DISCUSSION PAPER SERIES

Are Personality Traits Really Fixed and Does It Matter?

Steven Stillman
Malathi Velamuri

DISCUSSION PAPER SERIES

Are Personality Traits Really Fixed and Does It Matter?

Steven Stillman
Free University of Bozen-Bolzano and IZA

Malathi Velamuri
Chennai Mathematical Institute

ABSTRACT

Are Personality Traits Really Fixed and Does It Matter?*

A nascent but burgeoning literature examines the importance of non-cognitive skills in determining success across many facets of life. The majority of these papers treat these skills as fixed traits for adults. We estimate the impact of a number of life events on the Big Five personality traits and locus of control. A subset of life events have large impacts on these non-cognitive skills, especially on locus of control. For some events, these impacts persist in the medium-run. We then demonstrate that treating personality traits as fixed can lead to biased estimates of their relationship with socioeconomic outcomes.

Corresponding author:
Steven Stillman
Faculty of Economics and Management
Free University of Bozen-Bolzano
Piazza Università, 1
39100 Bozen-Bolzano
Italy

E-mail: steven.stillman@unibz.it

1 Introduction

There is a vast literature on the central role of cognitive ability in determining success across many facets of life. A nascent but burgeoning literature underscores the additional importance of non-cognitive skills, typically measured as personality traits such as the 'Big Five' or locus of control (LoC).[1,2] There is an enduring debate among psychologists regarding the stability of personality traits.[3] Two influential studies by Cobb-Clark and Schurer (2012, 2013) examine the stability of LoC and the Big Five, respectively, using longitudinal data on a representative sample of Australians. They find that these traits are stable for prime-age adults over a four-year period and that within-individual changes are generally unrelated to adverse life events.[4]

Researchers examining the relationship between non-cognitive skills and socioeconomic outcomes have generally used cross-sectional methods and argued that omitted variable bias and reverse causality can be ruled out because non-cognitive skills are set early in life.[5] In other words, these papers assume that personality can be treated the same way as embedded cognitive skills, such as IQ.[6] However, if life events that impact socioeconomic outcomes also impact non-cognitive skills, then cross-sectional regressions will produce biased estimates of the causal impact of non-cognitive skills. Getting an unbiased estimate would,

---

[1] See, for example, Heckman et al. (2006); Roberts et al. (2007); Cebi (2007); Heineck and Anger (2010); Lundberg (2012); Cobb-Clark and Schurer (2013); Coleman and DeLeire (2003); Cobb-Clark et al. (2014, 2016).

[2] Gutman and Schoon (2013) define non-cognitive skills as personality traits that are weakly correlated with cognitive skills and reflect 'relatively enduring patterns of thoughts, feelings, and behavior'. The terms 'non-cognitive skills' and 'personality traits' are used interchangeably in the economics literature, and we follow this custom. However, some authors caution against using the term 'non-cognitive skills' as it creates the impression of a dichotomy between cognitive skills and these traits, which is misleading (Borghans et al., 2008). Psychologists have developed a taxonomy of personality traits that are now well accepted across the social sciences. Prominent among these are the 'Big Five' - Openness to Experience (or Intellect/Culture), Conscientiousness, Extraversion, Agreeableness, and Emotional Stability (or Neuroticism) (Barrick and Mount, 1991). Economists have focused predominantly on the role of locus of control (LoC), which is a personality trait that captures an individual's perception regarding how much control she has over her life (Almlund et al., 2011; Rotter, 1966; Gatz and Karel, 1993). People with 'internal' LoC believe that much of what happens to them is a consequence of their own actions, while those who are 'external' believe that forces beyond their control are the main determinants.

[3] Roberts et al. (2006) offer a meta-analysis of the literature. Initial research suggested that personality traits become stable by early adulthood (Costa Jr and McCrae, 1997; Costa and McCrae, 1988). However, more recent evidence suggests that these traits continue to develop and change over the life course. Yet it is unclear if these changes relate solely to the aging process or are determined by life experiences as well (Almlund et al., 2011; Roberts and Mroczek, 2008; Mazure et al., 2000).

[4] Elkins et al. (2017) examine changes in the Big Five and LoC traits of adolescents and young individuals aged 15-24 over eight years and find that even among this age group, most personality traits show little variation.

[5] See, for instance, Semykina and Linz (2007); Cebi (2007); Brown and Taylor (2014); Lundberg (2013); Proto and Rustichini (2015); Le Moglie et al. (2015).

[6] Recent evidence indicates that educational investments affect IQ, long considered an innate aspect of cognition (Brinch and Galloway, 2012). However, this appears to be mostly true only during adolescence.

in fact, be quite challenging. For example, one would need to examine an experiment, policy or exogenous event that affects non-cognitive skills, but does not directly impact socioeconomic outcomes, or to control for every important event that a person experiences in their lifetime, which in most cases will be an impossible task.

In this paper, we use sixteen waves of the nationally representative, longitudinal Household, Income and Labour Dynamics in Australia (HILDA) survey data to estimate the impact of eighteen positive and negative life events on the Big Five and LoC for a sample of prime-age adults.[7] Our analysis has three components. First, using an individual fixed effects model, we examine whether personality traits change after experiencing any of these events, controlling for anticipation effects for each event. As long as experiencing these events is unrelated to time-varying unobservable characteristics that influence personality traits, this approach will give us unbiased estimates of the impact of life events on personality traits.[8] Second, we focus on four events that have large impacts on personality and are quite prevalent, and examine the impact of these events on the temporal path of adjustment of personality traits in the short and medium-run. Finally, we examine the cross-sectional relationship between personality traits and personal income, varying how traits are measured. The goal of this latter analysis is to examine whether treating non-cognitive skills as fixed is likely to lead to biased estimates of the relationship between these skills and socioeconomic outcomes.

We find that more than one-quarter of the events that we examine have significant impacts on personality for both men and women. The magnitudes of these effects can be large, especially for impacts on LoC and, to a lesser extent, agreeability and emotional stability. For example, experiencing major financial problems lowers LoC for men by 0.24 standard deviations (SDs), conscientiousness by 0.06 SDs and emotional stability by 0.08 SDs. The events with larger impacts include marital separation, major financial problems, being a victim of a violent crime and retirement for men, and major financial problems, suffering a serious illness or injury, the death of a spouse or child and getting married for women. We focus on four events that are both common and have large effect sizes: marital separation, major financial problems, serious illness or injury, and retirement. We show that, for some of these events, the impacts on personality last more than four years

---

[7]HILDA collects the Big Five and LoC every four years and asks individuals every year about events they have experienced in the past year. LoC was collected initially in two consecutive waves before becoming four-yearly, hence for each individual, we have up to five records for LoC and four for the Big Five.

[8]Recall that the literature suggests that there are unlikely to be time-varying unobservable characteristics that affect personality traits.

and, in the case of retirement for men and separation for women, even become larger over time.

We then demonstrate that the decision to treat personality traits as fixed can have large consequences for the estimated relationship between personality and total personal income. For example, a man with a one standard deviation more internalized LoC is estimated to have 0.21 SDs higher income if the LoC is measured using the mean across individual observations (the standard measure used in the literature), while the estimated impact is only 0.13 - 0.16 SDs if measures are used that reduce the likelihood of omitted variable bias. Our findings are qualitatively similar but quantitatively smaller when we examine the relationship between personality and income for women, and more generally when looking at the Big Five, which are, on average, less affected than LoC by the events we examine. Furthermore, when we estimate a fixed effects model of the relationship between personality and total personal income, we find that only LoC affects income for men and only openness affects income for women, and in both cases, the estimated relationships are quite weak. These are likely lower bound estimates as measurement error bias is exacerbated in fixed effects models, leading to attenuation towards zero effects.[9]

To our knowledge, ours is the first paper that examines the impact of a wide range of life events on the Big Five and LoC among adults, and demonstrates that treating personality traits as fixed can lead to biased estimates of their relationship with socioeconomic outcomes. The most comparable paper to ours is Marsaudon (2019), which uses the German Socioeconomic Panel (GSOEP) to examine the impact of different health shocks on LoC ten years later. Consistent with our findings, it finds that LoC declines in the medium-run for individuals who experience a health shock. Our paper hence makes an important contribution to the literature on the determinants and stability of non-cognitive skills, and the literature on the socioeconomic returns to non-cognitive skills.

