

Personality Change Following Unemployment

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Paper accepted for publication in the *Journal of Applied Psychology*

**Author notes:**

The authors would like to extend thanks to James Banks, Eamonn Ferguson, and Nattavudh Powdthavee for helpful comments. The Economic and Social Research Council (PTA-026-27-2665, ES/K00588X/1) and the University of Stirling provided research support. The data used here were made available by the German Institute for Economic Research (DIW Berlin). Neither the original collectors of the data nor the Archive bears any responsibility for the analyses or interpretations presented here.

### **Abstract**

Unemployment has a strongly negative influence on well-being, but it is unclear whether it also alters basic personality traits. Whether personality changes arise through natural maturation processes or contextual/environmental factors is still a matter of debate.

Unemployment, a relatively unexpected and commonly occurring life event, may shed light on the relevance of context for personality change. We examined, using a latent change model, the influence of unemployment on the Five Factor Model of personality in a sample of 6,769 German adults, who completed personality measures at two time-points four years apart. All participants were employed at the first time-point, and a subset became unemployed over the course of the study. By the second time-point, participants had either remained in employment, been unemployed from 1-4 years, or had become re-employed. Compared with those who had remained in employment, unemployed men and women experienced significant patterns of change in their mean-levels of agreeableness, conscientiousness, and openness, whereas re-employed individuals experienced limited change. The results indicate that unemployment has wider psychological implications than previously thought. Also, the results are consistent with the view that personality changes as a function of contextual/environmental factors.

*Keywords:* unemployment, personality, personality change, well-being, Five Factor Model.

### Personality Change Following Unemployment

Personality is most often viewed within the hierarchical Five Factor Model (FFM; McCrae & Costa, 2008). The basic traits of agreeableness, conscientiousness, extraversion, neuroticism, and openness occupy the highest level of the personality hierarchy, whereas other psychological characteristics (i.e., manifestations of the basic traits) occupy lower levels. Given that the FFM was partially motivated by biological considerations (McCrae et al., 2000), there was an initial tendency to regard these traits as relatively fixed, changing early in life through maturation but becoming “set like plaster” at approximately the age of 30 (Costa & McCrae, 1994; Srivastava, John, Gosling, & Potter, 2003). Recent advances, however, have challenged the traditional “set like plaster” perspective by demonstrating evidence of change throughout the life-cycle stages (Lucas & Donnellan, 2011; Roberts, Walton, & Viechtbauer, 2006a). Indeed, personality may be as malleable as socio-economic variables such as income or marital status (Boyce, A. M. Wood, & Powdthavee, 2013; Osafo Hounkpatin, A. M. Wood, Boyce, & Dunn, in press). Current debate now mostly centers on the extent to which personality change is a function of natural maturation processes versus events that occur throughout life (Costa & McCrae, 2006; Roberts, Walton, & Viechtbauer, 2006b).

Some proponents of the FFM argue that most of the observed personality changes are attributable to intrinsic maturation processes brought about by genetic influences (McCrae & Costa, 2008). Such a perspective is bolstered by similarities in the way traits appear to develop over the life-cycle across diverse cultures (McCrae et al., 1999, 2000). However, there is also a strong environmental contribution to personality change (Kandler, 2012), consistent with twin longitudinal studies which indicate that personality change has both genetic and environmental components (Bleidorn et al, 2010; Bleidorn, Kandler, Riemann, Angleitner, & Spinath, 2009). In support of the role of environmental variation in personality change, commonly occurring events -- such as alterations in marital status (Specht, Egloff, & Schmukle, 2011), marital and relationship quality (Neyer & Lehnart, 2007; Roberts & Bogg, 2004; Watson & Humrichouse, 2006), retirement (Specht et al., 2011), and experiences within the workplace (Roberts, Caspi, & Moffitt, 2003) -- have all been linked to personality change.

However, many events that have been investigated in connection with personality change are normative, in the sense that they occur at specific points in the life-cycle that correspond with age-graded social roles. As such, there may be alternative explanations to personality changes. According to the model of person-environment transactions (Roberts, D. Wood, & Caspi, 2008), continuous interactions between person and environment promote both stability and change. Individuals may orient towards environments that match their personalities, but they will still face fluctuations in the expectations placed upon them, by others and themselves, both before and after they assume new roles. The effect of normative events on personality change can therefore be challenging to examine, because it is difficult to distinguish the extent to which the experience (or anticipation) of an event precipitated personality change, whether the event itself happened to co-occur with a natural process of personality maturation, or whether personality change culminated in the event itself.

To minimize the conceptual and methodological problems associated with examining changes associated with normative roles, it is more informative to explore the influence of non-normative events on personality. We know, for example, that the use of certain drugs (MacLean, Johnson, & Griffiths, 2011; Roberts & Bogg, 2004), the experience of frightening or horrifying events (Löckenhoff, Terracciano, Patriciu, Eaton, & Costa, 2009), and involvement in intensive outpatient counseling (Piedmont, 2001) can all initiate personality changes. However, although such findings are indicative of personality change due to contextual or environmental factors, the relevant events are uncommon. In this article, we examine changes in personality as a function of a relatively major and commonly occurring non-normative life event, namely unemployment. In particular, we test whether, relative to remaining employed, (a) unemployment precipitates changes in basic personality traits, (b) this change depends on unemployment duration, (c) the influence of unemployment on personality differs by gender, and (d) unemployment-triggered personality change endures following re-employment.

### **Personality Stability and Change**

Debate on whether personality can and does change has been hindered from lack of explicit definitions of personality. Indeed, a good deal of disagreement has arisen by non-shared definitions of the construct. This can be particularly problematic, if one understands

personality to represent the non-changing aspects of the person. In this case, personality change would be precluded by terminological barriers or tautologies: If something is observed to change, it can no longer be deemed “personality.” Moreover, adopting a rigid definition of personality in terms of “unmitigated stability” would lead to the unavoidable conclusion that changes indicated by self-report measures of personality are inherently meaningless, despite a vast literature documenting the reliability and validity of such measures. Fortunately, personality psychologists are inclined to define personality more inclusively—for example, as “the psychological component of a person that remains from one situation to another” (A. M. Wood & Boyce, in press). This definition implies a degree of temporal and cross-situational stability, without which the construct would be viewed as a particular state arising in a particular situation, but does not preclude substantive personality change over time.

Aligned with this view, Mischel and Shoda (1995, 1998) defined personality as the stable way in which people behave within a given situation, such that people may have stably different personalities in different situations (e.g., at work vs. leisure). Personality indeed varies across social roles, with higher variation across roles being linked to reduced authenticity and impaired well-being (Bettencourt & Sheldon, 2001; Lenton, Bruder, Slabu, & Sedikides, 2013; Sheldon, Ryan, Rawsthorne, Ilardi, 1997). Fleeson (2001, 2004) defined personality as the average of personality expression across roles and situations, and showed that personality expression varies continually such that a person may score a “1” on extraversion one morning and a “7” the next, depending on situational factors. At the same time, Fleeson (2001, 2004) also demonstrated that individuals can be reliably distinguished from one another by the mean point of their personality expression distribution, which is to what people refer when asked about their personality “in general.” Each of these perspectives is compatible with definitions of personality as inter-individual differences in either behavior or the propensity to behave (Borghans, Duckworth, Heckman, & ter Weel, 2008; Eysenck, 1981).

Drawing consensus across these contemporary definitions, personality is regarded as a snapshot of a fluid process of individuals engaging dynamically with their environments, expressing behaviors to varying degrees, but being differentiated by how they typically feel,

think, and behave -- the “stable part of themselves” (Gramzow et al., 2004; Hafdahl, Panter, Gramzow, Sedikides, & Insko, 2000; Robinson & Sedikides, 2009). None of the perspectives anticipates that personality remain completely stable over time. Quite the converse: were people to find themselves chronically in a different life situation, they would (a) reliably exhibit different characteristics in the new environment (Mischel & Shoda, 1995, 1998); (b) have different mean-levels in distributions of personality expression (Fleeson, 2001, 2004); (c) and have stably different behavior propensities (Gramzow et al., 2004; Hafdahl et al., 2000). Indeed, it is highly plausible that living in new environments would precipitate personality change, given the adaptive advantage of adjusting flexibly to one’s contextual circumstance; such an advantage would maximize the person-environment fit (Lewin, 1951; Magnusson & Endler, 1977; Pervin, 1968).

These reflections on the nature of personality underlay our expectation that personality would change following unemployment, particularly if the experience were prolonged (Reynolds et al., 2010). Thus unemployment, which represents a severe environmental alteration that removes social contacts and restricts the opportunity to engage in certain types of tasks, would likely enable individuals to exhibit specific personality traits relevant to the new unemployed situation, in line with Mischel and Shoda’s (1995, 1998) definition of personality. Further, and consistent with Fleeson (2001, 2004), the changes to an individual’s life brought about by the experience of unemployment would result in different mean-levels of personality expression. It is also reasonable to expect that the unemployment experience will permeate the individual’s life and help to instigate behavior change even within situations associated weakly with the work environment (e.g., during leisure activities or home stay). In all cases, the unemployment experience is likely to give rise to stably different ways of thinking, feeling, and behaving, which will precipitate changes in personality.

### **The Psychological Effects of Unemployment**

Unemployment has one of the strongest impacts on well-being ( $d = -0.38$ , McKee-Ryan, Song, Wanberg, & Kinicki, 2005), with the impact often lasting beyond the period of unemployment (Clark, Georgellis, & Sanfey, 2001; Daly & Delaney, 2013) and being comparable to that of becoming disabled (Boyce & A. M. Wood, 2011b; Lucas, 2007) or

losing a spouse (Oswald & Powdthavee, 2008). However, much less is known about how unemployment might shape personality. The experience of unemployment is likely to bring considerable and unexpected contextual fluctuation to an individual's life and potentially to compromise the development of particular personality traits. In accord with this notion, personality change has been linked to other workplace variables (e.g., job satisfaction or status) and counterproductive work behaviors (e.g., Roberts, 1997; Roberts & Bogg, 2004; Roberts, Caspi, & Moffitt, 2003; Roberts, Walton, Bogg, & Caspi, 2006; Scollon & Diener, 2006). Given that personality matures in normative ways across the life-span (Lucas & Donnellan, 2011; Roberts et al., 2006a), we expect some change to take place across the whole sample. However, we are specifically interested in whether greater personality change occurs for those who become unemployed. As such, we examine personality change of the unemployed relative to the employed. Although theorizing on how personality might change is not in found in abundance, we build on this theory to offer several hypotheses below on whether and how the personality of the unemployed (vs. employed) will change, while also ascertaining, where possible, precise forms of change (Pitariu & Ployhart, 2010).

