PERSONALITY STABILITY AND CHANGE: THE ROLE OF LIFE EVENTS AND NORMATIVENESS IN TWO LONGITUDINAL SURVEYS

By

Jessica Ashley Wortman

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

Psychology – Doctor of Philosophy

2016

ABSTRACT

PERSONALITY STABILITY AND CHANGE: THE ROLE OF LIFE EVENTS AND NORMATIVENESS IN TWO LONGITUDINAL SURVEYS

By

Jessica Ashley Wortman

In this study, longitudinal data from two national panel studies were used to examine mean-level and differential stability in personality traits over an eight-year time span, and how stability or change was related to life events. Results showed that, in both samples, Agreeableness and Conscientiousness increased over the life span, whereas Openness to Experience and Neuroticism decreased over the life span, replicating prior work and extending it to three waves of data (e.g., Lucas & Donnellan, 2011; Specht, Egloff, & Schmuckle, 2011; Wortman, Lucas, & Donnellan, 2012). In addition, results indicated that experiencing the birth of a child was associated with a decrease in Conscientiousness, whereas marriage was weakly associated with a decrease in Agreeableness, again, replicating prior work (Specht et al., 2011). This study also explored the potential role of the normativeness of the event experience to determine if experiencing a life event at a socially average time might increase its association with personality change, as suggested by past researchers (Neyer, Mund, Zimmerman, & Wrzus, 2013). Results showed that normativeness did not increase the association between life events and mean-level personality trait change. With regard to differential stability, results showed that differential stability (or rank-order stability) showed an inverted U-shaped pattern over the life span, again, replicating past studies showing the same patterns (Lucas & Donnellan, 2011; Wortman et al., 2012). Finally, differential stability showed a positive association with experiencing a greater number of life events between 2009 and 2013, supporting the notion of cumulative continuity (Caspi et al., 2005), or the idea that experiencing life events strengthens personality traits.

Overall, this study supports prior work in personality trait stability and change, and represents the first exploration of the role of normativeness of life events as a possible moderator of personality trait change. The implications of these results are discussed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Introduction

There is a long history in social-personality psychology of research that examines the stability of personality traits. This work consistently shows that, although personality traits are highly stable over time, they also change in meaningful ways, both with age and in response to life events (Allemand, Zimprich, & Hendricks, 2008; Caspi, Roberts, & Shiner, 2005; Lucas & Donnellan, 2011; Roberts & Delvecchio, 2000; Specht, Egloff, & Schmuckle, 2011; Terracciano, Costa, & McCrae, 2006; Terracciano, McCrae, Brant, & Costa, 2005). In general, these studies have been able to determine a general pattern of mean level increases and decreases in specific personality traits over the life span. However, questions remain concerning the exact nature and timing of personality trait change. In this paper, I replicate and extend previous work examining mean-level and rank order stability of personality using three waves of longitudinal data in two large, nationally representative panel studies from Australia and Germany. In addition, I examine the role of life events in predicting the ways that individuals' personalities change over time.

When discussing personality trait development, it is important to acknowledge that change in personality traits is multi-faceted. Researchers distinguish between at least two different kinds of stability or change: mean-level stability or change and differential (a.k.a. rank-order) stability or change. *Mean-level stability* refers to the mean level of a trait over time, or the degree to which the average level of the trait changes. In contrast, *differential stability* refers to the degree to which individuals change or maintain their rank-ordering of personality traits over a period of time, or the stability of individual differences over time. Although personality traits show high differential stability over the life span (that is, they are highly correlated across time), mean levels of traits also change over the life span (Roberts et al., 2005). Both aspects of

personality change are meaningful and should be considered when attempting to understand the development of personality over the life span.

Questions remain regarding the nature of differential stability over time. Although past work has shown that there is an inverted-U shaped pattern with regard to differential stability of personality traits (meaning that differential stability increases until mid-life before declining again in later adulthood), this work is limited by methodological issues, such as panel effects (Lucas & Donnellan, 2011; Specht et al., 2011; Wortman, Lucas, & Donnellan, 2012). Previous work has revealed that the Socio-Economic Panel Study (SOEP), in particular, has been found to have panel effects. In this study, I examine both mean-level changes and differential change in personality traits over the life span (using the framework of the Big Five personality traits; McCrae & Costa, 1999) and how these changes are associated with life events.

In addition, researchers have recently suggested that in order to understand the links between life transitions, such as first marriage or birth of a first child, and personality changes, researchers should consider the factor of normativeness, or the degree to which an individual goes through a life event at a socially average time in their life (Neyer, Mund, Zimmerman, & Wrzus, 2013). That is, it might be important to consider the age at which individuals go through life transitions when considering the degree to which these life events might be related to personality trait change. Another goal of this paper is to explore the associations between life events and the age at which they are experienced to determine how they are associated with personality trait change.

Mean Levels of Personality Traits over Time

Personality traits do appear to change in meaningful ways across the life span (Roberts, Walton, & Viechtbauer, 2006). Most of the research on personality trait development has

focused on the Big Five traits as an organizing framework, and I do so here (McCrae & Costa, 1999). The pattern of mean-level personality trait change in emerging adults (ages 18-25; Arnett, 2000) has been summarized by the *maturity principle* of development (Caspi et al., 2005). Specifically, Conscientiousness and Agreeableness—two traits that are associated with positive outcomes—tend to increase with age, whereas Neuroticism—a trait more associated with negative outcomes—tends to decrease (Caspi et al., 2005; Donnellan & Lucas, 2008; Roberts et al., 2006; Wortman et al., 2012). A meta-analysis of studies of personality trait change showed that young adults increase over time in conscientiousness, emotional stability (the positive pole of Neuroticism), and social dominance in young adulthood (Roberts et al., 2006), whereas older adults decrease in social vitality and Openness to Experience. This result has been shown in a variety of cultural contexts (e.g., Lucas & Donnellan, 2011; Wortman et al., 2012). Thus, there does seem to be a consistent pattern of personality trait change that occurs over the life span.

These changes in personality have been connected with increasing capabilities to fulfill the adult roles that individuals take on beginning in these emerging adulthood years, including the development of successful relationships (Caspi et al., 2005; Neyer & Asendorpf, 2001). That is, personality trait change seems to be linked to the life transitions that individuals experience as they age. Researchers have suggested that changes in personality summarized in the maturity principle are the result of increasing investment in adult roles (e.g., employment, marriage, parenthood), a model known as Social Investment Theory (SIT; see Lodi-Smith & Roberts, 2007; Roberts & Wood, 2006; Roberts, Wood, & Smith, 2005). Social investment refers to commitment to adult roles, and this model suggests that, to the degree that individuals are invested in adult roles, those roles will provide an explanation for the ways that their personalities will develop over time. That is, as individuals are increasingly involved in, value,

and devote energy to the social roles that they take on throughout their lives, the personality traits that help them to better fulfill those social roles increase, and those that hamper their social roles decrease.

There is some direct evidence indicating that social roles are related to personality trait change. For example, Roberts, Caspi, and Moffitt (2003) examined the associations between work experiences at age 18 and personality at age 26 among individuals in a cohort study from New Zealand. They measured a number of work experience characteristics, including occupational attainment, resource power, work autonomy, and work stimulation. Results showed that occupational attainment at age 18 was associated with personality trait differences at age 26. Young adults who had higher-status work showed lower anxiety and higher positive emotionality than young adults who had lower-status work (assessed using social closeness and well-being). In addition, having greater power at age 18 was associated with higher levels of social potency later in life, as well as higher well-being. Finally, work involvement was associated with increases in constraint and traditionalism, supporting the logic of social investment theory by demonstrating that individuals who are more invested in their work roles increased more in the traits associated with success in their work roles.

More recently, researchers have shown that the timing of personality trait change is associated with the cross-cultural differences in timing of the onset of adult roles (Bleidorn, Klimstra, Denissen, Rentfrow, Potter, & Gosling, 2013). Using a large, cross-cultural sample, the results demonstrated strong evidence for the maturity principle. In particular, they found large age-related increases in Conscientiousness and Agreeableness, and decreases in Neuroticism. However, there was also cross-cultural variation in the age at which these changes occurred. Cultures in which individuals transitioned at an earlier age into adult roles showed an earlier

onset of these normative personality trait changes. This suggests that at least part of the explanation for the maturity principle might be the social roles that individuals take on throughout their lives.

Specht and colleagues (2011) also demonstrated a link between personality trait changes and life events. Using the German Socioeconomic Panel Study (SOEP), they assessed the associations for a variety of life events on personality trait change over four years; personality was assessed twice. They examined life events such as unemployment, retirement, starting a first job, moving in with a partner, separating from a partner, and many other life events. Results showed that different life transitions were associated with changes in conceptually related personality traits. For example, starting a first job was associated with greater increases in Conscientiousness, whereas moving in with a partner was related to increases in Extraversion and Openness. In contrast, separating from a partner was associated with decreases in Agreeableness.

Much of the previous work has relied upon two-wave designs, which limit the trends that can be examined. This is especially true when using a cohort sequential design, as has been used in some past work (Lucas & Donnellan, 2011; Wortman et al., 2012). In these types of designs, different cohorts, or age groups, are combined in a single analysis in order to get a complete picture of the nature of the change over the lifespan. In order to determine if there are differences between the cross-sectional and longitudinal trends it is necessary to examine whether or not the longitudinal trends match up, or align, with the differences found across age groups. Potential discontinuities might show that history effects (or in some cases panel effects, or effects of being in the longitudinal study; Lucas & Donnellan, 2011) are responsible for some of the cohort differences rather than a developmental trend. Using only two waves, however, does not allow

for clear projection of a longitudinal trend over time. That is, it is unclear with only two waves of data if the trait will continue to change in the same way in that cohort (whether the change is linear). A goal of the current study is to examine the nature of associations of life events with personality trait changes using three waves of data to determine if the same increases and decreases in personality traits associated with life events remain when looking at longer periods of time. In particular, using a cohort-sequential design (Anderson, 1993), I examine the longitudinal trends in mean levels of personality traits over the lifespan, and their associations with marriage and childbirth.

It is not just that individuals experience life events or take on social roles and that these roles then directly affect personality traits. Instead, Social Investment Theory researchers have suggested that what is more important is the degree of investment that individuals have in their roles (Roberts et al., 2005). As individuals desire to fulfill these new roles, their motivations and goals change, and this is likely what prompts personality trait change. Indeed, Roberts, Wood, and Caspi (2008) suggested that when individuals are not invested in their social roles, they will not respond to the social pressures associated with that role, because they do not value the rewards of doing so. Roles provide rewards and punishments for certain behaviors, such as showing up to work late vs. on time (resulting in either a promotion or loss of a job); as individuals desire certain outcomes, such as career success, they might attempt to alter their traits in order to achieve those desired outcomes. The accumulation of evidence in personality development theory suggests that the social roles that individuals take on as they get older (or change social environments) influence the contingencies for personality-trait related behaviors, and these contingencies then coalesce into personality trait change.

Although there is evidence that a variety of life events might have an impact on personality trait change, here I focus on the events of marriage and childbirth. These events occur for the majority of individuals within the societies that I will be examining, with around 90% of individuals in Australia and Germany reporting they had been married at least once by age 65 or older, and around 81% of men and 87% of women having children in their lifetimes (United Nations, 2009). Thus, these events will provide the largest numbers of individuals to examine (providing the greatest power). In addition, even researchers who propose that personality is largely stable in adulthood acknowledge that changes in marital status seem to relate to personality trait change (Costa, Herbst, McCrae, & Siegler, 2000). Finally, marriage and childbirth showed some of the strongest associations with personality trait change as compared to other events in prior work (Specht et al., 2011).

Past work has suggested that marriage and childbirth do have some predictable associations with personality trait change. Specifically, longitudinal studies have suggested that a stable marriage is associated with increases in Conscientiousness and decreases in Neuroticism, as well as increases in social dominance (Roberts & Wood, 2006). In addition, past work has suggested that negative relationships can negatively impact one's personality traits, making individuals more hostile, irritable, and alienated (Robins, Caspi, & Moffitt, 2002). Other work has suggested that insecure relationships in young adulthood are associated with increased shyness, Neuroticism, and lower self-esteem (Neyer & Asendorpf, 2001). Thus, the exact impact of a relationship might depend on its quality. Specific to the case of marriage, Specht and colleagues (2011) found that getting married was associated with being higher in Extraversion. However, over time, marriage was associated with a decrease in Extraversion, Openness to

Experience, and Agreeableness. Here, I expected to replicate this finding in the SOEP, and determine if it also holds true in the HILDA.

Just as with marriages, there is some evidence that the nature of personality change in response to childbirth might be related to the exact nature of the event. Specifically, the way that parents change in response to their birth of their first child has been related to their personality traits (Jokela, Kivimaki, Elvainio, & Keltikangas-Jarvinen, 2009). In particular, parents with high emotionality prior to having children increased in emotionality following the birth of their child. In addition, new parents who were high in sociability increased following childbirth, whereas parents who were low in sociability decreased following childbirth. Specht and colleagues (2011) found that having a child was associated with a decrease in Conscientiousness only, but no other substantial personality trait differences or change. Here, I expected to replicate this finding.

Although I focus on the associations between marriage and childbirth and personality trait change, another goal of this study is to examine the nature and timing of life events over the life span. There has not been an examination of the general timing of life events across the life course in these two studies. Thus, in addition to examining the links between mean-level change and the events of marriage and childbirth, I will also examine the timing of life events across the life span (and later, their links to differential stability). By plotting the average timing and life events, and exploring variability in that timing, I am able to gain a better understanding of their possible link to personality trait change and stability.

Personality trait change, life events, and normativeness. In addition to looking at the degree of investment of individuals in their social roles as a way of examining personality trait change, researchers have also recently suggested that the *normativeness* of a life transition might

be related to how individuals change in response to life events. Normativeness here refers to an individual's experience of a particular event—whether or not they experience at an age that is fairly typical within their society. Researchers have proposed that the reason for weak associations between life events and trait changes might be the normativeness of the events (Neyer et al., 2013).

Note that the primary indicator of the normativeness of the life event, according to Neyer and colleagues (2013), is the age at which individuals experience that life event. Here, I use normativeness to refer to the individual's experience of the event: does that person experience the event at a socially scripted time in life? Individuals within a given sociocultural context tend to experience life transitions during a relatively predictable time period, which results in a large number of individuals going through these transitions at similar ages. As such, Neyer and colleagues (2013) suggested that, during normative life transitions (transitions that an individual experiences at a typical age), the influences of these transitions on personality traits might be somewhat more visible, because these events are more socially scripted. For example, according to Neyer et al. (2013) there are strong norms about how young adults ought to behave in their first romantic relationship or their first job. Young adults entering a romantic relationship for the first time do so within a societal context that has strong norms about what that experience should mean for their behaviors, and subsequently, their traits (and possible trait change). During experiences like these, then, the effect of the event on personality trait change might be particularly pronounced.

In contrast, for non-normative life transitions, because the event is somewhat less scripted, the impact of life events on personality trait change might be somewhat less obvious in general (Neyer et al., 2013). When individuals experience a life transition during a time that

others around them are not experiencing a similar transition, the social script regarding how that experience might shape them ought to be weaker. As a result, the experience will likely have a weaker effect on personality trait development than one that is more normative. In order to understand the mutual influence of life transitions and personality traits, then, researchers ought to take how normative the life transition is into account for that individual.

However, normativeness (or non-normativeness) should only have an impact for events that occur within a relatively narrow age range, and not for events that occur over a wider age range. For example, relationship dissolution is a highly variable event in that there is no time in an individual's life when such a transition is most likely. During these sorts of life transitions, we would expect it to be somewhat more difficult to detect any effects on personality. Again, this is because there is not a strong social script for the ways that individuals ought to change during these times. However, correspondingly, variability in normativeness should be more important when life transitions occur within a relatively narrow age range. This is because, for events that occur within a given cultural context at a particular age, individuals have much stronger norms, scripts, and social pressure to behave in a specific way before and after that event. Thus, the normativeness of the individual's experience of the event should be much more important for these narrow age-range events, such as childbirth.

In this study, I examine life transitions and their effects on personality as a function of the normativeness of the life transition. In particular, I examine the associations between personality change and transition into marriage and parenthood and the way that these associations might differ as a function of individuals' age at the time of the event. This study represents the first examination of the potential role of normativeness and its associations with mean-level personality trait change.

In order to better understand who experience life transitions and when, I first examine the typical age at which a variety of events occur to determine which allow for the potential of normative experiences. Do most individuals experience event at a particular time in their lives (at around the same age)? Then, I will use information regarding the timing of different life events as a means of understanding for which events normativeness should matter. Here, I focus on the events of marriage and childbirth, and I expect that they will be common, and experienced at around the same age for most individuals.

Differential Stability of Personality Traits over Time

Differential stability, or the stability of individual differences over time, has generally been shown to be quite high (Roberts & DelVecchio, 2000). That is, personality traits are quite stable, even over long periods. In general, differential stability appears to increase over the life span. However, recent work has suggested that differential stability decreases again later in life (Lucas & Donnellan, 2011; Wortman et al., 2012).

Using a large, nationally representative panel study from Germany (SOEP; Wagner, Frick & Schupp, 2007), researchers demonstrated that age had a curvilinear association with rank-order stability of personality. This inverted U-shaped pattern of differential stability has been found in the SOEP (Lucas & Donnellan, 2011) and in a longitudinal study of Australians (Wortman et al., 2012). Thus, there is good evidence that the differential stability of personality increases up until mid-life, then subsequently decreases (Roberts et al., 2006).

This pattern of differential stability has been explained using two related principles. First, there are initial differences in the kinds of experiences that individuals select themselves into (Caspi & Roberts, 2001; Roberts et al., 2003). Personalities influence the environments that people choose, and these chosen environments then often help to cement the personality traits

that led to them in the first place. That is, there are both *selection effects* of personality on the kinds of environments that individuals choose to enter, and subsequently, *socialization effects* of those environments (Specht et al., 2011). This idea is known as the *corresponsive principle* (Caspi et al., 2005; Roberts et al., 2003). In other words, selection effects and socialization effects work in tandem in personality development, with both influencing the ways that individuals change over time (Roberts et al., 2003; Neyer et al., 2013). The corresponsive principle would suggest that, due to these selection and socialization effects, differential stability should increase over the life span. As individuals select into situations and experience life events that are associated with their personality traits, those personality traits should thereby become more stable as they are supported by those situations. For example, as an individual chooses a form of employment—one that is likely related to his or her personality traits—the traits that led to that decision will also likely be rewarded in that environment. The evidence thus far suggests that personality and the environment interact in a dynamic way over time, influencing each other throughout the life span. Personality is related to the events that individuals experience, and these events work to influence the way that personality traits develop, in particular, by reinforcing those personality traits.

Here, I examined the pattern of differential stability within two samples with three waves of assessment. Such data will help to clarify issues that arise in old age particularly, as there will be greater power in the older years with more data on individuals of those ages. That is, the pattern of differential stability in late life is unclear because of the limited amount of data available. By examining these questions in a dataset with three waves of data, there are larger numbers of individuals at the later periods of life, helping to clarify the patterns of differential stability among older individuals. Thus, one of the primary purposes of examining changes in

differential stability over the life span here is to determine, now that there is more data available later in life, whether the previously shown inverted U-shaped pattern of differential stability remains supported. Although I examined differential stability only across concurrent waves (that is, Time 1 to Time 2, or Time 2 to Time 3 stability), with greater numbers of individuals at each age, I believe this will help to support the still somewhat new finding that differential stability declines in later life.