_____

[9]Results are quite similar for men and even stronger for women if we instead examine the relationship between personality and life satisfaction. Interestingly, here we still find a strong significant relationship between personality and life satisfaction when estimating fixed effects models, with the impact of LoC about one-third the size as in the cross-section but that of extroversion, conscientiousness and emotional stability nearly the same size. These results suggest that our fixed effects estimates for the impact of personality on income might be unbiased since the attenuation bias issue should be of the same magnitude in these estimates.

2 Data

The Household, Income and Labour Dynamics in Australia (HILDA) survey began in 2001 and has since been administered annually. HILDA interviews all adult members (aged 15 and over) in over 7,500 sample households and collects information about economic and subjective well-being, labor market dynamics and family dynamics. Individuals in sample households are followed over time regardless to whether they remain in the original households. Four survey instruments are included in HILDA: a Household Form and a Household Questionnaire are completed during a personal interview with one adult member of each household; a Person Questionnaire is administered to all adult household members; and a Self-Completion Questionnaire (SCQ) is provided to all respondents to the Person Questionnaire and is collected at a later date or returned by post.

The SCQ elicits subjective responses to an array of sensitive questions, including the occurrence of various life events and questions that are used to calculate LoC and the Big Five. Starting in the second wave (2002), the following question was added to the SCQ: "We now would like you to think about major events that have happened in your life over the past 12 months. For each statement cross either the YES box or the NO box to indicate whether each event happened during the past 12 months. Twenty-one major events are then listed below the question. We consider the impact of eighteen life events - a mix of negative and positive events - in our analysis.[10] Table 1 lists the events we consider and shows their prevalence by gender. Many of the negative events are likely to have limited anticipation, for example being a victim of a violent crime, while most of the positive events, such as marriage or birth of a child, are clearly anticipated. In our analysis, we control for anticipation effects for all events. Some events - like changing one's residence or job - are extremely common, while others, such as the death of a spouse or child are, fortunately, very rare. Prevalence rates for most events are similar for men and women, with the exception of employment-related events, which are more common for men.

Locus of control (LoC) is measured in a SCQ module of seven questions which were asked in the 2003,

---

[10]We exclude pregnancy because birth of a child is already included as an event. We also exclude the end of marital separation since we include separation as an event and these are clearly linked. Finally, we leave out own incarceration as this is an extremely rare event.

2004, 2007, 2011 and 2015 waves.[11] The questions are in the form of statements asserting a higher or lower degree of autonomy over one's life.[12] Respondents were required to agree or disagree with each assertion on a scale of 1-7, with higher numbers indicating more agreement. We follow the standard approach in the literature and reverse code the responses to some statements such that for all responses, a higher number implies a more internal LoC, and then add them together to get LoC on a range from 7-49. As is common practice in the literature, we then standardized this index so that mean LoC in the full HILDA sample that responds to these questions is 0 and the SD is 1.

The Big-Five personality traits are measured using a 36-item personality inventory module based on the approach proposed by Goldberg (1992) and Saucier (1994). This module was part of the SCQ questionnaire in the 2005, 2009, 2013, 2017 waves.[13] Respondents are asked to self-report the degree to which each of 36 adjectives describe them, on a scale from 1 ("not at all") to 7 ("very well").[14] We aggregated the responses following the same approach used to measure the LoC. For ease of comparability with the LoC and estimates in the literature, we also standardized these indices such that the mean of each Big Five component in the full HILDA sample that responds to these questions is 0 and the SD is 1.

We use the 2002 to 2017 waves of HILDA in this paper, dropping 2001 because the question on life events was not asked. We included the top-up sample, added in 2011 to the original 2001 sample, to accommodate evolving changes to the Australian population.[15] We first define our target population as all individuals aged 25-64 who are not Aboriginal or Torres Strait Islanders (162,143 individual-year observations). We then

---

[11]These seven questions correspond to the original items developed by Pearlin and Schooler (1978) for the Psychological Coping Resources component of the Mastery Module.

[12]The statements were: (1) "I have little control over the things that happen to me"; (2) "There is really no way I can solve some of the problems I have"; (3) "There is little I can do to change many of the important things in my life"; (4) "I often feel helpless in dealing with the problems of life"; (5) "Sometimes I feel that Im being pushed around in life"; (6) "What happens to me in the future mostly depends on me"; (7) "I can do just about anything I really set my mind to do"

[13]Openness - People who like to learn new things and enjoy new experiences usually score high in openness. Openness includes traits like being insightful and imaginative and having a wide variety of interests; Conscientiousness - People with a high degree of conscientiousness are reliable and prompt. Traits include being organized, methodical, and thorough. Extraversion - Extraverts get their energy from interacting with others, while introverts get their energy from within themselves. Extraversion includes the traits of being energetic, talkative, and assertive. Agreeableness - These individuals are friendly, cooperative, and compassionate. Traits include being kind, affectionate, and sympathetic. Neuroticism - Neuroticism is also sometimes called Emotional Stability. People that score high on neuroticism often experience emotional instability and negative emotions. Traits include being moody and tense.

[14]For example, 'Extroversion' is measured using the responses to the following adjectives: talkative, quiet, extroverted, shy, lively and bashful; Agreeable is based on the adjectives sympathetic, kind, cooperative, warm; and so on. See Elkins et al. (2017) for a complete list of adjectives associated with each trait.

[15]For instance, Australians who were not in the country in 2001 but had since returned to settle in Australia as well as recent immigrants were added to the survey. See Watson (2011) for a description of the top-up sample.

drop 28,182 observations which are missing the information on life events (this is mainly individuals who do not fill out a SCQ in a particular year) and 7,073 observations for individuals who never report LoC or the Big Five while they are in the sample. This gives us an analysis sample of 126,888 observations. Since LoC and the Big Five are only periodically measured, our main analysis uses only the waves in the analysis sample where these questions are asked. This gives us 35,389 individual-year observations for our analysis of the impact of events on LoC and 28,192 observations for the impacts on the Big Five.[16] Appendix Table 1 presents summary statistics for the full prime-age sample and for each step in the sample selection procedure. Our analysis samples are representative of the prime-age Australian population across most measured characteristics.

3 Impacts of Life Events on LoC and the Big Five

3.1 Short-Term Impacts

We begin by estimating the impact of experiencing any life event on LoC and the Big Five in an individual fixed effects model, separately for men and women. Given that events are changes in experiences, this model is effectively an event history model. We start with a simple specification which compares an individual's personality after experiencing an event to that prior to the event, controlling for anticipation effects. Specifically, we estimate the following linear model:

$$PT_{i,t} = \Sigma_{k=1}^{18} \delta^k Event_{i,t+1}^k + \Sigma_{k=1}^{18} \beta^k After_{i,t}^k + X_{it}\lambda + \alpha_i + u_{it} \tag{1}$$

where PT_{it} is one of the six standardized personality trait measures (LoC and the Big Five) for individual i at time t, $Event_{i,t+1}^k$ is 1 if individual i experienced event k at time $t+1$, 0 otherwise, $After_{i,t}^k$ is 1 if time t is $\geq$ time j where an individual i experienced event k at time j, 0 otherwise, X_{it} are controls for a

---

[16]While we only use the waves where LoC and the Big Five are collected in our impact regressions, we use all the waves to define the timing of when individuals experience different life events, and for examining the relationship between personality and personal income.

quadratic in age, and year, region and geographic location (major city, inner region, outer region, remote) dummies and α_i is an individual fixed effect.

In Table 2 (men) and Table 3 (women), we present the estimates of β^k for LoC and the Big Five. The impact of each event is estimated by comparing personality in the years after experiencing an event k to personality for the same individual in all years more than one year prior to experiencing the event, controlling separately for the year prior to the event to allow for anticipation effects δ^k.[17] As all outcomes are standardized, the estimated coefficients can be interpreted as the impact of a particular event on standard deviations of the outcome variable. As we are following the same individuals over time, all standard errors are clustered at the individual level to allow for arbitrary serial correlation in outcomes for individuals.

