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Personality Development in Emerging and Young Adulthood: A Study of Age Differences

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Abstract: Early adulthood is a time of substantial personality change characterized by large inter-individual diversity. To investigate the role of age in this diversity, the present study examined whether emerging adults differ from an older group of young adults in their Big Five personality development. By means of multi-group latent change modelling, two groups of 16- to 19-year-olds (n = 3555) and 26- to 29-year-olds (n = 2621) were tracked over the course of four years and compared regarding four aspects of personality change: mean-level change, rank-order change, inter-individual differences in change, and profile change. In addition, age-differential socialization effects associated with six first-time life events were investigated. Analyses revealed substantial age differences in all four aspects of change. As expected, emerging adults showed greater change and diversity in change than young adults. However, the six life events had no age-differential impact on change in single traits and Big Five profiles. Overall, the results indicate that age differences should be considered even in specific life stages to advance the understanding of personality development. © 2018 European Association of Personality Psychology

Key words: personality development; emerging adulthood; young adulthood; life events; differential development

During early adulthood, typically referring to the ages between 18 and 30 years, individuals are confronted with multiple transitions that have profound consequences for their lives. The decisions and experiences made during this time, such as engaging in a serious romantic relationship for the first time or deciding which professional or educational track to pursue, largely set the foundation for one's future life. Early adulthood therefore not only presents a peak of environmental changes but also one of individual development (Hutteman, Hennecke, Orth, Reitz, & Specht, 2014; Rindfuss, 1991). Underscoring the importance of early adulthood, previous research has found that personality traits such as the Big Five (Extraversion, Neuroticism, Agreeableness, Conscientiousness, and Openness to Experience) change most strongly in early adulthood (Roberts, Walton, & Viechtbauer, 2006). These changes can be partly attributed to socialization effects following, for instance, the formation of one's first romantic relationship or entering the labour force (Bleidorn, Hopwood, & Lucas, 2018; Denissen, Ulferts, Lüdtke, Muck, & Gerstorf, 2014; Hudson & Roberts, 2016; Lehnart & Neyer, 2006; Lehnart, Neyer, & Eccles, 2010; Neyer & Asendorpf, 2001).

However, these findings may not be readily generalizable to the whole age range of early adulthood. Research suggests that people in their late adolescence to mid-twenties may substantially differ from those in their late twenties regarding their personality change (e.g. Milojev & Sibley, 2014, 2017; Schwaba & Bleidorn, 2018). Researchers in the field of personality development have recently drawn on Arnett's (2000, 2007) concept of emerging adulthood as a distinct developmental stage at the beginning of early adulthood to explain and understand these age differences. At the same time, there are also critical voices contesting the theoretical and empirical underpinnings of emerging adulthood, stating, for example, that the concept lacks a clear delimitation from other age groups (e.g. Hendry & Kloep, 2010; Syed, 2015). To inform this current debate, the present study tracked individuals at the beginning and end of early adulthood (16- to 19-year-old *emerging adults* and 26- to 29-year-old *young adults*, respectively) over a time interval of four years. The two age groups were compared with regard to four indicators of personality change and how their personality is associated with the occurrence of first-time life events.

EMERGING ADULTHOOD

The concept of emerging adulthood was introduced by Arnett (2000) who defined it as a new life stage that has developed in modern Western cultures because of the presumed postponement of traditional adulthood. Emerging adulthood is seen as an extended transitory period between late

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adolescence and full-fledged adulthood, located approximately between the ages 18 to 25 years. According to Arnett (2007), the period of emerging adulthood is characterized by five universal themes: 'It is the age of identity exploration, the age of instability, the self-focused age, the age of feeling in-between, and the age of possibilities' (p. 69). Accordingly, settling in and committing to traditional adult roles could be seen as indicators of having successfully reached young adulthood (referring to the age period between 25 and about 30 years), eventually resulting in more stable life circumstances and a stronger focus on others.

With regard to personality development, the question arises whether these assumed differences in life circumstances between emerging and young adults are mirrored in age-specific patterns of personality change. Accordingly, researchers recently proposed the application of the concept of emerging adulthood to research on personality development (Bleidorn & Schwaba, 2017; Roberts & Davis, 2016; Tanner & Arnett, 2011). For instance, Roberts and Davis (2016) assumed that successfully mastering the five developmental themes of emerging adulthood might be a central source of personality change during this age. As a conclusion, they advocated for 'linking the ideas in emerging adulthood to the processes of personality development in young adulthood to be an obvious future direction for research' (p. 324).