In addition to examining the general pattern of differential stability over the life span, I also examined the associations between the number of life events experienced and differential stability. If experiencing any life event is associated with personality trait change, one might predict experiencing a larger number of life events would be associated with greater rank-order change. In contrast, some past work has suggested that increasing experiences of life events might contribute to increased stability in life events, as suggested by the corresponsive principle (Caspi et al., 2005). In other words, as individuals experience life events that are associated with their initial levels of personality traits, those events might serve to cement the traits that to them in the first place, increasing the stability of personality traits. Past researchers have suggested that such a pattern of life events and social or biological upheaval might serve to explain this inverted U-shaped pattern of differential stability (Lucas & Donnellan, 2011; Wortman et al., 2012). However, other work has found inconsistent associations between experiencing particular life events and rank-order stability (Specht et al., 2011). Here, I explored the association between differential stability, age, and the number of life events experienced to test directly the notion that the experience of events might serve to increase the differential stability of personality traits.

The Current Study

Overall, research on mean levels of personality trait change suggests that individuals develop in ways summarized by the maturity principle and that these changes are related to major life transitions and the social roles that individuals take on over time (e.g., Roberts & Wood, 2006), particularly when individuals are invested in those social roles. However, many of the studies examining personality trait change are limited by the fact that they examined personality trait change across only two waves. Thus, one major goal of this study was to examine the nature and timing of mean levels of personality trait change over more than two waves of assessment. I first explored the timing and nature of mean level changes in personality traits over the life span. The samples here also have the benefit of containing a wide age range, which might help to clarify trends in trait change in later life.

In the second part of the study, I explored the associations between these mean levels of personality trait change and life events. I began by simply charting the timing of life events over the span, and describing the number of events that occur over different age groups. Following this, I examined the degree to which personality trait change over time is associated with experiencing life transitions such as a first marriage. By examining the associations between life transitions and mean level personality trait changes, I can also explore the suggestion that these trait changes are biological in nature, as has been suggested by some researchers in the past (Costa & McCrae, 2006). In addition, by using longer-term samples, this allowed me to better understand both how mean levels of personality traits change over time and their associations with life events, as I had a longer period of time over which to observe possible trait changes.

In addition, I also explored the association between life transitions, personality, and normativeness of the life transition as a moderator of these personality changes. Specifically, I

looked at the associations between first marriage and first childbirth as a predictor of changes in personality traits. I also examined whether or not the normativeness of the life event moderates the association between experiencing the life event and personality trait change. In the case of normativeness of the life transition, this is primarily indicated by the age of the individual at the time of the event. The normativeness of the life event is essentially the age at which the individual experiences that event (Neyer et al., 2013). Thus, I used individuals' age as a potential moderator of the association between marriage or childbirth and personality traits.

Finally, I examined the patterns of differential stability of personality traits over the life span, determining if three waves of data also show the same inverted U-shape pattern of changes in differential stability over the lifespan displayed in previous studies using two waves and a cohort-sequential design (Lucas & Donnellan, 2011; Specht et al., 2011; Wortman et al., 2012). In addition, I examined whether the number of life events experienced is associated with rank-order stability over the four-year time span.

General Method

Participants

HILDA. The Household Income and Labour Dynamics in Australia survey is a nationally-representative longitudinal panel study out of Australia. Households are selected in a multistage, representative manner. All individuals aged 15 or older within a given household are asked to respond. Individuals in the HILDA survey are asked to respond to a series of questions each year regarding the incidence of 21 life events. Individuals simply reported whether or not the life event had occurred in the past year (yes or no). For the first portion of the study (regarding the timing of life events), all individuals who responded to any questions regarding

their life events are included, resulting in a sample of 12316 individuals, with 52.9% (6513) women. Individuals ranged in age from 18 to 100 years old (M = 47.39, SD = 17.30) in 2005[1].

Participants in the HILDA survey responded to questions about their personality in 2005, 2009, and 2013. These items were initially administered to 11,307 individuals, with 8,662 (76.6%) of individuals responding to the same questions four years later in 2009, and 7848 (69.4%) of those individuals responding in 2013. Individuals were included in analyses if they responded to at least two personality assessments, and if they were at least 15 years of age in 2005. This resulted in a sample of 10,130 individuals from 15 to 94 years of age, with 50.7% women (5136). Individuals were on average 43.24 years of age (SD = 17.14) in 2005. Of the 10,130, individuals, 683 reported a first marriage in 2006 or later, and 775 reported a first child 2006 or later.

SOEP. The Socio-Economic Panel Study out of Germany is another ongoing nationally-representative, longitudinal panel study that began in 1984. All individuals age 16 years or older are asked to respond to a series of questions each year, including the timing of a number of life events. I focused on marriage, widowhood, childbirth, marital separation, divorce, and children moving out of the house. For the first portion of the study, regarding life events, all individuals who responded to at least one question regarding life events were included in the sample. In total, 49,423 individuals reported experiencing at least one of those life events between 1984 and 2013, with 53.7% (26543) women.

Individuals in the SOEP also responded to questions about their personality traits in the same years (2005, 2009, and 2013). The instrument used in the SOEP is a 15-item version of the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991). These items were initially

[1] Individuals might have answered questions about life events at any point in the study (any year), making it arbitrary to select a year from which to calculate age. Individuals could have been as young as 15 when answering questions.

administered to 21,005 individuals, 14,929 (71%) of whom responded again in 2009, and 10,115 (48.1% of the original sample) who responded in 2013. Again, any individuals who responded to at least two of the personality assessments were included, resulting in a sample of 16,632 individuals who were at least 15 in 2005 (*M* age = 46.72, *SD* = 16.90), with 52.5% (8738) women. Of these, 915 individuals reported a first marriage on or after 2006, and 875 reported a first child.

Measures

HILDA. Individuals responded to 36 items about their Big Five traits in 2005, 2009, and 2013. The instrument used was a variation on the Big Five inventory developed by Saucier (1994). For a full list of the items administered, see Appendix A. Individuals responded to questions of how well a list of adjectives described them on a 1 ("Does not describe me at all") to 7 ("Describes me very well") scale. Survey organizers, however, have found that using a subset of 28 items (rather than the full 36) has performed better psychometrically in mapping onto the Big Five traits, and thus, I will focus on those items here (see Losoncz, 2009). Reliabilities were acceptable for all scales, ranging from a Cronbach's α of .73 for Openness to Experience in the first wave, to .81 for Neuroticism in the second wave (*M* = .77). Full reliability information is presented in Table 1. Sample sizes vary slightly across analyses because some participants failed to answer all questions or answered questions in only two of the waves.

Table 1: Reliability Information for Personality Scales

	HILDA			GSOEP		
	Wave 1	Wave 2	Wave 3	Wave 1	Wave 2	Wave 3
Extraversion	.75	.75	.76	.66	.66	.65
Agreeableness	.77	.79	.78	.49	.50	.51
Conscientiousness	.79	.79	.80	.58	.59	.63
Neuroticism	.80	.81	.80	.63	.63	.60
Openness to Experience	.73	.75	.74	.62	.62	.62

SOEP. In 2005, 2009, and 2013, individuals responded to 15 items from the Big Five Inventory (BFI) about their personality in order to assess the Big Five personality traits (John & Srivastava, 1999). For each trait, individuals responded to three items indicating the degree to which that statement described themselves on a 1 ("Does not apply to me at all") to 7 ("Applies to me perfectly") scale. For example, for the trait of Conscientiousness, participants responded to items such as "I see myself as someone who is a thorough worker," and "I see myself as someone who carries out tasks efficiently." For a full list of items administered, see Appendix B. Participants completed questions like this for each of the Big Five traits, and all of the scales showed similar reasonable levels of internal consistency, with Cronbach's α ranging from α = .49 for Agreeableness in the first wave, to α = .66 for Extraversion in waves 1 and 2. Full reliability information is again presented in Table 1.

Mean Level Changes in Personality Traits

Analytic Strategy: Mean Level Changes in Personality Traits

In order to examine changes in mean-levels of personality traits over the life span, I began by first testing for measurement invariance for each of the Big Five traits in both samples. In addition, to get a complete picture of the life span, I used a cohort sequential design. This involves examining longitudinal trends in different age groups of individuals. I divided individuals in 14 5-year age cohorts, ranging from 15-19 years of age to 80-84 years of age. Although there were individuals who were older than 84 years of age, I limited analyses to a maximum age of 84 years because there were not enough people older than this to create separate groups. In both samples, measurement equivalence involves testing for measurement invariance across time (i.e., across each of the different assessments, in 2005, 2009, and 2013)

and across age groups (i.e., across all 14 different age groups). I will describe each sample in turn.

Measurement Invariance Testing. In the HILDA, 28 items are used to obtain estimates of individuals' Big Five traits at each of the three waves. I used a series of confirmatory factor analyses (CFAs) with sequential constraints in order to test for measurement equivalence across time and across age cohort. In order to show measurement equivalence, I tested a series of measurements both across time (i.e., the three time points of the study) and across age groups.

For the CFAs, each trait was examined in separate group models. To identify latent personality variables, three parcels were created by factor analyzing the items at each wave, averaging the loadings across the three waves, and then dividing the items to create equivalent parcels, with the highest loading item and the lowest loading item averaged together, and then the second highest with the second lowest, and so on. I used this approach in order to create fewer but more reliable indicators, and to avoid the possibility that correlated uniquenesses among items might lead to misfit.

In order to test for measurement equivalence, I examined model fit for a series of models (described in more detail below) to determine if increasing constraints caused a decrement in model fit. A change in model fit for any of these steps would indicate that there is not measurement equivalence across the groups or across time. When evaluating models, I report the chi-square and degrees of freedom, but focus on the Root Mean-Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Standardized Root Mean Residual (SRMR). Specifically, I used the guidelines that well-fitting models will have RMSEAs at or below .05, CFIs and TLIs at or above .95, and SRMRs at or below .08 (Hu & Bentler, 1998). For model comparison, I examined a likelihood ratio test using

the chi-square. However, due to the large sample size, it is possible that the chi-square test will change significantly for even small decrements in fit. As a result, I also examined relative fit indices for the amount of change to determine if constraints appear to be causing a substantial decrement in fit. If a constraint causes the model to fall below the criteria specified, or if it decreases CFI or TLI by more than .01, I will consider this to be evidence that the constraint does cause substantial decrement in fit (Cheung & Rensvold, 2002).

All analyses were conducted in Mplus version 7.11 using a full-information maximum likelihood procedure. I first tested a baseline model to establish configural measurement invariance across the three assessments and across age cohorts (Model 1). The variance for each latent trait was set to 1 to identify the model and to standardize the latent trait. Next, I tested whether there was measurement invariance over time. Specifically, in Model 2 I tested time metric invariance by constraining loadings in 2005 to be equal to the loadings in 2009 and 2013 within each of the age groups. In Model 2, I freed all of the latent variances except the first one in order to test the equivalence of the loadings. The latent variance at Time 1 was constrained for model identification. Then, in Model 3, I tested scalar invariance across time, constraining the intercepts of each indicator to be equal across the different time points. In order to do so, I freed the latent intercepts of all variables except the first, which was constrained to one for model identification.

In Models 4 and 5, I repeated these two sets of constraints for the measures across cohorts. I began by testing cohort metric invariance (constraining the factor loadings to be equal) in all of the age cohorts (Model 4). Following this, I constrained the intercepts be equal in all age cohorts, testing scalar invariance across cohorts (Model 5). In Model 5, the latent variance and

latent intercept for the youngest age group were constrained to 1 and 0, respectively, for model identification.

All fit indices for all of the models are presented in Table 2. In addition, example syntax for each of the different models is presented in Appendix C. With the exception of Openness to Experience, results showed that, in general, the final models fit the data well. Note that, likely due to the large sample size, the chi-square differences (not presented in the Table) all showed significant change in fit. However, past researchers have suggested that, in the case of large samples, likelihood ratio tests might be significant even in the absence of substantial misfit (Cheung & Rensvole, 2002). In the HILDA, there was some minor misfit in the model for Extraversion that seems to be due to the first parcel not loading particularly highly on the latent factor for some groups. Following constraints in Models 4 and 5 (the same as applied with other traits), fit indices improved, with only RMSEA remaining slightly above the threshold. Nonetheless, the evidence for scalar invariance is somewhat weaker for the trait of Extraversion as a result. In addition, for the models for Conscientiousness and Neuroticism in the SOEP, the RMSEA was slightly above threshold. Results from the models showed that there were some minor issues when constraining intercepts to be equal across the cohorts, suggesting that the evidence for scalar invariance is somewhat weaker across the age groups.

Openness to Experience proved to be somewhat more problematic. The initial model using the parcels created in past studies (Wortman et al., 2012) resulted in extremely high stability estimates from Time 1 to Time 2, and no constraints were able to get the model to estimate standard errors accurately. As a result, I chose to use the six indicators independently, without creating parcels. In particular, the items “deep,” “philosophical,” “imaginative,” “intellectual,” “complex,” and “creative,” were used independently as indicators of the

Table 2: Fit Indices for Measurement Invariance Testing

		HILDA					SOEP				
Trait	Model	df	Chi-Square	CFI	TLI	RMSEA	SRMR	df	Chi-Square	CFI	TLI	RMSEA	SRMR
Agreeableness	1	210	471.763	.992	.981	.042	.028	210	437.694	.991	.978	.030	.022
Agreeableness	2	266	556.073	.991	.983	.039	.037	266	501.432	.990	.982	.027	.027
Agreeableness	3	322	690.601	.989	.982	.040	.039	322	675.039	.986	.978	.030	.030
Agreeableness	4	348	775.252	.987	.981	.041	.052	348	754.529	.983	.976	.031	.034
Agreeableness	5	374	988.598	.981	.975	.048	.063	374	1068.374	.972	.962	.040	.046
Conscientiousness	1	210	273.513	.999	.996	.020	.016	210	416.195	.993	.984	.029	.024
Conscientiousness	2	266	331.042	.998	.997	.018	.025	266	514.622	.992	.985	.028	.031
Conscientiousness	3	322	408.266	.998	.997	.019	.027	322	664.163	.989	.983	.030	.031
Conscientiousness	4	348	439.915	.998	.997	.019	.032	348	882.227	.983	.976	.036	.048
Conscientiousness	5	374	776.941	.991	.987	.039	.044	374	2055.590	.947	.928	.062	.090
Extraversion	1	210	769.565	.987	.970	.061	.027	210	328.894	.997	.993	.022	.020
Extraversion	2	266	837.219	.987	.976	.054	.032	266	409.940	.997	.994	.021	.025
Extraversion	3	322	926.305	.986	.979	.051	.033	322	586.990	.994	.990	.026	.028
Extraversion	4	348	1061.675	.984	.977	.053	.044	348	837.018	.988	.983	.034	.042
Extraversion	5	374	1219.749	.980	.974	.057	.047	374	1380.349	.976	.968	.048	.042
Neuroticism	1	210	241.258	.999	.998	.014	.015	210	346.562	.996	.990	.023	.018
Neuroticism	2	266	301.897	.999	.998	.014	.020	266	443.263	.995	.990	.024	.023
Neuroticism	3	322	431.664	.997	.996	.022	.022	322	1517.454	.963	.943	.056	.040
Neuroticism	4	348	495.345	.996	.995	.024	.027	348	1590.867	.962	.945	.055	.043
Neuroticism	5	374	620.465	.994	.992	.030	.031	374	1967.172	.951	.934	.060	.051
Openness to Experience	1	1596	11068.568	.880	.836	.091	.101	210	297.585	.998	.994	.019	.017
Openness to Experience	2	1734	11257.071	.879	.851	.087	.102	266	372.726	.997	.994	.018	.021
Openness to Experience	3	1874	11607.813	.876	.859	.085	.102	322	575.565	.993	.989	.026	.025
Openness to Experience	4	1941	12189.222	.870	.856	.099	.085	348	618.259	.993	.989	.026	.027
Openness to Experience	5	2006	13785.378	.850	.840	.090	.105	374	1635.941	.965	.953	.053	.050

underlying latent trait. Using these indicators independently did resolve the issue of high stability; however, the resulting model did not meet the thresholds for model fit chosen earlier (CFI = .86, TLI = .85, RMSEA = .09, SRMR = .13). However, the model did not fit well initially, as the relative fit indices for Model 1 are nearly identical to those following the constraints for measurement invariance in Model 5. Thus, the poor model fit appears to result from the overall measurement model, not the constraints for measurement invariance.

The same process was repeated for the SOEP. Again, all fit indices for all models are presented in Table 2. Results showed that, with the exception of Neuroticism and Conscientiousness, all models fit the data well. In the case of Conscientiousness, the final model showed somewhat worse fit than the thresholds proposed (RMSEA = .06, SRMR = .09, TLI = .93). This suggests that the evidence of scalar invariance is somewhat weaker for Conscientiousness than for other traits. As a result, the comparison of mean levels across age cohorts should be interpreted with somewhat more caution.

Plotting Latent Means. In order to examine mean level changes in personality traits, I plotted the latent means of each of the age groups over time (obtained from the final model, Model 5, as described above) to determine how the different traits might be increasing or decreasing over the life span. In addition, latent means are presented for each age group in Tables 3 through 6. There is a single trajectory over time for each age group, and those trajectories shown on the same graph then show the cross-sectional trend over time. If the longitudinal paths for each age group line up with the age group trends, this suggests that the cross-sectional trends do a good job of describing the longitudinal trend of mean-level change in the personality trait.

Table 3: Descriptive Statistics for Age Groups: Extraversion and Agreeableness in the HILDA

Group	N	Age T1	Age T2	Age T3	E M T1	E Var T1	E M T2	E Var T2	E M T3	E Var T3	A M T1	A Var T1	A M T2	A Var T2	A M T3	A Var T3
A	908	15	19	23	.000	1.000	-.152	1.025	-.156	1.038	.000	1.000	.091	.973	.279	.967
B	851	20	24	28	-.122	1.126	-.149	.988	-.189	1.125	.209	.955	.184	.991	.311	.871
C	758	25	29	33	-.154	1.112	-.233	1.253	-.287	1.355	.380	.773	.340	.783	.436	.805
D	913	30	34	38	-.243	1.176	-.277	1.322	-.351	1.315	.326	.874	.303	.874	.378	.839
E	999	35	39	43	-.252	1.128	-.292	1.199	-.365	1.323	.306	.955	.298	.920	.423	.959
F	1073	40	44	48	-.291	1.143	-.297	1.187	-.316	1.207	.326	.843	.312	.872	.421	.938
G	1015	45	49	53	-.319	1.185	-.361	1.141	-.345	1.261	.375	.850	.401	.826	.502	.827
H	881	50	54	58	-.369	1.147	-.362	1.039	-.329	1.193	.420	.795	.427	.881	.527	.806
I	811	55	59	63	-.292	1.189	-.294	1.144	-.323	1.041	.484	.854	.434	.872	.535	.810
J	606	60	64	68	-.358	.937	-.373	.989	-.365	1.010	.502	.747	.418	.820	.580	.744
K	509	65	69	73	-.354	.925	-.367	.935	-.389	.966	.339	.940	.262	.987	.366	.787
L	376	70	74	78	-.270	1.017	-.325	.937	-.271	.950	.554	.874	.365	1.122	.464	.898
M	278	75	79	83	-.390	.898	-.386	.719	-.467	.719	.326	1.057	.311	.912	.400	1.196
N	152	80	84	88	-.356	.820	-.557	.859	-.528	1.167	.488	1.179	-.002	1.386	.433	.959

Note. E = Extraversion, A = Agreeableness, M = Mean, Var = Variance, T1 = Time 1 (2005), T2 = Time 2 (2009), and T3 = Time 3 (2013).

