

No Personality Change Following Unemployment:
A Registered Replication of Boyce, Wood, Daly, and Sedikides (2015)

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Highlights

- We aimed to replicate previous findings on job loss and personality change.
- Latent change analyses revealed significant general changes in the Big Five traits.
- There was no evidence for an effect of unemployment on changes in personality.
- Analyses accounting for potential selection effects led to comparable results.
- The results reported by Boyce et al. (2015) could not be replicated.

Abstract

The involuntary loss of paid employment represents an adverse life event that has been suggested to lead to personality change. However, previous research has reported highly contradictory findings. Therefore, a replication of Boyce, Wood, Daly, and Sedikides (2015) is presented. These authors originally identified nonlinear changes in openness, agreeableness, and conscientiousness. Using data from the German National Education Panel Study ($N = 5,005$), we examined the impact of unemployment on personality change across three years. Latent change analyses indicated no effect of job loss on any Big Five trait. Moderating effects of unemployment duration or gender were not found. Even analyses accounting for potential selection effects led to comparable results. Thus, personality seemed invariant despite changes in employment status.

Keywords: personality change; life events; unemployment; replication.

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Personality traits are enduring individual differences in thoughts, feelings, and behaviors that exhibit systematic rank-order and mean-level changes across the life span (Costa, McCrae, & Löckenhoff, 2018). At the same time, personality is also susceptible to contextual influences. Major life events such as parenthood, marriage, and transition into or out of work can alter people's perceptions, resulting in pronounced personality changes (for a review, see Bleidorn, Hopwood, & Lucas, 2018). Previous research on the impact of occupational life events on personality change have yielded rather mixed results (Tasselli, Kilduff, & Landis, 2018). Particularly for unemployment, highly contradictory effect patterns have been reported: Whereas some studies have reported negative effects of involuntary job loss on personality change (Boyce, Wood, Daly, & Sedikides, 2015), others have found positive effects (Anger, Camehl, & Peter, 2017), and yet others have identified no effect at all (Denissen, Luhmann, Chung, & Bleidorn, 2019; Specht, Egloff, & Schmukle, 2011). A major limitation of research in this field is that many ostensibly independent studies actually draw on the same data source but use different approaches for data selection and analysis. We are not aware of any close replications of specific studies on this topic in independent samples. Therefore, the current study seeks to replicate the study reported in Boyce et al. (2015) as closely as possible. By adopting a comparable analytical approach, we seek to evaluate the robustness of unemployment's nonlinear effects on changes in openness, agreeableness, and conscientiousness in an independent sample. Moreover, we extend these analyses and try to identify causal effects by creating matched samples of individuals who have lost or who have not lost their job (cf. Austin, 2011; Harder, Stuart, & Anthony, 2010).

¹ The study was preregistered at <https://doi.org/10.17605/OSF.IO/M4CYZ>.

Unemployment and Personality Change

The effect of personality on social, educational, and economic outcomes has been well established (e.g., Heckman, Stixrud, & Urzua, 2006; Israel, Lüdtke, & Wagner, 2019; Lindqvist & Vestman, 2011). In recent years, personality (typically anchored within the five factor framework) has been associated, among other things, with individual differences in job performance (Shiner, Masten, & Roberts, 2003), income (Gensowski, 2018), and the experience of financial stress (Xu, Beller, Roberts, & Brown, 2015). Similarly, personality traits were able to explain increased cumulative unemployment in adult working populations (Egan, Daly, Delaney, Boyce, & Wood, 2017) and in unemployment durations (Gnambs, 2017). The long-term effects of non-cognitive skills on labor market outcomes seem to be on par with effects of cognitive abilities (Heckman et al., 2006). Despite the established effects of personality on economic success, little research has been devoted to the reversed causality, that is, the impact of contextual influences on personality (see Bleidorn et al, 2018; Tasselli et al., 2018). Major life events, including various occupational factors, can alter people's thoughts and feeling, thus contributing to personality changes. For example, individuals promoted to managerial positions scored higher in openness as compared to other employees (Nieß & Zacher, 2015). Similarly, entering retirement was associated with higher agreeableness as compared to individuals remaining employed (Löckenhoff, Terracciano, & Costa, 2009).

These changes are typically explained by life event theories (e.g., Bleidorn et al., 2018; Roberts, 2018). Life events are sudden, frequently drastic, and potentially irreversible changes in social or occupational contexts (e.g., the birth of the first child) that result in a transition from one social status into another (e.g., becoming a parent). These status changes oftentimes affect individual's feelings, thoughts, and behaviors and, thus, require new or adapted emotional, cognitive, or behavioral responses that allow individuals to cope with these new situational demands. Following the sociogenomic model of personality (Roberts,

2018), life events affect personality in a bottom-up manner: the prolonged effect of the social or occupational context modified by the experienced life event alters the individuals' personality-relevant states and, over time, results in enduring personality changes (Luhmann, Orth, Specht, Kandler, & Lucas, 2014). Particularly life events that lead to unambiguous emotional, cognitive, or behavioral responses and are generalizable to multiple life domains (i.e., not limited to the domain affected by the life event) are likely to yield lasting changes in individuals' personality (cf. Neyer, Mund, Zimmermann, & Wrzus, 2014; Specht et al., 2011).

Different life events can trigger either one type of response (i.e., affective, cognitive, or behavioral), all three types, or any combination of them. Because affective, cognitive, or behavioral content is differently represented in the Big Five (Wilt & Revelle, 2015; Zillig, Hemenover, & Dienstbier, 2002), the five personality traits might be expected to be affected differently by different life events. For example, unemployment is most likely to yield behavioral and cognitive changes (and to a lesser degree affective responses). Job loss requires individuals to adapt to new behavioral routines. For example, getting up each morning in order to get to work on time (leading to stable daily structures) becomes less important during unemployment (Wanberg, Griffiths, & Gavin, 1997; Waters & Muller, 2003). Similarly, unemployment might lead to more cognitive engagement with financial matters (e.g., pondering financial expenses) when no regular income is available. Finally, involuntary job loss can also affect one's self-worth and well-being (Paul & Moser, 2009; Selenko, Batinic, & Paul, 2011), leading to affective responses. Because items measuring conscientiousness, openness, and neuroticism emphasize either behavioral, cognitive, or affective content, respectively (see Bleidorn et al., 2018), unemployment experiences might first and foremost lead to personality changes in these traits. However, studies trying to empirically test this conjecture have found few consistent personality effects for unemployment (see Table 1). Whereas some studies have found substantial effects of involuntary job loss on personality change (e.g., Anger et al., 2017; Boyce et al., 2015), others

have identified no effect (e.g., Denissen et al., 2019; Specht et al., 2011). Even among studies identifying unemployment effects, the reported findings have been highly contradictory, for example, either suggesting a decline in openness (and also conscientiousness; Boyce et al., 2015) or an increase in openness (and no effect for conscientiousness; Anger et al., 2017).

Most studies examining the consequences of unemployment have relied on the same data source and analyzed subsamples included in the German Socio-Economic Panel (GSOEP; Wagner, Frick, & Schupp, 2007). An initial analysis of the effects of several life events found no difference in the Big Five traits between individuals who experienced and who did not experience job loss within a four-year period (Specht et al., 2011). However, potential effects could have been masked in this analysis because the selected sample was rather heterogeneous and also included respondents out of the labor force (e.g., students, retirees, homemakers) who might experience personality changes differently (e.g., Löckenhoff et al., 2009). Therefore, in a further study, Boyce and colleagues (2015) limited their analysis to a working sample that was employed at the first measurement point and studied subsequent personality changes in response to unemployment. Estimating moderated latent change models (Collins, 2006) for the Big Five traits, they found that agreeableness, conscientiousness, and openness changed during unemployment relative to employment. The pattern of change was highly nonlinear and rather complex, being contingent on the unemployment duration and respondents' gender. For example, men's openness seemed to slightly increase during the first two years of unemployment, whereas longer unemployment durations led to a decrease. In contrast, women showed a pronounced decrease in openness in the second and third year of unemployment but recovered later on. Moreover, these effects were limited to respondents who remained unemployed during the study period; for individuals who found a new job after the unemployment experience, no personality changes were identified. A weakness of this study is that it neglected to use a matched control group design. It is conceivable that unemployment may be a consequence of several stressors (e.g.,

material deprivation) or psychological distress (e.g., depression) which may also be linked to personality. Because the employed and unemployed individuals were not matched on these characteristics, it is unknown whether the observed personality changes were a result of the unemployment experience or, rather, other preexisting differences between the two groups. To address this issue, Anger and colleagues (2017) selected a subsample of respondents from the GSOEP who lost their job due to plant closure and applied econometric methods accounting for potential selection effects. In contrast to the previous findings, they found a sharp increase in openness after a job loss; other traits were not affected. Thus, the reanalysis by Anger and colleagues (2017) led to pronouncedly different conclusions as compared to Boyce and colleagues (2015). Yet another pattern was reported with regard to transfer effects of parental unemployment on personality changes of their offspring (Angelini, Bertoni, & Corazzini, 2018). Children whose fathers lost their job increased in conscientiousness and decreased in neuroticism. Thus, despite being based on the identical dataset, four analyses found highly divergent results with regard to unemployment's consequences. Finally, a recent replication on the effects of various life events on personality change in a Dutch sample (Denissen et al., 2019) found no effect of unemployment on personality change. However, again the analyses included individuals out of the labor force. Taken together, the available evidence on unemployment's consequences is rather heterogeneous, making it difficult to draw generalizable conclusions.

