	0.3584	-0.7300	0.4760	-0.9973**	0.3193	-0.9973**	0.3193
Industrial sector working in (0,1) Omitted: community service								
Agriculture	-0.3957	0.5276	-0.8230	0.6639	-1.0645	0.6749	-1.0645	0.6749
Mining	-0.9732	0.7413	-0.9097	1.0875	-5.6333**	1.9391	-5.6333**	1.9391
Manufacturing	-0.9342*	0.3751	-0.7358	0.5065	-0.5806	0.5244	-0.5806	0.5244
Electricity	0.4121	0.9258	-0.0408	1.0312	-3.6694†	2.0160	-3.6694†	2.0160
Construction	-0.6407	0.3955	0.2695	0.5082	-0.1260	0.8354	-0.1260	0.8354
Wholesale	-0.6947	0.4789	-0.0798	0.6362	-1.5683*	0.6602	-1.5683*	0.6602
Retail	-1.3957**	0.3949	-1.2776*	0.5170	-1.1533**	0.3740	-1.1533**	0.3740
Hospitality	-0.9760†	0.5388	-1.0342	0.7640	-1.2652*	0.4974	-1.2652*	0.4974
Transport	-0.1995	0.4962	-0.6162	0.6568	-0.3344	0.7864	-0.3344	0.7864
Communication	-1.3033*	0.6559	-1.4304†	0.7790	-1.9349*	0.9455	-1.9349*	0.9455
Finance	-0.3198	0.5457	-0.1048	0.6440	-1.1103†	0.5769	-1.1103†	0.5769
Property	-0.5884	0.3883	-1.1175*	0.5157	-1.2454**	0.3982	-1.2454**	0.3982
Government	-0.6193	0.4916	-0.4215	0.6195	-1.1845*	0.5237	-1.1845*	0.5237
Education	0.3819	0.4939	1.3573*	0.6488	-0.2018	0.3728	-0.2018	0.3728
Community	-0.5584	0.5515	-0.2268	0.7781	-0.8760**	0.3364	-0.8760**	0.3364
Culture	0.2660	0.5957	0.1444	0.7070	-1.0677†	0.6247	-1.0677†	0.6247
Personal service	-0.2858	0.5695	0.4194	0.7138	-0.4359	0.5713	-0.4359	0.5713
Year dummy variables (0,1) Omitted: year 2002								
Year 2003	0.3718†	0.2094	0.3856†	0.2239	1.2767**	0.2062	1.2767**	0.2062
Year 2004	0.0729	0.2081	0.0805	0.2226	0.8927**	0.2053	0.8927**	0.2053
Year 2005	-0.6588**	0.2044	-0.7965**	0.2267	0.1692	0.2018	0.1692	0.2018
Year 2006	-0.8402**	0.2134	-0.9680**	0.2405	-0.2412	0.2104	-0.2412	0.2104
Year 2007	-1.4299**	0.2974	-1.4089**	0.3696	-0.8022**	0.2727	-0.8022**	0.2727
Year 2008	-1.4053**	0.2863	-1.4267**	0.3518	-1.1765**	0.2658	-1.1765**	0.2658
Personality traits (discrete values 1 to 7)								
Extroversion	1.2646**	0.2458	1.1899**	0.3070	1.1489**	0.1873	1.1489**	0.1873
Agreeableness	1.8284**	0.2797	1.6760**	0.3596	1.2532**	0.2443	1.2532**	0.2443
Conscientiousness	0.9127**	0.2636	1.1990**	0.3207	0.5902**	0.2050	0.5902**	0.2050
Emotional stability	2.0938**	0.247	1.9869**	0.3422	2.4219**	0.2039	2.4219**	0.2039
Openness	-0.6046*	0.2522	-0.2709	0.3287	-0.9776**	0.2038	-0.9776 **	0.2038
Net household income interacted with personality traits								
Household income (/1000)	0.0359*	0.0179	0.0748**	0.0239	0.0127	0.0164	0.0127	0.0164
Extroversion	0.0012	0.0020	0.0007	0.0026	-0.0029†	0.0017	-0.0029†	0.0017
Agreeableness	-0.0015	0.0024	-0.0021	0.0030	0.0000	0.0026	0.0000	0.0026
Conscientiousness	-0.0003	0.0021	-0.0041	0.0027	0.0005	0.0019	0.0005	0.0019
Emotional stability	-0.0015	0.0022	-0.0032	0.0030	-0.0022	0.0019	-0.0022	0.0019
Openness	-0.0019	0.0021	-0.0022	0.0027	0.0060**	0.0019	0.0060**	0.0019
Work hours interacted with personality traits								
Total work hours	0.0111	0.0409	0.0178	0.0542	-0.0511	0.0447	-0.0511	0.0447
Extroversion	-0.0050	0.0048	-0.0033	0.0062	-0.0028	0.0045	-0.0028	0.0045
Agreeableness	0.0032	0.0057	0.0069	0.0077	0.0065	0.0065	0.0065	0.0065
Conscientiousness	0.0026	0.0052	-0.0014	0.0067	-0.0026	0.0050	-0.0026	0.0050

Emotional stability	-0.0096*	0.0049	-0.0078	0.0067	-0.0069	0.0050	-0.0069	0.0050
Openness	-0.0024	0.0051	-0.0073	0.0066	0.0074	0.0051	0.0074	0.0051
Intercept	56.7300**	2.1121	55.8840**	2.5470	58.8244**	1.8167	58.8244**	1.8167
Random component estimates								
Var(Intercept) ($\hat{\psi}_{11}$)	128.2		–		108.8		–	
Var(Equiv. income)($\hat{\psi}_{22}$)	.0010		–		.0005		–	
Var(Hours worked) ($\hat{\psi}_{33}$)	.0190		–		.0140		–	
Cov(Inter., income)($\hat{\psi}_{12}$)	-.230		–		-.1900		–	
Cov(Inter., hours) ($\hat{\psi}_{13}$)	-.782		–		-.6170		–	
Cov(income, hours) ($\hat{\psi}_{23}$)	-.0010		–		-.0013		–	
Residual variance ($\hat{\sigma}^2$)	86.436		?		97.85		?	
Log likelihood	-134,804.9		–		-134,804.9		–	
Adjusted R^2	–		0.180		–		0.180	
Number observations		30,132				34,794		
Number individuals		5,269				6,018		