Table 2 reveals that certain events have a wide-ranging impact on personality while others affect just one trait. Financial problems have notable effects on men's non-cognitive skills, making them more externalized, less conscientious and less emotionally stable. Financial improvement, on the other hand, increases emotional stability but does not impact other traits. The onset of a personal illness or injury also causes men to become more externalized and has detrimental effects on extroversion, conscientiousness and emotional stability while a family member's illness or injury reduces emotional stability but has no other effect. The birth or adoption of a child, normally considered a positive event, causes men to become *less* agreeable and open, while separation from a partner or spouse causes men to be more agreeable and open to new experiences. Among the events affecting LoC, experiencing a negative financial event has the most impact, lowering LoC by nearly a quarter of a SD, followed by retirement and crime victimization. These events generally have the largest impact on the Big Five as well, particularly on conscientiousness and emotional stability. The impact of retirement on LoC and agreeability is consistent with the evidence highlighted by Roberts et al. (2008) that stable social roles contribute to stability in personality traits.

The estimates for women in Table 3 reveal interesting similarities as well as differences. Similar to men, women become more externalized and less conscientious following a negative financial event but the effects

---

[17] Anticipation affects are likely if individuals are forward-looking and have information that allows them to predict future events with some degree of certainty. Clearly, some of the events in our analysis are anticipated - for instance marriage, birth or adoption of a child, retirement - while others are not. We do not find evidence to suggest that anticipations effects extends further back in time than one year, which is consistent with previous research, such as Frijters et al. (2011).

are smaller and this event does not affect their emotional stability. A sudden illness or injury to self also makes women more externalized, and this effect is about three times bigger than that for men. Unlike men, a family member's illness or injury makes women more externalized while increasing their openness, and the death of a child or spouse has a large detrimental effect on LoC and extroversion. Work promotions have an internalizing effect on women's LoC, relative to men. A notable result is that financial improvement also has a large positive impact on women's LoC, while this event has no effect on men's non-cognitive skills. Getting married causes women to become less agreeable and less emotionally stable, while this event does not impact men's traits.

To summarize, we find that over one-quarter of the events that we examine have significant impacts on personality for both men and women. The magnitudes of these effects can be large, especially for impacts on LoC and, to a lesser extent, agreeability and emotional stability. The events with larger impacts include marital separation, major financial problems, being a victim of a violent crime and retirement for men, and major financial problems, suffering a serious illness or injury, the death of a spouse or child and getting married for women. While these results indicate that these skills are not time invariant, they do not necessarily imply that they are not stable. If individuals adapt quickly to life events, in the sense of returning to baseline levels of these traits within a couple of years of experiencing an event, for example, they can still be assumed to be stable and the temporary fluctuations can be addressed using standard econometric techniques.

3.2 Temporal Impacts of Life Events on Traits

To examine whether our initial estimates are picking up short-run or longer-run impacts, we next focus on four events - marital separation, major financial problems, retirement and experiencing a serious illness or injury - that have large impacts on personality and are quite prevalent, and examine the impact of these events on the temporal path of adjustment of personality traits in the short and medium-run. Specifically, we now estimate a modified version of Equation 1:

$$PT_{i,t} = \Sigma_{k=1}^{4} \delta^k Event_{i,t+1}^k + \Sigma_{k=1}^{4} \beta_{01}^k After01_{i,t}^k + \Sigma_{k=1}^{4} \beta_{23}^k After23_{i,t}^k +$$

$$\Sigma_{k=1}^{4} \beta_{4}p^k After4p_{i,t}^k + X_{it}\lambda + \alpha_i + u_{it}$$

(2)

where $After_{i,t}^k$ is replaced by three variables, $After01_{i,t}^k$, $After23_{i,t}^k$ and $After4p_{i,t}^k$, which are 1 if individual i experienced an event k in $t-0$ or $t-1$, in $t-2$ or $t-3$, or more than $t-3$ years ago, respectively, and 0 otherwise. Otherwise, the model remains the same as in Equation 1.[18]

The results for men and women are presented in Figure 1. Here, we show the time path of adjustment for each personality trait when an individual experiences one of the four events relative to more than one year prior to the event, along with 95 percent confidence intervals.[19]. While the results for each event are presented in separate panels, these are jointly estimated in one regression model as in Equation 2. Again, all outcomes are standardized and confidence intervals are calculated using robust standard errors clustered at the individual level.

Figure 1 reveals that particular events have lasting impacts on certain traits. Specifically, a separation from their partner makes men more agreeable and open, effects that last for at least 2-3 years after the event. Experiencing financial problems has a negative impact on men's LoC, making them more externalized even after 4 years. These effects are sizable, with over a quarter of an SD reduction in LoC 2-3 years after the event. This event also has a long-term negative impact on conscientiousness for men. Our estimates are also consistent with the 'grumpy old man' hypothesis; retirement causes declines in LoC and agreeability which become larger over time.[20]

Women also appear to become more agreeable 2-3 years after separating from a partner. They experience a long-term positive impact on their emotional stability as well, following this event. Similar to men, women also become more externalized following a negative financial event and these effects linger, though their

---

[18]This model is estimated only including the four events discussed above. If we reestimate Equation 1 including only these four events instead of all eighteen events, our estimates are qualitatively unaffected. In other words, assuming these four events are independent from the rest does not bias our estimates.

[19]The corresponding point estimates are presented in Appendix Table 2 for men and Appendix Table 3 for women.

[20]This is retirement among men younger than 65 which is presumably voluntary for most.

impacts are smaller compared to men. In contrast to men who only experience a short-term effect on LoC following a personal illness or injury, women experience a persistent externalizing effect. Women do not experience any longer-term changes in personality following retirement.

In summary, some of the events we examine have large long-run impacts on the personality of men and women, with the impacts of retirement for men and separation for women even becoming bigger over time. This finding implies that regression estimates that treat personality traits as stable or exogenous to life experiences are likely to produce biased estimates. To illustrate this possibility, we next estimate the relationship between personality and income when personality is treated as fixed, as opposed to allow to vary over time.

4   The Relationship between LoC and the Big Five, and Personal Income

In order to test for the potential bias arising from treating personality traits as fixed, we estimate a cross-sectional regression model of the relationship between personality and personal income, controlling for standard human capital variables:

$$Income_{it} = \alpha + Personality_{it}\gamma + X_{it}\psi + v_{it} \tag{3}$$

where $Income_{it}$ is the real personal income of individual i at time t, standardized to mean 0 and standard deviation 1 across the full HILDA sample, $Personality_{it}$ includes LoC and the Big Five, and X_{it} includes controls for a quadratic in age, and education, year, region and geographic location dummies. LoC and the Big Five are measured in three ways, i) the mean across each time an individual reports the variable; ii) the first measure collected in the survey for each individual; and iii) a version which is updated each time an individual is resurveyed on the question.[21]

---

[21]Using the mean across individuals was recommended by Cobb-Clark and Schurer (2013) and Cobb-Clark et al. (2014) to reduce noise in data, and this measure has been used in several papers. For the third measure, we use the first reported LoC or Big Five score as the RHS variable in rounds 1 to $j-1$ where round j is the second time an individual reports LoC or the Big Five. We then update the variable using the new response until the next time the individual reports LoC or the Big Five, etc.

Table 4 presents the results from estimating this model. Each column represents a separate regression. Again, standard errors are clustered at the individual level. The first panel present the results for men, the second for women. In the first column of each panel, we report estimates from using the standard approach in the literature which assumes that personality traits are fixed; a one standard deviation more internal male has 0.21 SDs higher income, while the impact for women is 0.08 SDs. Being more extroverted, less agreeable, and more conscientious are positively associated with income for both men and women, and men who are less open earn more. A one SD change in personality traits are related to 0.02 to 0.10 SD higher income. For comparison, going from having no formal education to having a completed high school degree is associated with a 0.21 SD higher income for men and 0.14 higher income for women.

In the second and third columns of each panel, we show alternative results where personality is either i) treated as fixed after the first time it is observed for an individual or ii) updated each time an individual gives a new response. Neither of these approaches completely solves the omitted variable bias problem but both should give less biased cross-sectional results; in the first case, while measured personality is now contaminated by shocks that occur prior to the first time the trait is reported by an individual, future shocks do not affect the measure; in the second case, while measured personality is contaminated by shocks, each time it is updated, it accounts for how past shocks have influenced personality. In both cases, the estimated relationship between personality and income is smaller, particularly for LoC. For men, the relationship between LoC and personal income is 27-38 percent less while for women it is 30-42 percent less. The results for the relationship between the Big Five and income are qualitatively similar but the differences are much smaller in magnitude.