The Present Study

Existing research on the effect of unemployment on personality change is afflicted with a major weakness: it has primarily relied on a single dataset (GSOEP) while adopting highly variable analytical approaches (see Table 1). Therefore, it is unclear whether the reported findings on unemployment's consequences are a result of idiosyncrasies in the examined data, peculiarities of the adopted analysis methods, or truly generalizable effects. Thus, the present study seeks to replicate the effect of involuntary job loss on personality

change in an independent sample. More specifically, we seek to replicate Boyce et al. (2015), who used data from the GSOEP, in another German large-scale assessment, the National Educational Panel Study (Blossfeld, Roßbach, & von Maurice, 2011). Mirroring the sampling criteria and analytical approach from Boyce and colleagues (2015), we seek to evaluate the robustness of the reported findings regarding the effects of unemployment on change in the Big Five traits. The study by Boyce and colleagues (2015) was chosen as target of our replication for two reasons: First, the study excluded data from participants who were out of the labor force, such as students, homemakers, or retirees. Previous research has shown that the two groups report different psychological experiences (Paul, Geithner, & Moser, 2009) and are governed by different transition processes into and out of employment (Sedláček, 2016). Therefore, unemployment might also yield different effects on personality change for the two groups. Second, Boyce and colleagues (2015) estimated latent variable models to examine change in personality. Most of the available studies on the effect of unemployment (see Table 1) have used rather short personality scales (only three items). Such short scales frequently exhibit rather low reliabilities (see Gnambs, 2015; Rammstedt & Beierlein, 2014). Therefore, it is important to account for measurement error in the personality measures to derive unbiased estimates for the effect of unemployment.

Given the results in Boyce et al. (2015), the current replication addresses the following research questions: First, we assume that the experience of unemployment will result in a mean-level change in openness. Moreover, the mean-level change in openness and agreeableness will be stronger for individuals experiencing longer unemployment spells, while respective changes for openness and conscientiousness will be stronger for men as compared to women. Finally, Boyce et al. (2015) also found gender differences in the effect of unemployment duration on changes of agreeableness, conscientiousness and openness. Therefore, we expected that men and women would exhibit different patterns of mean-level

change in these traits. These research questions gave rise to four explicit hypotheses to be tested in the current study:

Hypothesis 1: The experience of unemployment (as compared to employment) will be associated with a stronger mean-level decline of openness.

Hypothesis 2: The magnitude of the mean-level change in agreeableness and openness following unemployment (as compared to employment) will be dependent on the unemployment duration, such that a linear or nonlinear effect between individuals with different unemployment durations will be observed. The mean-level decline in these traits will be stronger for individuals who have been unemployed for a longer period of time.

Hypothesis 3: The mean-level decline in conscientiousness and openness following unemployment (as compared to employment) will be stronger for men as compared to women.

Hypothesis 4: The linear or nonlinear effect of unemployment duration on mean-level change in agreeableness, conscientiousness, and openness will be moderated by respondents' gender.

Finally, we improve on the methodology adopted in Boyce et al. (2015) and try to identify causal effects. We compare individuals experiencing an unemployment spell in our study period to similar employed individuals by creating matched samples (cf. Austin, 2011; Harder et al., 2010). In this way, the two groups will be comparable on important background characteristics that might simultaneously affect unemployment propensity and personality. Consequently, potential effects of employment status on personality change can be more readily causally attributed to the loss of employment.

Method

Participants and Procedure

Data for this study were collected as part of the longitudinal National Educational Panel Study (NEPS; Blossfeld et al., 2011). The NEPS has followed a representative sample

of German adults since 2010, conducting interviews and cognitive tests each year. The panel is based on a stratified two-stage sampling procedure that drew respondents randomly from local registers of residents within selected municipalities (see Hammon, Zinn, Abmann, & Würbach, 2016). Respondents were interviewed by a professional survey institute using either computer-assisted personal interviews at the respondents' private homes or computer-assisted telephone interviews. Further information on the sampling procedure and the survey process is summarized on the project website (<https://www.neps-data.de>).

The present analyses focus on two measurement waves in 2012/13 (Wave 5) and 2015/16 (Wave 8) that administered the focal personality measures. From a total of 17,140 participants included in the panel, we selected a subsample of participants according to the criteria adopted by Boyce and colleagues (2015): First, our sample was limited to respondents who were administered the personality scales and had at least one valid response. Second, we selected respondents that were employed at the first measurement occasion (T1) and were part of the labor force (i.e., employed or unemployed) until the second measurement occasion (T2). Thus, respondents who were out of the labor force (e.g., students, retirees) during this period were not considered. Third, persons experiencing multiple unemployment spells between T1 and T2 were excluded. Finally, to remain comparable to Boyce et al. (2015), participants younger than 17 years or older than 61 years were excluded. This resulted in a subsample of 5,005 individuals (43% women), of which 231 experienced an unemployment spell between T1 and T2. At T1, their mean age was 46.65 years ($SD = 8.53$), they had $Mdn = 15$ years ($Min = 9, Max = 18$) of education, and their median net household income fell between 3,000 and 4,000 Euros. The job type of the respondents spanned various fields including blue-collar (15%) and white-collar professions (65%) in the private sector, employment in the public sector (9%), and self-employment (11%). The median International Socio-Economic Index (ISEI; Ganzeboom, de Graaf, & Treiman, 1992) that reflects an

individual's economic and social position based on his or her most recent occupation (potential range: 16 to 90) was 52 ($Min = 16$, $Max = 90$).

Measures

Personality. The Big Five traits conscientiousness, extraversion, agreeableness, neuroticism, and openness were measured with two items each using the Big Five Inventory (BFI-10; Rammstedt & John, 2007). Because of low reliabilities in previous studies, the agreeableness scale included a third item (see the appendix). Responses were given on a five-point scales from 1 (“*does not apply at all*”) to 5 (“*applies completely*”). The scales were administered twice to each respondent, at T1 and T2. Despite the additional item, the omega reliability of the agreeableness scale remained unsatisfactory ($\omega = .36 / .37$); the remaining scales had reliability coefficients between .53 and .69 (see Table 2), which is typical for short scales administered in large-scale social studies (Rammstedt & Beierlein, 2014).

Employment status. The employment status of the respondents was determined from their self-reported employment histories, which informed about their previous jobs and unemployment experiences. From this information, monthly employment status indicators between T1 and T2 were determined as either employed (at least 20 hours per week) or unemployed (but seeking paid employment). Following Boyce et al. (2015), we created three variables from this data: First, a dummy variable indicated whether an individual was unemployed at T2 (1 = unemployed at T2, 0 = otherwise). Second, another dummy variable indicated whether a respondent had experienced an unemployment spell between T1 and T2 but was gainfully reemployed at T2 (1 = reemployed at T2, 0 = otherwise). Third, a continuous variable indicated the number of consecutive months spent in unemployment between T1 and T2 (range: 0 to 36).

Unemployment history. The employment history of the respondents was indicated by the number of years in unemployment prior to T1. Moreover, we also created a dummy

variable indicating whether a respondent had no unemployment experience before the study period (coded 1) or experienced unemployment spells prior to T1 (coded 0).

Covariates. To account for third variables that might explain the association between employment status and personality change, Boyce and colleagues (2015) acknowledged several control variables in their analyses. Because various life events have been previously linked to personality change (e.g., Specht et al., 2011), two dummy variables were created that indicated a change in a respondent's marital and parental status (0 = no change, 1 = change)². Moreover, respondent's age (in years), sex (0 = male, 1 = female), and education (as the number of years in education) using the CASMIN classification (Brauns, Scherer, & Steinmann, 2003) were acknowledged.