Table A3: Alternative random coefficient SWB models: Selected parameter estimates

	Men						Women					
	Model II		Model III		Model IV		Model II		Model III		Model IV	
Variables	Parm. est.	Std. err.	Par Std. est.	Parm. err.	Std. est.	Parm. err.	Std. est.	Par Std. err.	Parm. est.	Std. err.	est.	err.
Personality traits												
Extroversion	1.3640**	0.2158	1.3091**	0.2323	1.2865**	0.2384	1.1227**	0.1723	1.1596**	0.1828	1.1184**	0.1805
Agreeableness	1.8138**	0.2427	1.8494**	0.2650	1.7940**	0.2685	1.3261**	0.2208	1.2597**	0.2387	1.2977**	0.2310
Conscientiousness	0.9198**	0.2315	0.9081**	0.2490	0.9421**	0.2560	0.5589**	0.1874	0.6165**	0.2004	0.5414**	0.1962
Emotional stability	2.1577**	0.2167	2.0423**	0.2351	2.2088**	0.2388	2.4401**	0.1860	2.4161**	0.1996	2.4496**	0.1946
Openness	-0.5155*	0.2199	-0.5674*	0.2394	-0.5502*	0.2425	-1.0106**	0.1870	-0.9635**	0.1992	-1.0188**	0.1955
Income interacted with personality traits												
Household income (/1000)	0.0478**	0.0166	0.0336†	0.0182	0.0502**	0.0165	0.0075	0.0160	0.0161	0.0169	0.0057	0.0160
Extroversion	0.0013	0.0019	0.0016	0.0021	0.0011	0.0019	-0.0022	0.0017	-0.0030†	0.0018	-0.0024	0.0017
Agreeableness	-0.0013	0.0022	-0.0020	0.0025	-0.0010	0.0022	-0.0008	0.0024	0.0000	0.0027	-0.0006	0.0024
Conscientiousness	-0.0012	0.0020	-0.0005	0.0022	-0.0011	0.0020	0.0011	0.0019	0.0004	0.0020	0.0010	0.0019
Emotional stability	-0.0039†	0.0021	-0.0009	0.0022	-0.0041*	0.0021	-0.0027	0.0018	-0.0024	0.0020	-0.0025	0.0018
Openness	-0.0020	0.0019	-0.0017	0.0022	-0.0025	0.0019	0.0069**	0.0019	0.005**	0.0020	0.0070**	0.0019
Working hours interacted with personality traits												
Total work hours	0.0152	0.0357	0.0192	0.0357	0.0048	0.0407	-0.0362	0.0421	-0.0462	0.0420	-0.0457	0.0451
Extroversion	-0.0074	0.0042	-0.0070†	0.0042	-0.0050	0.0048	-0.0026	0.0042	-0.0027	0.0042	-0.0026	0.0045
Agreeableness	0.0031	0.0050	0.0031	0.0050	0.0036	0.0056	0.0057	0.0061	0.0065	0.0061	0.0060	0.0065
Conscientiousness	0.0041	0.0045	0.0033	0.0045	0.0031	0.0052	-0.0043	0.0047	-0.0046	0.0047	-0.0023	0.0051
Emotional stability	-0.0071†	0.0043	-0.0087*	0.0043	-0.0085	0.0049	-0.0065	0.0047	-0.0059	0.0047	-0.0072	0.0050
Openness	-0.0041	0.0044	-0.0029	0.0044	-0.0032	0.0051	0.0069	0.0048	0.0072	0.0048	0.0069	0.0051
Intercept	55.5373**	1.8609	56.4108**	2.0126	55.9323**	2.0323	58.6669**	1.6765	58.5207**	1.7816	59.0299**	1.7471
Random component estimates												
Var(Intercept) ($\hat{\psi}_{11}$)	80.21		112.72		109.92		78.64		100.3771		92.00	
Var(income) ($\hat{\psi}_{22}$)	–		0.001		–		–		.0008		–	
Var(Hours worked) ($\hat{\psi}_{33}$)	–		–		0.020		–		–		.0161	
Cov(Inter., income) ($\hat{\psi}_{12}$)	–		-0.329		–		–		-.2180		–	
Cov(Inter., hours) ($\hat{\psi}_{13}$)	–		–		-0.926		–		–		-.6531	
Residual variance ($\hat{\sigma}^2$)	89.430		89.027		86.748		99.67		99.33		97.97	
Log likelihood	-115,135.18		-115,060.33		-115,011.51		-134495.33		-134451.42		-134434.50	
LR test statistic[a]	343.2		95.9		193.49		177.88		55.50		89.36	
χ^2 critical value at 5%	11.1		7.8		7.8		11.1		7.8		7.8	