**Conscientiousness.** Conscientiousness, which represents a tendency for individuals to be goal focused (Barrick, Mount, & Strauss, 1993) and highly motivated (Judge & Ilies, 2002), bears links with achievements within the work environment. Hence, the experience of unemployment may curtail opportunities to express conscientious type behavior.

Conscientiousness is also positively linked to one's economic situation, such as wealth accumulation (Ameriks, Caplin, & Leahy, 2003) or higher wages (Mueller & Plug, 2006; Nyhus & Pons, 2005), and predicts fluctuations in life satisfaction following income changes (Boyce & A. M. Wood, 2011a). Unemployment, then, may cut-off access to previously valued achievement goals, and this may act as a catalyst for personality change. Consistent with the theoretical expectation that unemployment will precipitate changes in conscientiousness, both retirement and first-time entry into employment have been associated with changes, negative and positive respectively, in conscientiousness (Specht et al., 2011). Further, being in paid work has been linked with changes in conscientiousness-related traits, such as increased social responsibility (Roberts & Bogg, 2004). Due to the critical role of

conscientiousness in the workplace, we hypothesize that levels of conscientiousness will be influenced by unemployment.

*H1: The experience of unemployment (relative to employment) will produce mean-level reductions in conscientiousness.*

**Neuroticism.** Unemployment may have an influence on neuroticism. Unemployment is associated with high levels of stress (Frost & Clayson, 1991) and depression (Dooley, Prause, & Ham-Rowbottom, 2000). Given that neuroticism entails stress and depression at the dispositional level (Widiger, 2009), it is likely that unemployment will prompt higher neuroticism. Additionally, the work environment provides a vital source of social support, which may dissipate following unemployment (Atkinson, R. Liem, & J. H. Liem, 1986). Lack of social support may result in loneliness (Heinrich & Gullone, 2006) and low self-esteem (Waters & Moore, 2002). In turn, lack of social support and low self-esteem engender negative emotions, cognitions, and behaviors (Cohen, Gottlieb, & Underwood, 2000; Sedikides & Gregg, 2003). Based on the above, we hypothesize that unemployment will influence neuroticism.

*H2: The experience of unemployment (relative to employment) will produce mean-level increases in neuroticism.*

**Agreeableness, extraversion, and openness.** Work, like many normative life events, can have a crucial socialization influence (Roberts, 1997). The ability to interact socially, convey ideas, and make compromises are typical aspects of day-to-day activities within the workplace (Cohen, Gottlieb, & Underwood, 2000). Hence, the experience of unemployment may thwart the expression of socially-oriented personality traits. However, given that unemployment presents both new threats and new opportunities, it is not entirely clear how unemployment might influence traits like agreeableness, extraversion, and openness. For example, unemployment may result in new social engagements. Contrastingly, however, unemployed individuals may have fewer financial resources, but more time to share with others. On a similar note, openness may increase, as unemployment offers individuals the opportunity to evaluate their lives and refocus on less material outcomes (e.g., deepening relationships, appreciating aesthetics). At the same time, unemployment could constrain the individual's ability for novel experiences (e.g., restaurant eating, travel) and even beget



perceptions of the world as distasteful and unfriendly. As such, we do expect agreeableness, extraversion, and openness to be influenced by unemployment, but we are uncertain of the precise direction of influence; consequently, we adopt an exploratory approach.

*H3: The experience of unemployment (relative to employment) will produce mean-level changes in agreeableness (H3a), extraversion (H3b), and openness (H3c).*

**Influence of unemployment on personality as a function of time remaining unemployed.** Consistent with our earlier definitional considerations of personality (Fleeson, 2001, 2004; Mischel & Shoda, 1995; Shoda & Mischel, 1998) – culminating in the conclusion that unemployment may give rise to stably different ways of thinking, feeling, and behaving – we would expect the duration of unemployment and whether re-employment took place to be differentially critical for personality change. Distinctly stable ways of thinking, feeling, and behaving may prevail at various stages of the unemployment experience. Personality change may therefore differ according to whether individuals are short-term unemployed compared to those who are long-term unemployed or transitioning between short-term and long-term unemployment. For example, individuals may be initially subject to personality change as they actively search for new employment, but, after several years of failed searches, may experience lack of motivation to continue pursuing job leads (Kanfer, Wanberg, & Kantrowitz, 2001). This motivational burnout may still spark personality change, albeit different from that of the initial “search” years. We therefore expect that the impact of unemployment will depend on the number of years spent unemployed and may develop in a non-linearly fashion such that larger changes will occur at various stages of unemployment. For example, in the first year or two of unemployment, large personality change may be evident, whereas, in subsequent years, personality may be stabilized at the newly formed level. Alternatively, after a year or two of being out of work, individuals may learn to engage more productively with the unemployment process, thus being able to mitigate the initial personality change.

*H4: The magnitude of the mean-level changes in personality resulting from unemployment will be dependent on the number of years that an individual has been unemployed, such that a linear or non-linear relation will be observed between individuals at*

*different years of unemployment and changes in their agreeableness (H4a), conscientiousness (H4b), extraversion (H4c), neuroticism (H4d), and openness (H4e).*

**Influence of unemployment on men's and women's personality.** Unemployment may also have distinct personality implications for men and women owing to variability in thinking, feeling, and behaving following the event. Different personality traits are valued in the workplace for men and women; for example, agreeableness is likely to be penalized in men but rewarded in women (Mueller & Plug, 2006; Nyhus & Pons, 2005). Thus, to the extent that individuals develop certain personality traits to achieve greater workplace success, the absence of work may differentially dis-incentivize behavior patterns in the two genders. Further, men and women may experience and cope with unemployment dissimilarly. For example, men adopt a problem-focused orientation and hence are unlikely to seek social support, whereas women are symptom-focused and hence are likely to seek social support (Leana & Feldman, 1991). As such, men may engage with the job search process, whereas women may engage in socially-oriented activities (Kanfer et al., 2001). Also, unemployment may present a unique set of opportunities and threats across men and women that vary according to the years spent unemployed. Some authors (Forret, Sullivan, & Mainiero, 2010), for example, have speculated that traditional gender roles could still be relevant to the experience of unemployment, with men viewing the experience as a threat to their provider role and women viewing the experience as a potential opportunity for child rearing. Hence, although we are not in a confident position to ascertain precise patterns, we expect gender differences in the way unemployment alters personality.

*H5a: Men and women will exhibit different mean-level changes in personality as a result of unemployment (relative to employment).*

*H5b: Men and women will exhibit different non-linear relations between years spent unemployed and personality change, such that the magnitude of the mean-level changes in personality will vary differently for men and women by the years they spend unemployed.*

**Unemployed-triggered personality change and rebound following re-employment.** Given that we anticipate unemployment to influence personality change via the opportunity to express relevant traits, it is possible that unemployment's "impact" on personality will not be enduring. Once an individual regains employment, the dynamic

processes that brought personality change in the first place will no longer operate in the same way. Thus, within the new context of employment, further change may take place. However, since re-employment represents an absence of the unemployment context that created change in the first place, it is possible that the re-employment context will foster psychological processes that result in further change and may even return to pre-unemployment personality levels. Personality change, then, may not be apparent in those individuals who, although experiencing unemployment, subsequently become re-employed.

*H6: Becoming re-employed will produce additional mean-level changes in personality (relative to remaining employed).*

### **Overview**

In spite of the strong theoretical case for expecting personality change to accompany the experience of unemployment, there is a dearth of relevant evidence. This is particularly surprising, given that personality change has been linked to other momentous labor market events, such as retirement or first-time entry into the labor market (Specht et al., 2011). However, examining the influence of unemployment on personality is methodologically much more difficult than examining the influence of many other life events. The latter events generally endure once they have occurred. For example, individuals can enter the labor force for the first time only once, and they typically enter retirement only once at the end of their careers. As such, the influence on personality of starting one's first job or retiring can be determined by establishing whether these events took place between two time-points in which personality was assessed. However, this is not the case with unemployment, where individuals may enter in and out of it on multiple occasions and for varying temporal periods. Any results based simply on whether individuals experienced some unemployment over the study period would be confounded by potentially large subsets of those who had already become re-employed, had experienced repeated periods of unstable employment, or were experiencing long-term unemployment.

In this study, we therefore focus exclusively on unemployment, a major non-normative life event, and differentiate between types of unemployment experiences: becoming and remaining unemployed versus becoming unemployed but being re-employed. We also explore personality change differences by time spent in consecutive years of

unemployment. We analyze longitudinal responses to questionnaires from a large sample in which all participants were initially in employment. Participants completed measures of personality at the first time point while in employment and again four years later. We identify three sub-sets of participants: Those who became unemployed at various points over the four year period and remained so until the end of the study, those who became unemployed at some point over the study but regained employment by the end of the study, and those who were in employment in every time-point in the study. After testing for measurement invariance across the two personality-assessment time-points for each of the FFM traits, we use a latent change model to compare relative differences in changes in the FFM traits between these participants. We examine whether any impact of unemployment on personality change (a) depends on how long participants have been unemployed, (b) differs across men and women, and (c) endures following re-employment.

## **Method**

### **Participants and Procedure**

We used the German Socio-Economic Panel Study (SOEP), an ongoing longitudinal study of German households. The SOEP began in 1984 with a sample of adult members from randomly selected households in West Germany. Since 1984, the SOEP has expanded to include East Germany and also added various sub-samples to maintain a representative sample of the entire German population (Wagner, Frick, & Schupp, 2007). The SOEP is one of the primary socio-economic datasets with which hundred articles have been published (see [http://www.diw.de/en/diw\\_02.c.221182.en/publications\\_with\\_soep\\_data.html](http://www.diw.de/en/diw_02.c.221182.en/publications_with_soep_data.html)). The authors have used portions of SOEP to answer different research questions in the following published research articles: Boyce, (2010), Boyce & Wood, (2011a), Boyce & Wood, (2011b); Boyce, Wood, & Brown, (2010).