However, there are also critical voices contesting the validity of emerging adulthood as a distinct developmental stage and its applicability to research (Côté, 2014; Côté & Bynner, 2008; Hendry & Kloep, 2010, 2011; Syed, 2015). These criticisms can be subsumed under three major concerns: (i) emerging adulthood is not universally experienced by all individuals, (ii) emerging adulthood lacks a clear delimitation and could rather be understood as a prolonged moratorium between adolescence and young adulthood, and (iii) Arnett's theory does not specify the unique developmental features of emerging adulthood. A central goal of the present paper was to inform this debate by examining the distinctness of emerging adulthood with regard to personality development. Such a distinction would require the presence of substantial differences in the developmental patterns of emerging adults compared with younger or older age groups. In the present article, we investigated whether emerging adults can be distinguished from an older age group of young adults by age-differential patterns of change in the Big Five traits.

PERSONALITY DEVELOPMENT IN EARLY ADULTHOOD

Personality change can be operationalized in several ways. In the present study, we focused on the four aspects considered by Roberts, Wood, and Caspi (2008), which are theoretically distinct but often empirically related (Mund, Zimmermann, & Neyer, 2018). First, we addressed mean-level change, which refers to the average of all intra-individual increases and decreases in a given personality trait across all members of a given population. Second, we considered rank-order change, which pertains to changes in individuals' positioning on a given trait relative to each other and thus provides information on the stability of inter-individual differences over time (Mund, Zimmermann, et al., 2018). Third, we addressed inter-individual differences in intra-individual change, which reflect the extent to which individuals differ in their unique patterns of intra-individual personality trait change over time. Fourth, we investigated profile change, which describes changes in the relative ordering of different personality traits within an individual. Thus, instead of focusing on single personality traits, this aspect of change adopts a person-centred perspective on the intra-individual constellations of a set of multiple traits. The goal of the present study was to examine differences between emerging and young adults regarding all four aspects of personality change. In addition, we examined whether emerging and young adults differ in their changes in single personality traits and personality profiles in reaction to first-time life events.

As mentioned above, multiple researchers have proposed that the concept of emerging adulthood might have meaningful implications for the understanding of personality development in early adulthood. But how might the postulated psychological differences between emerging and young adulthood relate to personality change? Although not directly derived from the ideas of emerging adulthood, one could think of age-differential patterns of personality change. First, compared with young adults, emerging adults are considered to be more instable and to have greater freedom to explore new behaviours and environments. Therefore, emerging adults might demonstrate larger shifts in their personality traits in general, which might be reflected in stronger mean-level and profile changes compared with young adults. Second, emerging adults are supposed to be a generally more diverse group than young adults; for this reason, their individual personality trajectories might be more variable, which may be reflected in larger rank-order changes and larger inter-individual differences in intra-individual change. Third, compared with young adulthood, role non-engagement and exploration of alternatives is proposed to be more common in emerging adulthood (Arnett, 2000; Schwartz, Côté, & Arnett, 2005). Hence, emerging adults' personality development might be less affected by the demands of new roles following first-time life events than young adults'. In the sections to follow, we review previous findings regarding the different aspects of personality change with a focus on the emerging and young adulthood years.

Mean-level change

With regard to the Big Five personality traits, a large body of research indicates that early adulthood is characterized by substantial mean-level changes (Roberts et al., 2006; Roberts & Mroczek, 2008). Robust findings from these studies are that Conscientiousness and Agreeableness increase during the entire age period of early adulthood, whereas Neuroticism tends to decline. Several other studies, by contrast, have found Neuroticism to substantially increase from late adolescence to the early twenties (Leikas & Salmela-Aro, 2015; van den Akker, Dekovic, Asscher, & Prinzie, 2014). Furthermore, increases in Conscientiousness appear to be particularly strong between the age of 19 and 24 years, whereas the rest of the twenties is characterized by weaker increases (Milojev

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& Sibley, 2017; Specht, Egloff, & Schmukle, 2011). In addition, previous studies have reported substantial decreases in Agreeableness during the years of emerging adulthood (Milojev & Sibley, 2017; van den Akker et al., 2014). In sum, the findings on the effect of age on early adults' mean-level change appear to be somewhat mixed. Whereas some studies report comparable mean-level changes for all early adults, other findings suggest that the direction and size of mean-level changes in early adulthood largely depend on age.