a: $(-2(\ln L_1 - L_0))$

Table A4: Principal component analysis for personality traits

Extraversion (n=10927[1], retained factors = 2, paramteres=11)				
Factors	**Eigenvalues**	**Difference**	**Proportion**	**Cumulative**
Factor 1	1.92722	0.06897	0.3212	0.3212
Factor 2	1.85825	.	0.3097	0.6309
Correlation between the Factor 1 and Factor 2: 0.6902				
Factor loadings				
Variables	Factor 1	Factor 2	Uniqueness	
Talkative	0.7512	-0.2634	0.3663	
Quiet	-0.4592	0.6223	0.4019	
Extroverted	0.7389	-0.0719	0.4489	
Shy	-0.2274	0.8283	0.2622	
Bashful	0.0462	0.8407	0.2911	
Lively	0.7432	-0.0595	0.4441	
Emotional Stability (n=11022, retained factor=1, parameters=6)				
Factors	**Eigenvalues**	**Difference**	**Proportion**	**Cumulative**
Factor1	3.04257		0.5071	0.5071
	Factor 1	Factor 2	Uniqueness	
Factor loadings				
Variables	Factor 1	Factor 2	Uniqueness	
Envious	0.6711		0.5496	
Moody	0.7677		0.4107	
Jealous	0.7227		0.4778	
Temperamentful	0.7481		0.4404	
Fretful	0.6552		0.5707	
Touchy	0.7012		0.5083	
Conscientiousness (n=11015, retained factors=2, parameters=11)				
Factors	**Eigenvalues**	**Difference**	**Proportion**	**Cumulative**
Factor1	2.15487	0.34909	0.3591	0.3591
Factor 2	1.80579	.	0.301	0.6601
Correlation between the Factor 1 and Factor 2: 0.6386				
Factor loadings				
Variables	Factor 1	Factor 2	Uniqueness	
Orderly	-0.3907	0.7276	0.3179	
Systematic	0.0122	0.8829	0.2204	
Inefficient	0.7673	-0.13	0.3943	
Sloppy	0.806	-0.0988	0.3406	
Disorganised	0.7588	-0.2678	0.3526	
Inefficient	-0.4335	0.6313	0.4135	
Openness (n=10950, retained factors=2, parameters=11)				
Factors	**Eigenvalues**	**Difference**	**Proportion**	**Cumulative**
Factor1	1.95079	0.12312	0.3251	0.3251
Factor2	1.82768	.	0.3046	0.6297
Correlation between the Factor 1 and Factor 2: 0.676				
Factor loadings				
Variables	Factor 1	Factor 2	Uniqueness	
Deep	0.7684	0.1225	0.3946	
Philosophical	0.684	0.2371	0.476	
Creative	0.0672	0.9006	0.1844	
Imaginary	0.1608	0.8868	0.1878	
Complex	0.7552	0.0514	0.4271	
Intellectual	0.5403	0.3954	0.5518	
Agreeableness (n=11145, retained factors=1, parameters=4)				
Factors	**Eigenvalues**	**Difference**	**Proportion**	**Cumulative**
Factor1	2.42242	.	0.6056	0.6056
Factor loadings				
Variables	Factor 1	Factor 2	Uniqueness	
Sympathetic	0.7595		0.4231	
Kind	0.8207		0.3265	
Cooperative	0.7252		0.4741	
Warm	0.8038		0.3539	

Note: Table displays retained factors after matrix rotation.
1: Full sample of individuals for whom personality data is available.

Table A5: Sensitivity analysis: Alternative income (Y) definitions used in OLS models

	Men			Women		
	$\frac{Y}{1000}$	$\ln Y$	$\frac{Y}{\sqrt{N_H}}$	$\frac{Y}{1000}$	$\ln Y$	$\frac{Y}{\sqrt{N_H}}$
	(1)	(2)	(3)	(4)	(5)	(6)
Household income interacted with personality traits						
Household income	0.075***	1.488	0.139***	0.022	2.376*	0.035
	0.024	1.715	0.047	0.022	1.435	0.049
Extroversion	0.001	0.062	0.007	-0.003	-0.242	-0.003
	0.003	0.207	0.005	0.002	0.148	0.004
Agreeableness	-0.002	-0.277	-0.003	0.001	-0.16	0.003
	0.003	0.248	0.006	0.003	0.215	0.007
Conscientiousness	-0.004	-0.164	-0.010*	0	0.14	-0.002
	0.003	0.217	0.005	0.002	0.164	0.005
Emotional stability	-0.003	0.118	-0.008	-0.003	-0.09	-0.006
	0.003	0.24	0.006	0.002	0.164	0.005
Openness	-0.002	0.268	-0.006	0.005*	0.23	0.012**
	0.003	0.201	0.005	0.003	0.153	0.005
Constant	55.884***	54.167***	56.023***	58.953***	51.593***	59.338***
	2.547	6.777	2.555	2.153	5.583	2.249
Number of observations	30132	30072	30132	34794	34737	34794
Adjusted R-squared	0.19	0.19	0.19	0.18	0.18	0.18

Note: Robust standard errors are reported below each coefficient.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table A6: Sensitivity analysis: Alternative sample definitions used in OLS estimation

	Men				Women			
Selected variables	Benchmark model (1)	Year > 2005 (2)	All employed (3)	Married (4)	Benchmark (5)	Year > 2005 (6)	All employed (7)	Married (8)
Personality traits								
Extroversion	1.190***	1.019***	0.795**	0.592	1.133***	0.910***	0.575*	1.298***
	0.307	0.363	0.404	0.389	0.212	0.257	0.307	0.272
Agreeableness	1.676***	1.457***	1.554***	1.496***	1.427***	1.710***	1.748***	1.375***
	0.36	0.434	0.519	0.455	0.281	0.353	0.438	0.365
Conscientiousness	1.199***	1.337***	1.696***	1.324***	0.504**	0.413	0.409	0.248
	0.321	0.381	0.433	0.391	0.237	0.312	0.321	0.304
Emotional stability	1.987***	2.245***	1.591***	1.881***	2.266***	1.981***	2.053***	1.980***
	0.342	0.401	0.433	0.455	0.245	0.302	0.342	0.317
Openness	-0.271	-0.228	-0.788*	-0.17	-0.765***	-0.684**	-1.169***	-1.092***
	0.329	0.391	0.445	0.43	0.239	0.299	0.328	0.312
Household income interacted with personality traits								
Household income (/1000)	0.075***	0.070**	0.087***	0.052*	0.022	0.014	0.017	-0.015
	0.024	0.027	0.026	0.031	0.022	0.022	0.026	0.028
Extroversion	0.001	0	0.001	0.001	-0.003	0	0	-0.005*
	0.003	0.003	0.003	0.003	0.002	0.002	0.003	0.003
Agreeableness	-0.002	0	-0.003	0	0.001	-0.001	0	0.001
	0.003	0.003	0.003	0.004	0.003	0.004	0.003	0.004
Conscientiousness	-0.004	-0.004	-0.006**	-0.007**	0	0.001	-0.002	0.003
	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.003
Emotional stability	-0.003	-0.004	-0.004	0.001	-0.003	-0.002	-0.002	0
	0.003	0.003	0.003	0.004	0.002	0.002	0.002	0.003
Openness	-0.002	-0.003	-0.002	-0.003	0.005*	0.003	0.006**	0.008**
	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Total work-hours interacted with personality traits								
Total work hours	0.018	0.05	-0.112	0.017	-0.039	-0.006	-0.153*	-0.097
	0.054	0.069	0.073	0.069	0.058	0.072	0.079	0.073
Extroversion	-0.003	0.002	0.004	0.006	-0.003	0	0.006	-0.005
	0.006	0.008	0.008	0.008	0.006	0.007	0.008	0.007
Agreeableness	0.007	0.009	0.011	0.003	-0.001	-0.003	-0.008	0.007
	0.008	0.009	0.01	0.01	0.009	0.01	0.011	0.011
Conscientiousness	-0.001	-0.009	-0.009	0.002	0	-0.006	0.009	0.002
	0.007	0.008	0.009	0.009	0.006	0.008	0.008	0.008
Emotional stability	-0.008	-0.015*	0.003	-0.015	-0.004	-0.002	0.001	-0.006
	0.007	0.008	0.008	0.009	0.007	0.008	0.009	0.009
Openness	-0.007	-0.005	0.003	-0.008	0.007	0.005	0.014*	0.008
	0.007	0.008	0.008	0.009	0.007	0.008	0.008	0.008
Constant	55.884***	54.232***	59.464***	60.095***	58.953***	58.770***	64.016***	63.737***
	2.547	3.141	3.73	3.726	2.153	2.719	3.375	3.084
Number of observations	30132	12401	21633	20484	34794	14403	20484	21991
Adjusted R-squared	0.19	0.18	0.17	0.16	0.18	0.17	0.15	0.15