We focused on a sub-sample of SOEP participants who answered questions on their personality in 2005 while still employed. The employment status of these participants was recorded over the following four years (2006, 2007, 2008, 2009), and their personality assessed again in 2009. Our sub-sample consisted of 6,769 participants (3,733 males, 3,036 females). Of these participants, 6,308 remained employed throughout this period (2005-2009). In an effort to conduct a clean test of the effect of unemployment, we separated the

remaining 461 participants into two different groups: those who experienced some unemployment but were re-employed by 2009 ( $n = 251$ ) and those who (a) had begun a phase of unemployment between 2006 and 2009 and (b) were still in the same phase of unemployment in 2009 ( $n = 210$ ). Persons who entered and exited multiple unemployment spells over this period, yet were found to be unemployed in 2009, were excluded from our sub-sample.

In all, our sub-sample comprised 6,308 individuals who remained employed, 251 individuals who were unemployed but became re-employed, and 210 individuals who were unemployed in 2009 for 1, 2, 3, or 4 years. One hundred seventeen of these 210 individuals had been unemployed for one year (their first year of unemployment began in 2009), 41 had been unemployed for two years (their first year of unemployment began in 2008), 19 had been unemployed for three years (their first year of unemployment began in 2007), and 33 had been unemployed for four years (their first year of unemployment began in 2006). In 2005, when all individuals were employed, age ranged from 17 to 61 ( $M = 41.41$ ,  $SD = 10.45$ ), and household income varied from €200 to €30,000 per month ( $M = 3107.53$ ,  $SD = 1689.38$ ,  $Mdn = 2786.09$ ). Table 1 provides the means and standard deviations of the personality variables at both time points by employment status. Table 2 provides the correlations of the personality variables, unemployment variables, and socio-demographic characteristics.

## Measures

**Employment status.** Participants' current employment status is recorded in the SOEP as either in employment, retired, not-employed, in education, or unemployed. Given that we were interested specifically in entry to unemployment from employment, we concentrate only on individuals who were recorded as employed or unemployed throughout the study period. The not-employed category included the sub-category of those who were unemployed but also not looking for work. This sub-category, though, would reflect inaccurately "individuals not in work but wanting to work" (i.e., the unemployed), and thus we excluded such participants from our analysis.

**FFM personality measures.** A shortened version of the Big Five Inventory (Benet-Martinez & John, 1998) was administered in both 2005 and 2009. This version, shown in the

Appendix, was developed specifically for use in the SOEP, where space for survey questions is severely limited (Gerlitz & Schupp, 2005). Participants responded to 15 items (1 = *does not apply to me at all*, 7 = *applies to me perfectly* scale), with three items assessing each of the FFM domains of agreeableness (e.g., “has a forgiving nature”), conscientiousness (e.g., “does a thorough job”), extraversion (e.g., “is communicative, talkative”), neuroticism (e.g., “worries a lot”), and openness (e.g., “is original, comes up with new ideas”). The SOEP scale has comparable psychometric properties to longer FFM scales. For example, using different assessment methods, Lang, John, Lüdtke, Schupp, and Wagner (2011) showed that the short-item scale produces a robust five factor structure across all age groups. Donnellan and Lucas (2008) demonstrated that each of the scales contained in the SOEP correlates highly (at least  $r = .88$ ) with the corresponding sub-scale of the full Big Five Inventory. Also, Lang (2005) illustrated that the retest reliability of the scale across 6 weeks is acceptable (at least  $r = 0.75$ ). In our sample in 2005 (2009) each of the personality traits had the following Cronbach’s Alphas: Agreeableness – .52 (.57); Conscientiousness – .60 (.57); Extraversion – .66 (.67); Neuroticism – .61 (.59); Openness – .60 (.63). After testing for measurement invariance, we analyzed the FFM personality variables as latent variables.

**Gender:** We used a binary variable (female) to denote whether a participant was recorded as male (female = 0) or female (female = 1). This variable was included as a main effect variable and also interacted with all of the unemployment variables to establish whether there were gender differences in personality change as a result of unemployment.

**Covariates.** We controlled for several third variables that might account for the relation between unemployment and changes to personality. Various life events may co-occur with unemployment (e.g., alterations to marital, disability, parental status), and, given that such events have also been linked to changes in personality (Specht et al., 2011), any apparent effect of unemployment on these two variables may be due to the occurrence of these events rather than the specific experience of unemployment<sup>1</sup>. To rule out this possibility, we controlled for alterations in events that occurred between the two time points. Further, personality may have different natural maturation rates by age or years of education (Lucas & Donnellan, 2011), and these same factors may also be associated with an increased likelihood of unemployment. We therefore also controlled for age and education to rule out

personality changes that may have arisen from natural maturation rather than environment variation. In some cases, there were missing values for education. Given that this variable was not our main interest, and to avoid excluding relevant participants, we re-coded any missing values with the full SOEP sample-wide means. We further included dummy variables to indicate that a variable with a previously missing value had been re-coded with a sample-wide average. This practice ensured that the inputted values had no effect on subsequent results.

### **Data Analytic Strategy**

We used a latent change model to test whether unemployment (including time spent unemployed and re-employment), compared to lack of unemployment (i.e., employment), resulted in differences in mean-level personality change over a four-year period (Figure 1). The latent change model assesses changes in unobserved variables, so that both structural relations and measurement error can be estimated simultaneously. The latent change model is based on several testable assumptions (Allemand, Zimprich, & Hertzog, 2007). First, the relevant indicators (i.e., personality questionnaire items linked to a specific trait) must load onto the latent factor of interest at both time points (T0 and T1). Second, the extent to which indicators load onto a latent factor must not vary over time. This ensures that longitudinal change in the construct of interest cannot be attributed to differences in how specific manifest indicators link to latent variables from one testing occasion to another. This assumption is tested by carrying out a set of analyses to determine whether the measurements are factorially invariant.

### **Testing for Measurement Invariance**

We took several steps to ensure that each personality trait measure operated equivalently in 2005 (T0) and 2009 (T1), so that observed changes in personality traits could be attributed to true differences/changes rather than changes in the psychometric properties of the indicators over time. We examined the measurement invariance of each of the Big Five Inventory traits as these models formed the basis for all subsequent latent change models. Each trait was measured by three items at each time point. We followed recommended practice for testing measurement invariance, which suggests that it is necessary to establish configural, metric, and scalar invariance prior to testing for latent change (Bashkov & Finney,

2013; Vandenberg & Lance, 2000). To do this, we (a) implemented a Longitudinal Confirmatory Factor Analysis (CFA) model that systematically places a series of increasingly restrictive equality constraints on specific parameters, and (b) examined the impact of these restrictions on model fit.

We firstly identified a common model for each of the personality measures across time points, which we derived from three indicator variables for each of the five traits (Benet-Martinez & John, 1998). This *configural model* estimated the factor structure of the traits across the two time-points without placing any equality constraints on the model. If the *configural model* demonstrates a high level of fit, this will suggest that the basic factor structure with the same pattern of fixed and freed loadings is invariant across measurement occasions (Vandenberg & Lance, 2000). When configural invariance is established, the configural model can be used as the baseline model from which to evaluate changes in model-fit associated with implementing tests of metric and scalar invariance. We implemented several indices to gauge goodness-of-fit in order to test the model-data fit for each personality trait.

The  $\chi^2$  value quantifies the extent to which sample and fitted covariance matrices diverge, with a substantial discrepancy suggesting a lack of fit and resulting in a large  $\chi^2$  value. The  $\chi^2$  index of fit test is sensitive to sample size and rejects the model in most instances where large samples ( $N \geq 500$ ) are used (Hayduk, 1987). The comparative fit index (CFI) considers sample size and compares the fit of the hypothesized model to a null model that assumes the included variables are uncorrelated. CFI values range from 0 to 1, with values of  $\geq .95$  recognized as indicative of good model-data fit (Hu & Bentler, 1999). We also consider the root mean square error of approximation (RMSEA), which addresses how well a model "...with unknown but optimally chosen parameter values, [would] fit the population covariance matrix if it were available" (Browne & Cudeck, 1993). RMSEA values range from 0 to 1 with values of  $\leq .06$  indicating a good model fit (Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999).

We took a multistep approach, examining the change in model fit that resulted from placing a logically ordered series of additional constraints on the initial configural or baseline model. Full invariance was deemed to be supported when placing additional constraints on



the model did not produce a substantial change in model fit. To evaluate whether a substantial change in model fit occurred as a result of imposing additional equality constraints on particular parameters, we examined the chi-square difference test ( $\Delta\chi^2$ ), the CFI change ( $\Delta\text{CFI}$ ), the RMSEA goodness-of-fit statistic, and the degree of overlap in RMSEA confidence intervals between models. A non-significant chi-square difference test and a small  $\Delta\text{CFI}$  (where a decrease is no greater than .01) are considered indicative of invariance (Cheung & Rensvold, 2002).

We contrasted the model-fit of the configural or baseline model with the fit associated with the *measurement model*, where we constrained factor loadings to be equal across measurement occasions. This practice allowed a test of *metric invariance* or the hypothesis that measurement weights are invariant between the 2005 and 2009 personality trait assessments. We then conducted a test of *scalar invariance* by constraining the intercepts of the manifest indicators on latent variables to be equal across measurement occasions and by examining the change in model-fit associated with placing these additional equality constraints on the model. In the event of possible lack of *scalar invariance* for any of the personality measures, we examined the modification indices in order to determine which items resulted in fit decrement in the scalar invariance models. We then allowed these items to vary freely and re-examined model-fit as a test of *partial scalar invariance*.

### **Latent Change Models**

To assess the extent to which mean-level personality change took place as a function of unemployment, we constructed a latent change model (Allemand et al., 2007; McArdle, 2009), as depicted in Figure 1, for each personality trait separately. We explored the effect of unemployment by including a dummy variable to indicate that an individual was unemployed at T1 (unemployed at T1) and by including variables to indicate the number of consecutive years spent unemployed between 2005 and 2009 (years unemployed; this variable took integer values ranging from 0 to 4) as well as the quadratic of number of years spent unemployed (years unemployed<sup>2</sup>; this variable took integer values ranging from 0 to 16). Inclusion of these variables enabled us to determine whether unemployment and years spent unemployed related to personality. We further used a dummy variable to indicate those participants who had experienced unemployment, but had regained employment by T1 (re-

employed at T1). This would enable us to establish whether personality change through unemployment remains following re-employment. To discern whether there were personality change differences between men and women, we additionally interacted all the unemployed variables with the gender variable (female), and included the gender dummy variable and these interactions in each of our personality models.