In the fourth column of each panel, we continue to use the updated version of LoC and the Big Five, but now control for individual fixed effects. Hence, we are now examining the relationship between changes in personality and changes in income. These results will be unbiased if the likelihood of experiencing certain events are fixed at the individual level - in other words, as long as there are no time-varying shocks that are correlated with personality and impact personal income. If we believe that personality is mostly a fixed trait that is likely to be affected only by large changes in circumstances, then as long as these changes are

not correlated with random shocks to personality, a fixed effects model should give us unbiased results.[22] A second issue with using a fixed effects model is that measurement error bias is exacerbated, leading to attenuation towards zero effects. For this reason, we should probably think of the estimates here as lower bound estimates.

These results are striking, now there is almost no estimated relationship between personality and income. For men, only LoC has a significant impact on income and this effect is small; a one SD increase in LoC leads to a 0.03 SD increase in income. For women, only openness has a small, significant impact on income; a one SD increase in LoC leads to a 0.02 SD increase in income. Our estimates all have small standard errors, so we can rule out anything beyond very weak relationships between personality and income. In Appendix Table 4, we present the same estimates for the relationship between personality and life satisfaction. The general results are quite similar for men and even stronger for women. Interestingly, here we still find a strong, significant relationship between personality and life satisfaction when estimating fixed effects models, with the impact of LoC about one-third the size as in the cross-section but that of extroversion, conscientiousness and emotional stability nearly the same size. These results suggest that our fixed effects estimates for the impact of personality on income might be unbiased, since the attenuation bias issue should be of the same magnitude in these estimates.

5   Conclusions

A nascent but burgeoning literature examines the relationship between non-cognitive skills and a wide range of socioeconomic outcomes. Most of these papers use cross-sectional methods arguing that omitted variable bias and reverse causality can be ruled out because non-cognitive skills are set early in life. However, if life events that impact socioeconomic outcomes also impact non-cognitive skills, then cross-sectional regressions will produce biased estimates of the causal impact of non-cognitive skills.

In this paper, we use sixteen waves of the HILDA survey data to estimate the impact of eighteen positive and

---

[22]It does seem possible that this assumption is violated - for example, a random decrease in emotional stability could make individuals more likely to experience events that further impact both emotional stability and income.

negative life events on the Big Five and LoC for a sample of prime-age adults. We find that more than one-quarter of the events that we examine have significant impacts on personality for both men and women. The magnitudes of these effects can be large, especially for impacts on LoC and, to a lesser extent, agreeability and emotional stability. The events with larger impacts include marital separation, major financial problems, being a victim of a violent crime and retirement for men, and major financial problems, suffering a serious illness or injury, the death of a spouse or child and getting married for women. We show that, for some of these events, the impacts on personality last more than four years and, in the case of retirement for men and separation for women, even become larger over time.

We then examine whether treating non-cognitive skills as fixed is likely to lead to biased estimates of the relationship between these skills and socioeconomic outcomes. We find that the decision to treat personality traits as fixed can have large consequences for the estimated relationship between personality and total personal income. While cross-sectional regressions show that LoC and the Big Five have larger impacts on personal income for men and smaller but important impacts for women, we show that these are clearly biased upwards. Estimating fixed effects model of the relationship between personality and total personal income, we find that only LoC affects income for men and only openness affects income for women, and in both cases, the estimated relationships are quite weak. While these are likely lower bound estimates as measurement error bias is exacerbated in fixed effects models, other evidence suggests that these might be the 'correct' estimates of the relationship between personality and income. Our purpose in estimating this relationship in this paper is purely for expositional purposes; the causal impact of personality traits on personal income warrants a much deeper examination. However, our results do suggest that the previous literature has likely overstated the importance of personality in determining labor market outcomes.

References

ALMLUND, M., A. L. DUCKWORTH, J. HECKMAN, AND T. KAUTZ (2011): "Personality psychology and economics," in *Handbook of the Economics of Education*, Elsevier, vol. 4, 1–181.

BARRICK, M. R. AND M. K. MOUNT (1991): "The Big Five Personality Dimensions and Job Performance: A Meta-Analysis," *Personnel Psychology*, 44, 1–26.

BORGHANS, L., A. L. DUCKWORTH, J. J. HECKMAN, AND B. TER WEEL (2008): "The Economics and Psychology of Personality Traits," *Journal of Human Resources*, 43, 972–1059.

BRINCH, C. N. AND T. A. GALLOWAY (2012): "Schooling in adolescence raises IQ scores," *Proceedings of the National Academy of Sciences*, 109, 425–430.

BROWN, S. AND K. TAYLOR (2014): "Household finances and the Big Fivepersonality traits," *Journal of Economic Psychology*, 45, 197–212.

BUDDELMEYER, H. AND N. POWDTHAVEE (2016): "Can having internal locus of control insure against negative shocks? Psychological evidence from panel data," *Journal of Economic Behavior & Organization*, 122, 88–109.

CEBI, M. (2007): "Locus of control and human capital investment revisited," *Journal of Human Resources*, 42, 919–932.

COBB-CLARK, D. A., S. C. KASSENBOEHMER, AND S. SCHURER (2014): "Healthy habits: The connection between diet, exercise, and locus of control," *Journal of Economic Behavior & Organization*, 98, 1–28.

COBB-CLARK, D. A., S. C. KASSENBOEHMER, AND M. G. SINNING (2016): "Locus of control and savings," *Journal of Banking & Finance*, 73, 113–130.

COBB-CLARK, D. A. AND S. SCHURER (2012): "The stability of big-five personality traits," *Economics Letters*, 115, 11–15.

———— (2013): "Two Economists' Musings on the Stability of Locus of Control," *The Economic Journal*, 123, F358–F400.

COLEMAN, M. AND T. DELEIRE (2003): "An economic model of locus of control and the human capital investment decision," *Journal of Human Resources*, 38, 701–721.

COSTA, P. T. AND R. R. MCCRAE (1988): "Personality in adulthood: a six-year longitudinal study of self-reports and spouse ratings on the NEO Personality Inventory." *Journal of personality and social psychology*, 54, 853.

COSTA JR, P., A. TERRACCIANO, AND R. R. MCCRAE (2001): "Gender differences in personality traits across cultures: robust and surprising findings." *Journal of personality and social psychology*, 81, 322.

COSTA JR, P. T. AND R. R. MCCRAE (1997): "Longitudinal stability of adult personality," in *Handbook of personality psychology*, Elsevier, 269–290.

ELKINS, R. K., S. C. KASSENBOEHMER, AND S. SCHURER (2017): "The stability of personality traits in adolescence and young adulthood," *Journal of Economic Psychology*, 60, 37–52.

FRIJTERS, P., D. W. JOHNSTON, AND M. A.SHIELDS (2011): "Life Satisfaction Dynamics with Quarterly Life Event Data," *The Scandinavian Journal of Economics*, 113, 190–211.

GATZ, M. AND M. J. KAREL (1993): "Individual Change in Perceived Control over 20 Years," *International Journal of Behavioral Development*, 16, 305–322.

GOLDBERG, L. R. (1992): "The development of markers for the Big-Five factor structure." *Psychological assessment*, 4, 26.

GUTMAN, L. M. AND I. SCHOON (2013): "The impact of non-cognitive skills on outcomes for young people," *Education Endowment Foundation*, 59, 2019.

HECKMAN, J. J., J. STIXRUD, AND S. URZUA (2006): "The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior," *Journal of Labor economics*, 24, 411–482.

HEINECK, G. AND S. ANGER (2010): "The returns to cognitive abilities and personality traits in Germany," *Labour economics*, 17, 535–546.

JAKŠIĆ, N., L. BRAJKOVIĆ, E. IVEZIĆ, R. TOPIĆ, AND M. JAKOVLJEVIĆ (2012): "The Role of Personality Traits in Posttraumatic Stress Disorder (PTSD)," *Psychiatria Danubina*, 24, 256–266.

LE MOGLIE, M., L. MENCARINI, AND C. RAPALLINI (2015): "Is it just a matter of personality? On the role of subjective well-being in childbearing behavior," *Journal of Economic Behavior & Organization*, 117, 453–475.

LUNDBERG, S. (2012): "Personality and marital surplus," *IZA Journal of Labor Economics*, 1, 3.

——— (2013): "The college type: Personality and educational inequality," *Journal of Labor Economics*, 31, 421–441.

MARSAUDON, A. (2019): "Do Health Shocks Modify Personality Traits? Evidence from Locus Of Control," Tech. rep., Le Centre pour la Communication Scientifique Directe.