Note: Robust standard errors are reported below each coefficient. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A7: Added variable Wald test for the full sample

Stepwise inclusion of block of variables	F	Block DF	Residual DF	P-value	R^2	Δ R^2
Men						
Age	62.703	7	5268	0	0.041	–
Marital status	53.447	3	5268	0	0.063	0.022
Region	3.762	3	5268	0.010	0.064	0.001
Demography	2.463	4	5268	0.043	0.065	0.001
Health	113.585	4	5268	0	0.103	0.038
Life events	41.591	6	5268	0	0.123	0.020
Employment status	20.879	3	5268	0	0.128	0.005
Education	0.260	6	5268	0.956	0.128	0
Industry	2.198	17	5268	0.003	0.130	0.002
Occupation	0.570	7	5268	0.781	0.130	0
Time dummy variables	7.910	6	5268	0	0.131	0.001
Personality	106.611	5	5268	0	0.185	0.054
Income	18.598	1	5268	0	0.188	0.003
Income*personality	1.966	5	5268	0.080	0.188	0.001
Work-hours	16.495	1	5268	0	0.189	0.001
Work-hours*personality	0.599	5	5268	0.701	0.189	0
Including partner's personality traits and difference in wages and salaries						
All variables	15.233	82	3243	0	0.163	–
Partner's personality	11.782	5	3243	0	0.172	0.009
Wage difference between partners	5.345	1	3243	0.021	0.172	0
Women						
Age	40.497	7	6017	0	0.025	–
Marital status	91.975	3	6017	0	0.054	0.029
Region	13.696	3	6017	0	0.057	0.003
Demography	1.916	4	6017	0.105	0.058	0
Health	165.715	4	6017	0	0.106	0.048
Life events	42.031	6	6017	0	0.120	0.015
Employment status	9.714	3	6017	0	0.122	0.002
Education	0.780	6	6017	0.585	0.122	0
Industry	2.754	17	6017	0	0.124	0.002
Occupation	1.098	7	6017	0.361	0.124	0
Time dummy variables	14.106	6	6017	0	0.126	0.002
Personality	114.434	5	6017	0	0.175	0.049
Income	37.135	1	6017	0	0.178	0.003
Income*personality	2.255	5	6017	0.046	0.178	0.001
Work-hours	27.128	1	6017	0	0.180	0.001
Work-hours*personality	0.428	5	6017	0.830	0.180	0
Including partner's personality traits and difference in wages and salaries						
All variables	15.709	82	3255	0	0.156	–
Partner's personality	11.093	5	3255	0	0.164	0.008
Wage difference between partners	0.249	1	3255	0.618	0.164	0

Table A8: T-test income and hours worked differences, by personality

	Personality score < 3			**Personality score > 5**			Δ^4
	μ_0^1	σ_0^2	N_0^3	μ_1^1	σ_1^2	N_1^3	p-value
Men							
Extraversion							
Income[5]	73.754	45.177	6179	70.279	49.619	1454	0.010
Hours worked	34.852	21.730	6179	34.680	23.171	1454	0.788
Agreeableness							
Income	69.784	46.064	14705	50.113	40.675	80	0.000
Hours worked	32.871	22.485	14705	28.225	28.207	80	0.066
Conscientiousness							
Income	71.045	53.273	12097	68.596	36.288	330	0.407
Hours worked	32.357	22.491	12097	35.733	22.348	330	0.007
Emotional Stability							
Income	69.739	54.719	11567	64.175	59.352	464	0.032
Hours worked	31.080	22.993	11567	32.705	23.962	464	0.136
Openness to Experience							
Income	70.182	40.988	3342	63.689	38.443	2178	0.000
Hours worked	33.941	21.506	3342	29.752	23.640	2178	0.000
Women							
Extraversion							
Income	72.552	51.208	4437	69.549	41.977	1801	0.027
Hours worked	20.001	19.083	4437	17.626	18.818	1801	0.000
Agreeableness							
Income	68.265	53.935	10695	58.012	36.993	228	0.004
Hours worked	18.088	18.825	10695	15.096	19.229	228	0.018
Conscientiousness							
Income	71.397	56.822	10420	67.247	34.763	348	0.176
Hours worked	17.698	18.760	10420	22.825	19.972	348	0.000
Emotional Stability							
Income	70.990	58.201	11086	59.686	34.474	362	0.000
Hours worked	17.740	18.693	11086	13.959	17.696	362	0.000
Openness to Experience							
Income	72.622	45.319	3979	64.036	42.186	1841	0.000
Hours worked	20.341	19.212	3979	16.045	18.543	1841	0.000

1: μ_1, μ_2: mean income or hours worked; 2: σ_1 and σ_2: standard deviation of μ_1 and μ_2; 2: σ_1 and σ_2: standard deviation of μ_1 and μ_2, respectively.
3: N_1 and N_2: number of individuals for each group. 4: P-value of H_0: $\mu_0 - \mu_2$.
5: Income is reported as income divided by 1000.