All effects in the models were in relation to those experiencing no unemployment, and therefore this group represented the missing dummy coded group in each of the analyses. We adjusted for age, as well as for years of education, and any changes to participants' marital, disability, and parental statuses. The latent model consisted of an intercept factor (i) and a latent slope factor (s). The latent intercept factor reflected differences that already existed between participants at the first time-point (T0). Hence, any significance on the intercept variable for predictor variables in each of the models would suggest pre-existing differences in personality before the commencement of unemployment. The latent slope factor reflected differences in mean-level change between participants from the first to the second time-point (T1). If our primary predictor variables in each model explained a significant portion of variance in the slope variable, this would suggest that the mean-level change in a given personality trait is contingent on unemployment.

Significance on the slopes of any of the unemployed variables (unemployed at T1, years unemployed at T1 [linear or squared]) would denote that unemployed participants experience mean-level personality changes relative to those who remain employed. Specifically, a significant negative slope coefficient on the unemployed at T1 dummy variable in the conscientious model would support H1 that conscientious reduces following unemployment. Similarly, a negative significant slope coefficient on the unemployed at T1 dummy variable in the neuroticism model would support H2 that neuroticism reduces following unemployment. Given the uncertainty of the direction of change for agreeableness, extraversion, and openness, significant slopes in any direction for the remaining models on the unemployed at T1 dummy variable would offer support for H3. Specifically significance on the unemployed at T1 slope for agreeableness, extraversion, or openness would constitute support for H3a, H3b, and H3c respectively. Significant slopes on the years unemployed at T1 (either linear or squared) variables across each of the models would suggest that

personality change were dependent upon the year of unemployment, and therefore offer support for H4. Specifically significance on the agreeableness, conscientiousness, extraversion, neuroticism or openness years unemployed at T1 (either linear or squared) slopes would constitute support for H3a, H3b, H3c, H3d, and H3e respectively. Significance on the slopes of any of the gender interaction variables in any of the models would indicate gender differences in personality change following unemployment, yielding support for H5. More specifically significance on any of the gender interactions with unemployed at T1 would indicate support for H5a, whereas significance on any of the gender interactions with either of the years unemployed at T1 slopes would support H5b. Significance on any of the slopes of the re-employed at T1 variable would indicate that unemployment result in sustained changes to personality, offering support to H6 that following re-employment personality does not return to pre-unemployment levels. We estimated all the models using AMOS 19.

## Results

First, we tested for measurement invariance within each of the latent personality traits across time-points. We then examined, using latent change models, the extent to which unemployment influences mean-level change in all FFM personality traits.

### Measurement Invariance Model

The configural model simultaneously estimated the baseline factor models for each of the FFM personality traits for responses from 2005 and 2009. The analysis of this model showed  $\chi^2$  values ranging from 9.1 – 40.8, CFI values ranged from .994 – 1.000, and a RMSEA values from .011 - .036 (Table 3). Taken together, these fit indices indicate that the configural model fits the data very well and that the basic model structure is invariant across measurement occasions. Having established configural invariance, we then tested for metric invariance by restricting factor loadings to be equal in 2005 and 2009. The metric invariance model also fit the data very well, and imposing equality constraints on the factor loadings produced little change in the  $\chi^2$  ( $\Delta\chi^2$  ranging from 1.0 – 16.8), or CFI values ( $\Delta$ CFI ranging from -.002 – .000), thus suggesting that measurement weights were invariant across time-points (Table 3).

Our final scalar invariance model showed that constraining the intercepts of all corresponding items to be equal across measurement occasions had some impact on the fit indices. This model yielded evidence that the measurement intercepts for the personality traits agreeableness ( $\Delta\chi^2 = 209.7, p < .01; \Delta CFI = -.040; RMSEA = .075$ ) and neuroticism ( $\Delta\chi^2 = 150.3, p < .01; \Delta CFI = -.021; RMSEA = .053$ ) varied across time-points. Overall these fit-indices represented a moderately well-fitting model.

Restricting measurement intercepts to be equal produced a decline in fit across the remaining personality traits (i.e., conscientiousness, extraversion, openness;  $\Delta\chi^2$  ranging from 75.3 – 150.3;  $\Delta CFI$  ranging from -.021 – -.008), as can be seen in Table 3. However, the goodness-of-fit indices suggested that the model-data fit for these traits remained high (i.e.  $CFI \geq .95, RMSEA \leq .06$ ), and the RMSEA confidence intervals showed overlap in the majority of cases, implying that the hypothesis of scalar invariance may not be rejected. In all, tests of measurement invariance demonstrated that the personality traits conscientiousness, extraversion, and openness are characterized by full configural and metric invariance as well as a moderate degree of evidence of scalar invariance. The results of these tests allowed us to proceed with the latent change analysis.

Given that both agreeableness and neuroticism did not satisfy all of the fit-criteria, we explored the issue of scalar invariance in these measures further. We examined modification indices (MI) to assess which items resulted in a fit decrement in the scalar invariance models for both measures. For agreeableness, the thresholds for the item ‘forgives’ varied markedly over time (MI = 32), and thus relaxing the equivalence constraint on this item and allowing it to vary freely over time substantially improved the model fit ( $\Delta\chi^2 = 102.0, p < .01; \Delta CFI = -.004; RMSEA = .033$ ). For neuroticism, the thresholds for the item ‘worry a lot’ varied markedly over time (MI = 214). Relaxing the equivalence constraint on this item and allowing it to vary freely over time substantially improved the model fit ( $\Delta\chi^2 = 44.7, p < .01; \Delta CFI = -.014; RMSEA = .048$ ). In our main analysis, we estimated latent change models assuming scalar invariance for both agreeableness and neuroticism. However, the improvement in model fit after relaxing the equivalence constraints suggests that a partial invariance intercept model would be acceptable (Chungkham, Ingre, Karasek, Westerlund, & Theorell, 2013). Thus, for agreeableness and neuroticism, we also carried out latent change

models that allowed the items with the highest MI to vary freely so that we could account for the partial scalar invariance. This enabled us to determine whether partial scalar invariance had a substantive influence on our results.

### **Latent Change Models**

First, we determined the unconditional means and variances for both the intercept and slope terms, that is, estimates without any controls or predictors for each of the FFM traits. As shown in Table 4, all of the unconditional means and variance were significant for both the intercept and slope terms (except the slope term on neuroticism).

We then examined the extent to which unemployment influenced each of the FFM traits using latent change models (Table 5). For each trait, we explored the effect of unemployment on personality by (a) including a dummy variable in order to indicate that a participant was unemployed at T1 (unemployed at T1) and (b) including the number of consecutive years spent unemployed (years unemployed) and the quadratic of the number of years spent unemployed (years unemployed<sup>2</sup>), to further test for unemployment duration effects. We further included a dummy variable to index those participants who had experienced unemployment but had regained employment by T1 (re-employed at T1). All changes in the model were made relative to the missing dummy which represents participants employed across all years of the study.

To discern gender differences, we additionally interacted all the unemployed variables with our gender variable (female). Each model included intercept and slope factors that we allowed to vary according to all of the included predictors. The missing dummy was the group who was employed across all years of the study, with resulting intercept and slope coefficients always made relative to this group. We adjusted for age, years of education, and any changes to participants' marital, disability, and parental statuses<sup>3</sup>. All of the intercept terms were statistically significant ( $p < .01$ ), and an observation of the association between unemployment and the intercept differences across all models in Table 5 suggests that, prior to unemployment, there were very few personality differences between those who remained employed and those who eventually became unemployed. Only with openness was there evidence that initial levels for women predicted subsequent unemployment. There was no evidence of a selection effect for the remaining personality traits for either men or women.

We detail, in the portion of Table 5 titled “slopes for each personality trait,” the extent to which unemployment precipitated mean-level changes in personality. Significance on the slope terms for any of the unemployed variables, including the gender interaction terms, indicates that the mean-level personality changed relative to the group of participants who remained employed. We hypothesized that unemployment would produce mean-level decreases in conscientiousness (H1) and increases in neuroticism (H2). We also hypothesized there would be mean-level changes in an unspecified direction in agreeableness, extraversion, and openness (H3a-c). Further, we hypothesized that these mean-level changes would be dependent upon the year of unemployment (H4a-e) and would differ by gender (H5a/H5b). Overall, we observed mean-level changes across the sample in all of the FFM personality traits except neuroticism. These effects were small and can be taken to reflect the process of personality development that typically takes place across the life-span (Lucas & Donnellan, 2011; Roberts et al., 2006a). Importantly, however, we observed significant slope effects that are large in magnitude for the unemployed variables across agreeableness (Model 1), conscientiousness (Model 2), and openness (Model 5), suggesting that unemployment precipitated a substantial amount of additional mean-level personality change relative to the group of participants who remained employed. Our results lent partial support to hypotheses H3, through the effect on openness (H3c). Our results offer no support for H1 or H2. Mean-level changes in both agreeableness and openness, however, depended on the number of years unemployed (statistical significance on years unemployed at T1 and/or years unemployed squared at T1) giving partial support to H4, through H4a and H4e. As indicated by the gender interaction terms there were mean-level change differences between men and women in both conscientiousness and openness, as well as non-linear differences between unemployment duration and agreeableness, conscientiousness, and openness. Thus, we obtained partial support for both H5a and H5b<sup>2</sup>. We present the significant results separately for men and women in Figure 2 to illustrate how the mean-level of personality would be expected to change as participants experience a spell of unemployment of at least four years. Each point estimate is derived from the mean-level change in personality for each unemployed period according to Table 5. The overall pattern therefore only reflects an

implied trajectory of personality change. Dashed lines represent the background change in personality of participants who remained employed throughout the study.

**Unemployment's influence on FFM personality traits.** The upper-left graph depicts the *agreeableness* results for men who exhibit a significant trend, and the upper-right graph depicts the results for women. For men, the graph implies that agreeableness increases in the first two years of unemployment by approximately 0.25, whereas those who never became unemployed (represented in the graph by the dashed line) experienced decreases in agreeableness of 0.05. Thus, the relative difference in change between these two groups is approximately 0.30. However, due to the non-linear influence, after two years agreeableness levels of the unemployed men begin to diminish and in the long run are lower than that of the group who remained in employment. For women, we find large reductions in agreeableness with each year of unemployment. Specifically, each additional year of unemployment results in reductions in agreeableness, and, after four years of unemployment, agreeableness is approximately 0.40 lower than before unemployment.