Rank-order change

Regarding rank-order change in the Big Five traits, numerous studies have identified substantial age differences (Milojev & Sibley, 2014; Roberts & DelVecchio, 2000; Specht et al., 2011). Taken together, studies suggest that inter-individual differences in all Big Five traits increasingly stabilize over the course of early adulthood. This pattern might be due to individuals' growing abilities to form niches for themselves; with increasing age, individuals might increasingly select, create, and maintain environments that are congruent with their personalities (Wrzus, Wagner, & Riediger, 2016).

Inter-individual differences in change

To our knowledge, Schwaba and Bleidorn (2018) conducted the first study that directly compared inter-individual differences in personality change across different age groups. In their study of participants aged between 16 and 84 years, inter-individual differences in personality change were most pronounced in the emerging adulthood years. Overall, inter-individual differences in change decreased with age for each Big Five trait. Thus, although young adults still showed substantial deviations from the average trajectories, these deviations were small in magnitude compared with emerging adults.

Profile change

During emerging adulthood, the degree of profile change appears to be moderate. For example, Roberts, Caspi, and Moffitt (2001) reported an average correlation of .70 between personality profiles at ages 18 and 26 years. Moreover, previous studies consistently found personality profiles to become more stable (i.e. to change less) with increasing age (e.g. Bleidorn, Kandler, Riemann, Angleitner, & Spinath, 2012; Klimstra, Hale, Raaijmakers, Branje, & Meeus, 2009; Klimstra, Luyckx, Hale, Goossens, & Meeus, 2010; Terracciano, McCrae, & Costa, 2010). For instance, in a study of college students (Klimstra et al., 2010), one-year profile stabilities increased from .72 to .76 over four years. Similarly, Terracciano et al. (2010) found that personality profile stabilities increased up to age 30 years and then remained mostly unchanged.

Associations between life events and personality change in early adulthood

Many theoretical approaches emphasize the importance of life events and their related social experiences as catalysts of personality change. In essence, personality change is conceived as a process of adaptation to new social roles and demands that come along with changes in the environment, typically referred to as personality socialization (Roberts et al., 2008; Roberts & Mroczek, 2008; Wrzus & Roberts, 2017).

Love and family, work, and residential independence

As evident from a large body of literature, personality change can occur in response to environmental changes associated with different life events (e.g. Allemand, Gomez, & Jackson, 2010; Lockenhoff, Terracciano, Patriciu, Eaton, & Costa, 2009; Lüdtke, Roberts, Trautwein, & Nagy, 2011; Specht et al., 2011; for an overview, see also Specht, 2017b). Overall, it appears that transitional events in the domains of love and family (e.g. the first romantic relationship or birth of a child) and work (e.g. the first job) have great potential to stimulate personality socialization (Bleidorn et al., 2018; Denissen, Luhmann, Chung, & Bleidorn, 2018; Jokela, Kivimaki, Elovainio, & Keltikangas-Jarvinen, 2009; Neyer & Asendorpf, 2001; Neyer & Lehnart, 2007; Scollon & Diener, 2006; van Scheppingen et al., 2016; Wagner, Becker, Lüdtke, & Trautwein, 2015; for a review, see Mund, Jeronimus, & Neyer, 2018). For instance, in the love and family domain, research has repeatedly shown that finding a partner is associated with decreases in Neuroticism and related traits, increases in Extraversion, and increases in Conscientiousness (Lehnart et al., 2010; Neyer & Asendorpf, 2001; Neyer & Lehnart, 2007; Wagner et al., 2015). However, the influence of age on these socialization effects is less clear. For example, Lehnart et al. (2010) found decreases in Neuroticism for both 20- and 28-year-olds, indicating that engaging in a partnership for the first time may have socialization effects across the entire phase of early adulthood, whereas Wagner et al. (2015) could replicate these effects only for 23- to 25-year-olds. In the work domain, entering the labour force has been shown to be associated with substantial personality change, particularly in Conscientiousness (Denissen et al., 2014; Hudson & Roberts, 2016; Hudson, Roberts, & Lodi-Smith, 2012; Leikas & Salmela-Aro, 2015; Specht et al., 2011). In addition to transitions in the love and work domains, leaving the parental home marks another life event that gains particular relevance in early adulthood. Commonly seen as an important marker of the transition to adulthood, this event is typically associated with educational or occupational challenges, substantial changes in parent–child relationships, and increases in personal agency (Mulder, 2009).