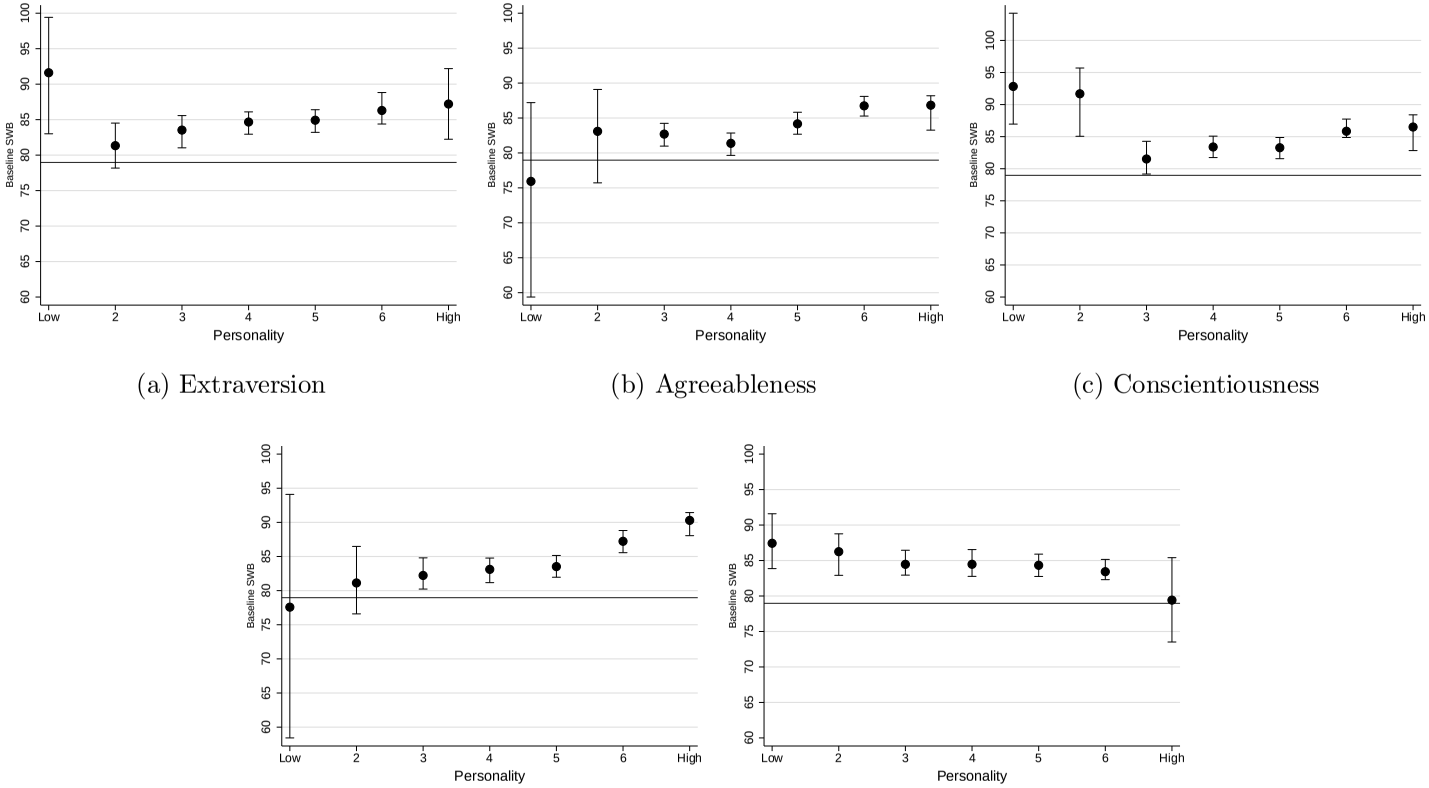
HILDA Wave 5 Personality Trait Items

B19 How well do the following words describe you? For each word, cross one box to indicate how well that word describes you. There are no right or wrong answers.

*(Cross ☒ **one** box for **each** word.)*

	Does not describe me at all 1	2	3	4	5	6	Describes me very well 7
talkative	☐	☐	☐	☐	☐	☐	☐
sympathetic	☐	☐	☐	☐	☐	☐	☐
orderly	☐	☐	☐	☐	☐	☐	☐
envious	☐	☐	☐	☐	☐	☐	☐
deep	☐	☐	☐	☐	☐	☐	☐
withdrawn	☐	☐	☐	☐	☐	☐	☐
harsh	☐	☐	☐	☐	☐	☐	☐
systematic	☐	☐	☐	☐	☐	☐	☐
moody	☐	☐	☐	☐	☐	☐	☐
philosophical	☐	☐	☐	☐	☐	☐	☐
bashful	☐	☐	☐	☐	☐	☐	☐
kind	☐	☐	☐	☐	☐	☐	☐
inefficient	☐	☐	☐	☐	☐	☐	☐
touchy	☐	☐	☐	☐	☐	☐	☐
creative	☐	☐	☐	☐	☐	☐	☐
quiet	☐	☐	☐	☐	☐	☐	☐
cooperative	☐	☐	☐	☐	☐	☐	☐
sloppy	☐	☐	☐	☐	☐	☐	☐