The middle-left graph indicates that, the longer men spent unemployed, the larger their reduction in *conscientiousness*. After four years of unemployment, their conscientiousness dropped by more than 0.60. Relative to the group who remained employed throughout, this represents a change of approximately 0.50. For women in the middle-right graph, there is evidence of a non-linear influence of unemployment on personality with increases in the early and late stages of unemployment but reductions in the medium term. Relative to the employed group, who do not experience any significant reductions in conscientiousness, unemployed women in the second and third years of unemployment are approximately 0.40 lower in conscientiousness.

The bottom-left graph indicates how *openness* changes with respect to the years spent unemployed in men, and the bottom-right graph indicates that of women. Unemployed men manifest approximately similar openness levels in the first year of unemployment, but the results imply that openness may increase by approximately 0.10. However, with increasing years of unemployment, men start to decrease in openness to more than 0.40 lower than they were before unemployment. Women, on the other hand, show sharp reductions in openness and are approximately 0.70 lower than their pre-unemployment openness levels in the second

and third years of unemployment. However, in the fourth year, openness begins to increase, such that those unemployed for four years decrease by only 0.30 relative to those who never experienced unemployment.

**Re-employment's influence on FFM traits.** To test whether personality endures once an individual regains employment (H6), we examined the slope effect of the re-employed dummy variable. Significance on the slope of this variable would indicate that the unemployed who were re-employed by T1 experienced mean-level changes to their personality relative to those who remained in employment for all four years. An analysis of slope values on this variable suggest no evidence that re-employed individuals experienced mean-level personality change relative to the employed group. Although unemployment is likely to have precipitated personality change, the results suggest that personality rebounds upon re-employment.

### Discussion

We theorized that the experience of unemployment, a major non-normative life event, would precipitate changes in personality by giving rise to different ways of thinking, feeling, and behaving. We aimed to examine whether, relative to individuals who remain in employment, (a) unemployment advances change in basic personality traits, (b) the influence of unemployment on personality depends on its duration, (c) this influence differs by gender, and (d) personality change is sustained following re-employment. Previous work found no effect of unemployment on personality (Specht et al. 2011), but this work did not address some of the above-stated nuances in the unemployment experience.

We showed in our study that agreeableness, conscientiousness, and openness changed during unemployment relative to employment, with the influence contingent upon the year of unemployment, gender, and re-employment. Across some of the FFM personality traits, we found mean-level changes of approximately .40 (and sometimes much higher) relative to individuals who remained employed. Studies that used comparable methodologies to test the influence of other major life events on personality change reported much weaker effects. For example, across many life events, Specht et al. (2011) found mean-level changes of approximately .10-.20, with their largest effect on divorce (.25). We also note that unemployment, which has one of the strongest impacts on well-being,<sup>4</sup> has an effect size of



approximately  $d = -.38$  (McKee-Ryan et al., 2005). When we consider the standardized effect sizes, we obtain effects that range up to a full standard deviation change in personality (e.g.,  $d = 0.97$  in conscientiousness for men unemployed for four years;  $d > 0.70$  in openness and agreeableness for women unemployed for three years<sup>5</sup>). Although we offer some caution as to drawing large inferences from small sub-samples, the effect sizes of unemployment on personality found here are comparatively large. We also note that we observed some changes in in the group that remained employed. However these effects were comparatively small and are likely to reflect the process of personality development that typically takes place across the life-span (Lucas & Donnellan, 2011; Roberts et al., 2006a) or may have arisen due to socio-economic factors likely to influence everyone, such as the global financial crisis. Importantly, the effects of unemployment are observed in addition to these changes.

We made a number of hypotheses as to how unemployment might be expected to precipitate personality change. Specifically we hypothesized that the experience of unemployment (relative to employment) would result in mean-level reductions in both conscientiousness (H1) and neuroticism (H2), as well as mean level changes in agreeableness (H3a), extraversion (H3b), and openness (H3c). We observed little evidence for any direct effects, with openness being the only personality trait to respond directly as a result of unemployment (H3c), thus only partially supporting H3. However, there was evidence that the time spent unemployed influenced mean-levels of agreeableness (H4a), as well as openness (H4e), partially supporting H4 that personality resulting from unemployment is largely dependent upon the number of years that an individual was unemployed. Further, we obtained partial support for the hypothesis that personality change following unemployment differed by gender. There were mean-level change differences between men and women in both conscientiousness and openness thus offering partial support for H5a. Also, there were non-linear differences between unemployment duration and agreeableness, conscientiousness, and openness giving partial support for H5b. In men, for example, agreeableness increased for those experiencing two or three years of unemployment, but decreased for longer-term unemployment. In women, however, agreeableness decreased at all stages of unemployment. These findings highlight a critical role for both gender and unemployment duration in personality change following unemployment. This is conducive to

the idea that unemployment will generally create both threats and opportunities, which will be more or less salient at various stages of unemployment (short-term versus long-term), and will differ according to gender. In early unemployment stages, there may be incentives for individuals to behave agreeably in an effort to secure another job or placate those around them, but in later years when the situation becomes endemic such incentives may weaken. Such tendencies may differ by gender according to traditional work roles (Forret et al., 2010). Similarly, openness reduced overall for both men and women, but the degree of reduction by gender varied according to years spent unemployed, perhaps reflecting differences in coping strategies (Leana & Feldman, 1991).

Although there was no significant effect of unemployment on conscientiousness for men, Figure 2 suggests that a strong linear trend may have been present. We therefore re-estimated the conscientiousness model excluding the quadratic of the years unemployed at T1 variable and obtained a significant effect on the linear years unemployed at T1 variable. This suggests that the analysis carried out for conscientiousness in Table 5 represents an over-parameterization with respect to discerning a simple linear trend in men and thus lends support for the hypothesis that the longer an individual is unemployed the larger the reductions in conscientiousness (H4b). Conscientiousness is important for success at work (Barrick et al., 1993; Judge & Ilies, 2002; Mueller & Plug, 2006; Nyhus & Pons, 2005), but our results also seem to suggest that work is important for high levels of conscientiousness. Unemployed individuals may experience situational pressures to gradually reduce their level of conscientiousness, as this practice may constitute an adaptive way of coping with unemployment. For example, unemployed individuals who are conscientious endure the largest decreases in life satisfaction following unemployment (Boyce, A. M. Wood, & Brown, 2010), and conscientiousness is related to enjoyment of one's own income which the unemployed lack (Ameriks et al., 2003; Boyce & A. M. Wood, 2011a). These findings may be interpreted as indicating that, in some ways, it is preferable to be less conscientious. However, conscientiousness is related to job search behavior and therefore is helpful in finding employment (Kanfer et al., 2001), hinting to potentially conflicting situational pressures that may perversely result in prolonged unemployment periods. Our results additionally show mean-level differences in conscientiousness change by gender in that,

whereas both men and women endured decreases, women regained some of their lost conscientiousness levels in later years of unemployment. These regains may reflect a greater ease to pursue non-work related activities congruent with traditional gender roles (e.g., caregiver; Forret et al., 2010).

Since unemployment is likely to entail unsettling and stress-promoting situations (Dooley et al., 2000; Frost & Clayson, 1991) that contribute to loneliness and low self-esteem (Heinrich & Gullone, 2006; Waters & Moore, 2002) it is surprising that we observed no changes in neuroticism. Neuroticism is the personality trait most strongly linked to well-being (Boyce et al., 2013; DeNeve & Cooper, 1998; Steel, Schmidt, & Shultz, 2008), and so it is likely that at least temporary changes in neuroticism would have taken place. Such a finding, rather than being inconsistent, helps to illustrate differences between relatively stable predispositions and temporary shifts to well-being. Yet, an alternative explanation is that unemployment alleviates certain difficulties associated with the workplace. As an aside, we note that neuroticism did not “perform” well in the test for measurement invariance, raising some doubts about the adequacy of the neuroticism scale that we used.

Our results generally highlight the importance of unemployment duration, which was overlooked in previous work (Specht et al., 2011). Examining personality change exclusively in terms of whether someone is unemployed or not may conceal the possibility that some periods of unemployment are associated with increases, while other periods are associated with decreases, in certain traits. Our results call attention to unfair stigmatization as a consequence of unemployment (Karren & Sherman, 2012). Stigma can be attached to the unemployed by attributing to them certain negative personality dispositions (McGarty, 2002). Our findings indicate that alternatively the experience of unemployment itself may create the personality types which would subsequently be unfairly stigmatized against.

We further hypothesized that becoming re-employed would culminate in additional mean-level changes in personality (H6)<sup>6</sup>. We examined this hypothesis by focusing on the group of individuals who experienced some unemployment during the study, but became re-employed by the second time point in which personality was measured. However, an examination of the re-employed group revealed no evidence of mean-level personality change across the study relative to the employed group, and, as such we cannot reject the null

hypothesis. The implication here is that individuals experiencing unemployment recover their pre-unemployment levels of personality. This may be so because the re-employed individuals did not experience personality change in the first place, but this interpretation is implausible. Our finding is therefore in line with suggestions that environmental factors will only influence personality in the long-run provided they are consistent and persistent (McGue, Bacon, & Lykken, 1993). An alternative explanation states that individuals who maintained their pre-unemployment level of personality traits were more likely to find re-employment. Either way, our results pattern highlights the importance of understanding personality change in relation to unemployment. Our results pattern also offers another explanation as to why previous studies, which did not analyze data from re-employed individuals separately, failed to find personality changes precipitated by unemployment (Specht et al., 2011).

### **Implications, Limitations, and Future Research**

Our study established that personality change takes place in response to unemployment, a major non-normative life event. In doing so, our study not only blazes new territory for occupational research and practice, but also carries broader implications for the conceptualization of personality stability and change. Although recent evidence points to the malleability of personality (Lucas & Donnellan, 2011; Roberts, Walton, et al., 2006a), there has been considerable debate on whether change is due to natural maturation influenced by biological factors (McCrae & Costa, 2008; McCrae et al., 2000) or to variation in social/occupational contexts (Haan, Millsap, & Hartka, 1986; Hogan, 1996; Kogan, 1990). Our results side with the contextual perspective. Personality change is associated with normative events that occur at relatively predictable life intervals such as leaving home, beginning a first job, moving in with a partner, marriage, having a child, retirement, death of a parent, and death of a spouse (Specht et al., 2011). Unemployment, however, is unique in that the experience can happen throughout most of the life cycle and is largely unanticipated. Hence, documenting that changes in personality occur following a non-normative event, like unemployment, is crucial for the contextual perspective. Our predictions for personality change arising from unemployment were based on limited existing theory, but we hope that our findings will open up opportunities for scholars to focus greater theoretical attention on unemployment and personality change specifically.