Table 4: Descriptive Statistics for Age Groups: Conscientiousness, Neuroticism, and Openness to Experience in the HILDA

Age Group	C M T1	C Var T1	C M T2	C Var T2	C M T3	C Var T3	N M T1	N Var T1	N M T2	N Var T2	N M T3	N Var T3	O M T1	O Var T1	O M T2	O Var T2	O M T3	O Var T3
A	0	1	0.21	1.02	0.51	1.09	0	1	-0.01	1.10	-0.06	1.25	0	1	-0.11	1.09	-0.03	1.10
B	0.29	1.08	0.58	1.08	0.71	1.09	0.05	1.24	-0.08	1.02	-0.14	1.08	-0.01	1.10	-0.08	1.08	-0.09	1.15
C	0.51	1.08	0.63	1.08	0.67	1.21	-0.04	1.09	-0.18	1.01	-0.18	1.02	-0.05	1.07	-0.13	1.04	-0.15	1.05
D	0.67	1.10	0.63	1.10	0.74	1.19	-0.14	1.05	-0.23	0.96	-0.22	1.01	-0.14	1.07	-0.20	1.05	-0.14	1.08
E	0.65	1.04	0.66	1.00	0.77	1.04	-0.19	1.08	-0.23	1.08	-0.29	0.99	-0.10	1.15	-0.18	1.19	-0.08	1.16
F	0.71	1.00	0.73	1.04	0.82	1.14	-0.20	1.08	-0.33	1.11	-0.36	1.07	-0.09	1.09	-0.13	1.16	-0.05	1.25
G	0.75	1.06	0.74	1.09	0.83	1.06	-0.28	1.03	-0.40	1.05	-0.42	1.08	-0.09	1.04	-0.18	1.10	-0.08	1.09
H	0.79	1.09	0.86	1.07	0.95	1.02	-0.42	1.20	-0.55	1.05	-0.57	1.09	-0.18	1.22	-0.23	1.24	-0.17	1.20
I	0.88	1.05	0.92	1.07	0.94	1.06	-0.58	1.23	-0.67	1.08	-0.67	1.14	-0.12	1.15	-0.22	1.18	-0.11	1.23
J	0.91	1.05	0.86	1.05	0.96	0.98	-0.65	1.04	-0.79	1.00	-0.79	1.06	-0.16	1.11	-0.33	1.13	-0.27	1.14
K	1.02	1.02	0.92	1.01	0.97	1.00	-0.73	0.98	-0.84	1.09	-0.82	1.00	-0.31	0.91	-0.45	1.25	-0.36	1.13
L	1.11	0.88	1.02	0.89	1.06	0.97	-0.96	0.81	-1.00	0.91	-1.05	0.80	-0.34	0.96	-0.53	1.06	-0.49	1.27
M	1.12	0.98	0.97	0.89	0.97	0.75	-0.97	0.81	-1.05	0.84	-1.01	0.81	-0.59	1.37	-0.73	1.22	-0.63	1.17
N	1.22	1.15	0.98	0.97	1.12	0.85	-1.31	0.74	-1.22	0.95	-1.15	0.69	-0.74	1.19	-0.93	1.61	-0.81	1.37

Note. C = Conscientiousness, N = Neuroticism, O = Openness to Experience, M = Mean, Var = Variance, T1 = Time 1 (2005), T2 = Time 2 (2009), and T3 = Time 3 (2013).

Table 5: Descriptive Statistics for Age Groups: Extraversion and Agreeableness in the SOEP

Age Group	N	E M T1	E Var T1	E M T2	E Var T2	E M T3	E Var T3	A M T1	A Var T1	A M T2	A Var T2	A M T3	A Var T3
A	957	0.00	1.00	-0.05	0.98	0.03	0.84	0.00	1.00	-0.08	0.96	-0.08	0.73
B	1031	0.03	1.02	-0.02	0.99	0.03	0.92	-0.02	1.05	-0.15	0.97	-0.05	0.87
C	1057	0.00	0.95	-0.13	1.09	-0.09	0.97	0.04	0.86	-0.15	0.81	-0.10	0.68
D	1176	-0.06	0.86	-0.14	1.02	-0.09	1.02	0.00	0.97	-0.15	1.04	-0.08	0.99
E	1678	-0.04	0.86	-0.12	1.01	-0.03	0.95	-0.06	1.02	-0.23	0.98	-0.09	0.87
F	1805	-0.06	0.96	-0.18	1.01	-0.14	1.03	-0.04	0.93	-0.24	1.06	-0.15	0.87
G	1677	-0.09	0.93	-0.23	0.93	-0.18	0.90	0.01	1.07	-0.15	0.92	-0.11	0.95
H	1556	-0.11	0.85	-0.28	0.91	-0.19	0.90	-0.01	1.03	-0.16	1.02	-0.10	0.95
I	1365	-0.09	0.86	-0.21	0.86	-0.08	0.77	0.01	0.96	-0.16	0.95	-0.08	0.94
J	1369	-0.10	0.88	-0.24	0.82	-0.14	0.82	0.05	0.76	-0.15	0.89	-0.10	0.93
K	1415	-0.13	0.89	-0.33	0.94	-0.13	0.76	-0.03	1.02	-0.14	0.87	-0.06	0.99
L	780	-0.10	0.94	-0.29	0.83	-0.18	0.79	0.13	1.07	-0.04	1.07	0.10	1.05
M	459	-0.15	0.97	-0.33	0.79	-0.33	1.06	0.29	1.12	0.11	1.13	0.11	0.99
N	307	-0.23	1.10	-0.44	1.09	-0.32	0.79	0.33	1.00	0.04	1.10	0.00	1.24

Note. E = Extraversion, A = Agreeableness, M = Mean, Var = Variance, T1 = Time 1 (2005), T2 = Time 2 (2009), and T3 = Time 3 (2013).

Table 6: Descriptive Statistics for Age Groups: Conscientiousness, Neuroticism, and Openness to Experience in the SOEP

Age Group	N	C M T1	C Var T1	C M T2	C Var T2	C M T3	C Var T3	N M T1	N Var T1	N M T2	N Var T2	N M T3	N Var T3	O M T1	O Var T1	O M T2	O Var T2	O M T3	O Var T3
A	957	0	1	0.34	0.87	0.55	0.83	0	1	-0.05	1.14	-0.08	1.17	0	1	-0.20	0.93	-0.09	0.77
B	1031	0.48	0.86	0.55	0.85	0.64	0.62	0.07	1.27	-0.05	1.25	-0.06	1.30	-0.02	0.95	-0.20	0.89	-0.10	1.00
C	1057	0.69	0.57	0.65	0.71	0.68	0.58	0.03	1.32	0.01	1.19	-0.08	1.23	-0.16	0.87	-0.32	0.86	-0.27	0.90
D	1176	0.78	0.57	0.75	0.58	0.74	0.53	-0.03	1.12	-0.13	1.24	-0.17	1.21	-0.27	1.01	-0.41	1.02	-0.34	0.92
E	1678	0.80	0.61	0.77	0.59	0.78	0.61	-0.03	1.24	-0.12	1.25	-0.17	1.15	-0.24	0.84	-0.39	0.94	-0.25	0.86
F	1805	0.86	0.53	0.73	0.60	0.78	0.60	0.02	1.29	-0.11	1.31	-0.08	1.32	-0.27	0.96	-0.43	1.05	-0.34	1.02
G	1677	0.90	0.54	0.80	0.57	0.77	0.57	0.04	1.27	-0.08	1.20	-0.02	1.33	-0.27	0.96	-0.43	1.03	-0.30	0.96
H	11556	0.89	0.57	0.80	0.58	0.76	0.63	0.10	1.32	-0.02	1.31	-0.10	1.22	-0.31	1.09	-0.46	1.03	-0.33	1.06
I	1365	0.87	0.60	0.76	0.67	0.74	0.64	0.16	1.35	0.02	1.41	-0.10	1.21	-0.25	1.12	-0.42	1.03	-0.23	1.02
J	1369	0.80	0.62	0.64	0.71	0.67	0.74	0.17	1.21	-0.01	1.12	-0.03	1.14	-0.29	1.29	-0.45	1.27	-0.26	1.07
K	1415	0.80	0.65	0.68	0.66	0.69	0.63	0.25	1.19	0.10	1.20	0.10	1.21	-0.46	1.09	-0.65	1.10	-0.49	1.12
L	780	0.88	0.60	0.67	0.71	0.69	0.76	0.15	1.32	0.04	1.29	-0.03	1.10	-0.50	1.29	-0.79	1.32	-0.57	1.11
M	459	0.82	0.66	0.53	1.02	0.61	0.83	0.11	1.25	0.03	1.39	-0.01	1.51	-0.57	1.26	-0.88	1.07	-0.82	1.29
N	307	0.75	0.70	0.42	1.15	0.40	0.79	-0.02	1.81	-0.13	1.39	-0.18	0.91	-0.73	1.32	-1.04	1.52	-1.04	1.52

Growth Curve Models. In addition to plotting the latent means, I used latent growth curve models to determine how traits are changing over the life span, predicting the intercept and slope of the model from individuals' age in 2005. I also examined the possibility of quadratic prediction from age. Results from these models investigate whether different traits increase or decrease as individuals get older, controlling for age, and also whether or not age is related to the rate of change (the slope). In contrast, the CFA simply plots latent means for different groups over time; growth curve models explicitly model longitudinal change, taking into account the initial mean level. The two approaches address the question of personality trait change in different ways, and might therefore lend themselves to making different conclusions.

In the growth curve models, the same parcels were used as indicators for each trait, but the intercept and slope were estimated for all participants in the study, ignoring age cohorts. Following an initial model in which intercept and slope were estimated with no predictors, age and age^2 were added as predictors of both the intercept and slope. In all cases, the mean of the latent growth curve intercept was constrained to zero, and its variance to 1, standardizing model parameters relative to the first measurement. Age was always included in the model, and age^2 was included in the model only if it predicted either the intercept or the slope at a significant level. Both age and age^2 were centered prior to analysis.

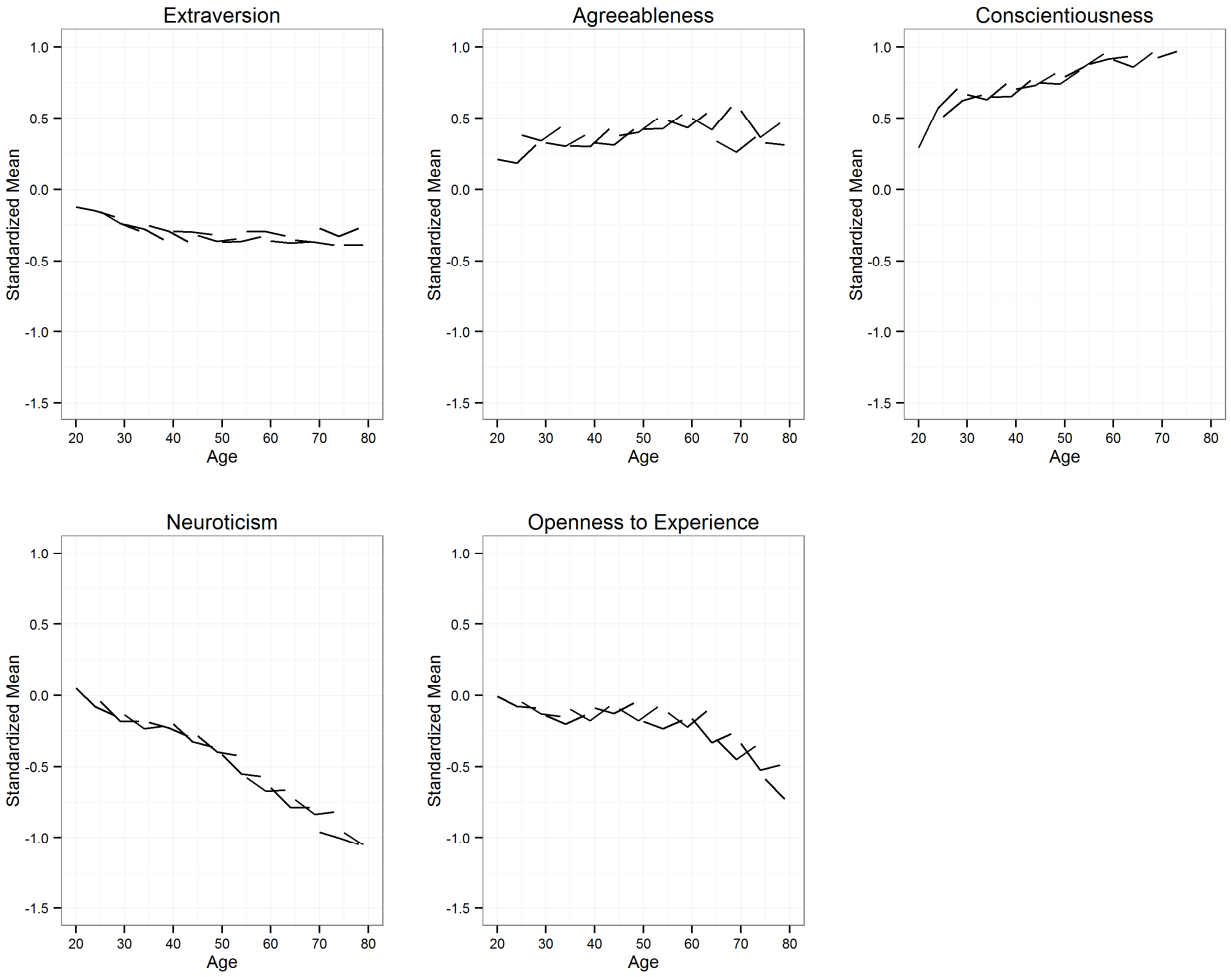
The growth models generally assumed scalar measurement invariance across time (with two exceptions described more below), constraining factor loadings and intercepts to be equal across the three time points. In addition, the loadings of each latent trait on the slope were set to zero at Time 1, one at Time 2, and two and Time 3, so that the slope represents the change in the latent trait for each time point (Time 1 to Time 2, Time 2 to Time 3). Again, example syntax is presented in the Appendix. Note that there is minor variation in the degrees of freedom for the

models for two reasons: first, age^2 was included in the model only when it predicted either the intercept or the slope at a significant level. Second, in the case of Agreeableness and Conscientiousness in the SOEP, the loadings for one of the parcels (the first parcel in both cases) had to be allowed to vary over time as a result of very high stability between Time 1 and Time 2 latent variables. In other words, there were extremely high (greater than 1) associations between Time 1 and Time 2 latent variables, probably due to low factor loadings of the first parcel. As a result, the model could not be accurately estimated with those loadings constrained, and they had to be allowed to vary over time in order for the model to run without errors; these models assume partial invariance (Millsap & Kwok, 2004). The consequence of this is that interpretation of the changes in Agreeableness and Conscientiousness over time should be interpreted with somewhat more caution.

Results: Mean-Level Personality Trait Change

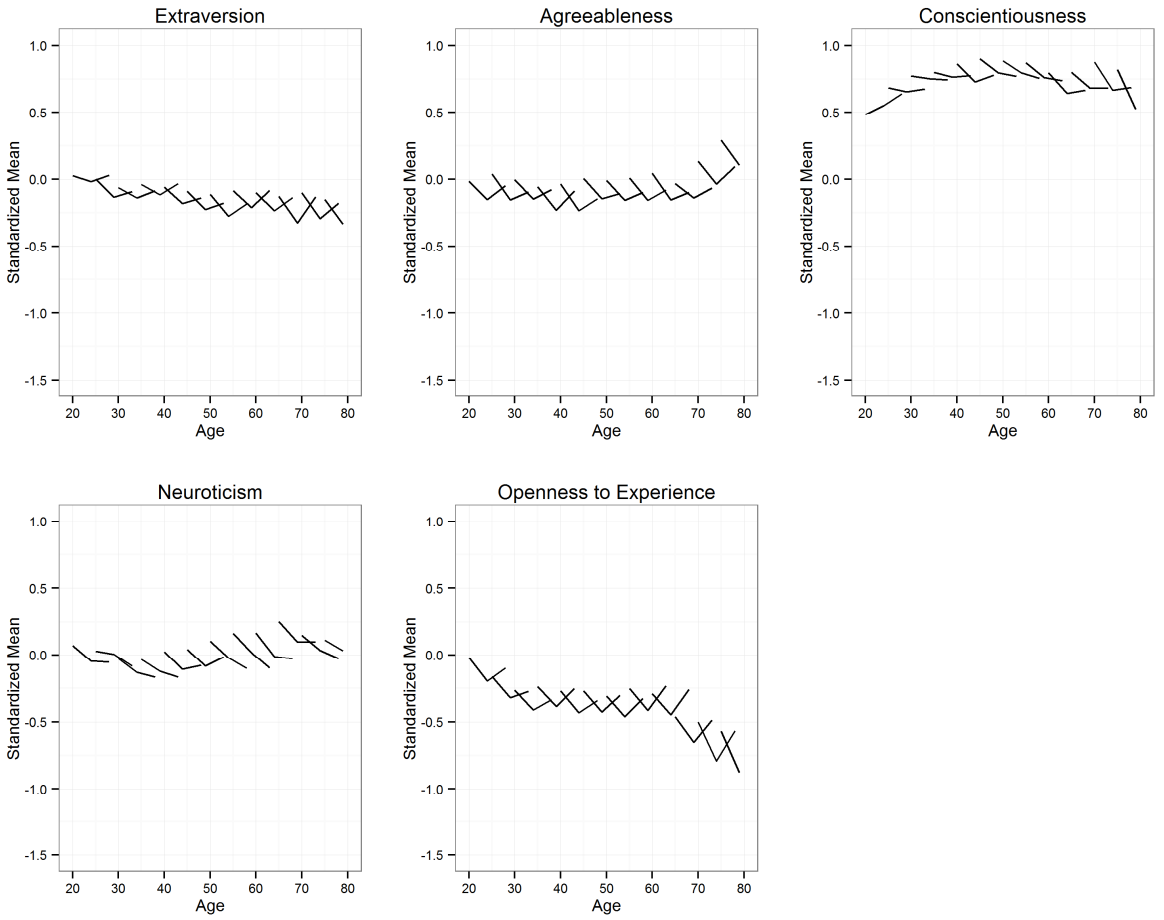
Confirmatory Factor Analyses. The plots for the mean levels of all traits are presented in Figures 1 and 2. Figure 1 is the plot for the HILDA; Figure 2 shows the same results for the SOEP. In addition, the Ns for each age cohort, latent means, and variances are presented in Tables 3 through 6. Figures 1 and 2 show the mean levels of personality traits over time using a cohort sequential design, which presents the longitudinal trend of each cohort as a separate line, and combines the longitudinal trends for each age cohort to show the life span trends in personality traits. I use this here to examine whether or not the traits increase or decrease in a manner that is consistent with the maturity principle, which suggests that Agreeableness and Conscientiousness should increase over time, whereas Neuroticism should decrease (Caspi et al., 2005).

Figure 1: Mean Level Traits in the HILDA



This plot shows the latent mean of each trait across the life span for each age cohort in the HILDA. Each separate line represents the longitudinal trend for a single age cohort for that trait.

Figure 2: Mean Level Traits in the SOEP



This plot shows the latent mean of each trait across the life span for each age cohort in the SOEP. Each separate line represents the longitudinal trend for a single age cohort for that trait.

In the HILDA, a general overview of the plots suggests that results follow the maturity principle fairly well: Conscientiousness increases, as does Agreeableness, whereas Neuroticism decreases over the life span. Extraversion declines somewhat over the life span, although the decrease is quite as small. In the case of Extraversion, Neuroticism, and Conscientiousness, the cross-sectional and longitudinal trends line up fairly well, suggesting that HILDA's cross-sectional trends likely reflect actual life span trends in personality trait changes. The pattern is somewhat less clear in the case of Agreeableness and Openness to Experience. Nonetheless, these traits do parallel past work showing that Openness to Experience declines somewhat with age, whereas Agreeableness increases.