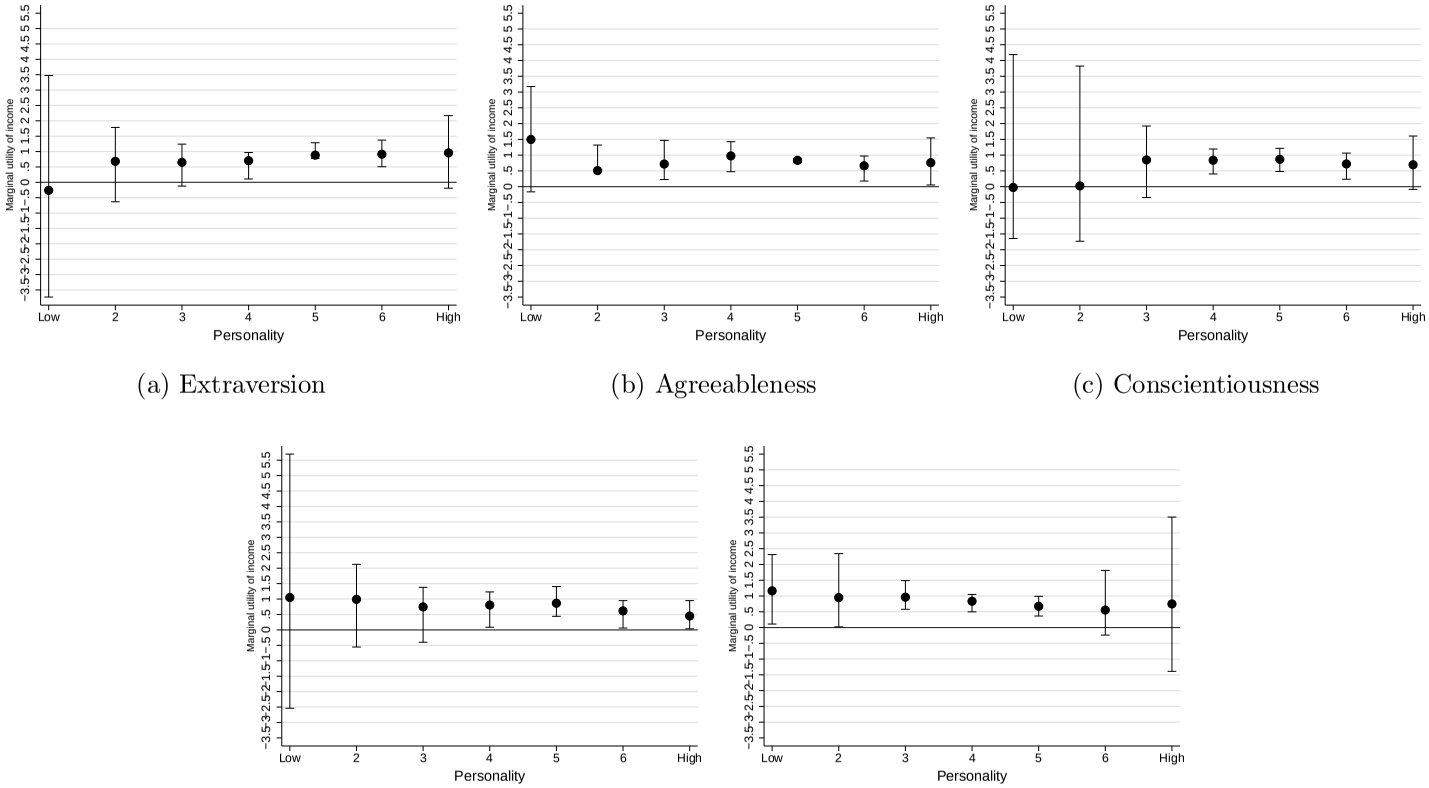
	Does not describe me at all 1	2	3	4	5	6	Describes me very well 7
jealous	☐	☐	☐	☐	☐	☐	☐
intellectual	☐	☐	☐	☐	☐	☐	☐
extroverted	☐	☐	☐	☐	☐	☐	☐
cold	☐	☐	☐	☐	☐	☐	☐
disorganised	☐	☐	☐	☐	☐	☐	☐
temperamental	☐	☐	☐	☐	☐	☐	☐
complex	☐	☐	☐	☐	☐	☐	☐
shy	☐	☐	☐	☐	☐	☐	☐
warm	☐	☐	☐	☐	☐	☐	☐
efficient	☐	☐	☐	☐	☐	☐	☐
fretful	☐	☐	☐	☐	☐	☐	☐
imaginative	☐	☐	☐	☐	☐	☐	☐
enthusiastic	☐	☐	☐	☐	☐	☐	☐
selfish	☐	☐	☐	☐	☐	☐	☐
careless	☐	☐	☐	☐	☐	☐	☐
calm	☐	☐	☐	☐	☐	☐	☐
traditional	☐	☐	☐	☐	☐	☐	☐
lively	☐	☐	☐	☐	☐	☐	☐



(a) Extraversion (b) Agreeableness (c) Conscientiousness

(d) Emotional stability (e) Openness

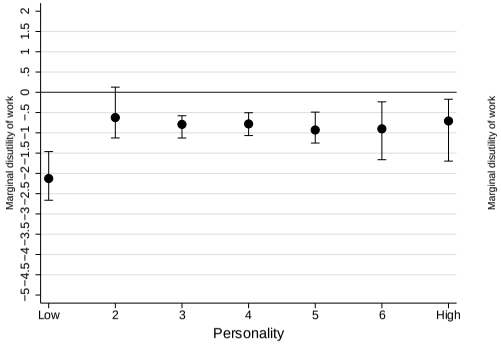
Figure 8: RCM: Baseline SWB by each personality dimension, for men



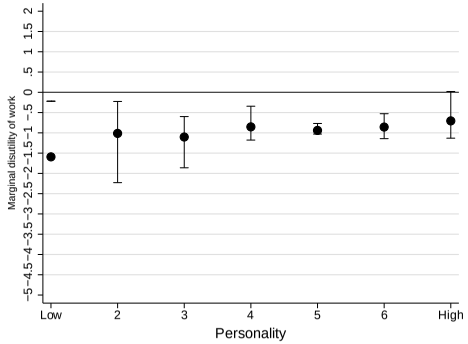
(a) Extraversion (b) Agreeableness (c) Conscientiousness

(d) Emotional stability (e) Openness

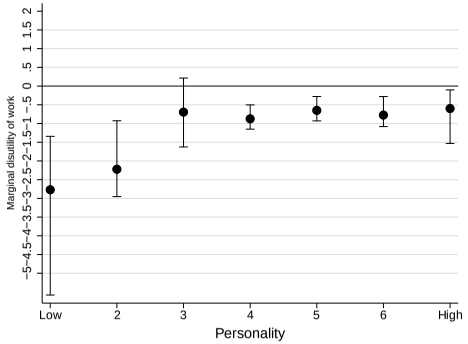
Figure 9: RCM: Marginal utility of income by each personality dimension, for men