Conditioning variables. Four groups of variables were used in order to match employed participants to those experiencing an unemployment spell. These variables had been previously used in studies analyzing psychological effects of unemployment (e.g., Anger et al., 2017; Marcus, 2013; Peter, 2016) and were expected to be related to employment status. All variables were measured at T1 or before. *Respondent characteristics* included the age (in years), sex (0 = male, 1 = female), education (as number of years), immigration background (0 = no, 1 = yes), children (0 = no, 1 = yes), marital status (1 = married, 0 = otherwise), and net household income (0 = up to 1,500 Euros, 1 = 1,500 to 3,000 Euros, 2 = over 3,000 Euros) at T1. In addition to the Big Five traits measured at T1, four *psychological characteristics* were considered: Satisfaction with life, health, and work were each measured with a single item on eleven-point response scales from 0 (“*completely dissatisfied*”) to 10 (“*completely satisfied*”), chronic stress was measured with 11 items from the Standard Stress Scale (Gross & Seebaß, 2014) on five-point response scales from 1 (“*does not apply at all*”)

² Boyce et al. (2015) also controlled for changes in disability status. However, respective information was not available in the present dataset and, thus, was not included in the analyses.

to 5 (“*applies completely*”), reading competence was measured with a standardized achievement test using 32 items (Hardt, Haberkorn, & Wiegand, 2013), and alcohol consumption was assessed with two items asking about the frequency of alcohol consumption on a five point response scale with 1 (“*never*”), 2 (“*once a month or less frequently*”), 3 (“*2-4 times per month*”), 4 (“*2-3 times per week*”), and 5 (“*4 times per week or more frequently*”) and the quantity of alcohol consumed per day on a five point response scale with 1 (“*1 to 2 alcoholic drinks*”), 2 (“*3 to 4*”), 3 (“*5 to 6*”), 4 (“*7 to 9*”), and 5 (“*10 and more alcoholic drinks*”). As *job characteristics* we included the net income (0 = up to 1,500 Euros, 1 = 1,500 to 3,000 Euros, 2 = over 3,000 Euros), the occupational prestige (using the ISEI; Ganzeboom et al., 1992), job contract (0 = fixed-term, 1 = permanent), supervisor position (0 = no, 1 = yes), public sector (0 = no, 1 = yes), employment history before T1 (as number of years in employment and number of years in unemployment), and firm size (with 11 categories from 0 = 0 to 11 = 2,000 and more). Finally, as *regional characteristics* we recorded the geographical region of Germany where the respondents primarily resided³ (0 = West Germany, 1 = East Germany) as well as the federal state (using 14 dummy indicators).

Statistical Analyses

The analysis strategy closely followed the approach adopted by Boyce and colleagues (2015). First, we examined longitudinal measurement invariance across the measurement waves. Then we tested the focal hypotheses using latent change models. Subsequently, we extended these analyses and evaluated the impact of potential selection effects by creating

³ Up to the year 1990, two independent countries (East Germany and West Germany) made up the geographical region that now encompasses Germany. The two countries experienced highly different political, societal, and economic conditions. The consequences of these differences can be still observed today (e.g., Vogt, van Raalte, Grigoriev, & Myrskylä, 2017) and result in, for example, different unemployment rates and economic conditions in the former Eastern and Western parts of Germany (e.g., Simonson, Gordo, & Kelle, 2015). Therefore, it is important to control for potential context effects of East and West Germany in the present analyses.

balanced samples of individuals with and without an unemployment spell during the study period and repeating the change analyses to examine the robustness of the previously identified results.

Latent variable modeling. Following Boyce and colleagues (2015), the effects of unemployment on personality change were examined using latent change models (LCM; Collins, 2006). For the unconditional LCMs (i.e., without moderators), two latent factors were specified reflecting the traits at the two measurement occasions (see Figure 1). Because latent factors with two indicators are not identified, the factor loadings were constrained to 1 for model identification (thus reflecting metric measurement invariance). The intercepts for the first indicator of each latent factor were constrained to 0 for model identification, whereas the intercepts for the second indicator were constrained to unity across factors, thus, reflecting scalar measurement invariance. Moreover, autoregressive effects were acknowledged by correlating the residuals for the same indicators across the two measurement waves. Two growth factors were modeled using the two latent trait factors as indicators that indicated the intercept and slope of the change process. The latent intercept factor constrained both factor loadings to 1, whereas the latent slope factor constrained the factor loadings for T1 and T2 to 0 and 1, respectively. The residuals of the latent trait factors were constrained to 0 for model identification, whereas the latent means and variances of both growth factors were freely estimated.

Subsequently, these models were extended to conditional LCMs by regressing the two latent growth factors on (a) a dummy-coded indicator reflecting whether the respondent was unemployed at T2, (b) the unemployment duration between T1 and T2, (c) the squared unemployment duration between T1 and T2, (d) a dummy-coded indicator reflecting whether the respondent was reemployed at T2, (e) the gender of the respondent, (f) four interaction terms between gender and the unemployment indicator, the reemployment indicator, the unemployment duration, and the unemployment duration squared, (g) respondent's age, (h)

educational years, and (i) two dummy-coded indicators reflecting a change in respondent's parental status and marital status.

The latent change models were estimated with full-maximum likelihood using the Yuan and Bentler (2000) test statistic and heteroscedasticity-consistent standard errors (Freedman, 2006) in *R* version 3.5.2 (R Core Team, 2018) and the *lavaan* package version 0.6-3 (Rosseel, 2012). Model fit was determined according to the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA) with values greater than .95 (CFI) or smaller than .05 (RMSEA) indicating satisfactory fit.

Measurement invariance. Longitudinal measurement invariance for each of the five Big Five scales across the two measurement waves was evaluated using confirmatory factor analyses. For each analysis, we modeled two correlated latent factors, each measured by the items of the respective trait scale. Again, autoregressive effects were acknowledged by allowing the residuals of the same indicator to correlate freely across the two waves. Because latent factors with two indicators are underidentified, the two loadings for each factor were constrained. As a consequence only metric and scalar invariance models could be examined. For the metric invariance model the factor loadings were constrained across waves, the latent factor variance at the first measurement occasion was constrained to 1, whereas the respective variance at the second measurement occasion was freely estimated (cf. Schroeders & Gnams, 2018). All intercepts were freely estimated, whereas both latent factor means were fixed to 0 for model identification. For the scalar invariance model, the intercepts of the same indicators were constrained across the two factors, while freely estimating the latent mean of the second factor. Because in large samples the chi square model fit statistic is overly sensitive to negligible model deviations, model comparisons were based on the CFI. Differences in the CFI between two nested models exceeding .01 indicate substantial deviations and, thus, a lack of measurement invariance (Chen, 2007; Cheung & Rensvold, 2002).

Covariate balancing. To draw causal inferences from the effect of employment status on personality change, we created groups of individuals with and without a period of unemployment during the study who were comparable on relevant background characteristics (see above). Using entropy balancing (Hainmueller, 2012), appropriate weights were estimated for respondents who were continually employed in order for this group to yield the same means and variances on the background variables as individuals experiencing an unemployment spell. Entropy balancing is a non-parametric approach that optimizes weights to deviate as little as possible from unit weights and, at the same time, is more efficient than propensity score weighting (i.e., the balance between the two groups is never worse), effectively mitigating confounding selection bias in observational studies (Harvey, Hayden, Kamble, Bouchard, & Huang, 2017). The balance of the background variables was quantified using the standardized bias that is calculated for metric variables as the difference in means between the two groups or for binary variables as difference in percentages standardized by the pooled standard deviation (see Austin, 2011). According to prevalent rule of thumb, a covariate can be considered balanced if it shows an absolute standardized bias less than 0.10. Sample balancing was performed in *R* using the *WeightIt* package version 0.5.0 (Greifer, 2018) and *ebal* version 0.1-6 (Hainmueller, 2014).

Missing values. Missing values on the Big Five scales were rare⁴ and acknowledged by the full maximum likelihood estimator in our latent variable models (cf. Newman, 2003). For the predictors in the constrained LCMs and the selection models, dummy-coded missing indicators were created (see Boyce et al., 2015).

⁴ Missing rates for all items of the Big Five scales were less than 0.1 percent at both measurement occasions.

Because full maximum likelihood estimation has been shown to yield unbiased parameter estimates for missing rates of 25% and above (cf. Enders & Bandalos, 2001; Gnamb & Zinn, 2018), it is unlikely that missing responses distorted the reported results.

Open Practices

The data used in this study, including the survey material, are available at <https://doi.org/10.5157/NEPS:SC6:9.0.1>. The syntax to reproduce the reported results and output can be accessed at <https://doi.org/10.17605/OSF.IO/YEDRN>. Finally, the preregistration for the reported analyses is provided at <https://doi.org/10.17605/OSF.IO/M4CYZ>.

Results

Descriptive Statistics

In our sample, 74 individuals were unemployed at T2 and 157 experienced an unemployment spell after T1 but were reemployed at T2. For these respondents, the mean unemployment duration was 7.35 months ($SD = 8.06$, $Min = 1$, $Max = 36$). The correlations between the personality variables at the two time points and the unemployment variables are summarized in Table 2. All Big Five traits exhibited substantial stability over time ($r = .53$ to $.66$). However, they were not associated with the three employment indicators ($p > .05$). Furthermore, Table 3 presents the means and standard deviations of the five traits by employment status. These show slightly larger changes in conscientiousness, neuroticism, and extraversion across time for respondents without employment at T2 as compared to individuals without unemployment experience or those reemployed at T2.

Measurement Invariance

The results for the tests of longitudinal measurement invariance are summarized in Table 4. All examined models exhibited satisfactory fit with values of CFI at .99 above and RMSEA smaller than .05. This supports metric (i.e., factor loading) invariance across the two measurement points. Moreover, model comparisons using the difference in CFIs also supported strong (i.e., intercept) invariance because all difference were .005 or smaller. In summary, these results highlight that the data allows for longitudinal comparisons of the Big Five traits across time points.