In the case of the SOEP, the patterns are far less clear. Although the general trend for some of the traits reflects what has been found in prior work (with Conscientiousness and Agreeableness increasing slightly, and Extraversion declining), there is evidence of substantial discontinuity between cross-sectional and longitudinal trends. This replicates what has been shown in the past on this same sample, whereby the SOEP has some unique issues that can affect interpretation of the results (Lucas & Donnellan, 2011). Specifically, the SOEP has been shown to have panel conditioning effects in the past, meaning that the experience of being in the panel study appears to have an effect on the individuals' responses (Lucas & Donnellan, 2011). Here, that continues to be true. For example, in the case of Neuroticism, the age cohort trend is to remain fairly steady, even increasing slightly in later life, but each cohort demonstrates a downward longitudinal trend. In addition, there is a V-shaped trend. An examination of the raw means suggests that this trend is not due to issues with models (i.e., artifacts of the estimation). These V-shaped patterns are not explainable via traditional panel effects, which should accumulate over time. Instead, they might reflect some acute experience in 2005 that might have

affected all individuals' traits in the same way during that year. Recall that the sample only uses individuals who had at least two waves of data, so it is not the result of new individuals who are entering the study in Wave 3. I consider this difference between HILDA and SOEP in the discussion.

Latent Growth Curve Models. Results of the growth curve models are presented in Tables 7 and 8. Note that the intercepts here describe cross-sectional differences (i.e., average differences between cohorts), whereas slopes describe longitudinal changes over time. First, examining the associations between age and the intercept, a positive association between age and the intercept suggests that older individuals report higher initial levels of the trait, whereas a negative relationship would suggest that older individuals report a lower initial level of the trait. Second, associations between age and the slope represent the slope at the mean age (age 0). Recall that age here is each individual's age in 2005 (centered).

In both the HILDA and the SOEP, cross-sectional differences suggested that older individuals initially report lower levels of Extraversion and higher levels of Conscientiousness than younger individuals do. Agreeableness showed a contradictory picture. In the HILDA, Agreeableness was higher among older age groups (as shown by a positive relationship between age and the intercept); in the SOEP, Agreeableness was lower among older age groups. This suggests that cross-sectional differences in the trait are different for the two studies. For Neuroticism, there was no cross-sectional difference in the HILDA; in the SOEP, older individuals initially reported higher levels of the trait. Finally, for Openness to Experience, older individuals initially reported higher levels of the trait than younger individuals in the HILDA did, and lower levels in the SOEP. This suggests that there are substantial differences across the studies in terms of cross-sectional differences in traits. For Neuroticism and Openness to

Table 7: Growth Curve Model Results and Fit Indices in the HILDA

Model fit	E		A		C		N		O	
χ^2 (df)	850.21 (38)		853.07 (38)		1149.08 (38)		409.49 (38)		11349.58 (168)	
CFI	.980		.975		.985		.992		.860	
TLI	.970		.965		.979		.988		.842	
RMSEA	.046		.046		.054		.031		.080	
SRMR	.059		.083		.059		.047		.090	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*
Intercept with Age Unstd/Std	-.016/-.276	<.001	.022/.382	<.001	.058/.901	<.001	.001/.009	.874	.051/.259	<.001
Intercept with Age^2 Unstd/Std	<.001 /.200	<.001	<.001/-.287	<.001	<.001 /-.491	<.001	<.001 /-.292	<.001	<.001 /-.380	<.001
Slope Mean Unstd/Std	-.032/-.120	<.001	.045/.117	<.001	.065/.105	<.001	-.067/-.204	<.001	-.010/-.035	<.001
Slope with Age Unstd/Std	.005/.295	<.001	-.001/-.043	.552	-.006/.175	.040	-.003/-.178	.039	.003/.182	.044
Slope with Age^2 Unstd/Std	<.001 /-.240	<.001	<.001/-.027	.710	<.001 /-.157	.064	<.001/.204	.018	<.001/-.213	.017

Table 8: Growth Curve Model Results and Fit Indices in the SOEP

Model fit	E		A		C		N		O	
χ^2 (df)	909.671 (31)		596.615 (37)		1716.790 (37)		1337.435 (31)		15274.610 (38)	
CFI	.979		.978		.956		.960		.961	
TLI	.970		.967		.934		.942		.944	
RMSEA	.041		.030		.090		.050		.049	
SRMR	.031		.029		.060		.052		.045	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*
Intercept with Age Unstd/Std	-.004/-.060	<.001	-.015/-.257	<.001	.076/1.238	<.001	.003/.048	<.001	-.005/-.091	.101
Intercept with Age2 Unstd/Std	--		.000/.304	.790	-.001/-.109	<.001	--	--	.000/-.054	.327
Slope Mean Unstd/Std	-.051/-.153	<.001	-.138/-.488	.614	-.051/-.135	<.001	-.113/-.294	<.001	-.054/-.155	<.001
Slope with Age Unstd/Std	-.001/-.036	.027	.001/.035	<.001	-.190/-.840	<.001	-.001/-.026	.069	.008/.384	<.001
Slope with Age^2 Unstd/Std	--		.000/-.065	<.001	.000/.596	<.001	--	--	.000/-.384	<.001

Note. There is slight variation in the *df* across the models due to the inclusion or exclusion of age^2.

Experience in particular, this is not surprising given the plots in Figures 1 and 2. These plots show that the overall patterns of age-related cross-sectional differences vary greatly in the two studies. These results are slightly different from what is shown in the plots of the latent means. In the SOEP, this might be partially due to the discontinuities in the latent means. Openness to Experience is quite different here, with the general negative trend shown in the

The mean slope here represents the longitudinal change from 2005 to 2013, and the association between age and the slope represents the slope at the (grand) mean age (i.e., at the average age of the sample, what is the change over time?). That is, the slope alone asks, controlling for age at the start of the model, how does the trait change over eight years, including any aging effects? Finally, the quadratic association represents the slope at the mean age above and beyond any linear association with age. In both studies, for the traits Extraversion, Neuroticism, and Openness to Experience, the slope is negative, suggesting an overall negative longitudinal change. However, there are differences in the patterns of Agreeableness and Conscientiousness, with the mean slope being positive (suggesting a positive longitudinal trend, controlling for age) in the HILDA, and negative in the SOEP. Associations between the slope and age are largely inconsistent across the two studies, as shown in Tables 7 and 8. There was a negative association between age and Extraversion in both studies, suggesting that age explains the negative longitudinal trend in Extraversion. Finally, both studies showed on average negative trends for the traits of Neuroticism and Openness to Experience.

With regard to age-slope associations, again, the differences across the studies are apparent. The single consistent association is for Openness to Experience. The general trend for Openness to Experience is a negative on, but the linear and quadratic age-slope associations suggest that the slope changes slightly from negative to positive around age thirty, and then

becomes more negative again later in life. This negative later life trend is consistent with what is shown in Figures 3 and 4 for both studies. Outside of Openness to Experience, associations are quite inconsistent. Extraversion has a positive slope at the mean age in the HILDA (which becomes more negative again among older individuals, as shown by the quadratic trend), whereas the slope is negative at the mean age in the SOEP. Conscientiousness shows an overall positive trend in the HILDA, both on average and at the mean age; in the SOEP, however, there is a slightly negative trend at the mean age. Neuroticism generally declines in both studies over time (a negative slope), but there are no age associations with the slope in the SOEP, whereas the mean age is associated with a negative slope in the HILDA that becomes weaker over time (a negative quadratic trend). Finally, Agreeableness has no associations with age in the HILDA, but has a positive slope at mean age in the SOEP that becomes weaker over time.

In general, results of the growth curve models are inconsistent across the two studies. Average slopes differ for three of the five traits; associations with age are also largely inconsistent. Overall, the results of the growth curve models do not present a clear picture of age-related trait changes.

Discussion: Mean-Level Changes in Personality Traits

Results from the two methods and two samples suggest a number of patterns: first, Conscientiousness generally increases across the life span in both studies, paralleling prior work (Lucas & Donnellan, 2011; Specht et al., 2012; Wortman et al., 2012) and supporting the idea of the maturity principle (Caspi et al., 2005). The single exception to this is the negative slope in the SOEP for Conscientiousness, which suggests a negative longitudinal trend; this might be reflect in the discontinuities in the latent means vs. trends shown in Figure 2. In contrast to other results, this suggests that in the SOEP, especially within cohorts, there is a negative longitudinal

trend in Conscientiousness. In addition, there is some evidence that Openness to Experience declines over the life span. Extraversion showed a much flatter trajectory over the life span, with some evidence of a decline (from the growth curve models), albeit fairly slight. Neuroticism does appear to decrease over the life span in the HILDA, although the results from the SOEP are substantially less clear. Again, this mirrors prior work showing and supporting the maturity principle (Caspi et al., 2005). Finally, Agreeableness shows the most unclear picture. The CFAs reveal substantial discontinuities in both studies, and results from the growth curve models are inconsistent. This could be due to either panel conditioning effects (as suggested by past work; Lucas & Donnellan, 2011), or it could be more general sorts of history effects (such as the economic crash). The overall trend appears to be that Agreeableness increases over the life span, but there remain substantial individual differences in this trend.

In sum, then, increases in Conscientiousness and decreases in Neuroticism do support the idea of the maturity principle (Caspi et al., 2005), but the picture does not appear to be quite that simple. Agreeableness does not seem to predictably increase over the life span as prior work might have suggested, although not all studies have been consistent in this finding (e.g., Wortman et al., 2012). Social Investment Theory might suggest, however, that the traits of Conscientiousness and Neuroticism could be most important to fulfilling adult roles, and thus, it is not surprising that they show the most reliable and consistent lifetime trends (Roberts et al., 2005).

The models here reveal a number of interesting new findings. First, adding in a third wave of data does appear to complicate the picture, particularly in the case of Agreeableness. That is, the CFAs show that, despite the apparent lifetime trends in the mean levels of the traits, age cohorts still show slightly different longitudinal trends in some cases. There is still

unaccounted-for variability in the ways that individuals are changing over this eight-year span. Specifically, the SOEP shows substantial discontinuities between the cohort differences and the longitudinal trends. These discontinuities might be due to panel conditioning effects (perhaps individuals are contrasting reports to prior years), but panel effects would not account for the V-shaped patterns in latent means demonstrated for many of the traits. Instead, it is possible that some sort of history effect, or event occurring 2009, might explain the common shape across the cohorts. Thus, researchers using the SOEP to examine personality trait changes should be aware of this issue. The HILDA sample does not seem to have a similar issue, with the exception of the trait of Agreeableness, suggesting that perhaps the event in question might have been unique to the German sample.

In addition, the two modeling solutions both provided interesting insight into the nature of personality trait changes over the life span. Using the CFAs provides more flexibility, as the trends are not limited to only linear or quadratic effects. By simply plotting the latent means, researchers can examine the exact levels of traits for each cohort at each time point, and the possible discontinuities between cohort and longitudinal change. However, using growth curve models allows researchers to explicitly model individual differences in the rate of change with age (using the slope). This suggests that growth curve models might prove to be particularly useful if researchers are interested in attempting to predict these individual differences in rate of change.

Overall, the results of this study suggest that the maturity principle does roughly describe many of the trends in mean levels personality traits over the lifespan. However, using three waves of data rather than two exposes some interesting longitudinal trends that are not necessarily mirrored by the cross-sectional differences. This suggests that, although much of the

changes seen over the lifespan might be due to changing social roles (as suggested by past researchers; e.g., Lodi-Smith & Roberts, 2007; Roberts et al., 2005), there might also be issues with history effects or generational effects that are also related to personality trait differences.

In the next portion of the study, I examined the associations between life events and personality trait differences. I began by examining the timing and nature of different life events over the life span in both studies. In doing so, I hoped to better understand the answers to several questions. First, I wanted to understand the timing and transitions that individuals are going through in their lives. These two panel studies represent large, nationally representative samples, and a comprehensive way to examine the timing of life events in two cultures. Second, if social roles and life events are responsible for personality trait changes (as suggested by past work; Specht et al., 2011), one might expect to find more of these events during times that changes in mean levels of personality traits are most prominent—in particular, during the period of emerging adulthood (Arnett, 2000). At the very least, one might expect decreasing events during in mid-life, and perhaps increasing again in later life. Thus, I began by examining the age at which individuals experienced different events, using a life events checklist in the HILDA, and records of different life events (e.g., marriage, childbirth, divorce) in the SOEP.

Life Events

Past work in personality traits has focused on the associations between life events and personality trait differences (e.g., Specht et al., 2011). Indeed, a large literature has suggested that experiencing certain life events might be associated with specific changes in personality traits (Bleidorn et al., 2013; Neyer & Asendorpf, 2011; Specht et al., 2011). Before examining the associations between experiencing particular life events and personality trait change (focusing on marriage and childbirth), I began by simply plotting the timing of various life

events over the life span. I later used this information when examining patterns of differential stability in personality traits.

A related goal of this study with respect to life events was to explore the possibility of normativeness as a moderator of the association between life events and personality trait change. In order to do so, I chose to use the timing and rates of incidence for these life events to better understand which events are occurring during wide vs. narrow age ranges in these cultures. Only for events that occur within a relatively narrow age range should normativeness matter. Following this, I explored the possibility that the normativeness of the individual's experience of the event might moderate its association with personality trait changes over time.

Analytic Strategy: Life Events

The first goal of this study with respect to life events was to describe the timing and incidence of various life events in these two samples in order to understand for which events normativeness might matter. In order to do so, I examined a checklist of life events in the HILDA, which describes the occurrence of 21 different life events. In the SOEP, I used marital status data, along with a question concerning the timing of children moving out of the house. I calculated the age at which individuals experienced different life events (using their year of birth and the year that they reported experiencing the event), as well as how many events individuals experienced in general and how common the event was across the entire sample (i.e., on average, how often did individuals experience the event?). Boxplots of the age of experiencing some common life events are presented in Figures 3 and 4. In addition, Table 9 shows the average number of events each year from 2006 through 2013.

Table 9: Number of Events per Year

	HILDA			GSOEP		
	Maximum	Mean	SD	Maximum	Mean	SD

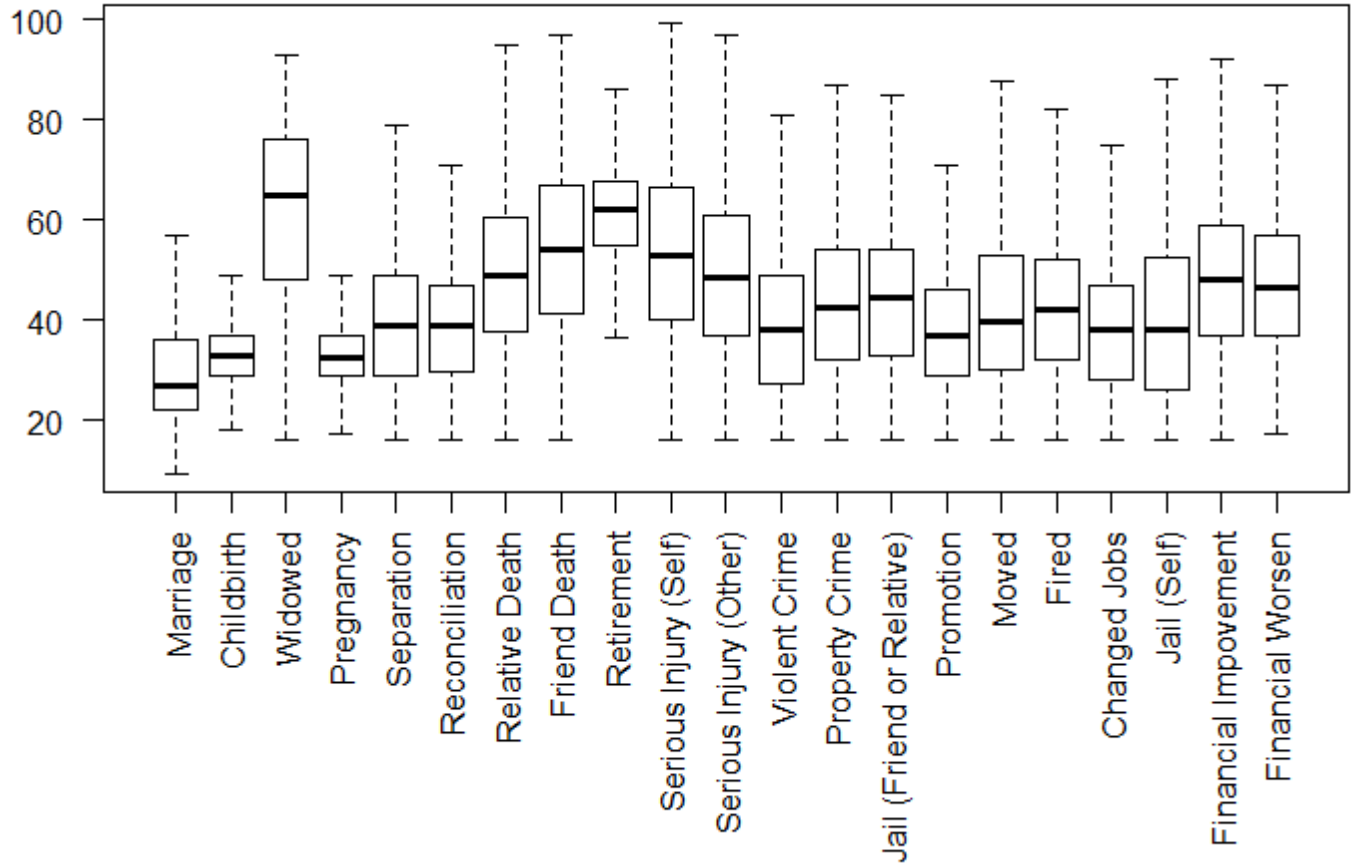
Table 9 (cont'd)

Number of Events in 2006	21	0.85	1.20	3	0.03	0.19
Number of Events in 2007	21	0.77	1.16	3	0.02	0.16
Number of Events in 2008	10	0.74	1.13	2	0.02	0.16
Number of Events in 2009	10	0.71	1.12	3	0.03	0.18
Number of Events in 2010	14	0.70	1.10	4	0.02	0.15
Number of Events in 2011	21	0.67	1.09	3	0.02	0.16
Number of Events in 2012	9	0.69	1.09	2	0.03	0.18
Number of Events in 2013	9	0.62	1.04	3	0.07	0.26

Results: Life Events

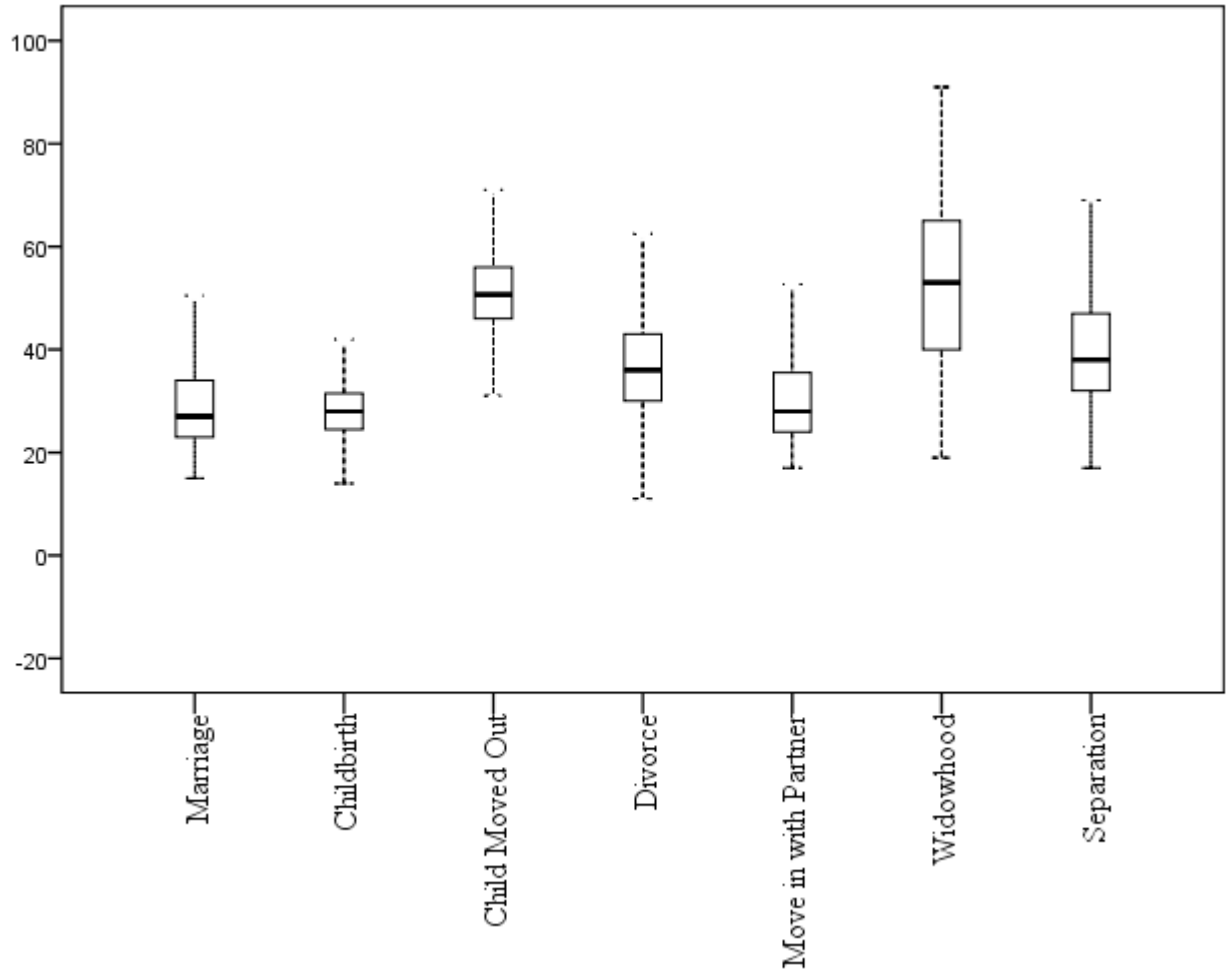
A full list of life events examined in the HILDA is displayed in Table 10. Sample sizes and descriptive statistics for the different life events are presented in Tables 11 and 12. Results are described for each of the life events below. The goal of this section was to try to determine at what ages life events seem to be occurring and how often life events as assessed in these two panel studies occur. Note that I focus only on events for which I had information at least 100 individuals.