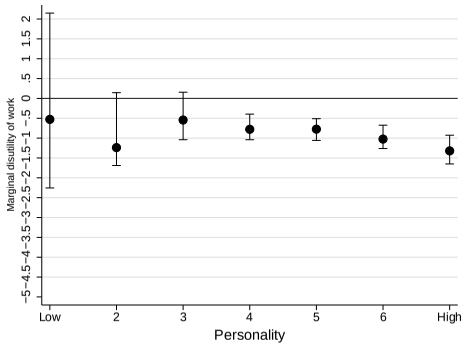
(a) Extraversion



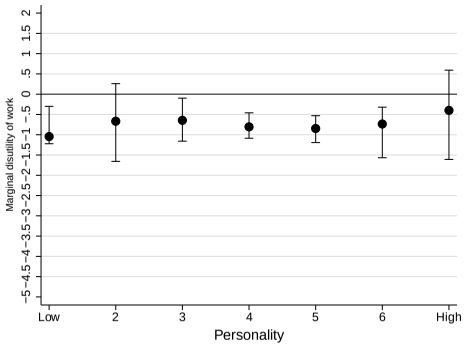
(b) Agreeableness



(c) Conscientiousness

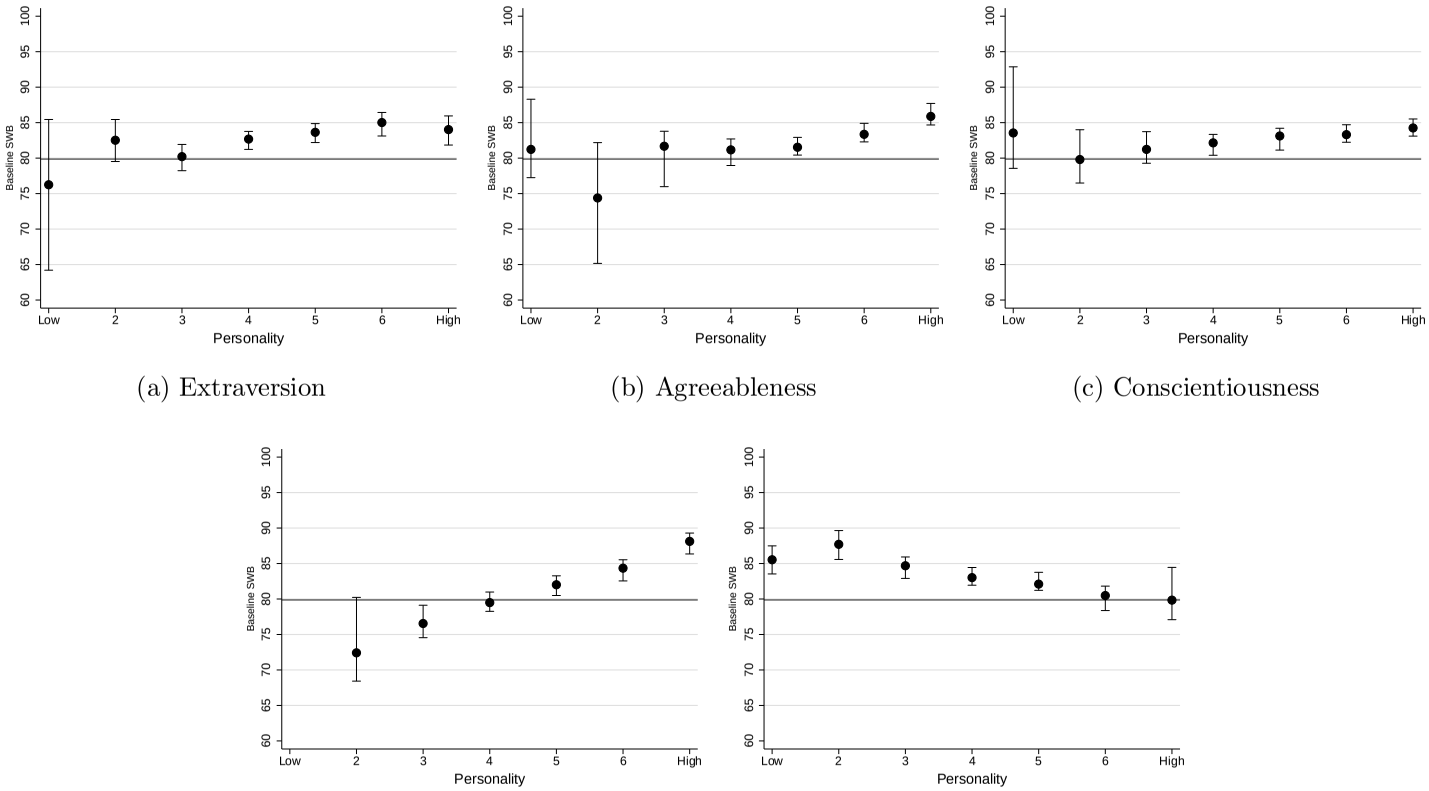


(d) Emotional stability



(e) Openness

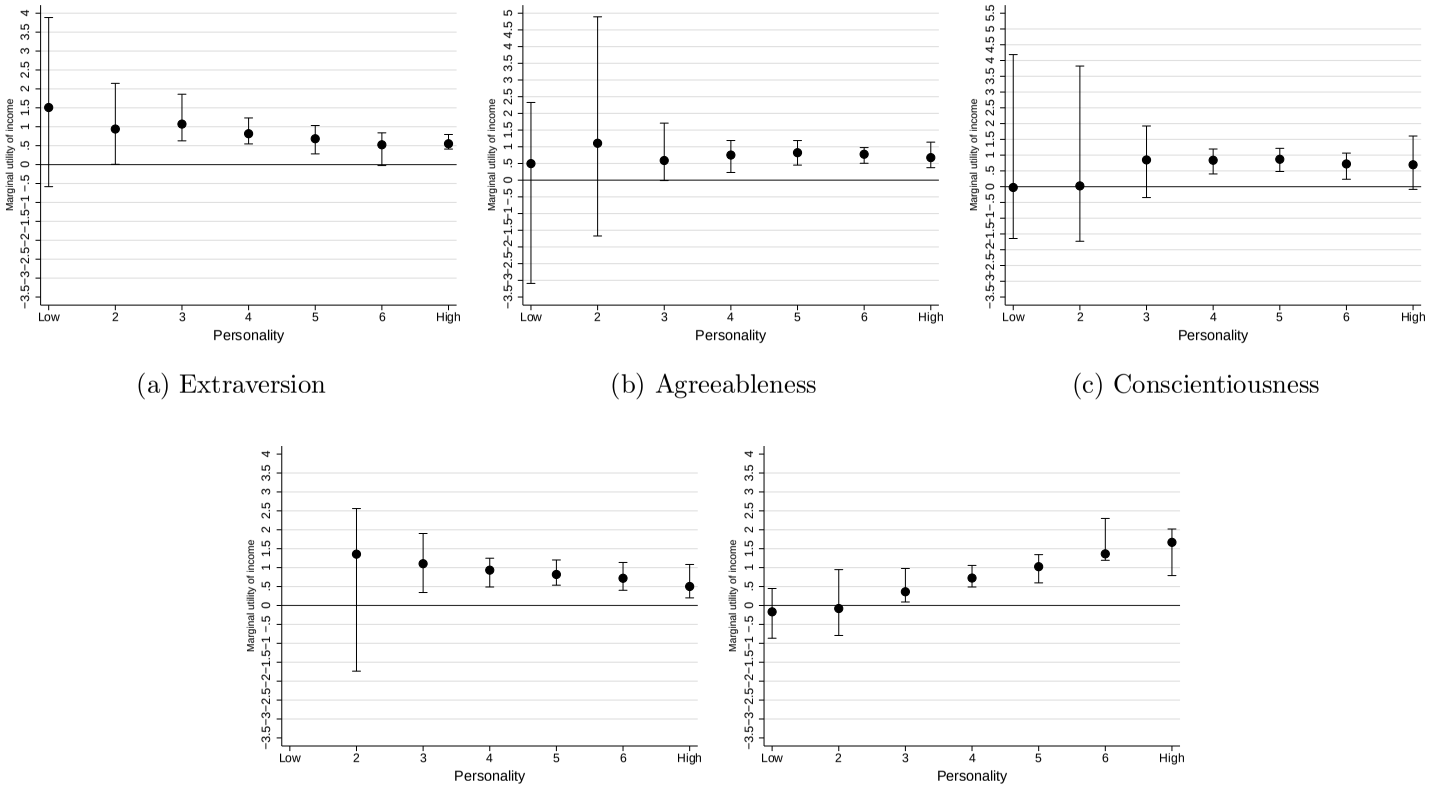
Figure 10: RCM: Marginal disutility of work by each personality dimension, for men



(a) Extraversion (b) Agreeableness (c) Conscientiousness

(d) Emotional stability (e) Openness