MAZURE, C. M., M. L. BRUCE, P. K. MACIEJEWSKI, AND S. C. JACOBS (2000): "Adverse Life Events and Cognitive-Personality Characteristics in the Prediction of Major Depression and Antidepressant Response," *American Journal of Psychiatry*.

PEARLIN, L. I. AND C. SCHOOLER (1978): "The structure of coping," *Journal of health and social behavior*, 2–21.

PROTO, E. AND A. RUSTICHINI (2015): "Life satisfaction, income and personality," *Journal of Economic Psychology*, 48, 17–32.

ROBERTS, B. W., N. R. KUNCEL, R. SHINER, A. CASPI, AND L. R. GOLDBERG (2007): "The power of personality: The comparative validity of personality traits, socioeconomic status, and cognitive ability for predicting important life outcomes," *Perspectives on Psychological Science*, 2, 313–345.

ROBERTS, B. W. AND D. MROCZEK (2008): "Personality trait change in adulthood," *Current directions in psychological science*, 17, 31–35.

ROBERTS, B. W., K. E. WALTON, AND W. VIECHTBAUER (2006): "Patterns of mean-level change in personality traits across the life course: a meta-analysis of longitudinal studies." *Psychological bulletin*, 132, 1.

ROBERTS, B. W., D. WOOD, AND A. CASPI (2008): "The development of personality traits in adulthood," *Handbook of personality: Theory and research*, 3, 375–398.

ROTTER, J. B. (1966): "Generalized Expectancies for Internal versus External Control of Reinforcement." *Psychological Monographs: General and Applied*, 80, 1–28.

SAUCIER, G. (1994): "Mini-Markers: A brief version of Goldberg's unipolar Big-Five markers," *Journal of personality assessment*, 63, 506–516.

SCHURER, S. (2017): "Bouncing back from health shocks: Locus of control and labor supply," *Journal of Economic Behavior & Organization*, 133, 1–20.

SEMYKINA, A. AND S. J. LINZ (2007): "Gender differences in personality and earnings: Evidence from Russia," *Journal of Economic Psychology*, 28, 387–410.

STILLMAN, S. AND M. VELAMURI (2016): "If Life Throws You Lemons Try To Make Lemonade: Does Locus of Control Help People Cope with Unexpected Shocks," *Available at SSRN 2835350*.

WATSON, N. (2011): "Methodology for the HILDA top-up sample," Tech. rep., Melbourne Institute of Applied Economic and Social Research.

Table 1: Summary of Shocks

	Type of Shock		Male		Female	
	Positive	Planned	Percent	Total	Percent	Total
Separated from spouse	No	Maybe	3.5%	2,102	3.6%	2,447
Fired or made redundant	No	Maybe	4.4%	2,597	2.6%	1,726
Major worsening in finances	No	Maybe	3.3%	1,975	3.3%	2,205
Serious personal injury/illness	No	No	8.0%	4,751	7.5%	5,076
Serious injury/illness to family member	No	No	13.5%	8,029	17.7%	11,945
Death of spouse or child	No	No	0.4%	241	0.6%	427
Death of close relative/family member	No	No	10.8%	6,400	12.0%	8,131
Death of a close friend	No	No	9.1%	5,376	8.9%	6,032
Victim of Violent Crime	No	No	1.2%	700	1.3%	889
Victim of Property Crime	No	No	4.6%	2,705	3.9%	2,662
Family Member Jailed	No	No	1.0%	602	1.6%	1,067
Promoted at work	Yes	Maybe	7.7%	4,585	6.0%	4,034
Major improvement in finances	Yes	Maybe	3.3%	1,949	3.4%	2,274
Got married	Yes	Yes	2.9%	1,728	2.7%	1,814
Birth/adoption of new child	Yes	Yes	4.9%	2,911	4.6%	3,099
Retired from the workforce	Yes	Yes	1.8%	1,060	2.0%	1,367
Changed jobs	Yes	Yes	14.1%	8,380	12.2%	8,258
Changed residence	Yes	Yes	16.1%	9,570	16.0%	10,767
Observations				59,359		67,490

Table 2: Fixed Effects Estimates of the Impact of Shocks on Men

	Locus of Control	Extroversion	Agreeability	Conscientiousness	Emotional Stability	Openness
Separated	-0.0312	-0.00321	0.0929***	0.00665	-0.00156	0.0409**
	(0.0240)	(0.0189)	(0.0248)	(0.0211)	(0.0236)	(0.0207)
Fired / Made Redundant	-0.0222	0.00356	-0.00878	-0.0133	0.0208	-0.0141
	(0.0209)	(0.0169)	(0.0205)	(0.0183)	(0.0196)	(0.0177)
Financial Problems	-0.241***	-0.0265	0.00966	-0.0615***	-0.0826***	0.0360*
	(0.0254)	(0.0184)	(0.0238)	(0.0201)	(0.0228)	(0.0192)
Own Injury/Illness	-0.0345**	-0.0496***	0.00272	-0.0323**	-0.0358**	-0.00168
	(0.0163)	(0.0120)	(0.0138)	(0.0131)	(0.0146)	(0.0130)
Family Injury/Illness	-0.0184	-0.0130	0.00983	0.0158	-0.0252**	0.00884
	(0.0114)	(0.00957)	(0.0110)	(0.00999)	(0.0114)	(0.00957)
Death of Spouse or Child	-0.000765	-0.0181	0.0418	-0.0710	0.0578	0.0109
	(0.0920)	(0.0494)	(0.0617)	(0.0527)	(0.0607)	(0.0558)
Death of Close Relative	-0.00206	-0.00587	0.0233*	0.00832	0.00883	0.00213
	(0.0130)	(0.0104)	(0.0133)	(0.0112)	(0.0125)	(0.0114)
Death of a Close Friend	0.00521	-0.00680	0.0309**	0.0140	0.0119	0.00859
	(0.0148)	(0.0114)	(0.0140)	(0.0120)	(0.0133)	(0.0122)
Violent Crime Victim	-0.0938**	-0.0279	0.00857	-0.0602	-0.0280	-0.00628
	(0.0393)	(0.0347)	(0.0465)	(0.0410)	(0.0406)	(0.0373)
Property Crime Victim	-0.0122	0.00867	-0.0395**	-0.0355**	0.000883	-0.00694
	(0.0189)	(0.0172)	(0.0191)	(0.0179)	(0.0201)	(0.0162)
Family Member Jailed	0.0243	-0.0148	-0.0694*	-0.00418	-0.0783**	0.0241
	(0.0406)	(0.0342)	(0.0382)	(0.0372)	(0.0339)	(0.0304)
Promoted at Work	0.0354**	0.0134	-0.00926	0.0243*	-0.00772	-0.00877
	(0.0141)	(0.0122)	(0.0138)	(0.0126)	(0.0143)	(0.0119)
Financial Improvement	0.0229	0.0127	-0.00205	0.00542	0.0477**	0.00542
	(0.0232)	(0.0177)	(0.0204)	(0.0203)	(0.0222)	(0.0171)
Got Married	0.00591	0.0107	-0.0152	-0.0130	0.0191	-0.0436
	(0.0307)	(0.0257)	(0.0324)	(0.0283)	(0.0336)	(0.0310)
Birth/Adoption	-0.0117	-0.0246*	-0.0519***	-0.0237	0.00690	-0.0408***
	(0.0199)	(0.0149)	(0.0171)	(0.0167)	(0.0182)	(0.0157)
Retired	-0.105***	-0.0304	-0.0766**	-0.0562*	-0.0159	-0.000571
	(0.0320)	(0.0256)	(0.0377)	(0.0314)	(0.0322)	(0.0320)
Changed Jobs	0.0379***	0.00287	-0.00493	0.00861	0.00188	-0.0360***
	(0.0121)	(0.00992)	(0.0123)	(0.0115)	(0.0120)	(0.0106)
Moved	0.0122	-0.00995	0.0118	0.00996	0.00307	0.0248***
	(0.0119)	(0.00889)	(0.0114)	(0.0107)	(0.0114)	(0.00949)
R-Squared	0.028	0.014	0.009	0.017	0.020	0.010
Individuals	6,523	6,597	6,597	6,597	6,597	6,597
Observations	18,146	15,233	15,233	15,233	15,233	15,233

Note: *** p<0.01, ** p<0.05, * p<0.1. All outcomes are standardized to mean zero, standard deviation one across the whole sample. All impacts are relative to more than one year prior to the event. Robust standard errors clustered at the individual level are in parentheses. Age, age-squared, statistical region, geographical area, and survey year are controlled for but not reported.