Figure 3: Life Events in the HILDA



Boxplots represent the average age at which individuals experienced a particular life event. The line across the center of the boxplot represents the median, whereas the whiskers extend to the first and third quartiles.

Figure 4: Life Events in the SOEP



Boxplots represent the average age at which individuals experienced a particular life event. The line across the center of the boxplot represents the median, whereas the whiskers extend to the first and third quartiles.

Table 10: Life Events Checklist in the HILDA Survey

Life Event	Max	Mean	SD
Marriage	9	0.17	0.50
Childbirth	7	0.26	0.68
Death of a Spouse or Child	6	0.09	0.36
Pregnancy	9	0.37	0.96
Marital Separation	9	0.30	0.77
Marital Reconciliation	5	0.08	0.35
Death of a Relative	9	0.88	1.12
Death of a Friend	12	1.03	1.58
Serious Personal Injury/Illness	12	0.79	1.32
Serious Injury/Illness of Close Friend or Relative	12	1.39	1.74
Victim of a Violent Crime	8	0.11	0.48
Victim of a Property Crime	10	0.37	0.77
Detained in Jail (Self)	4	0.02	0.15
Detained in Jail (Other)	11	0.10	0.53
Fired	10	0.24	0.66
Changed Jobs	11	0.96	1.56
Promoted	10	0.46	1.00
Major Improvement in Finances	7	0.27	0.64
Major Worsening in Finances	12	0.27	0.78
Changed Residence	10	1.19	1.68
Retired	10	0.25	0.72

Note. Mean refers to the mean number of times that the event occurred per person in the survey.

Table 11: Descriptive Data for Life Events in the HILDA

Life Event	N	M	SD	Min	Max	25th percentile	75th percentile	Range
Average Age at Marriage	2805	31.61	13.66	16	93	22	36.25	14.25
Average Age at Childbirth	1776	33.55	6.76	18	85	29	37	8
Women	934	32.27	5.46	18	64	29	36	7
Men	842	34.96	7.72	18.5	85	30	38	8
Average Age at Pregnancy	2170	33.22	7.08	16	85	29	37	8
Women	1145	31.90	5.79	17	64	28	35.5	7.5
Men	1025	34.68	8.05	16	85	30	38.21	8.21
Average Age at Separation	2228	39.92	14.89	16	94	29	49	20
Average at Reconciliation	700	38.68	13.39	16	88	29.5	47	17.5
Average Age at Retirement	1982	59.4	12.4	16	96	55	67.5	12.5
Average Age at Promotion	2994	36	11.4	16	87	29	46	17
Average Age at Job Change	4960	36	12.1	16	87	28	47	19
Average Age at Major Worsening in Finances	2046	45.5	14.7	17	92	37	57	20
Average at Being Fired/Made Redundant	1981	40.6	13.5	16	87	31.83	52	20.17
Average Age at Close Family/Friend Being Detained in Jail	714	43	15.3	16	91	33	54.13	21.13
Average Age of Being Victim of Violent Crime	889	38.2	14.9	16	88	27.17	49	21.83
Average Age of Being Victim of Property Crime	3053	42.3	15.7	16	95	32	54	22
Average Age at Major Improvement in Finances	2359	46.6	15	16	92	37	59	22
Average Age at Death of a Relative	6682	47.4	16.2	16	101	37.5	60.5	23
Average Age at Changing Residence	6150	40	15.9	16	97	30	53	23
Average Age at Serious Injury/Illness to Family Member	7255	46.7	16.4	16	100	37	61	24
Average Age at Death of Friend	5878	51.5	17.2	16	97	41.33	67	25.67
Average Age at Serious Personal Injury/Illness	4953	50.9	17.5	16	101	40	66.58	26.58
Average Age at Being Detained in Jail	156	43.7	17.5	16	88	26	52.75	26.75
Average Age at Partner/Child Death	773	60.36	17.95	16	93	48	76	28

Note. Average age refers to the overall average age at the event, regardless of whether it was the first time the person had experienced that event.

Table 12: Descriptive Data for Life Events in the SOEP

Life Event	N	M	SD	Minimum	Maximum	25th percentile	75th percentile	Range
Average Age at Marriage	46352	30.14	11.12	16	94	23	34	9
Average Age at Childbirth	34934	28.33	5.26	14	66	24.5	31.5	7
Average Age at Divorce	7704	36.70	10.29	17	91	30	43	13
Average Age at Separation	1755	40.42	12.28	17	91	32	47	15
Average Age at Partner Death	1183	52.48	15.57	19	91	40	53	13
Average Age at Moving in with Partner	6734	31.36	10.4	17	90	27	45	18
Average Age at Child Moving Out	6887	50.97	8.49	17	88	48	56	8

Marriage. Unsurprisingly, in both samples, a majority of participants reported experiencing a marriage at some point during the course of the study. In the HILDA, 12.6% (1555) of individuals reported that they experienced a first marriage (starting single) at some point between 2001 and 2013; 16.8% (2074) experienced any marriage between 2001 and 2013. In the SOEP, 72.9% (46354) of individuals reported a marriage at some point between 1984 and 2013. Note that, in both samples, the rate of marriage was approximately 1-2% per year, and the difference in frequency is the result of the study having been held over a longer span of time for the SOEP than the HILDA. This suggests that marriage is common: most individuals (in both cultures) will experience that event in their lifetimes.

In order to understand when the normativeness of the event might matter, I first explore the ages at which the event is typically experienced. Normativeness should matter only for narrow age range events. In the case of the HILDA, a number of responses indicated a very young age of first marriage (for example, nine years of age). In Australia, the youngest possible age for a legal marriage is 16 years; as a result, any responses that indicated that the individual was married prior to that age were discarded (n = 12). In general, individuals were around 30 years old at the time of their first marriage, ranging from a low of 16 years of age to a maximum of 93 years, both in the HILDA.

Although there is a wide age range of when individuals were first married, the distribution of ages shows that much of this is due to a strong positive skew (in the HILDA, skew = 1.76, SE = .05; in the SOEP, skew = 2.02, SE = .01), with both samples showing a fairly strong grouping of cases in the late twenties to early thirties. Table 11 shows the first and third quartiles for all life events, and I will focus on the interquartile range as an indicator of the spread of ages for a particular event. In the HILDA, the interquartile range is 14.25 years, with

most individuals marrying between 22 and 36; in the SOEP, the interquartile range was 11 years, with most individuals marrying between 23 and 34. Relative to other events shown in the Table, this is a fairly small span of time, suggesting that the age at which individuals get married is fairly small. In fact, the only events with a smaller range of years are childbirth in the HILDA (8 years), retirement in the HILDA (8 years), and child moving out in the SOEP (8 years). Thus, the results here suggest that marriage represents an event that occurs within a relatively narrow age range.

The SOEP also asks individuals about the timing of moving in with a partner—what month did you move in with your partner last year? In total, 10.5% (6734) of individuals reported moving in with a partner during the study, and they did so at an age of approximately 31 years old. Unlike first marriage, the interquartile range here was somewhat larger (25^{th} percentile = 27, 75^{th} percentile = 45, interquartile range = 18 years). This suggests that, in general, moving in with a partner (before or outside of marriage) occurs over a wider age range.

In the SOEP, there was also information on the age at which individuals experienced a divorce or separation. Approximately 3% (1755) of individuals reported a marital separation, as obtained from marital spell data in the SOEP, and they were on average 40 years old. In total, 12% (7704) of individuals reported a period of time during which they were divorced (this does not include individuals who started the divorce). Individuals were approximately 37 years of age at their first divorce, with an interquartile range of 13 years (first quartile = 30, third quartile = 43, interquartile range = 13 years). A single individual reported a divorce at age 15; this value was discarded, as the legal age of marriage in Germany is 16. Note that the actual number of individuals experiencing these events might be higher, but due to the annual nature of the survey, they might not have appeared in individuals' self-reports of their marital status.

In the HILDA, individuals were asked whether or not they experienced a reconciliation with their partner within the last year. In total, 700 (6%) individuals experienced a reconciliation at approximately 39 years of age, and an interquartile range of 17.5 years. As compared with other events, a reconciliation with their partner is relatively rare. In addition, a histogram shows that the distribution of ages is fairly wide, with a slight positive skew.

In the SOEP, 1183 individuals reported being widowed at some point during the study, at an average of 53 years old. In the HILDA, individuals were asked whether or not they had experienced the death of a spouse or a child within the past year, and 773 individuals reported experiencing either one of these events at an average of 60 years old. Because the question asked in the HILDA refers to the death of a child or a spouse, the information about age and the number of individuals experiencing it is much harder to interpret. This is because the age at which these two different events might be experienced is likely to be fairly broad.

Children and Pregnancy. 14.5% (1776) of the HILDA sample and 55.0 % (34934) of the SOEP sample reported having a child at some point. In the HILDA, this includes only individuals who had children during the study. In the SOEP, this includes any childbirth that the individual reported, regardless of whether it happened during the study. That is, individuals were asked to report retrospectively on whether or not they had children, thus, the time span is substantially longer than the time span covered by the HILDA. However, Table 11 displays the average age at childbirth for both sexes overall, and then for each sex individually. In the HILDA, individuals reported whether or not they had a child only during the duration of the study. In general, individuals were around thirty years of age at the time of childbirth (*M* age = 28 in the SOEP, *M* age = 32 in the HILDA). Unsurprisingly, childbirth or pregnancy shows the lowest interquartile range of any of the life events in the HILDA and the SOEP (8 years or 7

years, respectively). This suggests that not only is childbirth or pregnancy is very low in age variability. Put differently, childbirth and pregnancy generally occur within a very narrow age range, meaning that the normativeness of an event should be related to its impact on personality traits.

The HILDA also asks individuals whether or not they experienced a pregnancy during the last year (this includes men reporting on partner's pregnancies). In the case of age at pregnancy, any extreme values for women were removed (as pregnancy above age 65 is highly unlikely at best; $N = 10$ cases were removed that had pregnancies over the age of 65). In total, 17.6% (2170) individuals reported experiencing a pregnancy during the course of the study. In general, they were about 31 years of age during their pregnancy. The interquartile range was somewhat higher for men than women, at least partially as a result of biological necessity. Nonetheless, the results for pregnancy and childbirth suggest that it occurs within a narrow age range.

Finally, the SOEP also asks individuals the timing of their children leaving home—that is, what month last year did a child move out of your house? 10.8% (6887) individuals reported that a child moved out during the study when they were approximately 51 years old, with an interquartile range of around 8 years, suggesting that this event is fairly low in variability in the age at which it is experienced. Given that pregnancy and childbirth occur within a narrow age range, it is reasonable that this event is also quite narrow in the age at which it occurs.

Deaths and Illness. The HILDA survey also contains a number of questions regarding deaths or illnesses of family members, friends, or the self. 54% (6682) of individuals reported on the death of a relative during the study at an average of 47.4 years old. In addition, 48% (5878) of individuals reported that they experienced the death of a friend at an average of 52 years old.

In addition, individuals (40%, or 4953) were approximately 54 years of age at their first serious personal injury or illness, and individuals (58.9%, or 7255) were approximately 49 years of age when they experienced a serious personal injury or illness of a family member. The interquartile ranges for these events indicate that they are among the most variable in terms of the age at which they are experienced. The events are fairly common, but are not experienced at a common age.

Employment. In the HILDA only, the Life Events questionnaire asks individuals to report on a series of employment-related life events. 4960 (40.27%) individuals reported on a job change during the study at an average of 36 years of age. 2994 (24.31%) individuals also reported being promoted for the first time also at 36 years of age. 1981 (16.08%) individuals reported being fired or made redundant (that is, the position was no longer required at the company) at approximately 42 years of age. Finally, individuals (1982, 16.09%) reported retiring for the first time at around 63 years of age. Note that the average age of retirement is somewhat lower than the age of first retirement because a number of individuals reported retiring several times (up to four), and this brought down the overall average somewhat. It is possible that individuals retired from multiple jobs throughout the study, however, it is unclear here—thus, I retained the information despite the fact that this somewhat lowers the average age of retirement. With the exception of retirement, all of these events had a fairly high interquartile range (as compared to events such as marriage or childbirth). Although many individuals experience these events, people do not generally experience it at the same age, with the exception of retirement.

Finances. In the HILDA only, 2359 (19.15%) individuals reported experiencing a major improvement in finances at approximately 47 years of age. In addition, 2046 (16.61%) individuals reported experiencing a major worsening in finances at 46 years of age. The

interquartile ranges for these events were also relatively high. This suggests that these events are not experienced at a highly socially scripted time, and thus, the normativeness of the experience should not have a strong effect on its association with personality.

Crime. Only the HILDA contains a series of questions regarding experiences with being a victim of a crime or jail time (either self or family/friends). 889 individuals (7%) reported being a victim of a violent crime at some point during the study, at around 38 years old. Property crimes were more frequently reported, with 25% (3053) of individuals reporting a property crime at some point during the study, at approximately 42 years old. 156 individuals in the survey (1%) reported being detained in jail during the study at an average of 44 years old. 714 (6%) of individuals reported having a close friend or family member who was detained during the study, at an average age of target participant of 43 years. Unsurprisingly, these events are some of the most variable in the age at which they are experienced, in as shown by the high interquartile ranges. Thus, it is unlikely that the normativeness of the experience should matter much for this event.

Summary of age range of event experiences. Given the profile of events in these two studies, I can use this information to understand for which events normativeness might matter. By understanding how much variability there is for the age at which those events are experienced, I can use this to determine whether normativeness should matter for a particular event. In both studies, marriage and childbirth represent some of the narrowest age range events. Retirement (in the HILDA) and children leaving home (in the SOEP) also occur within a narrow age range. In contrast, events such as being the victim of a crime, the death of a partner, divorce, or separation have a wider age range at which they are experienced. Here, I will test the notion that the normativeness of the individual's experience event (as defined by the age at which it is

experienced) moderates the association between that event and trait change, focusing on two of the events found here to occur within a relatively narrow age range (marriage and childbirth). If prior research is correct, the normativeness of the event should matter for those events that occur within a relatively narrow age range.

Correlation with age. In addition to exploring the association between life events and mean level trait change, I also explored the association between stability and life events. I tested whether or not experiencing more life events was associated with greater or weaker differential stability, and thus, might serve to explain the inverted-U shaped pattern of differential stability over the life span. Part of this hypothesis is that individuals do, in fact, experience different numbers of life events at different ages.

In order to determine whether or not age was associated with the number of life events that an individual experienced, I tested a multilevel model predicting the number of events in each year using the individual's age in each year, as well as age^2 in each year to account for possible quadratic effects. In order to account for dependencies due to the same individuals being measured in each year, person IDs were entered as random intercepts. Age was standardized prior to the analysis in order to standardize the regression weights. Results showed that, in both studies, individuals experienced somewhat fewer events as they got older, although the association was stronger in the HILDA (b = -.20 in the HILDA, b = -.08 in the SOEP). This suggests that individuals do experience somewhat fewer events as they get older. In addition, there was a quadratic effect, which was positive in both studies (b = .07 in the HILDA, b = .03 in the SOEP). This positive quadratic effect indicates that the negative linear trend becomes weaker in later waves, or that individuals begin experiencing somewhat more life events as they get older.

Discussion: Life Events

The results here serve to provide a somewhat clearer picture of which events are highly occur within a relatively narrow or wide age range, and thus, whether normativeness might matter for understanding the impact of that event on personality traits. Here, results suggest that marriage and childbirth are events that occur within a very narrow age range, suggesting that normativeness might have an impact on the association between that event and personality traits. Individuals experience these events at normative and non-normative times in their life; I will explore the normativeness of that experience to understand how it might to personality trait change.

I also explored the ages at which individuals experience life events. In particular, are people experiencing more or fewer life events at any point across the life span? Overall, results suggested that life events occur throughout the life span, although events seem somewhat more common in the late twenties and early thirties and the late forties, with fewer events occurring in the late thirties or forties. This could be because at least some of the events are biologically defined (for example, marriage and childbirth are often linked, and childbirth has a somewhat limited timespan during which it might occur), or it could be that the types of life events examined are simply more likely to occur for younger individuals. In general, many of the life events (particularly extremely common life events, such as marriage and childbirth) do appear to be occurring earlier in life, especially from the ages of 25-35. Comparatively, fewer life events (or rarer ones) seem to be occurring in from ages 35-50, and the changes that are occurring are most frequently job related and involve less of a change in the family unit (i.e., marriage or the birth of a new child).

Past work has shown that differential stability in personality traits is highest in mid-life (40 to 50 years of age; Lucas & Donnellan, 2011; Wortman et al., 2012). Researchers have suggested that this increase in differential stability to midlife might be related to the fact that individuals are experiencing fewer life events around this time period (Lodi-Smith & Roberts, 2007; Roberts & Wood, 2006; Roberts et al., 2005). The events surveyed here do suggest that the increase in differential stability might be partially due to fewer life events occurring around this age, as suggested by SIT. Later in this study, I empirically examine the association between life events and differential stability by testing whether or not the number of life events experienced in each year (as assessed using the events described above) might be associated with greater or weaker differential stability.

The SOEP survey in particular, in which there is more complete and higher quality marriage and childbirth data (as survey organizers have collected and checked this data, and also asked about past marriages that began before the first wave of the panel study), has found that marriage and childbirth are highly normative events—they are experienced by many people, and there is somewhat less variability in the age at which individuals experience the event (Neyer et al., 2013). This parallels epidemiological data showing that these events are extremely common in both of these cultures (United Nations, 2009). In the case of childbirth, the lower variability is likely due to biological necessity. The lower variability means that marriage and childbirth make particularly good events to test the idea of normativeness and its association with personality trait change. That is, do events experienced at a more normative time actually have a stronger association with personality trait change?