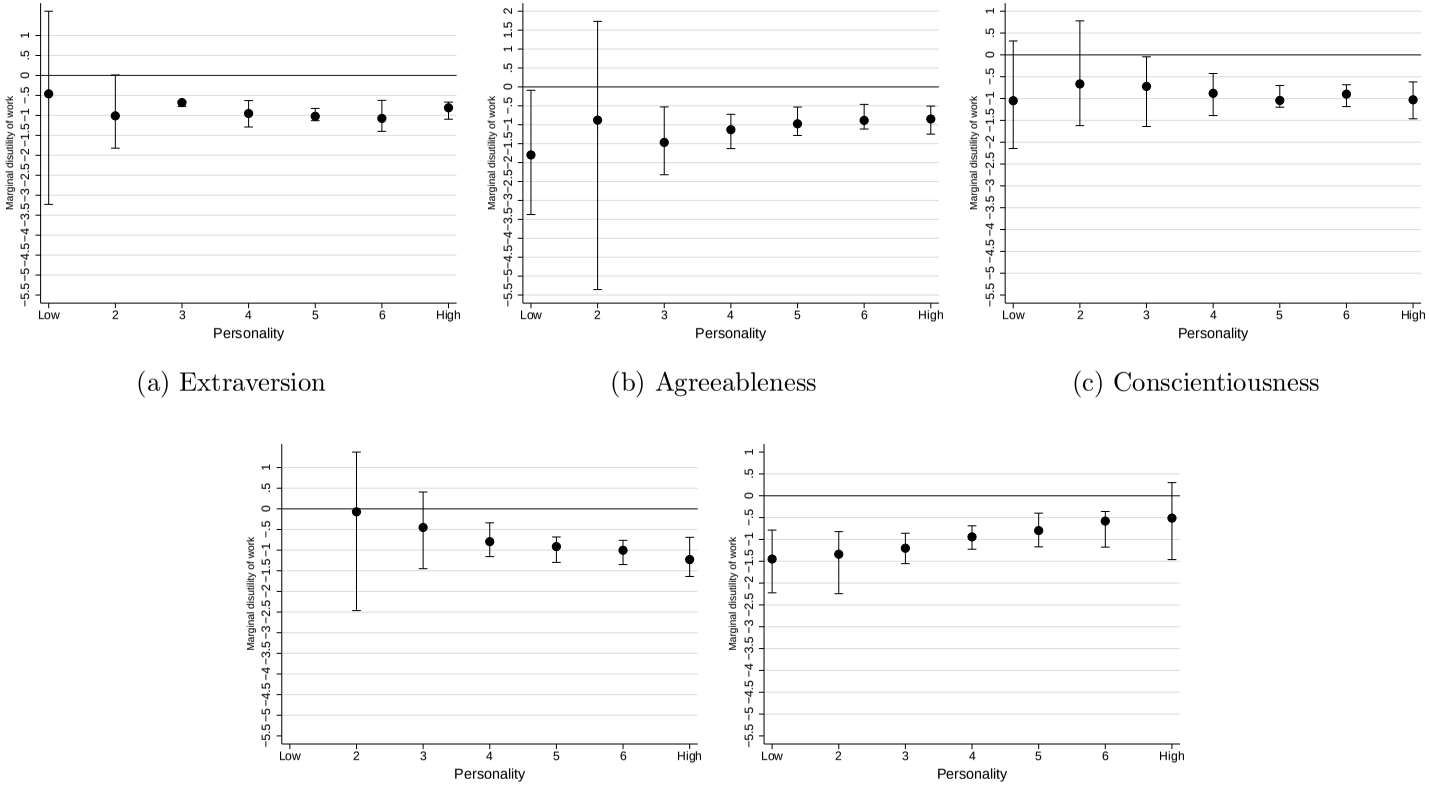
Figure 11: RCM: Baseline SWB by each personality dimension, for women



(a) Extraversion (b) Agreeableness (c) Conscientiousness

(d) Emotional stability (e) Openness

Figure 12: RCM: Marginal utility of income by each personality dimension, for women



(a) Extraversion (b) Agreeableness (c) Conscientiousness

(d) Emotional stability (e) Openness

Figure 13: RCM: Marginal disutility of work by each personality dimension, for women