Table 3: Fixed Effects Estimates of the Impact of Shocks on Women

|	Locus of Control	Extroversion	Agreeability	Conscientious ness	Emotional Stability	Openness
Separated	-0.000836	0.0265	0.0373*	-0.0293	0.0386*	0.0227
	(0.0243)	(0.0177)	(0.0196)	(0.0192)	(0.0230)	(0.0186)
Fired / Made Redundant	-0.0257	0.00516	-0.00647	0.0106	0.00182	0.00810
	(0.0275)	(0.0195)	(0.0223)	(0.0206)	(0.0236)	(0.0203)
Financial Problems	-0.155***	-0.0372*	0.0155	-0.0505***	-0.0219	0.0203
	(0.0243)	(0.0200)	(0.0186)	(0.0183)	(0.0215)	(0.0178)
Own Injury/Illness	-0.101***	-0.0224*	0.0111	-0.0208	-0.0141	-0.00134
	(0.0155)	(0.0128)	(0.0128)	(0.0132)	(0.0141)	(0.0123)
Family Injury/Illness	-0.0216**	0.00670	0.00981	-0.00176	0.00222	0.0212***
	(0.0104)	(0.00755)	(0.00818)	(0.00853)	(0.00912)	(0.00789)
Death of Spouse or Child	-0.116*	-0.120***	0.0175	-0.0417	-0.0339	0.0320
	(0.0626)	(0.0437)	(0.0483)	(0.0509)	(0.0547)	(0.0468)
Death of Close Relative	0.0242*	-0.0118	-0.00832	0.00524	-9.82e-05	-0.0126
	(0.0124)	(0.00912)	(0.0100)	(0.00991)	(0.0105)	(0.00962)
Death of a Close Friend	-0.0103	-0.0155	-0.0132	-0.0251**	0.00819	-0.00684
	(0.0140)	(0.0109)	(0.0112)	(0.0117)	(0.0123)	(0.0113)
Violent Crime Victim	0.00294	0.0591**	0.0316	0.0251	-0.0328	0.0430
	(0.0391)	(0.0297)	(0.0299)	(0.0375)	(0.0407)	(0.0310)
Property Crime Victim	-0.0360*	-0.0156	0.0243	-0.00208	0.0339*	0.0164
	(0.0206)	(0.0178)	(0.0188)	(0.0192)	(0.0192)	(0.0175)
Family Member Jailed	0.0125	-0.00791	-0.0516**	-0.0241	0.0133	-0.0376
	(0.0324)	(0.0248)	(0.0254)	(0.0266)	(0.0298)	(0.0252)
Promoted at Work	0.0508***	0.000525	-0.0169	0.0215*	0.0105	-0.0204*
	(0.0157)	(0.0118)	(0.0125)	(0.0130)	(0.0140)	(0.0117)
Financial Improvement	0.0698***	-0.00292	0.0276	-0.00908	0.00979	-0.00639
	(0.0204)	(0.0163)	(0.0169)	(0.0179)	(0.0184)	(0.0163)
Got Married	0.0239	-0.0454	-0.108***	0.00949	-0.0637**	-0.00709
	(0.0314)	(0.0285)	(0.0303)	(0.0278)	(0.0313)	(0.0282)
Birth/Adoption	-0.00405	-0.0183	-0.0463***	-0.0134	0.0359**	-0.0738***
	(0.0177)	(0.0145)	(0.0167)	(0.0164)	(0.0174)	(0.0158)
Retired	0.0342	-0.0173	-0.0645**	-0.0197	0.00174	0.0177
	(0.0308)	(0.0234)	(0.0271)	(0.0233)	(0.0263)	(0.0248)
Changed Jobs	0.0137	-0.0100	0.0198**	0.0242**	0.0194*	-0.00112
	(0.0118)	(0.00931)	(0.00948)	(0.00968)	(0.0110)	(0.00940)
Moved	0.0113	0.00355	0.0120	0.0283***	-0.00600	0.0104
	(0.0113)	(0.00886)	(0.00918)	(0.00959)	(0.0104)	(0.00920)
R-Squared	0.023	0.014	0.015	0.012	0.021	0.007
Individuals	7,211	7,330	7,330	7,330	7,330	7,330
Observations	20,519	17,252	17,252	17,252	17,252	17,252

Note: *** p<0.01, ** p<0.05, * p<0.1. All outcomes are standardized to mean zero, standard deviation one across the whole sample. All impacts are relative to more than one year prior to the event. Robust standard errors clustered at the individual level are in parentheses. Age, age-squared, statistical region, geographical area, and survey year are controlled for but not reported.

Table 4: Cross-sectional Estimates of the Impact of Non-Cognitive Skills on Real Total Personal Income - Does Measurement Matter?

Regression Model	Men				Women			
	OLS	OLS	OLS	Fixed Effects	OLS	OLS	OLS	Fixed Effects
Non-Cognitive Skills Measured:	Mean	First Time	Updated	Updated	Mean	First Time	Updated	Updated
Locus of Control	0.213***	0.131***	0.156***	0.0325***	0.0880***	0.0513***	0.0614***	0.00451
	(0.0148)	(0.0137)	(0.00980)	(0.00694)	(0.0104)	(0.00831)	(0.00676)	(0.00450)
Extroversion	0.0509***	0.0533***	0.0475***	0.00913	0.0198**	0.0249***	0.0191***	-0.00372
	(0.0184)	(0.0162)	(0.0156)	(0.0113)	(0.00818)	(0.00756)	(0.00704)	(0.00738)
Agreeability	-0.0725***	-0.0633***	-0.0591***	0.000844	-0.0687***	-0.0517***	-0.0526***	0.00338
	(0.0170)	(0.0146)	(0.0137)	(0.0120)	(0.0108)	(0.00886)	(0.00821)	(0.00652)
Conscientiousness	0.104***	0.0979***	0.0910***	-0.00938	0.0467***	0.0338***	0.0393***	0.00732
	(0.0190)	(0.0156)	(0.0153)	(0.0128)	(0.00821)	(0.00738)	(0.00682)	(0.00668)
Emotional Stability	-0.0274*	-0.00786	-0.00505	0.00963	0.000474	0.00650	0.00566	-0.000222
	(0.0154)	(0.0130)	(0.0116)	(0.0104)	(0.00843)	(0.00733)	(0.00641)	(0.00639)
Openness	-0.0513***	-0.0436***	-0.0433***	-0.0143	0.000181	-0.00614	0.00109	0.0174**
	(0.0160)	(0.0147)	(0.0134)	(0.0126)	(0.00764)	(0.00724)	(0.00661)	(0.00718)
R-Squared	0.135	0.127	0.130	0.035	0.117	0.110	0.113	0.021
Individuals	6,431	6,431	6,431	6,431	7,184	7,184	7,184	7,184
Observations	57,374	57,374	57,374	57,374	65,403	65,403	65,403	65,403

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors clustered at the individual level are in parentheses. Real total personal income, locus of control (LoC) and personality traits are standardized to mean zero, standard deviation one across the whole sample. Higher numbers for LoC indicate more internal people. Each column represents a separate regression. LoC and personality traits are measured in three ways, i) the mean across each time an individual reports a variable; ii) the first measure collected in the survey for each individuals; and iii) and iv) a version which is updated each time an individual is resurveyed on the question. In the fourth column, individual fixed effects are also included in the regression. Age, age-squared, three educational categories, statistical region, geographical area, and survey year are controlled for but not reported.