Life Events and Means Levels of Traits

In addition to clarifying the age-related changes in mean levels of personality traits, another goal of this study was to examine association between particular experiences of life events and personality trait change. Past work has suggested that substantial changes in traits seem to coincide with peak periods for marriage, employment, and fertility (Roberts et al., 2008). Research has found that both marriage and childbirth are related to changes in mean levels of personality traits. Specifically, marriage was associated with a decrease in Extraversion, Openness to Experience, and Agreeableness, whereas childbirth was associated with a decrease in Conscientiousness (Specht et al., 2011). In this study, I examined the associations between marriage and personality trait changes in three waves, rather than two. Doing so allowed me to examine the nature of personality trait change in response to life events. That is, by adding a third wave, I was able to determine whether or not these changes in personality persist over longer periods of time following these events. Overall, doing so will help to clarify the nature of personality trait change and its links to life events—does the experience of life events explain some of the trends in personality traits found in prior work, or are other factors responsible for the developmental trajectories in personality traits?

Method: Life Events and Mean Levels of Traits

Participants. For this portion of the study, all individuals who responded to at least two waves of personality assessment *and* experienced the event for the first time at some point between 2006 and 2013 were included in the sample. Thus, the size of the sample varied depending upon the event and the sample.

In the HILDA, 683 reported a first marriage in 2006 or later, and 775 reported a first child 2006 or later. In the SOEP, 915 individuals reported a first marriage on or after 2006, and 875 reported a first child.

Analytic Technique. In order to examine the association between experiencing a life event (either marriage or pregnancy) and personality trait change, I conducted a series of multilevel models. I calculated a single model for each Big Five trait. Scores for the Big Five were obtained by averaging either the parcels (in the case of the HILDA) or the items (in the case of the SOEP). In all cases, sex, age, the life event (marriage or childbirth), and normativeness (defined below) were used as predictors. An interaction between age and event, and sex and event is included as well. Because normativeness was defined by age relative to the average age at which the event was experienced, both age and normativeness could not be included in the model simultaneously. Sex is included here because it represents an important control variable when examining the effects of these particular life events (Bleidorn et al., 2013).

For the life events (marriage and childbirth), individuals were assigned a "0" for each wave that they had not yet experienced a life event in the first, second, and third waves of personality assessment (2006, 2010, and 2013), "1" for each wave that they had experienced the life event, including the waves after the event. Note that individuals were assigned a "1" only if they experienced the event sometime after 2005, so that the first wave represented a baseline personality assessment prior to the event occurrence. Thus, in the dataset, individuals have three waves of data. To determine the effect of event, I focused only on individuals who experiencing their first marriage or first childbirth. By focusing on these individuals only (rather than including those who did not experience the event), the analysis should provide information about changes that are associated with the experience of that event. Including individuals who did not

experience the event might be qualitatively different from those who do. Note that this also represents a limitation of the study; these selection effects might limit the generalizability of the analyses. Nevertheless, because the focus was on the potential personality change associated with an event, the main difference of interest is for the same individuals before and after the event has occurred.

In order to operationalize normativeness, individuals' age at the time of the event was calculated, and the difference between this and the average age at which individuals experienced the event (in this sample) was calculated. Models were calculated in a piecewise manner, first estimating models with only age and sex included (Model 1), then adding in event (marriage or childbirth) and two-way interactions between event, sex, and age in Model 2. Finally, in Model 3, normativeness and its interaction with event were added to determine if, after controlling for all other effects, normativeness might be associated with any differences in Big Five traits.

To account for dependencies due to person, person IDs were included in the model as a random effect. Thus, the sample size is identical to that described in the previous section for "life events." Note that a certain percentage of the sample is married, and thus represents a dyad. This is a limitation of the results presented here: individuals within a marriage might be influencing each other (violating the assumption of non-independence).

Results: Life Events and Mean Level Traits

Results from all of the multilevel models are presented in Tables 13 through 16.

Extraversion. In all models, age was very weakly associated with lower levels of Extraversion. In addition, women reported lower levels of Extraversion. Marriage was associated with lower levels of Extraversion in both the HILDA and the SOEP. In the HILDA only, the effect of marriage varied by sex, such that men showed a weaker decrease in Extraversion

following marriage than women. Childbirth was also associated with lower levels of Extraversion in the both samples, but there was no difference between the sexes. In all models, normativeness had neither a main effect nor any interaction with the event (marriage of childbirth).

Agreeableness. Age was very inconsistently and weakly associated with any differences in Agreeableness. However, in almost all models, men reported lower levels of Agreeableness than women did. Marriage was associated with lower Agreeableness in the SOEP. In the HILDA, however, marriage was associated with higher agreeableness in Model 2, but this association disappeared after controlling for normativeness in Model 3. The effects of marriage did vary by sex, whereby men showed greater declines in Agreeableness after marriage than women. Only the marriage model in the HILDA showed any interaction between marriage and normativeness on Agreeableness, and the association was quite small (b = .03), but suggested that individuals who experienced marriage at a less normative age showed higher levels of Agreeableness than individuals who experienced marriage at a more normative age. This is contrary to what might be suggested by past research.

Conscientiousness. The HILDA models show that Conscientiousness increases very slightly with age; there is a somewhat weaker effect of age on Conscientiousness in the SOEP, but it is in the same direction. In both studies, women are somewhat lower in Conscientiousness. Marriage is related to a slight increase in Conscientiousness in the HILDA, but the opposite is true in the SOEP. Correspondingly, men show a weaker increase in Conscientiousness than women in the HILDA, but men show a weaker decrease in Conscientiousness than women do in the HILDA. Childbirth is associated with a slight decrease in Conscientiousness in both samples. In both samples, normativeness was not associated with any differences in Conscientiousness.

Table 13: Multilevel Regressions Predicting Big Five Traits from Marriage in the HILDA

	Extraversion			Agreeableness			Conscientiousness			Neuroticism			Openness to Experience		
Variable	Est.	SE	t	Est.	SE	t	Est.	SE	t	Est.	SE	t	Est.	SE	t
							Model 1								
Intercept	4.39	.06	75.56	5.44	.05	12.06	5.10	.05	98.65	3.05	.05	57.31	4.39	.06	77.92
Age	-.01	<.001	-3.39	<.001	<.001	.29	.01	<.001	2.78	-.01	<.001	-1.57	.01	<.001	1.45
Sex	-.13	.07	1.75	-.046	.058	-.80	.04	.066	.61	-.071	.068	-1.04	.03	.07	.38
Age^2	<.001	<.001	.64	<.001	<.001	-.60	<.001	.0002	-1.12	<.001	<.001	-2.27	<.001	<.001	-2.9
							Model 2								
Intercept	4.45	.06	72.09	5.39	.05	107.49	5.02	.06	89.75	3.10	.06	52.33	4.29	.06	75
Age	-.02	.00	-3.94	.00	.00	.33	.01	.00	3.57	-.01	.00	-1.84	.01	.00	1.46
Sex	-.09	.08	1.13	.01	.065	.09	.07	.072	1.03	-.05	.077	-.65	-.003	.073	-.04
Age^2	<.001	<.001	.58	<.001	<.001	-.58	<.001	<.001	-1.04	<.001	<.001	-2.33	<.001	<.001	-2.81
Marriage	-.11	.04	-2.83	.10	.04	2.47	.15	.04	3.67	-.08	.05	-1.77	.17	.02	9.29
Sex*Marriage	.07	.05	1.26	-.10	.06	-1.70	-.06	.06	-1.05	-.04	.07	-.62	.06	.03	2.14
Age*Marriage	.01	.002	2.62	<.001	.002	-.20	-.01	.002	-3.20	.003	.003	1.20	-.001	.001	-1.19
							Model 3								
Intercept	4.45	.10	46.46	5.42	.08	68.36	5.07	.09	57.75	3.03	.09	32.14	4.19	.09	48.41
Age	-.02	.02	-.99	.01	.01	.48	.02	.02	1.43	-.02	.02	-1.39	-.02	.02	-1.12
Sex	-.09	.08	1.12	.01	.07	.08	.07	.07	1.03	-.05	.08	-.65	<.001	.07	-.04
Age^2	<.001	<.001	.51	<.001	<.001	-.63	<.001	<.001	-1.04	<.001	<.001	-2.36	<.001	<.001	-2.95
Marriage	-.20	.06	-3.22	-.01	.07	-.15	.05	.07	.84	-.03	.08	-.04	.17	.03	5.5
Normativeness	.001	.02	.06	-.01	.01	-.41	-.01	.02	-.59	.02	.02	.98	.03	.02	1.53
Sex*Marriage	.07	.05	1.26	-.10	.06	-1.71	-.06	.06	-1.06	-.04	.07	-.62	.06	.03	2.14
Age*Marriage	-.02	.01	-1.44	-.03	.01	-2.11	-.03	.01	-2.29	.02	.02	1.45	<.001	.01	-.48
Marriage*Norm.	.02	.01	1.94	.03	.01	2.11	.02	.01	1.74	-.02	.02	-1.25	.002	.01	.26

Note. For the "sex" variable, women are coded as 0, and men are coded as 1 in both studies.

Table 14: Multilevel Regressions Predicting Big Five Traits from Marriage in the SOEP

	Extraversion			Agreeableness			Conscientiousness			Neuroticism			Openness to Experience		
	Est.	SE	t	Est.	SE	t	Est.	SE	t	Est.	SE	t	Est.	SE	t
							Model 1								
Intercept	5.00	.05	98.92	5.37	.04	133.72	5.80	.04	132.02	4.10	.05	83.29	4.54	.05	91.96
Age	-.01	.01	-1.58	-.01	.00	-2.15	.02	.00	3.53	.01	.01	1.33	-.003	.01	-.51
Sex	-.18	.07	-2.64	-.24	.05	-4.32	-.12	.06	-2.00	-.68	.07	-1.18	-.17	.07	-2.58
Age^2	<.001	<.001	-.17	<.001	<.001	2.00	<.001	.0003	-1.55	<.001	<.001	.20	<.001	<.001	1.52
							Model 2								
Intercept	5.05	.06	89.84	5.45	.05	116.68	5.83	.05	121.60	4.14	.06	73.02	4.64	.06	82.64
Age	-.01	.01	-1.03	-.01	.01	-2.07	.02	.01	3.54	.01	.01	1.58	-.001	.01	-.18
Sex	-.19	.08	-2.44	-.20	.06	-3.05	-.10	.07	-1.52	-.72	.08	-9.22	-.20	.08	-2.63
Age^2	<.001	<.001	-.15	<.001	<.001	1.87	<.001	<.001	-1.53	<.001	<.001	.22	<.001	<.001	1.47
Marriage	-.09	.04	-2.07	-.14	.04	-3.40	-.04	.03	-1.43	-.08	.05	-1.65	-.18	.05	-3.97
Sex*Marriage	.01	.06	.19	-.07	.06	-1.22	-.03	.05	-.72	.07	.07	1.02	.050	.07	.73
Age*Marriage	-.004	.00	-.93	.003	.00	.79	-.002	.003	-.49	<.001	<.001	-.77	-.0013	<.001	-.28
							Model 3								
Intercept	5.06	.06	89.38	5.46	.05	116.57	5.83	.05	12.91	4.13	.06	72.57	4.66	.06	82.52
Age	.001	.02	.05	.03	.02	1.92	.03	.02	2.24	.02	.02	1.10	.04	.02	2.29
Sex	-.19	.08	-2.40	-.19	.06	-2.88	-.10	.07	-1.45	-.72	.08	-9.15	-.19	.08	-2.48
Age^2	<.001	<.001	-.12	<.001	<.001	1.95	<.001	<.001	-1.35	<.001	<.001	.43	<.001	<.001	1.57
Marriage	-.09	.04	-2.08	-.14	.04	-3.49	-.05	.03	-1.49	-.09	.05	-1.75	-.19	.05	-4.07
Normativeness	-.01	.02	-.42	-.04	.02	-2.72	-.02	.02	-1.12	-.01	.02	-.63	-.05	.02	-2.46
Sex*Marriage	.01	.06	.16	-.09	.06	-1.42	-.03	.05	-.75	.08	.07	1.05	.04	.07	.55
Age*Marriage	-.01	.01	-.79	-.05	.01	-3.41	-.01	.01	-.67	.01	.02	.51	-.05	.02	-3.28
Marriage*Norm.	.01	.02	.54	.06	.02	3.80	.01	.01	.56	-.01	.02	-.75	.06	.02	3.34

Note. For the "sex" variable, women are coded as 0, and men are coded as 1 in both studies.

Table 15: Multilevel Regressions Predicting Big Five Traits from Childbirth in the HILDA

	Extraversion			Agreeableness			Conscientiousness			Neuroticism			Openness to Experience		
Variable	Est.	SE	t	Est.	SE	t	Est.	SE	t	Est.	SE	t	Est.	SE	t
							Model 1								
Intercept	4.63	.06	8.17	5.61	.04	129.25	5.25	.05	99.67	2.99	.05	58.24	4.28	.05	8.23
Age	.00	.00	-.97	-.001	.004	-.20	.01	<.001	2.23	-.01	<.001	-1.24	.01	<.001	1.74
Sex	-.21	.07	-3.12	-.49	.05	-9.62	-.29	.06	-4.70	-.09	.06	-1.52	.10	.06	1.60
Age^2	<.001	<.001	-.41	<.001	<.001	-.54	<.001	<.001	-1.13	<.001	<.001	-.45	<.001	<.001	-2.26
							Model 2								
Intercept	4.68	.06	76.29	5.62	.05	115.30	5.25	.06	91.62	3.06	.06	52.95	4.35	.06	74.85
Age	-.01	.00	-1.40	<.001	.004	-.05	.01	.00	2.98	-.002	.00	-.40	.01	.00	2.35
Sex	-.22	.07	-2.99	-.50	.06	-8.55	-.37	.07	-5.38	-.08	.07	-1.10	.06	.07	.92
Age^2	<.001	<.001	-.44	<.001	<.001	-.56	<.001	<.001	-1.16	<.001	<.001	-.65	<.001	<.001	-2.42
Childbirth	-.09	.04	-2.45	-.02	.04	-.41	-.01	.04	-.26	-.12	.05	-2.60	-.13	.04	-3.21
Sex*Childbirth	.01	.05	.14	.01	.05	.22	.14	.05	2.71	-.03	.06	-.49	.07	.05	1.24
Age*Childbirth	.01	.003	1.79	-.001	.003	-.28	-.01	.003	-2.64	-.01	.00	-1.28	-.01	.004	-1.70
							Model 3								
Intercept	4.73	.08	57.57	5.51	.07	83.48	5.28	.08	68.17	3.15	.08	4.03	4.22	.08	53.91
Age	.01	.02	.48	-.03	.01	-2.45	.02	.01	1.36	.02	.01	1.34	-.02	.01	-1.62
Sex	-.21	.07	-2.92	-.51	.06	-8.75	-.36	.07	-5.34	-.07	.07	-1.00	.05	.07	.75
Age2	<.001	<.001	-.31	<.001	<.001	-1.14	<.001	<.001	-1.14	<.001	<.001	-.47	<.001	<.001	-2.83
Childbirth	-.13	.05	-2.48	-.05	.06	-.82	-.06	.06	-.98	-.21	.07	-3.12	-.10	.06	-1.66
Normativeness	-.02	.02	-.98	.03	.01	2.58	-.01	.02	-.43	-.02	.02	-1.55	.04	.02	2.51
Sex*Childbirth	.003	.05	.06	.01	.05	.16	.14	.05	2.63	-.04	.06	-.61	.07	.05	1.29
Age*Childbirth	-.005	.01	-.46	-.01	.01	-1.01	-.02	.01	-1.86	-.03	.01	-2.07	.001	.01	.09
Childbirth*Norm.	.01	.01	1.06	.01	.01	.95	.01	.01	1.11	.02	.01	1.77	-.01	.01	-.65

Table 16: Multilevel Regressions Predicting Big Five Traits from Marriage in the SOEP

	Extraversion			Agreeableness			Conscientiousness			Neuroticism			Openness to Experience		
	Est.	SE	t	Est.	SE	t	Est.	SE	t	Est.	SE	t	Est.	SE	t
							Model 1								
Intercept	5.01	.05	96.19	5.44	.04	135.46	5.84	.04	132.98	4.10	.05	79.74	4.56	.05	89.83
Age	-.01	.01	-1.52	-.01	<.001	-1.29	.01	.01	2.40	.00	.01	-.38	.01	.01	1.05
Sex	-.13	.07	-1.88	-.25	.05	-4.47	-.17	.06	-2.91	-.71	.07	-1.03	-.21	.07	-2.99
Age^2	<.001	<.001	-.42	<.001	<.001	-.06	<.001	<.001	-.67	<.001	<.001	.10	<.001	<.001	-.36
							Model 2								
Intercept	5.07	.06	88.86	5.50	.05	119.10	5.89	.05	122.93	4.17	.06	71.85	4.67	.06	82.32
Age	-.01	.01	-1.12	<.001	.01	-.53	.02	.01	2.67	.00	.01	-.43	<.001	.01	-.20
Sex	-.13	.08	-1.66	-.23	.07	-3.49	-.19	.07	-2.88	-.74	.08	-9.09	-.25	.08	-3.17
Age^2	<.001	<.001	-.45	<.001	<.001	-.12	<.001	<.001	-.69	<.001	<.001	.09	<.001	<.001	-.36
Childbirth	-.12	.04	-2.75	-.10	.04	-2.49	-.08	.03	-2.44	-.13	.05	-2.68	-.20	.05	-4.32
Sex*Childbirth	<.001	.07	-.04	-.03	.06	-.54	.03	.05	.58	.06	.07	.87	.08	.07	1.17
Age*Childbirth	<.001	.01	-.33	<.001	.01	-.87	<.001	<.001	-1.07	<.001	.01	.34	.02	.01	2.61
							Model 3								
Intercept	5.08	.06	88.71	5.50	.05	118.90	5.88	.05	122.61	4.18	.06	71.87	4.67	.06	82.16
Age	-.01	.02	-.47	.02	.01	1.05	.03	.02	1.95	.04	.02	2.27	.02	.02	1.06
Sex	-.13	.08	-1.63	-.22	.07	-3.34	-.19	.07	-2.78	-.72	.08	-8.82	-.24	.08	-3.05
Age^2	<.001	<.001	-.49	<.001	<.001	-.04	<.001	<.001	-.60	<.001	<.001	.27	<.001	<.001	-.27
Childbirth	-.11	.04	-2.66	-.11	.04	-2.54	-.08	.03	-2.51	-.14	.05	-2.85	-.20	.05	-4.40
Normativeness	.00	.02	.03	-.02	.02	-1.37	-.02	.02	-.98	-.05	.02	-2.65	-.02	.02	-1.23
Sex*Childbirth	-.01	.07	-.15	-.04	.06	-.67	.03	.05	.57	.05	.07	.70	.08	.07	1.11
Age*Childbirth	-.02	.01	-1.19	-.02	.01	-1.40	<.001	.01	-.40	-.02	.02	-1.11	.01	.02	.62
Childbirth*Norm.	.02	.02	1.15	.02	.01	1.16	<.001	.01	.00	.02	.02	1.37	.01	.02	.42

Neuroticism. Age was very inconsistently and weakly associated with any overall differences in Neuroticism (after controlling for sex). In all models, women report somewhat higher levels of Neuroticism than men do. In all models, marriage and childbirth are associated with declines in Neuroticism. Although sex differences were consistent across the two studies, the interactions with marriage or childbirth were in opposite directions. In the SOEP, men showed weaker declines than women did in Neuroticism after marriage; the opposite was true in the HILDA. There was a single main effect of normativeness, with lower normativeness being associated with slightly lower levels of Neuroticism in the final childbirth model in the SOEP. There were no interactions with normativeness for any more.