Latent Change Modeling

In the first step, we specified unconditional change models for each Big Five trait without any control variables (see Figure 1). As summarized in Table 5, the means and variances of the latent growth factors (except for the slope mean of extraversion) were significant ($p < .05$). On average, the sample exhibited a decline in conscientiousness, agreeableness, and openness and an increase in neuroticism. More importantly, the significant slope variances indicated interindividual differences in personality change that might be explained by the employment status of the respondents. Therefore, in the next step these models were extended by regressing the latent growth factors on our unemployment indicators, that is, (a) the dummy variable indicating unemployment at T2, (b) the dummy variable indicating reemployment at T2, (c) the number of months spent in unemployment, and (d) the squared value of the unemployment duration. Moreover, these unemployment variables were interacted with respondents' gender. In line with Boyce and colleagues (2015), we also acknowledged several control variables, that is, respondents' age, years of education as well as change in marital and parental status. To account for missing values the model also included dummy-coded missing indicators for the education and marital status change variables. The results of these models are summarized in Table 6. All five models exhibited satisfactory fit with CFIs of .95 and above and RMSEAs smaller than .05.

In line with Boyce et al. (2015), we expected the experience of unemployment to result in a mean-level change of openness (*Hypothesis 1*) and nonlinear changes of openness and agreeableness depending on the unemployment duration (*Hypothesis 2*). As can be seen in Table 6 (columns B_{uadj}), none of these effects could be replicated in the present sample. Neither the experience of unemployment nor the number of months in unemployment moderated personality change for any trait. Unexpectedly, we found a stronger decline in agreeableness for individuals reemployed at T2; for these respondents mean-level decline was about $d = 0.52$ larger as compared to respondents continually employed. Moreover, we also

expected gender differences in changes of conscientiousness and openness following unemployment (*Hypothesis 3*) and in the effect of unemployment duration on personality change (*Hypothesis 4*). But we were unable to find support for these effects (see Table 6). Again unexpectedly, the effect of reemployment on change in agreeableness was stronger for men as compared to women. Taken together, these results offer no support for the effect of unemployment on personality change as reported in Boyce et al. (2015).

Accounting for Selection Effects

Unemployment propensity may be a consequence of several stressors which may also be linked to personality. To draw causal inferences from the effect of employment status on personality change, the two groups of individuals with and without a job loss need to be comparable on relevant background characteristics. Figure 2 (diamonds) displays the standardized bias for various variables used for the previous analyses. It illustrates that the two groups differed on several key aspects. For example, at T1 individuals experiencing an unemployment spell during the study period had lower net income and they were less likely to work in the public sector than employed participants. Moreover, they also had less work experience ($M = 17.64, SD = 10.86$ years) as compared to individuals without a job loss ($M = 22.12, SD = 9.72$ years), while having spent more time in unemployment ($M = 1.79, SD = 2.76$ years) as compared to those who were continuously employed during the study period ($M = 0.75, SD = 1.84$ years). With regard to psychological characteristics, these respondents also reported lower life satisfaction, less satisfaction with work, and more chronic stress at T1. Moreover, individuals who were about to lose their job had higher levels of openness at T1 ($d = 0.15$) as compared to individuals with continuous employment. Therefore, we matched the two groups on these background variables. This resulted in an effective sample size of 872 respondents without job loss who had means and variances on these variables comparable to those of respondents who experienced job loss. In the adjusted sample, the

standardized bias between individuals with and without unemployment experience was close to 0 for all variables (see circles in Figure 2).

To examine the impact of a potential selection bias, we reestimated the unconditional and conditional latent change models using the generated weights for the matched sample. In the thus adjusted sample, the latent slope variances for the five traits were slightly larger, thus, reflecting more interindividual differences in personality change (Table 5). However, the effects of unemployment on personality change closely mirrored the previously reported results (see Table 6). We found no evidence for an effect of an unemployment experience or the number of months in unemployment on changes in the Big Five trait. Also, no moderating effects of respondents' gender were observed. Again, these analyses replicated the unexpected effect of reemployment on changes in agreeableness, albeit with a slightly larger effect ($d = -0.58$). Taken together, these results lend no support for our hypotheses and do not replicate the findings by Boyce and colleagues (2015).

Exploratory Change Analyses

In accordance with Boyce and colleagues (2015), our hypotheses assumed effects of current (un)employment conditions on personality change. However, it is also conceivable that previous (un)employment experiences might influence personality development. Therefore, we conducted exploratory analyses (without explicit *a priori* hypotheses) and regressed the latent growth factors on a dummy-coded variable indicating whether the respondent had previous unemployment experiences prior to the first measurement occasion (coded 0) or whether no unemployment spells before T1 were observed (coded 1). In addition to the control variables used in the previous latent change models, these analyses also included the number of years in unemployment prior to T1. These analyses yielded two main results: We found a stronger increase in openness for individuals with longer unemployment experiences prior to the first measurement occasion; one year of unemployment translated into an increase in openness of about $d = 0.18$. Similar, we found a stronger increase in

conscientiousness for respondents without prior unemployment experiences as compared to respondents who were unemployed before T1 ($d = 0.30$). However, the latter was only found after accounting for selection effects. All results of these analyses are summarized in the supplement material.

Discussion

Changes in important socio-economic life conditions can shape individuals' thoughts, feelings, and behaviors; this may result in profound personality changes (Bleidorn et al., 2018). Although some occupational factors exert similar effects (Tasselli et al., 2018), previous findings with regard to unemployment, a major adverse life event, have been rather inconsistent (Anger et al., 2017; Boyce et al., 2015; Denissen et al., 2019; Specht et al., 2011). In particular, Boyce and colleagues (2015) analyzed data from a German large-scale social survey over a 4-year period and found a significant decline in openness, conscientiousness, and agreeableness following unemployment, which was moderated by unemployment duration and gender. To evaluate the robustness of these results, we applied a similar analytical procedure to data from another German large-scale assessment and found a *general* decline in openness, conscientiousness, and agreeableness as well as a general increase in neuroticism over time. However, we could not replicate the findings reported by Boyce et al. (2014), nor did we find any other effects of unemployment on personality change. More importantly, in contrast to Boyce et al. (2015), we matched the samples of individuals with and without job loss regarding a number of relevant background characteristics that might affect both unemployment propensity and personality (i.e., sociodemographic, job, and psychological characteristics). This was important, as individuals who were about to lose their job appeared to differ significantly on several key variables such as net income, chronic stress, or openness to experience from those continuously employed. This allowed us to rule out possible selection effects that might have biased previous analyses (see also Denissen et al., 2019, who reported that about two thirds of the significant effects of life events on the Big

Five personality traits traced back to selection effects). However, despite thorough reanalyses, we found none of the hypothesized effects of unemployment on the Big Five personality traits. Interestingly, we found an effect of reemployment on one of the Big Five traits: (particularly male) individuals who experienced reemployment after an unemployment spell revealed a stronger decline in agreeableness than individuals who were continuously employed. The reason for this effect is still unclear and was not hypothesized a priori. We might speculate that a certain level of disagreeableness (e.g., lower levels of altruism, modesty, and tender-mindedness; cf. Costa, McCrae, & Dye, 1991) conforms to prevalent male stereotypes benefitting occupational success (cf. Rudman & Fairchild, 2010). For example, men who are lower in agreeableness tend to earn more and receive more career advancements as compared to highly agreeable men (Judge, Livingston, & Hurth, 2012). We therefore recommend future research to focus not only on effects of unemployment on personality change but also to address how reemployment could shape the Big Five traits.

Although we were unable to corroborate the expected effects of unemployment on changes in the Big Five, we do not conclude that individuals' personality is impervious to (un-)employment-related experiences. First, we need to note that, despite its strengths, our study is limited to very short measurements of the Big Five (with correspondingly low reliability coefficients; Rammstedt & Beierlein, 2014) and two waves of data covering a 3-year time period. Accordingly, the zero effects of unemployment on personality change pertain to unemployment experiences of up to three years; we cannot rule out the possibility that only longer unemployment experiences unfold in lasting personality trait changes. Some personality changes in response to life events can unfold incrementally over long periods of time (Luhmann, Orth, Specht, Kandler, & Lucas, 2014), whereas other research on subjective well-being or self-esteem has shown that change can also occur more immediately (e.g., Chung, Robins, Trzesniewski, Nofhle, 2014; Gnambs & Buntins, 2017; Lucas, 2007). So far, it is unclear whether unemployment is susceptible to slow and long-term or, rather, quicker

and short-term changes. The present study tried to mitigate this problem by analyzing the moderating effect of unemployment duration; but found neither linear nor nonlinear effects in this respect. Thus, future research should focus on long-term unemployment—which was rather rare in the present sample (i.e., the mean unemployment duration was 7.35 months as compared to 14.63 months in Boyce et al., 2015)—and examine whether enduring longer periods of unemployment results in more pronounced personality changes.