The demonstration that personality changes in conjunction with occupational context is particularly crucial, given that personality predicts a good deal of applied and behavioral outcomes. For example, FFM traits predict wage earning (Fletcher, 2013; Groves, 2005; Heineck, 2011; Mueller & Plug, 2006; Nyhus & Pons, 2005; Semykina & Linz, 2007), knowledge sharing with colleagues (Matzler, Renzl, Muller, Herting, & Mooradian, 2008), job satisfaction (Winkelmann & Winkelmann, 2008), wealth accumulation (Ameriks et al., 2003; Ameriks, Caplin, Leahy, & Tyler, 2007), entrepreneurial behavior (Zhao, Seibert, & Lumpkin, 2010), and well-being following occupationally related events (Boyce & A. M. Wood, 2011a, 2011b; Boyce et al., 2010; Pai & Carr, 2010). In parts of the literature, personality has been conceptualized as if it were unchanging (Boyce, 2010; Ferrer-i-Carbonell & Frijters, 2004) or, even if somewhat changing, as having narrow applied potential (Cobb-Clark & Schurer, 2012). According to our findings, the assumption that personality change is non-existent or unimportant is a mistake. Therefore, our demonstration of substantively large personality change in the context of a commonly occurring labor market event has the potential to shape the way researchers think about personality development processes in organizations, while highlighting the need for additional empirical foci. Can personality change explain essential labor market outcomes? Could the environment assist the development of personality types that are most useful for occupational success in individuals, organizations, and society? What are the ethical implications of enacting policies that, while obtaining some other core objective, simultaneously have the potential to shape personality?

It is crucial to understand both cognitive skills and personality traits when assessing early-year educational investment on later labor market outcomes (Heckman, Moon, Pinto, Savelyev, & Yavitz, 2010). However, cognitive skills reach stability relatively early in life (Borghans et al., 2008), whereas personality traits continue to change throughout life, and, as demonstrated here, can do so in response to unemployment. Greater exploration into personality change may then offer impactful later-life intervention strategies that will help mitigate possible harmful effects of various labor market events and promote adaptive coping in occupational settings (and beyond). If specific traits are found to be conducive to a functional workplace, then it will be critical to initiate accompanying policies (e.g.,

encouraging fairer employment practices, expanding access to mental health care; Benach et al., 2010; Blustein, 2008; Layard, 2006) that seek to foster them. That conditions promoting personality development may be assisted though policy intervention raises the possibility of conceptualizing personality traits as quality of life indicators (Boyce et al., 2013). Such indicators—typically including health, crime, economic, and subjective well-being outcomes—change across time and may therefore provide clues on how individuals and societies progress (Diener & Suh, 1997). Personality also changes across time. As such, monitoring personality at the national level may indicate the achievement of desirable outcomes that raise the quality of life in society. For example, personality change has been linked to improved health outcomes (Magee, Heaven, & Miller, 2013; Turiano et al., 2012). Neuroticism, in particular, predicts various mental and physical health disorders, and hence mental health will likely track reductions in neuroticism (Lahey, 2009). Extraversion and agreeableness may offer clues on the extent of community engagement, whereas conscientiousness may reflect a society that is well-structured, organized, and conducive to members' pursuit of meaningful goals. Openness-to-experiences is a correlate of intelligence (Fumham, Swami, Arteché, & Chamorro-Premuzic, 2008) and creativity (Chamorro-Premuzic, Reimers, Hsu, Ahmetoglu, 2009); this trait, then, may reflect societal proclivities for inventiveness and flexible responses to new situations. Taken together, personality may be suitable as a quality of life indicator.

Exploration of personality change would more generally be assisted by a wider inclusion of personality measures at multiple time-points in routine large scale data collection. Personality measures increasingly appear in large and nationally representative longitudinal datasets. In our study, such measures were available at only two time-points and not every year. Having only two time-points presents a limitation for longitudinal studies (for a discussion see Ployhart & Vandenberg, 2010). First, this practice restricts the ability to discern precise forms of change—for example, whether the change was steady or delayed. Second, this practice increases the probability of confounding true change with measurement error (Singer & Willett, 2003). However, we examined the extent to which the impact of unemployment on personality varied with regard to length of time that each individual had spent in unemployment at the second time-point. This helped overcome some of the issues

regarding the form of change, but still we were only able to implicate the trajectory of personality changes across the years of unemployment. Ideally, we would track within-person changes in personality at each stage of the unemployment process (e.g., at each year of unemployment, and then once re-employment was established). Our results might therefore be explained through an increased tendency for certain individuals both to become unemployed in the first place and to remain unemployed for longer time periods. As an example, certain traits (e.g., the proactive personality) are useful in the job search process (Brown, Cober, Kane, Levy, & Shalhoop, 2006), and this may have been one reason for the relation between personality and unemployment duration (Uysal & Pohlmeier, 2011; Wanberg, 2012). One concern is whether our observed personality change reflects measurement error or true change. The evidence points towards true change, given our tests for measurement invariance. Yet, future empirical efforts could separate more successfully true change from measurement error by engaging in greater temporal frequency of personality assessment.

A further limitation in our research, which resulted from the restricted availability of personality variables, was a somewhat restricted sample size especially in regards to those individuals who experienced unemployment for the longest time periods. This limitation raises the issue of whether our analysis lacked adequate power. However, our primary goal was on testing whether personality changed in some way following unemployment, a goal that we accomplished conclusively in the current sample. We offer caution against drawing large inferences at the population level, but nevertheless our results are indicative.

We were also unable to examine the extent to which personality change following unemployment predicted unemployment length. An alternative explanation of our results is therefore that changes following personality may have occurred immediately, and it seems plausible that those who experienced the largest initial reductions in, for example, conscientiousness following unemployment may have been more likely to undergo longer periods of unemployment. Alternatively, those who decreased (vs. increased) in agreeableness may have been more likely to be unemployed several years later, thus explaining why individuals in longer (vs. shorter) unemployment periods manifest decreases in agreeableness. These limitations could have been easily overcome had personality data

been available at more than two time-points. Moreover, it is possible that individuals high on such traits as openness or agreeableness were more likely to become unemployed (Specht et al., 2011). There was some evidence of a selection effect, as indicated by the zero-order correlations in Table 2, which illustrates that individuals higher in neuroticism and lower in openness at T0 were more likely to experience unemployment. Yet, we did account for selection effects by fully controlling for them in the latent change models.

Our work relied on small item-scales for each of the personality traits. Although we demonstrated personality change, this is a limitation that arises from resource constraints in large nationally representative surveys. More extensive personality scales would have assisted our understanding of how specific facets of each of the FFM personality dimensions are susceptible to change. As well as using more detailed self-report personality scales, future work into personality change may benefit from the use of neurological assessments of personality (such as eye blink measures of extraversion; Blumenthal, 2001). Although the validity of self-report measures of personality is established (Goldberg, 1993; McCrae & Costa, 1987, 1997), with perceptions of the self often motivating behavior and being strongly linked to biological functioning (O'Leirigh, Ironson, Weiss, & Costa, 2007; Ryff et al., 2006; Sedikides, 2012), it would be useful to examine whether the same patterns emerge when personality is measured with overt behavior (e.g., agreeableness in a laboratory setting).

## **Conclusion**

Unemployment is an event that can be inflicted upon most persons. As we have demonstrated, this event can influence an individual's core personality, a finding that challenges the notion of personality being fixed. This challenge will hopefully contribute to a wider conceptualization of personality in disciplines outside of psychology (e.g., management, economics, social sciences), while suggesting that public policy can play a key role in enabling psychological growth. Increases in national unemployment rates may have pivotal implications for personality. As such, to the extent that personality precipitates desirable social and economic behavior -- for example, higher savings rates (Ameriks et al., 2003; Ameriks, et al., 2007), pro-social activities (Binder & Freytag, 2013), or better health behaviors (Lahey, 2009; O'Connor, Conner, Jones, McMillan, & Ferguson, 2009) --, unemployment may pose additional difficulties beyond the simple economic. Policies



designed to curb unemployment preserve not only psychological health but, critically, the basic personality traits that characterize personhood.

### Footnotes

1. We also note that changes to an individual's income may precipitate personality change (Powdthavee, Boyce, & A. M. Wood, 2011), but, since the losses in income that accompany unemployment are part of the causal effect, we did not include income changes as a covariate in the main analysis. Nevertheless, the inclusion of income change as a covariate did not change our substantive conclusions, and there was little evidence that the income change was related to personality change in the unemployed. This finding is consistent with findings that the detrimental effect to well-being goes far beyond the simple loss in income (Clark & Oswald, 2002).
2. There was some evidence to suggest that agreeableness and neuroticism were not scalar invariant. Thus, we also carried out latent change models that allowed the most problematic item in each of the scales (highest MI) to vary freely. We found no substantive differences in our results.
3. The full model results, including the coefficients from the covariates, are available upon request
4. In a further analysis, we included changes in life satisfaction as an additional control to determine whether changes in personality could be viewed simply as a proxy for changes in life satisfaction. The results remained significant.
5. To calculate these estimates, we divided the standardized coefficients in Table 5 by the standard deviations of the appropriate unemployment variables (unemployed dummy  $SD = 0.173$ , years unemployed  $SD = 0.376$ , years unemployed squared  $SD = 1.253$ , female\*unemployed dummy  $SD = 0.115$ , female\*years unemployed  $SD = 0.250$ , female\*years unemployed squared  $SD = 0.848$ ).
6. There was also no evidence to support any gender differences for those becoming re-employed.

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### Appendix

In the questionnaire section of the SOEP entitled “What kind of personality do you have?” individuals are asked whether they see themselves as someone who...