Openness to Experience. Age was very inconsistently and weakly associated with any overall differences in Openness to Experience (after controlling for sex).

Summary. The primary goal of these models was to examine the effects of life events. Marriage was related to decreases Extraversion and Agreeableness, and increases in Neuroticism. Childbirth was associated with lower Extraversion and Openness to Experience, and slightly higher Neuroticism. Theory suggested that these results should vary depending on the normativeness of the life event (here, operationalized as distance from the average age experienced). This was not the case here, and for some traits, results actually showed the opposite effect. Thus, the hypothesized role of normativeness does not seem to hold up here.

Discussion: Life Events and Mean-Level Changes in Personality Traits

The results here generally show that there is some association between experiencing life events and personality change. In addition, the results here replicated prior work, showing that childbirth is associated with decrease in Conscientiousness (Specht et al., 2011). I also replicated prior work showing a decrease in Agreeableness and Openness to Experience in response to

marriage (Specht et al., 2011). Thus, there is some evidence of consistency between this study and past work. In general, however, the associations between life events and personality here are quite small (as shown by the size of the estimates), and smaller than what has been previously found. This could be because the effect of life events might be only immediate; that is, after adding a third wave of data, these effects might become smaller, as the event does not have a lasting impact, as might be suggested by adaptation-type theories, although recent work has suggested that the degree of adaptation to life events (in the case of subjective well-being in particular) varies across individuals and across time (Diener, Lucas, & Scollon, 2006).

The results here do not support the notion that normativeness increases the effect of life events (Neyer et al., 2013). There is evidence that the effect of a life event does vary according to age, however. That is, it does seem to be the case that experiencing an event at a non-normative age might change the associations with personality trait change. However, it is not as simple as decreasing the effect of the event. In some cases, the change was stronger for older individuals (who would represent the non-normative group), whereas in others, the change was weaker.

Differential Stability

In the final portion of the study, rather than examining mean changes in personality traits, I examined the pattern of differential stability over the life span and its associations with age and life events. In particular, I explored whether or not the pattern of differential stability shown in previous studies remains when there is more power to test it, particularly in older groups. In addition, I will directly test the association between the experience of life events (the number of life events experienced in a particular year) and differential stability of personality traits.

Analytic Technique: Differential Stability

In order to examine the differential stability of personality traits over the life span, I took two different approaches. First, using the CFAs described previously for both studies, I plotted the concurrent correlation between latent traits for each cohort. For example, for Age Cohort A (ages 15-19-23), I plotted the latent correlation between Time 1 and Time 2 and between Time 2 and Time 3. I did this for each of the age groups, adding them to the plot. By doing so, I assess how these cross-time correlations change with age. In addition, I estimated linear regressions between age and differential stability to describe the general pattern.

In addition, I estimated a multilevel model predicting Time 2 and Time 3 from Time 1 Big Five, age, sex, age^2, number of events, and the interaction between number of events and early trait level. The number of events represented the number of events the person experienced (including all events described when discussing life events) between either 2005 and 2009, or 2010 and 2013. Thus, each person had two rows in the dataset. I expect to see a positive association between Time 1 trait and Time 2 or 3 trait. The key association is the interaction between number of events and Time 1 trait. A positive interaction would suggest that a greater number of life events are associated with greater trait stability; a negative interaction would suggest that a greater number of life events are associated with lower stability. Person IDs were entered as a random effect to control for the dependency based on time. In addition, age (both overall and quadratic effect) was entered to control for any age effects. Just as in the section above with life events and personality traits, the models were conducted in steps, increasing the predictors in each step, to determine whether the number of events added any incremental prediction, followed by the events and the interaction. The advantage of this analysis is that I can

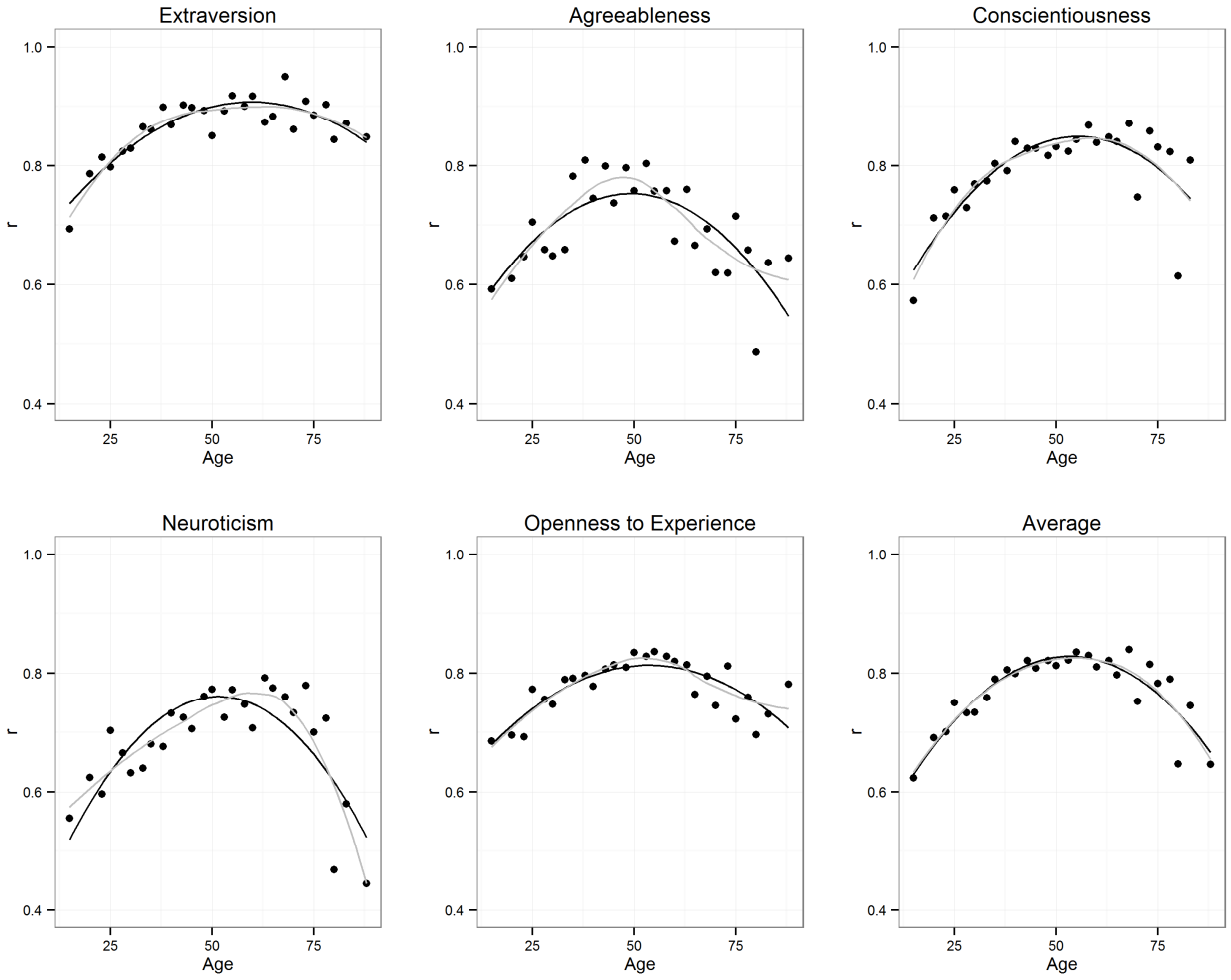
to test whether or not individuals who experience more life events during the intervening years show lower or higher differential stability.

Results: Differential Stability

Plots of differential stability for both studies are presented in Figures 5 and 6. The regressions for the darker (quadratic) lines are presented in Tables 17 and 18, which represent the association between age and differential stability. Note that this is only stability between concurrent waves—that is, Time 1 to Time 2, or Time 2 to Time 3. Thus, it is always two-wave stability. I chose to analyze it this way to be able to more easily plot the trends over the life span, without the complicating factor of varying periods of time. It is immediately apparent that, even in three waves, there is a quadratic trend between age and differential stability. In both studies, differential stability increases in young adulthood, and decreases in later life, although the trend is much clearer and stronger in the HILDA than in the SOEP. This replicates earlier studies showing that differential stability has an inverted U-shaped pattern across the lifespan (Lucas & Donnellan, 2011; Specht et al., 2011; Wortman et al., 2012).

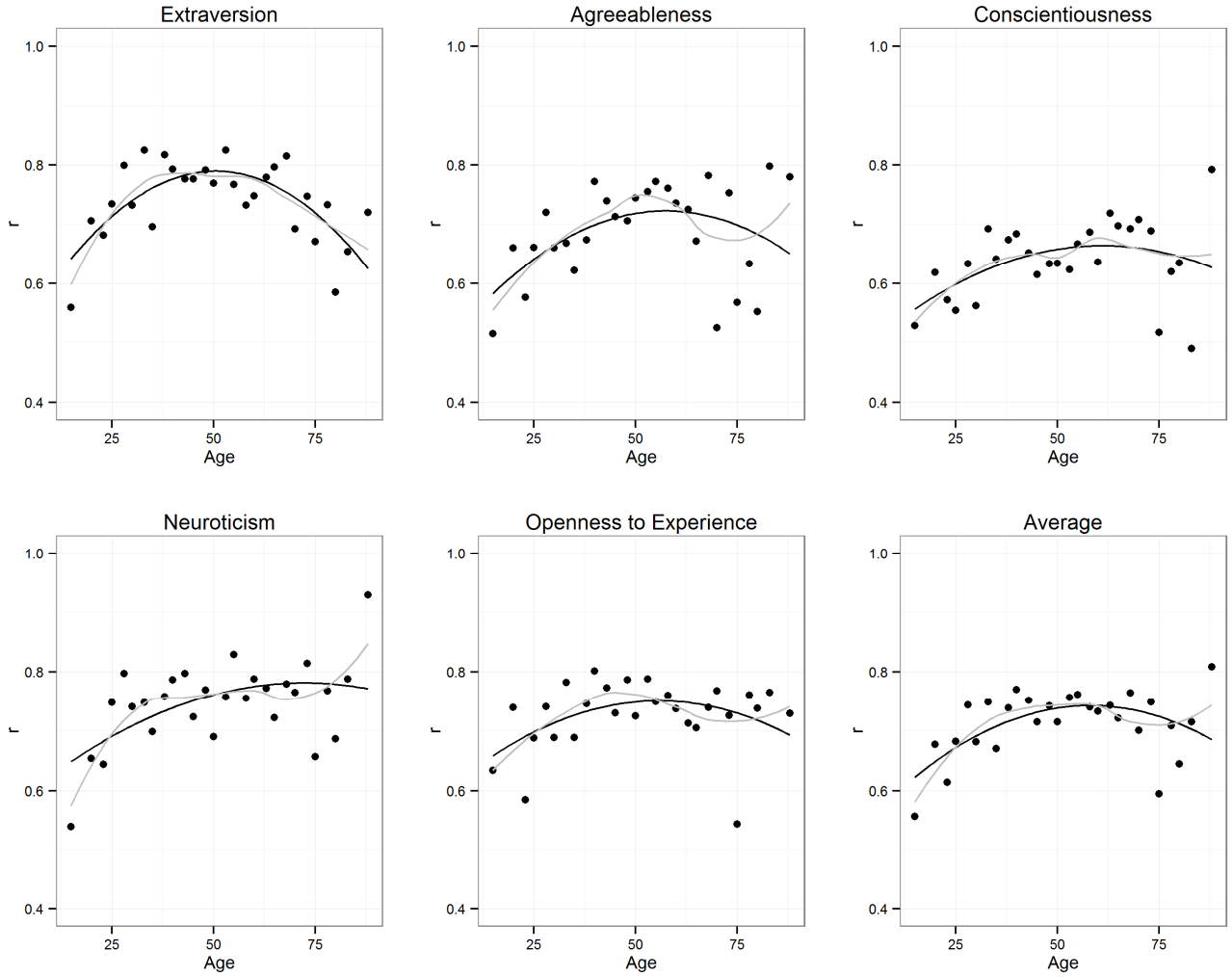
Despite the pattern emerging fairly clearly, it was not without variability across the traits. In both the HILDA and the SOEP, the U-shaped pattern was weaker for Openness to Experience than for other traits. The curve was in general quite a bit flatter, suggesting that individuals do not increase in rank-order stability as much for Openness to Experience in mid-life as they might for other traits. In addition, in both studies, the decline in rank-order stability of Conscientiousness was not as pronounced as for other traits, suggesting that individuals increase into mid-life, but show somewhat smaller decline.

Figure 5: Differential Stability in the HILDA



This plot shows the differential stability across the life span for each of the Big Five Traits in the HILDA.

Figure 6: Differential Stability in the SOEP



This plot shows the differential stability across the life span for each of the Big Five Traits in the SOEP.

Table 17: Regression Model Predicting Latent Stability from Age in the HILDA

	b	SE	*t*	*df*	Multiple R^2
Extraversion				25	.79
Intercept	.6021	.0284	21.189		
Age	.0102	.0001	8.493		
Age^2	-.0001	.0000	-7.453		
Agreeableness				25	.54
Intercept	.4195	.0648	6.465		
Age	.0135	.0028	4.922		
Age^2	-.0001	.0000	-5.234		
Conscientiousness				25	.58
Intercept	.2868	.0945	3.035		
Age	.0228	.0401	5.687		
Age^2	-.0002	.0000	-5.832		
Neuroticism				25	.64
Intercept	.2833	.0665	4.257		
Age	.0185	.0028	6.551		
Age^2	-.0002	.0000	-6.645		
Openness to Experience				25	.60
Intercept	.5554	.0342	16.236		
Age	.0096	.0015	6.633		
Age^2	-.0001	.0001	-6.481		

Note. Age refers to age of the subject in 2005, the first year of measurement of personality traits in both samples.

Table 18: Regression Model Predicting Latent Stability from Age in the SOEP

	b	SE	*t*	*df*	Multiple R^2
Extraversion				25	.50
Intercept	.4906	.0587	8.355		
Age	.0183	.0002	4.753		
Age^2	-.0001	.0000	-4.929		
Agreeableness				25	.20
Intercept	.4946	.0897	5.1770		
Age	.0090	.0038	2.3630		
Age^2	-.0001	.0036	-2.1570		
Conscientiousness				25	.18
Intercept	.4752	.0744	6.389		

Table 18 (cont'd)

	b	SE	*t*	*df*	Multiple R^2
Age^2	-.0001	.0000	-1.687		
Neuroticism				25	.25
Intercept	.6152	.0925	6.650		
Age	.0035	.0039	.8890		
Age^2	.0000	.0000	-.3710		
Openness to Experience				25	.17
Intercept	.5781	.0652	8.836		
Age	.0062	.0277	2.236		
Age^2	-.0001	.0000	-2.100		

Note. Age refers to age of the subject in 2005, the first year of measurement of personality traits in both samples.

In addition, results from multilevel models equations predicting Time 2 or Time 3 personality from Time 1 personality, number of life events, and their interaction (controlling for age) are presented in Tables 19 and 20. Results show that, in general, the number of life events between Time 1 and Time 3 do not moderate the association between Time 1 and Time 2 or 3 personality.

Discussion: Differential Stability

In general, the results here replicate prior findings showing an inverse U-shaped pattern of differential stability over the life span (Lucas & Donnellan, 2011; Wortman et al., 2012). In addition, results do not show that experiencing more or fewer life events is associated with any differences in differential stability of personality traits.

Note that these results are not consistent with the suggestion that the U-shaped pattern of differential stability might be related to the number of life transitions that individuals are experiencing throughout the life span. If this were the case, the number of life events should be

inversely related to differential stability. Thus, although differential stability does increase into midlife, this increase does not seem associated with the number of life events experienced.

Table 19: Multilevel Models Predicting Personality from Previous Personality and Number of Life Events in the HILDA

	Extraversion			Agreeableness			Conscientiousness			Neuroticism			Openness to Experience		
Variable	Est.	SE	t	Est.	SE	t	Est.	SE	t	Est.	SE	t	Est.	SE	t
							Model 1								
Intercept	1.13	.03	36.65	2.42	.04	56.71	1.79	.04	47.84	1.06	.02	43.41	.51	.02	3.29
T1 Trait	.74	.01	114.26	.56	.01	74.41	.66	.01	95.76	.59	.01	81.49	.91	.004	244.09
Age	<.001	<.001	.49	<.001	<.001	1.09	-.001	<.001	-2.63	-.01	<.001	-12.55	-.002	<.001	-7.45
Sex	.002	.01	.16	-.01	.01	-.59	-.01	.01	-.58	.01	.02	.71	.01	.01	1.37
Age^2	<.001	.00	-2.39	<.001	.000	-4.84	<.001	<.001	-.20	<.001	<.001	-.27	<.001	<.001	7.97
							Model 2								
Intercept	1.08	.03	32.73	2.33	.05	5.98	1.72	.04	42.61	1.01	.03	37.64	.48	.02	24.97
T1 Trait	.75	.01	109.71	.58	.01	7.96	.68	.01	92.47	.60	.01	78.66	.92	.004	217.35
Age	<.001	<.001	.75	.001	.001	2.43	-.002	.00	-2.66	-.005	.001	-7.24	-.001	<.001	-4.34
Sex	.01	.01	.42	-.01	.01	-.59	-.002	.01	-.15	.01	.02	.43	.01	.01	1.37
Age^2	<.001	<.001	-2.62	<.001	<.001	-5.39	<.001	<.001	-.15	<.001	<.001	-1.47	<.001	<.001	6.32
Num. of Events	<.001	.002	-.02	.01	.002	4.08	<.001	.002	-.22	.005	.002	2.40	.003	.001	3.08
							Model 3								
Intercept	1.06	.05	22.95	2.29	.07	34.99	1.65	.06	28.80	.97	.04	27.24	.44	.03	17.33
T1 Trait	.76	.01	75.51	.58	.01	48.83	.69	.01	63.82	.62	.01	55.02	.92	.01	158.80
Age	<.001	.001	.73	.001	.001	2.45	-.002	.001	-2.63	-.005	.00	-7.25	-.001	<.001	-4.32
Sex	.01	.01	.42	-.01	.01	-.58	-.002	.01	-.12	.01	.02	.44	.01	.01	1.37
Age^2	<.001	<.001	-2.60	<.001	<.001	-5.40	<.001	<.001	-.20	<.001	<.001	-1.41	<.001	<.001	6.35
Num. of Events	.01	.01	.69	.02	.01	1.47	.01	.01	1.63	.01	.01	2.34	.01	.004	2.90
Trait*Events	-.001	.002	-.71	-.002	.002	-.78	-.003	.00	-1.71	-.003	.002	-1.58	-.002	.001	-2.23

Table 20: Regression Model Predicting Personality from Previous Personality and Number of Life Events in the SOEP

	Extraversion			Agreeableness			Conscientiousness			Neuroticism			Openness to Experience		
Variable	Est	SE	t	Est	SE	t	Est	SE	t	Est	SE	t	Est	SE	t
							Model 1								
Intercept	2.01	0.03	64.18	2.80	0.04	75.99	1.15	0.03	35.67	1.90	0.03	66.24	1.93	0.03	63.76
T1 Trait	0.58	0.01	97.90	0.48	0.01	75.27	0.81	0.01	157.82	0.51	0.01	83.42	0.57	0.01	93.68
Age	-0.004	<.001	-10.03	0.002	<.001	6.07	0.001	<.001	4.04	0.001	<.001	1.44	-0.002	<.001	-4.49
Sex	-0.10	0.01	-7.77	-0.17	0.01	-13.93	-0.07	0.01	-7.09	-0.25	0.02	-16.63	-0.06	0.01	-4.50
Age^2	<.001	<.001	0.45	<.001	<.001	3.46	<.001	<.001	-5.63	<.001	<.001	1.95	<.001	<.001	-6.80
							Model 2								
Intercept	2.01	0.03	64.14	2.80	0.04	75.95	1.15	0.03	35.67	1.90	0.03	66.21	1.94	0.03	63.81
T1 Trait	0.58	0.01	97.89	0.48	0.01	75.27	0.81	0.01	157.82	0.51	0.01	83.41	0.57	0.01	93.68
Age	-0.004	<.001	-9.90	0.002	<.001	5.88	0.001	<.001	3.90	0.001	<.001	1.14	-0.002	<.001	-4.90
Sex	-0.10	0.01	-7.77	-0.17	0.01	-13.93	-0.07	0.01	-7.10	-0.25	0.02	-16.65	-0.07	0.01	-4.54
Age^2	<.001	<.001	0.47	<.001	<.001	3.48	0.000	<.001	-5.59	<.001	<.001	2.04	<.001	<.001	-6.62
Num. of Events	-0.003	0.01	-0.22	-0.01	0.01	-0.38	-0.004	0.01	-0.40	-0.02	0.02	-1.41	-0.04	0.02	-2.60
							Model 3								
Intercept	2.01	0.03	62.44	2.79	0.04	73.47	1.13	0.03	34.27	1.90	0.03	64.83	1.93	0.03	62.00
T1 Trait	0.58	0.01	94.58	0.48	0.01	73.15	0.81	0.01	153.48	0.51	0.01	80.99	0.57	0.01	90.73
Age	-0.004	<.001	-9.90	0.002	0.000	5.85	0.001	<.001	3.87	0.001	<.001	1.14	-0.002	<.001	-4.90
Sex	-0.10	0.01	-7.77	-0.17	0.01	-13.92	-0.07	0.01	-7.09	-0.25	0.02	-16.65	-0.07	0.01	-4.55
Age^2	<.001	<.001	0.46	<.001	<.001	3.49	<.001	<.001	-5.57	<.001	<.001	2.04	<.001	<.001	-6.62
Num. of Events	-0.03	0.06	-0.51	0.08	0.07	1.09	0.11	0.06	1.70	-0.02	0.05	-0.38	-0.02	0.06	-0.31
Trait*Events	0.01	0.01	0.48	-0.02	0.01	-1.18	-0.02	0.01	-1.79	-0.001	0.01	-0.05	-0.005	0.01	-0.35

Results with regard to life events here suggest that individuals experience fewer life events later in their lives (as shown by a negative association between the number of life events and age). This is not inconsistent with the result showing that individuals increase in their differential stability until mid-life. Instead, they suggest that as individuals experience more events throughout their lives, their initial personality traits seem to solidify somewhat. Overall, the results for differential stability suggest several things: first, that there is a clear U-shaped pattern, even when considering larger samples and more time points (that is, examining the same individuals in three waves). In addition, there is no evidence that experiencing life events might lead to greater differential stability of personality traits.