Second, Cobb-Clark and Schurer (2012) reported changes in the Big Five traits in response to a certain *intensity* of employment-specific shocks (e.g., increase in openness and decrease in emotional stability following five or more adverse events). Individuals' personality might hence change significantly only in reaction to repeated unemployment spells. Boyce et al. (2015) did not examine such effects, as they excluded individuals who had experienced more than one unemployment spell during the examined time frame. We closely followed Boyce et al.'s (2015) methodological procedure, but conducted exploratory analyses to examine whether unemployment incidents or unemployment duration prior to the first measurement occasion had an effect on personality change. These analyses revealed a slightly stronger increase in openness for each year spent in unemployment prior to the first measurement occasion, which is consistent with the findings reported by Cobb-Clark and Schurer (2012). Boyce et al. (2015) also examined the influence of unemployment in general (and its duration) rather than the influence of a person's *first* unemployment experience. Neyer and Asendorpf (2001), for example, found that only the transition to the first romantic relationship but not the transition to marriage led to personality change. In a similar vein, personality change might occur only when individuals experience an unemployment spell for the first time in their lives. Our exploratory analyses on a potentially stronger impact of the *first* unemployment incident on personality change, however, did not reveal robust effects.

Finally, our conditional latent change models revealed significant slope variances, which might indicate that personality trait changes do not result from the mere occurrence of

unemployment and the associated change in role status (i.e., employed → unemployed), but rather from individuals' corresponding psychological experiences and investments (cf. Denissen et al., 2019). Differences in the psychological experiences of unemployment might also account for the divergent findings of Boyce et al.'s (2015) and our study. Boyce et al.'s (2015) findings rely upon data collected in 2005 to 2009, whereas our results refer to data collected in 2012 to 2015. Notably, labor market conditions in Germany differed substantially in those time periods. For example, Germany experienced an increase in (already high) unemployment rates up to 2005 (11.7%), followed by a sharp decline (e.g., 8.1% in 2009); since then unemployment rates have continued to decrease (e.g., from 6.8% in 2012 to 6.4% in 2015) and the labor market has become much more stable (Bundesagentur für Arbeit, n.d.). Research suggests that labor market conditions could moderate effects of unemployment; for example, unemployment tends to have a stronger impact on health, the less favorable the labor market is (Paul & Moser, 2009). Similarly, economic conditions might determine effects of unemployment on personality trait change, as they could affect individuals' psychological experiences and investments associated with unemployment. Psychological experiences associated with unemployment might also differ between individuals who are voluntarily versus involuntarily unemployed. Unfortunately, we could not disentangle such potentially divergent effects, as the current dataset does not provide the respective information. On the other hand, however, previous research suggests that the percentage of voluntarily unemployed individuals is fairly low in Germany (Chadi, 2010). We therefore do not believe that the failure to clearly distinguish between voluntary and involuntary unemployment had a major impact on the findings.

Conclusion

In conclusion, this study provides further evidence that personality is subject to change (see Costa et al., 2018), but was unable to show that such changes are evoked by the mere occurrence of unemployment. An important task left for future research is to explore whether

the significant effects of unemployment on personality trait changes reported in previous studies (e.g., Boyce et al., 2015) are a result of uncontrolled selection effects or whether omitted variables (e.g., labor market conditions) account for the divergent findings.

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Appendix: Personality Scale

To what extent do the following statements apply to you?

1. I am quite cautious, reserved. [E*]
2. I trust other people easily, I believe in the good in people. [A]
3. I am easy-going and tend to be lazy. [C*]
4. I am relaxed and don't get stressed easily. [N*]
5. I have little interest in artistic things. [O*]
6. I am out-going and sociable. [E]
7. I tend to be critical of other people. [A*]
8. I am thorough when completing my tasks. [C]
9. I easily become nervous and unsure of myself. [N]
10. I have a vivid imagination, I am an imaginative person. [O]
11. I am considerate towards others, sensitive. [A]

Response options: 1 = does not apply at all, 2 = does rather not apply, 3 = partly, 4 = does rather apply, 5 = applies completely

E = Extraversion, A = Agreeableness, C = Conscientiousness, N = Neuroticism, O = Openness, * reverse scored

Items 1 to 10 are part of the BFI-10 (Rammstedt & John, 2007).

Author Contributions

TG developed the study outline and performed the statistical analyses. TG and BS wrote the manuscript.

Table 1.

Studies on the Effect of Unemployment on Personality Change

Publication	Country	Study	N_{uemp}	OLF	LV	Controlled for selection effects	Reported effect of unemployment
Specht et al. (2011)	Germany	GSOEP	860	Yes	Yes	No	Marginally significant stronger decline for openness, but no effects on other traits.
Boyce et al. (2015)	Germany	GSOEP	461	No	Yes	No	Significant decline for openness, agreeableness, and conscientiousness, moderated by unemployment duration and sex.
Anger et al. (2017)	Germany	GSOEP	168	No	No	Yes	Significant increase in openness, but no effects on other traits.
Angelini et al. (2018)	Germany	GSOEP	77	No	No	Yes	Significant increase in offspring's conscientiousness and decrease in offspring's neuroticism for fathers' unemployment (no effects for mothers)
Denissen et al. (2019)	Netherlands	LISSS	787	Yes	No	Yes	No effect on any trait

Note. N_{uemp} = Number of individuals with unemployment experience in the sample; OLF = Includes individuals out of the labor force (e.g., students, retired); LV = Latent variable modeling of personality traits; GSOEP = German Socio-Economic Panel (Wagner et al., 2007); LISSS = Longitudinal Internet Studies for the Social Sciences (Scherpenzeel, & Das; 2010).

Table 2.

Means, Standard Deviations, and Correlations between Study Variables

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Conscientiousness at T1	(.56)	.59*	.15*	.07*	-.11*	-.04	.11*	.09*	.15*	.13*	-.00	-.02	-.01
2. Conscientiousness at T2		(.53)	.11*	.12*	-.09*	-.10*	.10*	.13*	.16*	.19*	.04	-.02	.02
3. Agreeableness at T1			(.36)	.54*	-.07*	-.03	.14*	.08*	.06*	.06*	.01	.00	-.00
4. Agreeableness at T2				(.37)	-.02	-.06*	.11*	.11*	.07*	.06*	.02	-.00	-.00
5. Neuroticism at T1					(.55)	.53*	-.08*	-.04	-.16*	-.14*	.03	.01	.03
6. Neuroticism at T2						(.55)	-.07*	-.06*	-.14*	-.17*	.00	.00	.01
7. Openness at T1							(.54)	.62*	.17*	.18*	.02	.03	-.00
8. Openness at T2								(.54)	.14*	.19*	.04	.03	.03
9. Extraversion at T1									(.69)	.66*	.02	-.01	-.00
10. Extraversion at T2										(.68)	.02	.02	.00
11. Unemployed at T2												-.02	.64*
12. Reemployed at T2													.36*
13. Months unemployed													
<i>M</i>	4.02	3.98	3.55	3.54	2.54	2.59	3.45	3.38	3.37	3.37	0.01	0.03	0.34
<i>SD</i>	0.71	0.69	0.59	0.56	0.76	0.75	0.89	0.89	0.92	0.88	0.12	0.17	2.32

Note. $N = 4,991$ to $5,005$. T1 = First measurement occasion, T2 = Second measurement occasion. Correlations are based upon pairwise deletion. Omega reliabilities are in diagonal.

* $p < .05$

Table 3.

Means and Standard Deviations for Personality Traits by Employment Status

	T1		T2		T1 – T2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	Cohen's <i>d</i>
<i>Conscientiousness</i>					
Always employed	4.03	0.71	3.98	0.68	0.07
Unemployed at T2	3.98	0.68	4.20	0.68	-0.25
Reemployed at T2	3.91	0.79	3.91	0.76	0.03
<i>Agreeableness</i>					
Always employed	3.55	0.59	3.54	0.56	0.02
Unemployed at T2	3.61	0.63	3.65	0.63	-0.06
Reemployed at T2	3.56	0.61	3.53	0.62	0.05
<i>Neuroticism</i>					
Always employed	2.54	0.76	2.58	0.75	-0.06
Unemployed at T2	2.75	0.76	2.61	0.76	0.18
Reemployed at T2	2.58	0.82	2.59	0.75	-0.02
<i>Openness</i>					
Always employed	3.44	0.89	3.37	0.89	0.09
Unemployed at T2	3.59	0.95	3.67	0.95	-0.09
Reemployed at T2	3.60	0.99	3.50	0.91	0.10
<i>Extraversion</i>					
Always employed	3.37	0.92	3.37	0.88	0.00
Unemployed at T2	3.30	0.97	3.47	0.88	-0.18
Reemployed at T2	3.55	0.89	3.49	0.84	0.06

Note. $N_{\text{employed}} = 4,774$, $N_{\text{unemployed}} = 74$, $N_{\text{reemployed}} = 157$. T1 = First measurement point, T2 = Second measurement point.

Table 4.