Figure 1: Short Versus Longer-Run Impact of Specific Shocks on Men and Women
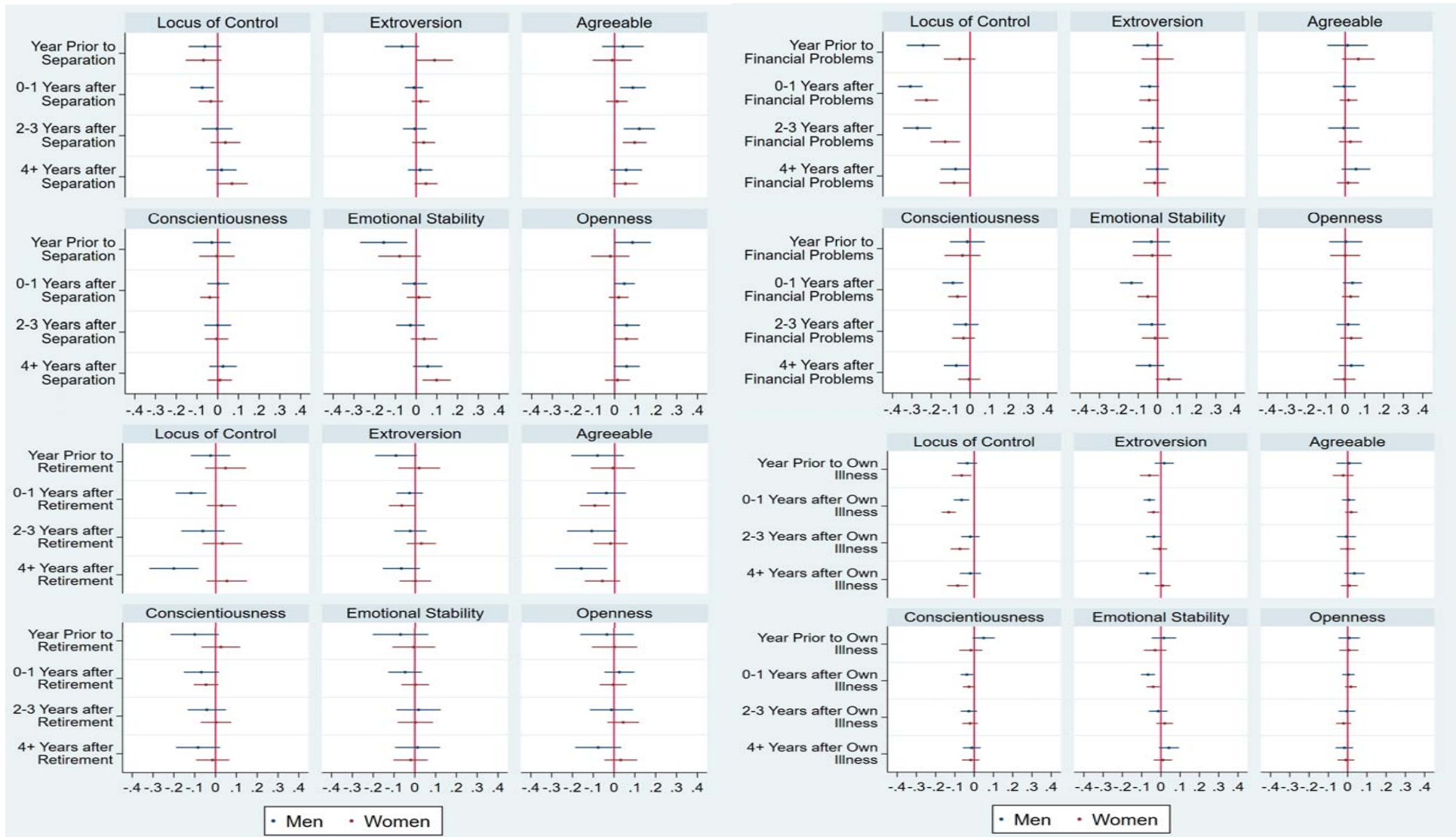
Note: The figure shows the impact of a specific shock relative to more than one year prior to the event along with the 95 percent confidence interval. All outcomes are standardised to mean zero, standard deviation one across the whole sample. Confidence intervals are calculated using robust standard errors clustered at the individual level. Age, age-squared, statistical region, geographical area, survey year, as well as individual fixed effects are controlled for but not reported.

Appendix Table 1: Summary Statistics of Various Samples

	Full Prime-Age Sample	Observation Has All Shock Data	Individual Has LoC and Big Five >0 Times	Analysis Sample LoC	Analysis Sample Big Five
Standarised Locus of Control	0.03	0.04	0.04	0.04	
Standarised Extroversion	-0.01	-0.02	-0.02		-0.02
Standarised Agreeability	0.04	0.04	0.04		0.05
Standarised Conscientiousness	0.05	0.06	0.06		0.07
Standarised Emotional Stability	-0.04	-0.04	-0.03		-0.02
Standarised Openness	0.06	0.06	0.06		0.06
Number of Negative Shocks	0.54	0.62	0.62	0.62	0.59
Number of Positive Shocks	0.43	0.50	0.49	0.48	0.45
Age	43.6	44.0	44.2	44.7	44.7
Sydney	17.4%	16.5%	16.2%	16.0%	15.8%
New South Wales / ACT	14.7%	14.9%	15.1%	15.4%	15.4%
Melbourne	18.0%	18.1%	18.1%	17.8%	17.9%
Victoria / Tasmania	10.1%	10.0%	10.0%	10.2%	10.1%
Brisbane	9.4%	9.7%	9.7%	9.6%	9.9%
Queensland	11.4%	11.5%	11.5%	11.4%	11.7%
South Australia	9.0%	9.1%	9.1%	9.2%	9.0%
Western Australia / Northern Territory	10.1%	10.3%	10.3%	10.4%	10.1%
Major City	63.4%	63.4%	63.3%	62.6%	63.2%
Inner Regional Australia	24.0%	24.3%	24.4%	24.8%	24.7%
Outer Regional and Remote Australia	12.7%	12.3%	12.3%	12.6%	12.1%
Did Not Finish High School	24.8%	23.5%	23.3%	25.3%	21.2%
High School Graduate	12.6%	12.3%	12.3%	12.1%	12.0%
Non-University Degree	33.8%	34.1%	34.1%	33.3%	35.0%
Bachelor Degree or Higher	28.8%	30.1%	30.3%	29.3%	31.8%
Observations	162,143	133,961	126,888	35,389	28,192

Note: Locus of control and the five personality domains are standardised to mean zero, standard deviation one across the whole sample.

Appendix Table 2: Short Versus Longer-Run Impact of Shocks on Men

	Locus of Control	Extroversion	Agreeability	Conscientious ness	Emotional Stability	Openness
			Separated from Partner			
Year Prior	-0.0616	-0.0682	0.0403	-0.0286	-0.157***	0.0864*
	(0.0402)	(0.0421)	(0.0512)	(0.0466)	(0.0582)	(0.0454)
0-1 Years Later	-0.0749**	-0.00988	0.0884***	0.00201	-0.00752	0.0473*
	(0.0294)	(0.0224)	(0.0317)	(0.0267)	(0.0310)	(0.0260)
2-3 Years Later	-0.00314	-0.00628	0.120***	9.62e-05	-0.0274	0.0590*
	(0.0380)	(0.0293)	(0.0387)	(0.0330)	(0.0351)	(0.0325)
4+ Years Later	0.0186	0.0193	0.0563	0.0259	0.0560	0.0583*
	(0.0370)	(0.0300)	(0.0390)	(0.0339)	(0.0362)	(0.0322)
			Major Financial Problems			
Year Prior	-0.242***	-0.0514	0.0123	-0.0142	-0.0320	0.00326
	(0.0435)	(0.0397)	(0.0530)	(0.0461)	(0.0495)	(0.0435)
0-1 Years Later	-0.308***	-0.0411*	-0.00421	-0.0886***	-0.135***	0.0377
	(0.0325)	(0.0249)	(0.0299)	(0.0277)	(0.0299)	(0.0252)
2-3 Years Later	-0.272***	-0.0237	-0.00706	-0.0224	-0.0299	0.0154
	(0.0373)	(0.0296)	(0.0408)	(0.0334)	(0.0361)	(0.0307)
4+ Years Later	-0.0751*	-0.00168	0.0560	-0.0714**	-0.0397	0.0318
	(0.0394)	(0.0296)	(0.0379)	(0.0327)	(0.0374)	(0.0340)
		Experienced Serious Personal Illness or Injury				
Year Prior	-0.0362	0.0177	0.00785	0.0492*	0.0155	0.00770
	(0.0263)	(0.0254)	(0.0334)	(0.0295)	(0.0322)	(0.0282)
0-1 Years Later	-0.0655***	-0.0601***	0.00534	-0.0382**	-0.0667***	0.00420
	(0.0205)	(0.0150)	(0.0174)	(0.0166)	(0.0186)	(0.0165)
2-3 Years Later	-0.0196	-0.0366*	-0.00609	-0.0273	-0.0138	-0.00366
	(0.0245)	(0.0204)	(0.0253)	(0.0218)	(0.0245)	(0.0220)
4+ Years Later	-0.0198	-0.0703***	0.0355	-0.0125	0.0420	-0.0166
	(0.0281)	(0.0221)	(0.0268)	(0.0235)	(0.0267)	(0.0231)
			Retired			
Year Prior	-0.0246	-0.0923*	-0.0825	-0.0998*	-0.0686	-0.0339
	(0.0484)	(0.0511)	(0.0644)	(0.0593)	(0.0680)	(0.0654)
0-1 Years Later	-0.118***	-0.0268	-0.0397	-0.0678	-0.0463	0.0256
	(0.0375)	(0.0324)	(0.0478)	(0.0430)	(0.0414)	(0.0367)
2-3 Years Later	-0.0616	-0.0234	-0.110*	-0.0416	0.0181	-0.0124
	(0.0531)	(0.0395)	(0.0603)	(0.0469)	(0.0543)	(0.0529)
4+ Years Later	-0.201***	-0.0663	-0.161**	-0.0839	0.0134	-0.0763
	(0.0601)	(0.0453)	(0.0637)	(0.0539)	(0.0552)	(0.0563)
Individuals	6,523	6,597	6,597	6,597	6,597	6,597
Observations	18,146	15,233	15,233	15,233	15,233	15,233