General Discussion

In this study, I explored the mean level changes of personality traits over the life span, the general pattern of life events and their associations with the mean levels of personality traits, and the possibility of the normativeness of a life event moderating the association between life events and trait changes. In addition, I directly tested the association between experiencing life events and the differential stability of personality traits.

Results for the mean-level changes in personality traits were, in the HILDA, quite similar to what has been found in previous work (e.g., Roberts et al., 2005). In general, Conscientiousness and Agreeableness increased over the life span, whereas Neuroticism and Openness to Experience decreased. Extraversion showed a fairly flat trajectory over the life span. This pattern fits well with theories suggesting that the trait changes over the life span might be associated with increasing capabilities to fulfill adult roles (SIT; Lodi-Smith & Roberts, 2007). Put differently, individuals seem to increase in those traits that are related to activities such as marriage, employment, and childbirth when those traits become relevant.

Results from the SOEP with respect to mean level changes were somewhat more complex. This is consistent with past work, which has shown that there are probably panel conditioning effects in the SOEP (Lucas & Donnellan, 2011). Nonetheless, the pattern is similar to that found in the HILDA for Conscientiousness and Agreeableness. However, Conscientiousness shows a later-life decline in the SOEP that is not present in the HILDA. In addition, Neuroticism shows a fairly flat pattern in the SOEP, rather than the decrease found in the HILDA. Openness to Experience showed a more substantial decline with age here, whereas Extraversion decreased somewhat more. However, all of the results here are more difficult to interpret as a result of the substantial discontinuities between the longitudinal and cross-sectional trends.

Results from the growth curve models are, in general, quite similar to those found by plotting the means from the CFAs. The main differences are reflected in the fact that using growth curves allows one to explicitly model both the initial level of individuals (via the intercept) as well as their changes over time. Although these trends are shown in the CFAs, by using growth curves, one can obtain an estimate of the degree of longitudinal change in addition to the cross-sectional differences due to age. The discontinuities in the SOEP for the cohort-level trends are therefore apparent in the stronger associations between age and the slope. However, this discontinuity does not substantially alter the nature of the results, which largely support the notion of the maturity principle (Caspi et al., 2005). Thus, the decision to use one analytic technique or another depends on the nature of the question. If researchers are interested in modeling individual differences in longitudinal trends due to some external variable, growth curve models might provide more flexibility to do so.

The results here also show that these patterns of longitudinal change observed in previous studies (e.g., Roberts et al., 2005) remain consistent even when using a third wave of personality data. The current study is the first to explore this question using these large, longitudinal panel studies for the third wave of personality data. However, the results from the SOEP also support prior work suggesting that there are substantial panel effects within this particular study; there are large discontinuities between the cohort effects and the longitudinal trends (Lucas & Donnellan, 2011). Thus, within the SOEP, examining longitudinal trends of personality traits is somewhat risky, as the changes are inconsistent and potentially unclear. The patterns within the HILDA, by contrast, are much clearer, and generally show that, even incorporating a third wave of data, the maturity principle seems to explain the patterns of mean-level trait change quite well.

Nonetheless, the third wave of data here does somewhat complicate the picture. There are substantial discontinuities between the mean level changes longitudinally and across cohorts. This suggests that, although the general pattern might reflect the maturity principle, this does not adequately explain all personality trait change. It provides some evidence of possible history effects or panel study effects, and also suggests that perhaps intrapersonal personality change should be examined more closely. That is, although researchers have suggested that social roles and increasing ability to fulfill them largely explains the pattern of mean-level change, examining the same individuals over time (and perhaps more directly testing the proposal of social investment in those roles) could clarify the discontinuities found here over time (Roberts et al., 2005).

In terms of the associations between life events and mean-level personality trait changes, results here generally supported prior work (showing decreases in Conscientiousness following childbirth and marriage, and decreases in Agreeableness following childbirth), but the

associations were quite weak. Thus, there is some evidence that life events are associated with changes in personality, but the associations are not strong, although they are consistent with prior work. However, it is unclear that this is evidence in support of Social Investment Theory (Roberts et al., 2015). Past work has shown that, in young adulthood, engaging in a serious partnership is associated with increases in Conscientiousness (Neyer & Lehnart, 2007). It could be the case that the transition to marriage is different from the transition to first partnership. However, it is unclear the nature of the social role, and how it should be expected to be associated with personality trait change. This could be a case of compensatory Conscientiousness, in the sense that individuals with a long-term partner can rely on the other individuals' trait levels to make up the difference for their lower Conscientiousness (Roberts, Smith, Jackson, & Edmonds, 2009). However, it could also be that younger individuals change in response to partnerships more than older ones, and the partnership serves as one explanation (that is, valuing keeping one's partner happy) for the young adult increases in Conscientiousness. Once individuals reach marriage age, they might simply have less need to continue to increase in Conscientiousness, having (likely) already had this initial increase due to partnership occur in earlier relationships. Unfortunately, I cannot explore these potential explanations here, but they provide an interesting avenue for future research.

In addition, the results for normativeness were also somewhat unclear. Although the age of the individual did moderate the association between the life event and trait change for some individuals, the effects were not consistently stronger for younger or older individuals. In addition, among those individuals who experience the event, the normativeness of the age at which the individual experienced the event did not have a substantial impact on personality trait differences. Overall, I do not think the results here support a simple picture that normativeness

increases the impact of the life event, as past researchers suggested (Neyer et al., 2013). The picture seems to be substantially more complex. In particular, the age at which individuals experience an event might matter, but among individuals who did experience the event, there was no strong association with personality traits. Despite the theoretical suggestion that life events and personality traits interact in a dynamic way (with both mutually influencing each other over the lifespan), normativeness here did not serve to strengthen that proposed theoretical link. The results here suggest that life events show only a weak association with personality in general, and that the stability of personality generally seems to prevail.

In the case of differential stability, the patterns found here largely mirror those found in previous studies (Lucas & Donnellan, 2011; Wortman et al., 2012). That is, there is a clear, inverted-U shaped pattern of differential stability. An interesting new contribution of this study, however, was to examine the association between the number of events experienced in intervening years and differential stability of personality. In particular, does the association between earlier personality traits and later personality traits become stronger or weaker depending on the number of events that an individual experiences? Results showed that, between Time 2 and Time 3, experiencing more life events was associated with greater stability in personality, which is supportive of the notion of cumulative continuity effects (Specht et al., 2011). That is, experiencing life events (that are associated with one's personality, as evidenced by prior work showing selection effects; Specht et al., 2011) does appear to strength the stability of those initial traits. This is supportive of the notion of the corresponsive principle (Caspi et al., 2005; Roberts et al, 2003). Although the correspondence principle explains the increase in differential stability toward midlife, it does not explain the decrease later in life. It is possible that this decrease is associated with other factors, such as aging—that is, biological processes

that might decrease personality trait stability later in life, unrelated to changing life events. It is also consistent with the idea that lower stability in young adulthood and later adulthood is related to the number of life changes occurring—including biological changes (Donnellan & Robins, 2009; Trzesniewski, Donnellan, & Robins, 2003).

Thus, the main findings from this study are that mean-level trends in personality traits do appear to be consistent with the maturity principle, even incorporating three waves of data (Caspi et al., 2005). In addition, the patterns of life events and personality trait change also largely replicated prior work (Specht et al., 2011). However, the results here do not support the notion that the effect of a life event seems to depend on the normativeness of the event, as measured by the distance from the average age of experiencing the event (Neyer et al., 2013). Thus, although the social scripts around the event might be stronger for normative events, normativeness does not appear to be related to stronger associations with personality trait change. Finally, patterns of differential stability were generally quite similar to those found in past studies (Lucas & Donnellan, 2011; Wortman et al., 2012). In addition, experiencing more life events was associated with somewhat more stable personality traits, suggesting that life events serve to solidify initial personality traits. However, the decrease in differential stability in later life is not accounted for.

Limitations and Future Directions

As in all studies using archival data, the results here are somewhat limited by the nature of these data. In the case of this project, there are two main limitations: first, there were some issues with regard to measurement of traits, particularly in the case of Openness to Experience in the HILDA. Specifically, the indicators of Openness to Experience did not load as highly onto their factor at each time point, resulting in a generally poor model fit. In addition, for the life

events data, the results here are limited to those events for which information was available. This does not necessarily indicate, in all cases, that those events were the most relevant to personality traits. Finally, as in any study of the association between life events and personality traits, there are limitations to the conclusions that can be made as a result of selection effects. That is, because certain individuals are more likely to experience certain events, any differences that occur after experiencing the event might be due to those initial differences rather than the event itself. This study is not able to address this limitation.

Nonetheless, there are several novel findings from this work. In particular, the mean-level trends of personality trait change found in previous work continue to hold after examining a third wave of data (Lucas & Donnellan, 2011; Specht et al., 2011; Wortman et al., 2012). This suggests that the effects are not due to cohort differences, but rather appear to be longitudinal trends, even when examining such a large population over a long period of time (8 years). As a result, researchers can be somewhat more confident that the changes in traits are due to individuals changing in particular ways over time. In addition, there is evidence here that some of those changes might differ depending on the life events experienced, particularly marriage or childbirth. This provides further support for the idea of Social Investment Theory—that individuals' investment in adult roles might alter the way that individuals change over time (Lodi-Smith & Roberts, 2005).

In addition, the results examining the normativeness of life events did not support suggestions that the normativeness of the event might increase its impact (Neyer et al., 2013). It does not seem to be the case that experiencing an event at a more normative age is related to a stronger impact of that event. Instead, the age at which an individual experiences an event seems to change the impact of that event in varying ways. This could be due a variety of reasons,

including the specific nature of the life event being different with age (that is, the same life event might come in many different forms, depending on the individuals' age), or it could be that greater life experience (or less) might change an individuals' interpretation of, and response to, a particular life experience. Future researchers should work to determine the nature of these age-related differences. One possibility is that the experience of marriage or childbirth at a non-normative age might be related to selection effects that are not accounted for here.

Finally, differential stability here showed the same patterns that have been found in past work, increasing toward mid-life, and decreasing in later life. Results did show that experiencing more life events was associated with an increase in differential stability, but did not account for the decrease in later life. Future research should examine possible mechanisms for this change. In particular, are there age-related changes that might explain more rapidly-changing personality traits in later life?

Overall, this study represents a replication of past work using longer time spans, and also suggests that there continues to be good evidence for the theory of Social Investment and personality trait change. Questions remain regarding the effects of experiencing life events at different ages, and research should still be done to better understand the associations between differential stability and life events.

REFERENCES

REFERENCES

Allemand, M., Zimprich, D., & Hendriks, A. A. J. (2008). Age differences in five personality domains across the life span. *Developmental Psychology*, *44*(3), 758–770.

Anderson, E. R. (1993). Analyzing change in short-term longitudinal research using cohort-sequential designs. *Journal of Consulting and Clinical Psychology*,*61*, 929.

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, *55*(5), 469–480. doi:10.1037//0003-066X.55.5.469

Bleidorn, W., Klimstra, T., Denissen, J. J., Rentfrow, P. J., Potter, J., & Gosling, S. D. (2013). Personality maturation around the world: a cross-cultural examination of social-investment theory. *Psychological Science*, *24*(12), 2530–40. doi:10.1177/0956797613498396

Caspi, A., & Roberts, B. W. (2001). Personality Development across the Life Course : The Argument for Change and Continuity Personality Development Across the Life Course : The Argument for Change and Continuity. *Psychological Inquiry*, *12*(2), 49–66. doi:10.1207/S15327965PLI1202_01

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: stability and change. *Annual Review of Psychology*, *56*, 453–84. doi:10.1146/annurev.psych.55.090902.141913

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. Structural Equation Modeling, 9, 233–255.

Costa, P. T., Herbst, J. H., McCrae, R. R., & Siegler, I. C. (2000). Personality at midlife: Stability, intrinsic maturation, and response to life events. *Assessment*, *7*, 365-378.

Costa, P. T., & McCrae, R. R. (2006). Age changes in personality and their origins: comment on Roberts, Walton, and Viechtbauer (2006). *Psychological Bulletin*, *132*(1), 26–28. doi:10.1037/0033-2909.132.1.26

Donnellan, M. B., & Lucas, R. E. (2008). Age differences in the Big Five across the life span: Evidence from two national samples. *Psychology and Aging*, *23*(3), 558–566. doi:10.1037/a0012897.

Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological methods*, 3(4), 424.

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). The big five inventory: Versions 4a and 54, institute of personality and social research. *University of California, Berkeley, CA*.

John, O., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of Personality: Theory and Research* (pp. 102–138).

Jokela, M., Kivimäki, M., Elovainio, M., & Keltikangas-Järvinen, L. (2009). Personality and having children: a two-way relationship. *Journal of personality and social psychology*, *96*, 218.

Lodi-Smith, J., & Roberts, B. W. (2007). Social investment and personality: a meta-analysis of the relationship of personality traits to investment in work, family, religion, and volunteerism. *Personality and Social Psychology Review*, *11*, 68–86. doi:10.1177/1088868306294590

Losoncz, C. (2009). Personality traits in the HILDA. *Australian Social Policy No. 8*, p. 169.

Lucas, R. E., & Donnellan, M. B. (2011). Personality development across the life span: longitudinal analyses with a national sample from Germany. *Journal of Personality and Social Psychology*, *101*(4), 847–61. doi:10.1037/a0024298

McCrae, R. R., & Costa Jr, P. T. (1999). A five-factor theory of personality. *Handbook of personality: Theory and research*, 2, 139-153.

Millsap, R. E., & Kwok, O. M. (2004). Evaluating the impact of partial factorial invariance on selection in two populations. *Psychological methods*, *9*, 93.

Muthén, L. K., & Muthén, B. O. (1998-2011). Mplus User's Guide. Sixth Edition. Los Angeles, CA: Muthén & Muthén.

Neyer, F. J., Mund, M., Zimmermann, J., & Wrzus, C. (2013). Personality-Relationship Transactions Revisited. *Journal of Personality*, (1993), 1–12. doi:10.1111/jopy.12063

Neyer, F. J., & Asendorpf, J. B. (2001). Personality–relationship transaction in young adulthood. *Journal of Personality and Social Psychology*, 81, 1190.

Roberts, B. W., Caspi, A., & Moffitt, T. E. (2003). Work experiences and personality development in young adulthood. *Journal of Personality and Social Psychology*, *84*(3), 582–593. doi:10.1037/0022-3514.84.3.582

Roberts, B. W., & DelVecchio, W. F. (2000). The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. *Psychological Bulletin*, *126*(1), 3–25.

Roberts, B. W., Smith, J., Jackson, J. J., & Edmonds, G. (2009). Compensatory conscientiousness and health in older couples. *Psychological Science*, *20*(5), 553-559.

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: a meta-analysis of longitudinal studies. *Psychological Bulletin*, *132*(1), 1–25. doi:10.1037/0033-2909.132.1.1

Roberts, B.W., & Wood, D. (2006). Personality development in the context of the neo-socioanalytic model of personality. In D. Mroczek & T. Little (Eds.), Handbook of personality development (pp. 11-39). Mahwah, NJ: Erlbaum.

Roberts, B. W., Wood, D., & Caspi, A. (2008). The development of personality traits in adulthood. In O. P. John, R.W. Robins, & L.A. Pervin (Eds.) *Handbook of personality: Theory and Research* (pp. 375-398). New York, NY: Guilford Press.

Roberts, B. W., Wood, D., & Smith, J. L. (2005). Evaluating Five Factor Theory and social investment perspectives on personality trait development. *Journal of Research in Personality*, *39*(1), 166–184. doi:10.1016/j.jrp.2004.08.002

Saucier, G. (1994). Mini-markers: A brief version of Goldberg's unipolar Big-Five Markers. *Journal of Personality Assessment*, *63*(3), 506–516.

Specht, J., Egloff, B., & Schmukle, S. C. (2011). Stability and change of personality across the life course: the impact of age and major life events on mean-level and rank-order stability of the Big Five. *Journal of Personality and Social Psychology*, *101*(4), 862–82. doi:10.1037/a0024950

Terracciano, A., Costa, P.T., & McCrae, R. R. (2006). Personality plasticity after age 30. *Personality and Social Psychology Bulletin*, *32*(8), 999–1009. doi:10.1177/0146167206288599

Terracciano, A., McCrae, R. R., Brant, L. J., & Costa Jr, P. T. (2005). Hierarchical linear modeling analyses of the NEO-PI-R scales in the Baltimore Longitudinal Study of Aging. Psychology and aging, 20(3), 493.

United Nations, Department of Economic and Social Affairs, Population Division (2009). *World Marriage Data 2008* (POP/DB/Marr/Rev2008).

Wagner, G. G., Frick, J. R., & Schupp, J. (2007). The German Socio-Economic Panel study (SOEP)-evolution, scope and enhancements.

Wooden, M., & Watson, N. (2007). The HILDA Survey and its Contribution to Economic and Social Research (So Far)*. *Economic Record*, 83(261), 208-231.

Wortman, J., Lucas, R. E., & Donnellan, M. B. (2012). Stability and change in the Big Five personality domains: evidence from a longitudinal study of Australians. *Psychology and Aging*, *27*(4), 867–74. doi:10.1037/a0029322