1. *...does a thorough job*
2. *...is communicative, talkative*
3. *...is sometimes somewhat rude to others*
4. *...is original, comes up with new ideas*
5. *...worries a lot*
6. *...has a forgiving nature*
7. *...tends to be lazy*
8. *...is outgoing, sociable*
9. *...values artistic experiences*
10. *...gets nervous easily*
11. *...does things effectively and efficiently*
12. *...is reserved*
13. *...is considerate and kind to others*
14. *...has an active imagination*
15. *...is relaxed, handles stress well*

Individuals are asked whether the statement applies to them on a 1 to 7 scale, with 1 meaning the statement does not apply to them at all and 7 that it applies perfectly. Questions 3, 6 and 13 relate to the agreeableness scale; 1, 7 and 11 relate to the conscientiousness scale; 2, 8 and 12 relate to the extraversion scale; 5, 10 and 15 relate to the neuroticism scale; and 4, 9 and 14 relate to the openness-to-experience scale. Scores for each of the traits are obtained by aggregating across each of the three-items by trait after reverse coding questions 3, 7, 12, 15.

Table 1: Means and standard deviations of aggregated personality variables at each time point by employment status across the study

Variable:	Agre. at T0		Agre. at T1		Cons. at T0		Cons. at T1		Extr. at T0		Extr. at T1		Neur. at T0		Neur. at T1		Open. at T0		Open. at T1		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Unemployed group																					
Never unemployed ( <i>N</i> = 6308)	16.2	2.87	15.8	2.91	18.0	2.56	17.8	2.59	14.7	3.40	14.4	3.40	11.4	3.58	11.1	3.56	13.6	3.44	13.2	3.49	
Unemployed for 1 year at T1 ( <i>N</i> = 117)	16.1	3.05	15.8	2.42	17.9	2.33	17.9	2.49	14.2	3.61	14.3	3.68	11.9	3.29	11.8	3.62	13.2	3.67	12.5	3.70	
Unemployed for 2 years at T1 ( <i>N</i> = 41)	15.7	4.01	16.5	2.73	18.2	2.61	17.4	2.45	14.4	3.43	14.0	3.70	11.7	4.13	12.1	3.59	12.6	4.95	13.0	4.26	
Unemployed for 3 years at T1 ( <i>N</i> = 19)	14.3	3.84	15.9	2.33	15.5	3.69	14.5	3.33	13.6	2.72	12.9	3.71	13.5	2.57	12.5	4.20	11.7	3.52	12.1	4.29	
Unemployed for 4 years at T1 ( <i>N</i> = 33)	16.1	3.26	14.7	3.29	18.6	2.57	16.7	2.95	13.8	3.33	13.1	2.83	12.9	3.42	12.6	3.94	13.2	3.36	11.2	2.75	
Re-employed at T1 ( <i>N</i> = 251)	15.3	3.27	15.3	2.82	17.6	2.61	17.5	2.77	14.6	3.72	14.1	3.66	11.4	3.62	10.8	3.55	13.6	3.50	12.9	3.08	

*Note:* The scores for each of the FFM personality traits represent aggregated scores of the respective 3 items, following appropriate reverse coding as shown in the Appendix; *N* = 6,769.



Table 2: A correlation matrix showing the association between aggregated personality variables, unemployment variables, and key socio-demographic characteristics

	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Agre. at T0	.53**	.30**	.18**	.11**	.06**	-.13**	-.08**	.14**	.09**	-.00	.01	.01	-.02	.15**	.02	.01
2. Agre. at T1	-	.17**	.27**	.07**	.10**	-.08**	-.12**	.12**	.15**	.00	.00	-.00	-.01	.16**	.03*	.02
3. Cons. at T0		-	.52**	.19**	.12**	-.11**	-.07**	.17**	.07**	-.01	-.01	-.00	-.01	.07**	.13**	-.10**
4. Cons. at T1			-	.13**	.19**	-.06**	-.11**	.12**	.13**	-.02	-.03	-.04**	-.02	.10**	.08**	-.09**
5. Extr. at T0				-	.63**	-.15**	-.11**	.36**	.26**	-.02	-.01	.00	.02	.14**	-.07**	-.01
6. Extr. at T1					-	-.10**	-.16**	.27**	.34**	-.01	-.01	-.01	.01	.13**	-.08**	-.02
7. Neur. at T0						-	.57**	-.07**	-.04**	.04**	.04**	.04**	.03*	.19**	.03**	-.09**
8. Neur. at T1							-	-.04**	-.03**	.05**	.05**	.04**	.02*	.18**	.02	-.07**
9. Open. at T0								-	.59**	-.03*	-.03*	-.02	.03*	.08**	.03*	.14**
10. Open. at T1									-	-.05**	-.05**	-.04**	.01	.08**	.04**	.18**
11. Unemp. at T0										-	.85**	.65**	-.04**	-.01	0.01	-.06**
12. Years Unemp. at T1											-	.95**	-.03*	-.01	.02	-.05**
13. Years Unemp. at T1 (squared)												-	-.02	-.00	.02	-.04**
14. Re-employed at T1													-	.00	-.10**	-.06**
15. Female														-	.01	-.01
16. Age															-	.08**
17. Education (years)																-

*Note.* The scores for each of the FFM personality traits represent aggregated scores of the respective 3 items, following appropriate reverse coding as shown in the Appendix;  $N = 6,769$ ; \* $p < .05$  \*\* $p < .01$

Table 3: *Fit indices for testing measurement invariance for the personality variables from 2005 (T0) to 2009 (T1)*

Model	$\chi^2$	<i>df</i>	$\Delta\chi^2$	$\Delta df$	CFI	$\Delta CFI$	RMSEA	RMSEA 90% CI
<b>Agreeableness</b>								
Configural invariance	48.0**	5	-	-	.994	-	.036	.027, .045
Metric invariance	49.0**	7	1.0	2	.994	.000	.030	.022, .038
Scalar invariance	199.3**	10	150.3**	3	.973	-.021	.053	.047, .059
Partial scalar invariance	151.0**	9	102.0**	2	.980	-.014	.048	.042, .055
<b>Conscientiousness</b>								
Configural invariance	36.9**	5	-	-	.996	-	.031	.022, .040
Metric invariance	48.6**	7	11.7**	2	.995	-.001	.030	.022, .038
Scalar invariance	123.9**	10	75.3**	3	.987	-.008	.041	.035, .048
<b>Extraversion</b>								
Configural invariance	34.5**	5	-	-	.997	-	.030	.022, .040
Metric invariance	51.3**	7	16.8**	2	.996	-.001	.031	.023, .039
Scalar invariance	170.1**	10	118.8**	3	.987	-.009	.049	.042, .055
<b>Neuroticism</b>								
Configural invariance	17.8**	5	-	-	.999	-	.019	.010, .030
Metric invariance	29.6**	7	11.8**	2	.997	-.002	.022	.014, .030
Scalar invariance	386.6**	10	209.7**	3	.957	-.040	.075	.068, .081
Partial scalar invariance	74.3**	9	44.7**	2	.993	-.04	.033	.026, .040
<b>Openness</b>								
Configural invariance	9.1	5	-	-	1.000	-	.011	.000, .022
Metric invariance	13.2	7	4.1	2	1.000	.000	.011	.000, .021
Scalar invariance	120.6**	10	107.4**	3	.988	-.012	.040	.034, .047

Note.  $\Delta\chi^2$  = chi-square difference;  $\Delta df$  = degrees of freedom difference;  $N = 6,769$ ; \* $p < .05$  \*\* $p < .01$ .

Table 4: *Unconditional intercept and slope means and variances in personality from 2005 (T0) to 2009 (T1) using latent change models*

	Agreeableness	Conscientiousness	Extraversion	Neuroticism	Openness
Intercept	$b = 2.863$	$b = 6.312$	$b = 5.114$	$b = 3.408$	$b = 4.755$
	$SE = .155^{**}$	$SE = .010^{**}$	$SE = .016^{**}$	$SE = .098^{**}$	$SE = .015^{**}$
Intercept variance	$b = .220$	$b = .468$	$b = 1.151$	$b = 0.623$	$b = .682$
	$SE = .016^{**}$	$SE = .018^{**}$	$SE = .039^{**}$	$SE = .032^{**}$	$SE = .030^{**}$
Slope	$b = -.063$	$b = -.065$	$b = -.138$	$b = -.021$	$b = -.117$
	$SE = .007^{**}$	$SE = .010^{**}$	$SE = .013^{**}$	$SE = .012$	$SE = .012^{**}$
Slope variance	$b = .127$	$b = .349$	$b = .573$	$b = .323$	$b = .368$
	$SE = .011^{**}$	$SE = .017^{**}$	$SE = .026^{**}$	$SE = .020^{**}$	$SE = .022^{**}$

*Note.* The models contain no predictor variables.  $N = 6,769$ ;  $*p < .05$   $**p < .01$ .

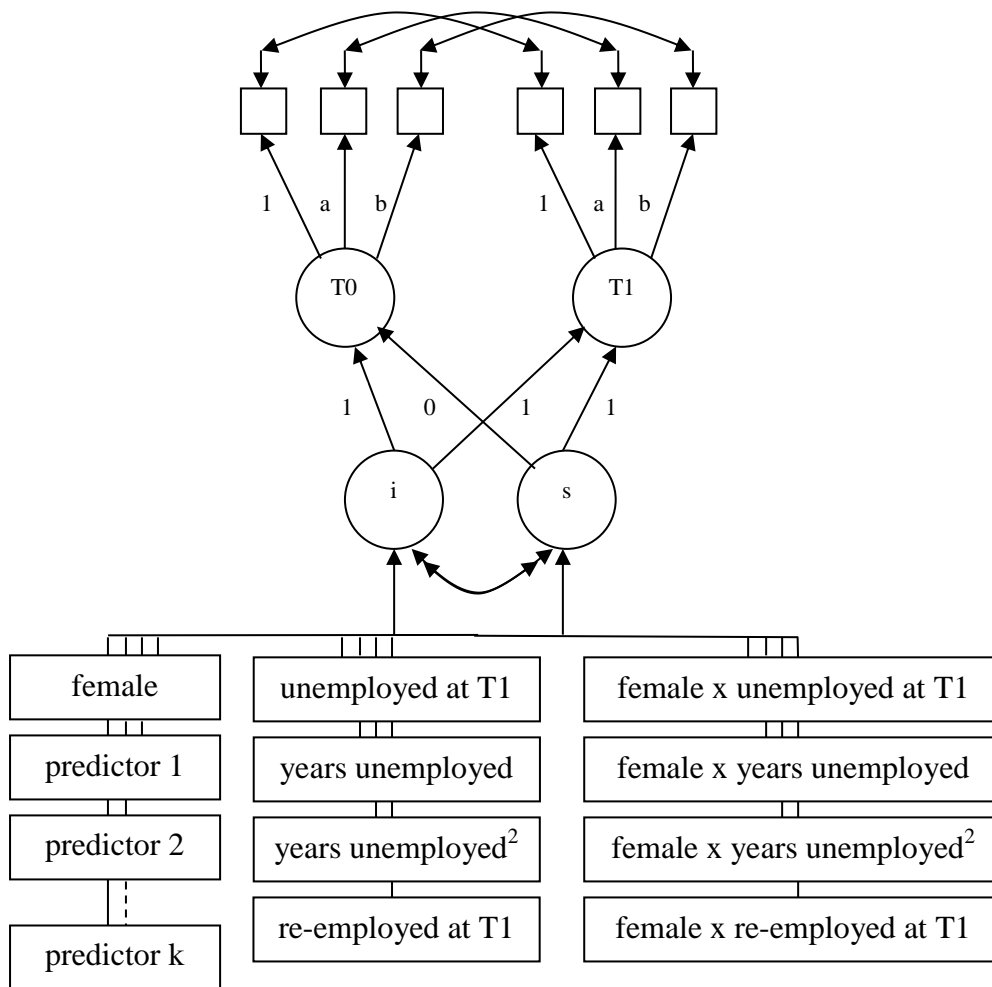
Table 5: *Effects of consecutive years of unemployment on the level (intercept) and change (slope) in personality from 2005 (T0) to 2009 (T1) using latent change models and controlling for the occurrence of other non-related life events and demographic characteristics*