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. All outcomes are standardised to mean zero, standard deviation one across the whole sample. All impacts are relative to more than one year prior to the event. Robust standard errors clustered at the individual level are in parentheses. Age, age-squared, statistical region, geographical area, survey year, as well as individual fixed effects are controlled for but not reported.

Appendix Table 3: Short Versus Longer-Run Impact of Shocks on Women

	Locus of Control	Extroversion	Agreeability	Conscientiousness	Emotional Stability	Openness
			Separated from Partner			
Year Prior	-0.0685	0.0891**	-0.0109	-0.00375	-0.0796	-0.0207
	(0.0438)	(0.0449)	(0.0483)	(0.0437)	(0.0526)	(0.0471)
0-1 Years Later	-0.0331	0.0214	0.0120	-0.0381	0.0131	0.0202
	(0.0302)	(0.0217)	(0.0265)	(0.0240)	(0.0297)	(0.0241)
2-3 Years Later	0.0372	0.0366	0.0974***	-0.00489	0.0388	0.0582**
	(0.0368)	(0.0283)	(0.0294)	(0.0288)	(0.0328)	(0.0287)
4+ Years Later	0.0690*	0.0475*	0.0521*	0.0103	0.0989***	0.0142
	(0.0388)	(0.0286)	(0.0304)	(0.0297)	(0.0348)	(0.0306)
			Major Financial Problems			
Year Prior	-0.0542	-0.000310	0.0683	-0.0391	-0.0276	0.000268
	(0.0417)	(0.0422)	(0.0429)	(0.0472)	(0.0510)	(0.0394)
0-1 Years Later	-0.225***	-0.0437*	0.0173	-0.0648***	-0.0509*	0.0279
	(0.0307)	(0.0259)	(0.0235)	(0.0246)	(0.0267)	(0.0228)
2-3 Years Later	-0.129***	-0.0380	0.0273	-0.0341	-0.0126	0.0315
	(0.0391)	(0.0291)	(0.0304)	(0.0301)	(0.0349)	(0.0289)
4+ Years Later	-0.0817**	-0.0152	0.0148	-0.00446	0.0572*	-0.00355
	(0.0383)	(0.0294)	(0.0289)	(0.0289)	(0.0342)	(0.0292)
			Experienced Serious Personal Illness or Injury			
Year Prior	-0.0649**	-0.0595**	-0.0229	-0.0173	-0.0301	0.00577
	(0.0263)	(0.0256)	(0.0277)	(0.0308)	(0.0301)	(0.0251)
0-1 Years Later	-0.132***	-0.0386**	0.0190	-0.0267	-0.0403**	0.0171
	(0.0191)	(0.0156)	(0.0164)	(0.0163)	(0.0174)	(0.0158)
2-3 Years Later	-0.0739***	-0.00601	0.000174	-0.0215	0.0198	-0.0208
	(0.0248)	(0.0197)	(0.0201)	(0.0207)	(0.0218)	(0.0198)
4+ Years Later	-0.0862***	0.00933	0.00910	-0.0176	0.0105	-0.00890
	(0.0277)	(0.0209)	(0.0222)	(0.0230)	(0.0245)	(0.0223)
			Retired			
Year Prior	0.0474	0.0188	-0.00850	0.0259	-0.00482	0.00222
	(0.0502)	(0.0513)	(0.0542)	(0.0473)	(0.0525)	(0.0554)
0-1 Years Later	0.0280	-0.0646**	-0.0954***	-0.0455	0.00219	-0.00389
	(0.0364)	(0.0313)	(0.0369)	(0.0302)	(0.0338)	(0.0333)
2-3 Years Later	0.0320	0.0293	-0.0201	0.00229	0.00236	0.0437
	(0.0483)	(0.0358)	(0.0422)	(0.0375)	(0.0433)	(0.0391)
4+ Years Later	0.0533	0.000549	-0.0589	-0.0139	-0.0197	0.0322
	(0.0492)	(0.0386)	(0.0431)	(0.0406)	(0.0419)	(0.0400)
Individuals	7,211	7,330	7,330	7,330	7,330	7,330
Observations	20,519	17,252	17,252	17,252	17,252	17,252

Note: *** p<0.01, ** p<0.05, * p<0.1. All outcomes are standardised to mean zero, standard deviation one across the whole sample. All impacts are relative to more than one year prior to the event. Robust standard errors clustered at the individual level are in parentheses. Age, age-squared, statistical region, geographical area, survey year, as well as individual fixed effects are controlled for but not reported.

Appendix Table 4: Cross-sectional Estimates of the Impact of Non-Cognitive Skills on Life Satisfaction - Does Measurement Matter?

Regression Model	Men				Women			
	OLS	OLS	OLS	Fixed Effects	OLS	OLS	OLS	Fixed Effects
Non-Cognitive Skills Measured:	Mean	First Time	Updated	Updated	Mean	First Time	Updated	Updated
Locus of Control	0.397***	0.249***	0.312***	0.129***	0.384***	0.241***	0.302***	0.137***
	(0.0137)	(0.0114)	(0.00975)	(0.00844)	(0.0123)	(0.0109)	(0.00856)	(0.00686)
Extroversion	0.0556***	0.0612***	0.0594***	0.0241**	0.0281***	0.0404***	0.0368***	0.0415***
	(0.00960)	(0.00990)	(0.00833)	(0.0102)	(0.00829)	(0.00842)	(0.00733)	(0.00995)
Agreeability	0.115***	0.105***	0.0952***	0.00331	0.0889***	0.0773***	0.0803***	0.0240**
	(0.0112)	(0.0107)	(0.00918)	(0.00923)	(0.0117)	(0.0108)	(0.00930)	(0.00987)
Conscientiousness	0.0326***	0.0423***	0.0449***	0.0420***	0.0342***	0.0437***	0.0408***	0.0261***
	(0.0105)	(0.0101)	(0.00895)	(0.00966)	(0.00933)	(0.00898)	(0.00799)	(0.00938)
Emotional Stability	0.0325***	0.0518***	0.0482***	0.0370***	0.0609***	0.0880***	0.0773***	0.0552***
	(0.0119)	(0.0108)	(0.00928)	(0.0103)	(0.0117)	(0.0106)	(0.00907)	(0.00961)
Openness	-0.0910***	-0.0844***	-0.0741***	0.0142	-0.0652***	-0.0542***	-0.0536***	0.0183*
	(0.0111)	(0.0109)	(0.00959)	(0.0109)	(0.00986)	(0.00984)	(0.00863)	(0.0104)
R-Squared	0.185	0.131	0.170	0.018	0.172	0.123	0.163	0.021
Individuals	6,431	6,431	6,431	6,431	7,184	7,184	7,184	7,184
Observations	57,374	57,374	57,374	57,374	65,403	65,403	65,403	65,403

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors clustered at the individual level are in parentheses. Life Satisfaction, locus of control (LoC) and personality traits are standardized to mean zero, standard deviation one across the whole sample. Higher numbers for LoC indicate more internal people. Each column represents a separate regression. LoC and personality traits are measured in three ways, i) the mean across each time an individual reports a variable; ii) the first measure collected in the survey for each individuals; and iii) and iv) a version which is updated each time an individual is resurveyed on the question. In the fourth column, individual fixed effects are also included in the regression. Age, age-squared, three educational categories, statistical region, geographical area, and survey year are controlled for but not reported.