Fit Indices for Tests of Longitudinal Measurement Invariance

	χ^2	<i>df</i>	<i>sc</i>	CFI	RMSEA	$\Delta\chi^2$	Δdf	ΔCFI
Conscientiousness								
Metric invariance	1.49	1	1.10	1.00	.011			
Scalar invariance	4.17	2	1.05	.999	.015	2.74	1	.001
Agreeableness								
Configural invariance	8.53	5	1.24	.999	.012			
Metric invariance	9.12	7	1.22	.999	.008	0.50	2	.000
Scalar invariance	27.98*	9	1.14	.994	.021	23.80*	2	.005
Neuroticism								
Metric invariance	0.55	1	1.11	1.00	.000			
Scalar invariance	7.04*	2	1.06	.998	.022	6.81*	1	.002
Openness								
Metric invariance	8.10*	1	1.05	.998	.038			
Scalar invariance	8.43*	2	1.03	.998	.025	0.03	1	.000
Extraversion								
Metric invariance	4.87*	1	1.02	.999	.028			
Scalar invariance	23.23*	2	1.01	.995	.046	18.58*	1	.004

Note. $\chi^2 = T^*$ test statistic (Yuan & Bentler, 2000), *df* = degrees of freedom, *sc* = scaling correction for χ^2 , CFI = comparative fit index, RMSEA = root mean square error of approximation, $\Delta\chi^2$ = scaled difference chi-square test statistic (Satorra & Bentler, 2001), ΔCFI = difference in CFIs.

* $p < .05$

Table 5.

Unconditional Latent Change Models for the Big Five Traits

	Conscientiousness		Agreeableness		Neuroticism		Openness		Extraversion	
	<i>B</i>	(<i>SE</i>)	<i>B</i>	(<i>SE</i>)	<i>B</i>	(<i>SE</i>)	<i>B</i>	(<i>SE</i>)	<i>B</i>	(<i>SE</i>)
<i>Unadjusted data</i>										
Intercept mean	3.76*	(0.01)	3.37*	(0.01)	2.84*	(0.01)	3.15*	(0.02)	3.23*	(0.02)
Intercept variance	0.21*	(0.01)	0.06*	(0.01)	0.28*	(0.01)	0.35*	(0.02)	0.57*	(0.02)
Slope mean	-0.05*	(0.01)	-0.02*	(0.01)	0.05*	(0.01)	-0.08*	(0.01)	0.00	(0.01)
Slope variance	0.08*	(0.01)	0.02*	(0.01)	0.10*	(0.02)	0.05*	(0.02)	0.19*	(0.02)
<i>Adjusted data</i>										
Intercept mean	3.68*	(0.04)	3.36*	(0.04)	2.89*	(0.04)	3.33*	(0.05)	3.21*	(0.04)
Intercept variance	0.26*	(0.03)	0.11*	(0.05)	0.35*	(0.05)	0.48*	(0.06)	0.59*	(0.05)
Slope mean	0.00	(0.03)	-0.02	(0.02)	-0.02	(0.03)	-0.09*	(0.03)	0.03	(0.03)
Slope variance	0.14*	(0.04)	0.04	(0.02)	0.20*	(0.05)	0.17*	(0.06)	0.25*	(0.05)

Note. *N* for unadjusted data = 5,005; effective *N* for adjusted data = 1,103.

* $p < .05$

Table 6.

Conditional Latent Change Models for the Effect of Unemployment on Personality Change

	Conscientiousness		Agreeableness		Neuroticism		Openness		Extraversion	
	B_{uadj}	B_{adj}	B_{uadj}	B_{adj}	B_{uadj}	B_{adj}	B_{uadj}	B_{adj}	B_{uadj}	B_{adj}
Intercept	3.81*	3.54*	3.28*	3.30*	3.04*	3.28*	2.23*	2.73*	3.59*	3.43*
Unemployed at T2	0.10	0.13	0.66*	0.60	0.16	0.01	0.80*	0.58	0.05	0.05
Months unemployed	0.00	0.00	-0.02	-0.02	0.02	0.02	-0.01	-0.01	0.00	-0.01
Months unemployed ²	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reemployed at T2	-0.09	-0.03	0.39	0.33	0.25	0.11	0.28	0.11	-0.15	-0.14
Female	0.31*	0.42*	0.45*	0.47*	0.56*	0.50*	0.24*	0.24*	0.29*	0.26*
Female x Unemployed at T2	-0.13	-0.20	-0.42	-0.48	0.02	0.04	0.08	-0.40	0.72	0.72
Female x Months unemployed	-0.03	-0.07	-0.01	0.00	0.03	0.03	-0.15	-0.12	-0.03	-0.03
Female x Months unemployed ²	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01*	0.00	0.00
Female x Reemployed at T2	0.19	0.07	-0.30	-0.35	-0.67	-0.58	0.70	0.51	0.25	0.26
Slope	0.02	0.28	-0.11	-0.36	-0.34	-0.50	0.13	0.28	-0.12	0.03
Slope x Unemployed at T2	0.17	0.22	-0.53	-0.58	-0.34	-0.17	-0.36	-0.27	0.05	0.07
Slope x Months unemployed	0.06	0.05	0.05	0.05	0.02	0.02	0.07	0.06	0.00	0.00
Slope x Months unemployed ²	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slope x Reemployed at T2	-0.12	-0.05	-0.52*	-0.58*	-0.14	-0.02	-0.30	-0.22	-0.20	0.21
Slope x Female	-0.04	-0.06	0.04	-0.03	-0.03	-0.06	-0.08	-0.19*	0.00	0.02
Slope x Female x Unemployed at T2	0.58	0.50	0.74	0.78	0.32	0.24	0.45	0.52	-0.12	-0.15
Slope x Female x Months unemployed	-0.08	-0.08	-0.10	-0.11	-0.13	-0.11	-0.05	-0.04	-0.01	-0.01
Slope x Female x Months unemployed ²	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slope x Female x Reemployed at T2	0.23	0.21	0.85*	0.89*	0.49	0.43	0.21	0.31	0.21	0.18
Intercept variance	0.19*	0.22*	0.06*	0.06*	0.25*	0.32*	0.32*	0.42*	0.55*	0.55*
Slope variance	0.08*	0.13*	0.03*	0.03*	0.10*	0.19*	0.05	0.15*	0.19*	0.23*
Intercept-slope correlation	-.46*	-.58*	-.38*	-.37	-.35*	-.47*	-0.18	-.42*	-.38*	-.53*
Intercept R^2	.06	.09	.06	.07	.09	.09	.06	.10	.03	.07
Slope R^2	.03	.09	.02	.12	.02	.07	.05	.11	.02	.07

Note. N for unadjusted data = 5,005; effective N for adjusted data = 1,103. B_{uadj} = Parameter for unbalanced data; B_{adj} = Parameter for balanced data. Parameters (except for intercept and variances) were standardized with respect to the trait at the first measurement occasion. All models had CFI > .95 and RMSEA < .05. Because of a Heywood case the models for agreeableness did not include a correlated residual for the third indicator. Results for covariates are not presented. * $p < .05$

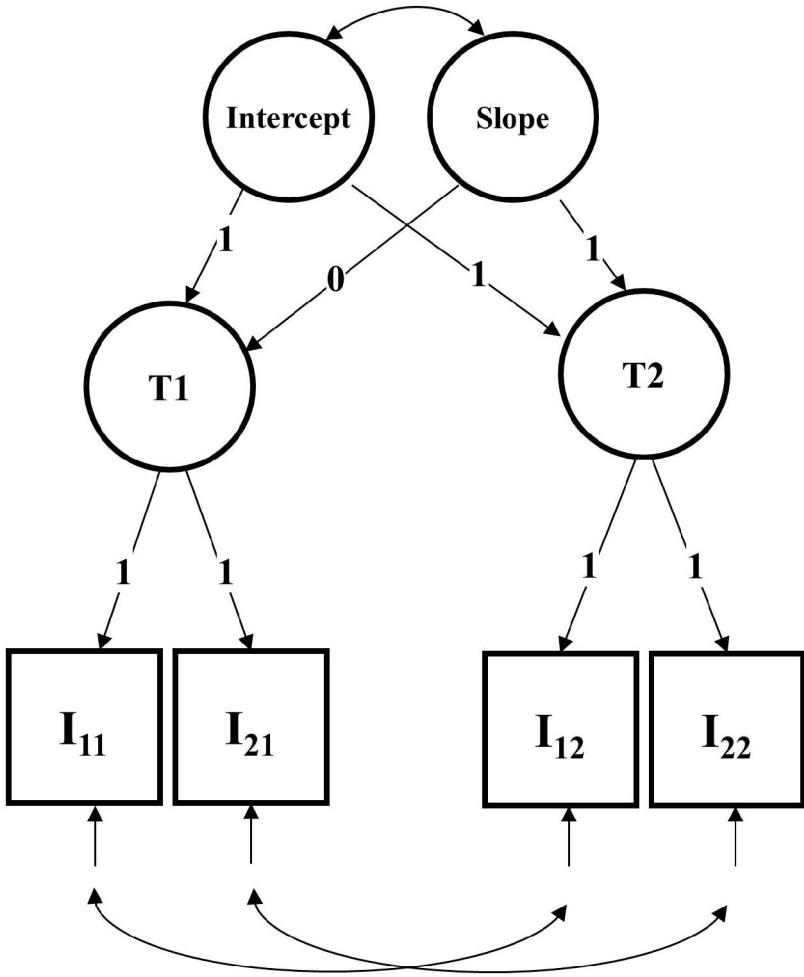


Figure 1. Unconditional latent change model for personality change across two measurement occasions T1 (first measurement in 2012/13) and T2 (second measurement in 2015/2016). Each personality trait was analyzed separately and measured with two (or three) items *I*.