	Model 1			Model 2			Model 3			Model 4			Model 5		
Dependent variable at T1:	Agreeableness			Conscientiousness			Extraversion			Neuroticism			Openness		
	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$
Intercept	3.121	.137	**	6.278	0.014	**	4.946	.022	**	3.484	.101	**	4.708	.019	**
Unemployed at T1	.037	.267	.013	.379	.373	.096	-.730	.567	-.119	-.145	.471	-.030	.708	.477	.150
Years Unemployed at T1	-.066	.284	-.050	-.404	.398	-.221	.719	.605	.255	.271	.503	.121	-.810	.509	-.372
Years Unemployed at T1 (squared)	.013	.059	.033	.075	.083	.138	-.146	.126	-.172	-.025	.104	-.037	.156	.106	.239
Re-employed at T1	-.032	.050	-.012	-.027	.070	-.008	.033	.106	.006	.133	.088	.030	.147	.089	.034
Female	.188	.016	.189**	.079	.020	.057**	.375	.031	.176**	.389	.027	.230**	.092	.026	.056**
Female*Unemployed at T1	-.049	.417	-.011	-.770	.584	-.129	.025	.887	.003	.105	.738	.014	-1.545	.747	-.218*
Female*Years Unemployed at T1	.015	.452	.008	.816	.632	.297	-.212	.960	-.050	-.245	.799	-.073	1.698	.808	.519*
Female*Years Unemployed at T1 (squared)	.015	.093	.026	-.171	.130	-.210	.078	.198	.062	.027	.164	.028	-.348	.166	-.361*
Female*Re-employed at T1	.028	.074	.007	.076	.104	.014	.039	.158	.005	.003	.131	.000	.131	.133	.021
Slope	-.089	.011	**	-.094	0.014	**	-.131	0.018	**	-.082	.016	**	-.113	.016	**
Unemployed at T1	-.538	.277	-.250	-.208	.386	-.061	.687	.497	.159	-.326	.446	-.094	-1.098	.440	-.318*
Years Unemployed at T1	.784	.296	.792**	.204	.412	.129	-.557	.530	-.280	.356	.476	.223	1.267	.469	.797**

(table continues)

Dependent variable at T1:	Model 1			Model 2			Model 3			Model 4			Model 5		
	Agreeableness			Conscientiousness			Extraversion			Neuroticism			Openness		
	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	<i>B</i>	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	<i>B</i>
Years Unemployed at T1 (squared)	-.171	.062	-.574**	-.074	.086	-.156	.089	.110	.148	-.075	.099	-.157	-.276	.098	-.579**
Re-employed at T1	.042	.052	.021	.010	.072	.003	-.077	.093	-.019	-.073	.084	-.023	-.062	.082	-.020
Female	.017	.015	.023	.074	.021	.062**	-.012	.027	-.008	-.033	.024	-.027	.007	.024	.006
Female*Unemployed at T1	.748	.433	.231	1.394	.604	.270*	-.462	.778	-.071	.293	.698	.056	1.586	.689	.306*
Female*Years Unemployed at T1	-.965	.469	-.647*	-1.414	.654	-.596*	.419	.842	.140	-.002	.756	-.001	-2.045	.746	-.855**
Female*Years Unemployed at T1 (squared)	.185	.097	.422	.300	.135	.429**	-.068	.173	-.076	-.026	.155	-.037	.428	.153	.607**
Female*Re-employed at T1	-.039	.077	-.013	-.160	.107	-.035	.046	.138	.008	.142	.124	.030	-.027	.122	-.006
$\chi^2$ (degrees of freedom)	255.03 (85)			433.6 (85)			312.0 (85)			636.2 (85)			1094.3 (85)		
CFI	.998			.997			.998			.995			.990		
RMSEA	.017			.025			.020			.031			.042		
Intercept R <sup>2</sup>	.039			.038			.037			.072			.032		
Intercept variance	<i>b</i> = .236, <i>SE</i> = .015**			<i>b</i> = .454, <i>SE</i> = .017**			<i>b</i> = 1.086, <i>SE</i> = .037**			<i>b</i> = .655, <i>SE</i> = .032**			<i>b</i> = .648, <i>SE</i> = .029**		
Slope R <sup>2</sup>	.016			.023			.005			.013			.016		
Slope variance	<i>b</i> = .136, <i>SE</i> = .011**			<i>b</i> = .344, <i>SE</i> = .017**			<i>b</i> = .558, <i>SE</i> = .025**			<i>b</i> = .355, <i>SE</i> = .022**			<i>b</i> = .352, <i>SE</i> = .021**		

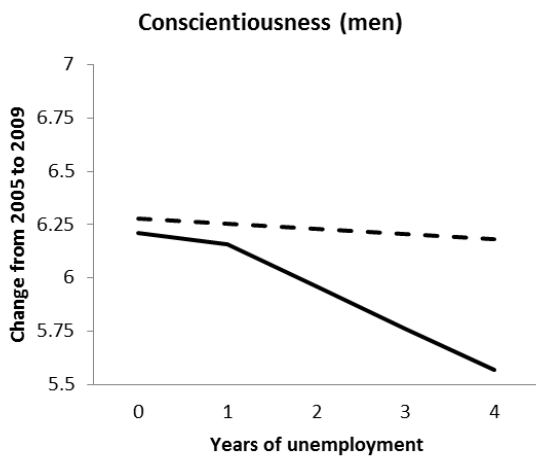
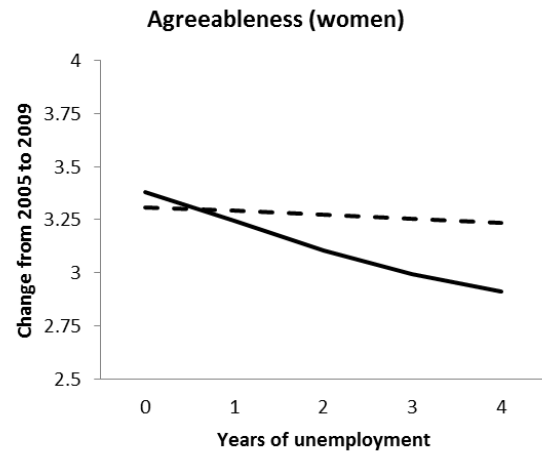
*Note:* In each model all coefficients are made relative to those employed across all years of the study, where “unemployed at T1” was coded 0 = “not unemployed at T1”, 1 = “unemployed at T1”; “years unemployed at T1” was coded from 0 to 4; “years unemployed at T1 (squared)” was coded from 0 to 16; “re-employed at T1” was coded 0 = “not re-employed at T1”, 1 = “re-employed at T1”; “female” was coded 0 = “male”, 1 = “female”. In all models ( $N = 6,769$ ) additional controls for age and years of education were included, as well as dummy variables to control for changes to marital status, changes to disability status and changes to parental status. The full model results, including the coefficients from the covariates, are available upon request. All coefficients (*b*) indicate standardized effects ( $SD = 1$ ) on personality; \* $p < .05$  \*\* $p < .01$ .



*Figure 1:* Latent change model for analyzing the effects of unemployment on personality accounting for initial levels and differences in personality change. Each of the FFM personality traits were analyzed separately with each trait being measured at both time-points (T0 and T1) with the item measurement residuals allowed to correlate over time. Factor loadings (a and b) and measurement intercepts of the three items for each of the latent traits were constrained to be equal across time points. In all cases age, years of education, dummy variables missing values for education and to indicate changes to marital status, changes to disability status, and changes to parental status were included as additional predictors (predictors 1 to k). The effect of unemployment was explored by including a dummy variable to indicate that an individual was unemployed at T1 (unemployed at T1), and variables to indicate the number of consecutive years spent unemployed since becoming unemployed (years unemployed) and the quadratic of the number of years spent unemployed

(years unemployed<sup>2</sup>). We further included a dummy variable to indicate those individuals who had experienced unemployment but had regained employment by T1 (re-employed at T1) with the missing dummy being employed across all years of the study. To discern whether there were important personality change differences between men and women we additionally included a gender dummy variable (female), which we interacted with all the unemployed variables. The results of all of these models are contained in Table 5.

— Unemployed  
 - - - Never Unemployed





*Figure 2:* Predicted mean-level change in personality across men and women across a 4-year unemployment spell based the results in agreeableness, conscientiousness, and openness from Table 5. The point estimate for 0 years of unemployment represents the average initial pre-unemployment value of those that became unemployed across the study. Each subsequent point estimate is derived from the mean-level change in personality for the group of individuals experiencing the associated number of years of unemployment in the study. The overall pattern therefore reflects an implied trajectory of personality change during a four year unemployment spell. Dashed lines, for men and women respectively, represent the background change in personality of those that remain employed throughout the study.