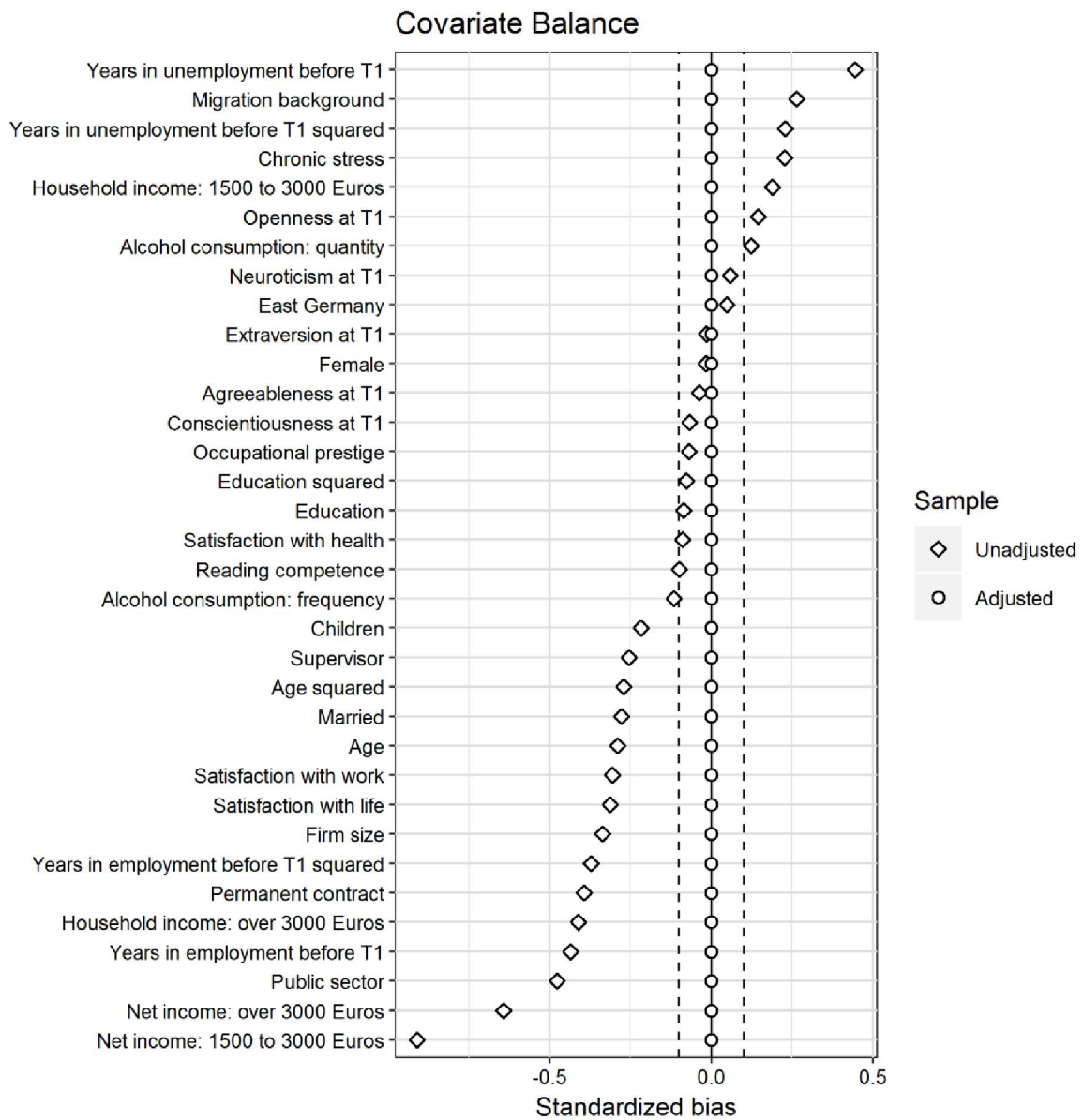


Figure 2. Covariate balance for background variables (with dashed line as threshold for negligible bias). Positive values indicate larger means for respondents with unemployment spells as compared to employed participants. Dummy variables for federal states and missing indicators are not displayed. Numeric results are given in the supplement material.

Supplement material for

“No Personality Change Following Unemployment:

A Registered Replication of Boyce, Wood, Daly, & Sedikides (2015)”

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Covariate Balance

Table S1.

Covariate Balance: Unadjusted and Adjusted Means for Unemployed and Employed

Variables	M_{Uemp}	M_{Emp}		Bias	
	($N = 231$)	Unadj. ($N = 4,774$)	Adj. ($N_{eff} = 944$)	Unadj.	Adj.
<i>Respondent characteristics</i>					
Age (in years)	44.13	46.78	44.13	-0.29	0.00
Age squared	2043.03	2259.26	2043.03	-0.27	0.00
Gender (0 = male, 1 = female)	0.42	0.43	0.42	-0.02	0.00
Education (in years)	14.35	14.54	14.35	-0.09	0.00
Education squared	211.36	216.57	211.36	-0.08	0.00
Migration (0 = no, 1 = yes)	0.17	0.09	0.17	0.27	0.00
Children (0 = no, 1 = yes)	0.67	0.76	0.67	-0.22	0.00
Married (0 = no, 1 = yes)	0.57	0.70	0.57	-0.28	0.00
Household income ^a					
1,500-3,000 Euros	0.36	0.28	0.36	0.19	0.00
over 3,000 Euros	0.43	0.63	0.43	-0.41	0.00
<i>Job characteristics</i>					
Net income ^a					
1,500-3,000 Euros	0.06	0.41	0.06	-0.91	0.00
over 3,000 Euros	0.02	0.21	0.02	-0.64	0.00
Occupational prestige	50.34	51.44	50.34	-0.07	0.00
Tenured (0 = no, 1 = yes)	0.55	0.73	0.55	-0.39	0.00
Supervisor (0 = no, 1 = yes)	0.18	0.29	0.18	-0.25	0.00
Public sector (0 = no, 1 = yes)	0.10	0.28	0.10	-0.48	0.00
Employment history (in years)	17.64	22.12	17.64	-0.44	0.00
Employment history squared	428.74	583.88	428.74	-0.37	0.00
Unemployment history (in years)	1.79	0.75	1.79	0.45	0.00
Unemployment history squared	10.78	3.93	10.78	.023	0.00
Firm size	4.48	5.32	4.48	-0.34	0.00
<i>Psychological characteristics</i>					
Satisfaction with life	7.23	7.71	7.23	-0.31	0.00
Satisfaction with health	7.31	7.48	7.31	-0.09	0.00
Satisfaction with work	6.77	7.38	6.77	-0.31	0.00
Chronic stress	0.37	0.34	0.37	0.23	0.00
Reading competence	0.00	0.10	0.00	-0.10	0.00
Alcohol consumption: frequency	3.02	3.12	3.02	-0.12	0.00
Alcohol consumption: quantity	1.23	1.15	1.23	0.12	0.00
Conscientiousness at T1	3.68	3.76	3.68	0.07	0.00
Agreeableness at T1	3.32	3.36	3.32	-0.04	0.00
Neuroticism at T1	2.92	2.86	2.92	0.06	0.00
Openness at T1	3.33	3.14	3.33	0.15	0.00
Extraversion at T1	3.19	3.21	3.19	-0.02	0.00

Note. N_{eff} = Effective sample size; M_{Uemp} = Mean for unemployed; M_{Emp} = Mean for employed; Unadj. = Unadjusted; Adj. = Adjusted using entropy balancing; Bias = Standardized bias (Austin, 2011). ^a Dummy-coded. Regional characteristics (federal state, West/East Germany) and missing indicators are not reported.

Table S2.

Covariate Balance: Unadjusted and Adjusted Variances for Unemployed and Employed

	SD_{Uemp}	SD_{Emp}		Variance ratio	
	($N = 231$)	Unadj. ($N = 4,774$)	Adj. ($N_{eff} = 944$)	Unadj.	Adj.
<i>Respondent characteristics</i>					
Age (in years)	9.81	8.45	9.79	1.35	1.00
Age squared	841.17	751.67	839.79	1.25	1.00
Education (in years)	2.36	2.25	2.36	1.10	1.00
Education squared	416.48	417.71	415.80	1.01	1.00
<i>Job characteristics</i>					
Occupational prestige	16.31	16.04	16.29	1.03	1.00
Employment history (in years)	10.86	9.72	10.85	1.25	1.00
Employment history squared	416.48	417.71	415.80	1.01	1.00
Unemployment history (in years)	2.76	1.84	2.76	2.26	1.00
Unemployment history squared	33.88	25.39	33.82	1.78	1.00
Firm size	2.54	2.43	2.53	1.09	1.00
<i>Psychological characteristics</i>					
Satisfaction with life	1.67	1.33	1.66	1.57	1.00
Satisfaction with health	2.06	1.81	2.06	1.30	1.00
Satisfaction with work	2.24	1.71	2.24	1.72	1.00
Chronic stress	0.12	0.11	0.12	1.24	1.00
Reading competence	1.06	1.05	1.06	1.02	1.00
Alcohol consumption: frequency	0.89	0.91	0.89	1.05	1.00
Alcohol consumption: quantity	0.71	0.59	0.71	1.44	1.00
Conscientiousness at T1	1.16	1.06	1.16	1.19	1.00
Agreeableness at T1	1.06	1.00	1.06	1.13	1.00
Neuroticism at T1	1.09	1.01	1.09	1.17	1.00
Openness at T1	1.36	1.25	1.36	1.19	1.00
Extraversion at T1	1.14	1.12	1.14	1.04	1.00

Note. N_{eff} = Effective sample size; SD_{Uemp} = Standard deviation for unemployed; SD_{Emp} = Standard deviation for employed; Unadj. = Unadjusted; Adj. = Adjusted using entropy balancing. Limited to continuous variables.

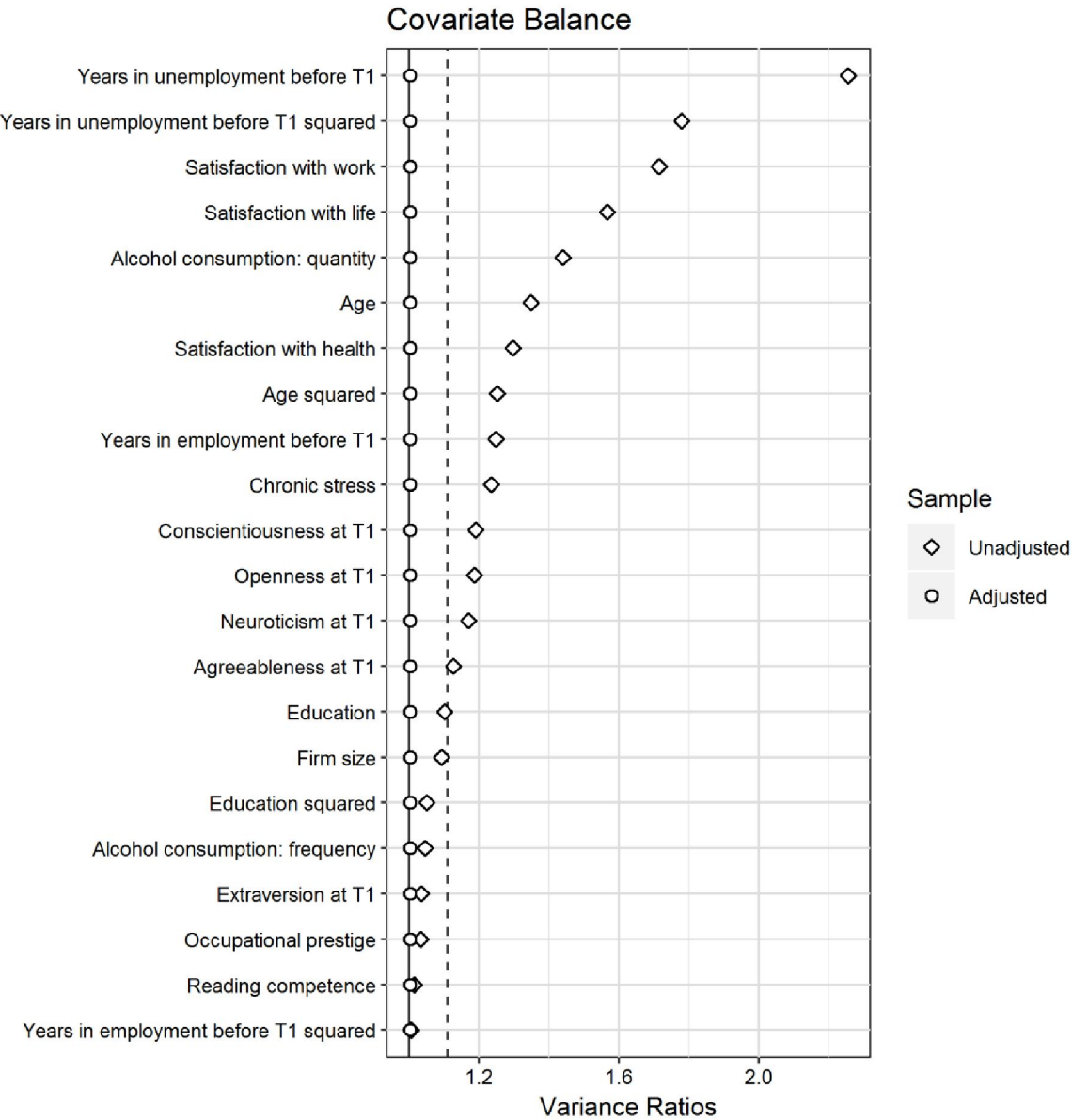


Figure S1. Covariate balance for background variables (with dashed line as threshold for negligible bias). Dummy variables for federal states and missing indicators are not displayed. Numeric results are given in Table S2.

Exploratory Latent Change Analyses

Table S3.

Exploratory Conditional Latent Change Models for the Moderating Effect of Previous Unemployment Experience

	Conscientiousness		Agreeableness		Neuroticism		Openness		Extraversion	
	B_{uadj}	B_{adj}	B_{uadj}	B_{adj}	B_{uadj}	B_{adj}	B_{uadj}	B_{adj}	B_{uadj}	B_{adj}
Intercept	3.83*	3.49*	3.25*	3.28*	3.06*	3.33*	2.14*	2.48*	3.58*	3.32*
Unemployed at T2	0.00	-0.02	0.17	0.09	0.39	0.22	0.04	-0.04	0.40	0.47*
Years unemployed before T1	0.05	0.03	-0.11*	-0.16	0.00	0.01	-0.21*	-0.31*	0.00	-0.06
First unemployment experience ^a	-0.02	-0.10	0.06	-0.08	-0.07	-0.14	-0.03	0.12	0.04	0.19
Unemployed at T2 x Years unemployed before T1	0.03	0.03	-0.04	-0.05	-0.02	-0.02	0.04	0.01	-0.06	-0.07
Unemployed at T2 First unemployment experience ^a	-0.45	-0.34	0.10	0.28	-0.02	0.11	0.34	0.19	-0.10	-0.23
Slope	0.02	0.40	-0.10	-0.49	-0.31	-0.57	0.21	0.47	-0.07	0.17
Slope x Unemployed at T2	0.50	0.52*	-0.12	-0.06	-0.36	-0.20	0.18	0.20	-0.08	-0.20
Slope x Years unemployed before T1	0.01	0.03	0.03	0.01	0.05	-0.13	0.08*	0.18*	0.04	0.12
Slope x First unemployment experience ^a	0.08	0.30*	-0.01	0.10	0.01	-0.01	-0.02	0.02	0.02	-0.12
Slope x Unemployed at T2 x Years unemployed before T1	-0.01	-0.01	0.06	0.05	0.05	0.02	0.02	0.02	0.02	0.03
Slope x Unemployed at T2 x First unemployment experience ^a	0.21	-0.04	0.15	0.01	-0.20	-0.14	-0.05	-0.08	-0.19	-0.09
Intercept variance	0.19*	0.22*	0.06*	0.08*	0.25*	0.33*	0.32*	0.43*	0.55*	0.55*
Slope variance	0.07*	0.12*	0.03*	0.03	0.10*	0.19*	0.05*	0.15*	0.19*	0.24*
Intercept-slope correlation	-.46*	-.57*	-.37*	-.35	-.35*	-.48*	-0.18	-.42*	-.38*	-.52*
Intercept R^2	.06	.09	.06	.06	.09	.07	.07	.08	.03	.06
Slope R^2	.03	.11	.01	.06	.02	.05	.05	.08	.01	.04

Note. N for unadjusted data = 5,005; effective N for adjusted data = 1,103. B_{uadj} = Parameter for unbalanced data; B_{adj} = Parameter for balanced data. Parameters (except for intercept and variances) were standardized with respect to the trait at the first measurement occasion. All models had CFI > .95 and RMSEA < .05.

Because of a Heywood case the models for agreeableness did not include a correlated residual for the third indicator. Results for covariates are not presented.

^a Coded 0 for previous unemployment before T2 and 1 for no unemployment before T2.

* $p < .05$