Socialization effects in the wake of first-time life events can differ depending on their age-graded normativeness, the strength and transparency of associated role demands (i.e. behavioural scripts guiding and facilitating the adaptation to the new role; Neyer, Mund, Zimmermann, & Wrzus, 2014), and the extent to which individuals commit to the new role (Lodi-Smith & Roberts, 2007). For example, starting the first job can be deemed a rather well scripted event that comes along with transparent and obligatory behavioural contingencies (e.g. the demands of being a responsible and conscientious worker or a fixed daily structure); we thus expected to find

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substantial personality socialization associated with this event in both age groups, particularly in relation to Conscientiousness. To our knowledge, a systematic investigation of age-differential socialization effects is however missing. Because of differences in the normative pressure to commit to traditional adulthood roles, socialization effects might differ between emerging and young adults: compared with young adulthood, role non-engagement and exploration of alternatives is more common in emerging adulthood (Arnett, 2000; Schwartz et al., 2005). We therefore expected to find generally stronger socialization effects for young adults than for emerging adults.

While numerous studies have looked at socialization effects on single personality traits, to date, the role of life events in personality profile change has not been addressed. However, a person-centred perspective on socialization effects can provide additional insights into the catalysts of personality development; it is possible that people react to the disruptions associated with life events in highly idiosyncratic ways that involve multiple traits, which might not be fully captured by a variable-centred approach.

THE PRESENT STUDY

The present study aimed to shed further light on the role of age in Big Five personality development during early adulthood. Most previous studies on personality development have treated early adulthood as a single stage in life. However, an increasing body of research on age differences in personality development indicates that abandoning this view might be useful to have a better understanding of personality development in early adulthood. Following recent suggestions by researchers in the field (e.g. Roberts & Davis, 2016), we examined whether emerging and young adults differ regarding various aspects of personality change.

By means of multi-group structural equation modelling, we conducted a systematic age group comparison with regard to all four aspects of personality change considered by Roberts et al. (2008). Consistent with the concept of emerging adulthood and previous findings reviewed above, the following patterns were expected: first, age differences in mean-level change were explored without specific expectations because of the somewhat mixed state of empirical findings; second and third, we expected emerging adults to show larger rank-order change and larger inter-individual differences in change than young adults; and fourth, we expected that emerging adults would experience larger changes in their personality profiles than young adults.

In addition, we carried out two sets of analyses focusing on socialization effects of first-time life events on emerging and young adults' changes (i) in single Big Five traits and (ii) their personality profiles. Specifically, we investigated effects associated with entering the first romantic relationship, moving in together with a partner for the first time, the first separation from a partner (representing life events related to the domain of love and family), beginning the first job (work domain), and leaving the parental home (residential independence). Based on the assumed age differences in the commitment to adult roles, we expected socialization effects to be generally stronger in the young adulthood group.

METHOD

The data used in the present study are accessible to researchers in the form of a scientific use file provided by the pairfam administration (for additional information, see http://www.pairfam.de/en/data/data-access/). A detailed description of the data structure and all used measures can be found in the pairfam data manual (Brüderl et al., 2017) and the scales manual (Thönnissen, Barbara, Alt, Friedrich, & Walper, 2017), respectively. All R scripts used for the present analyses are available online at https://osf.io/z6ryh.

Participants

The data used in this study were drawn from the first six measurement waves of the German Family Panel (pairfam; Huinink et al., 2011). Since the start of the panel study in 2008, pairfam has annually collected data on a representative sample of participants from three different cohorts born between 1971 to 1973, 1981 to 1983, and 1991 to 1993. Because our research goal was to investigate patterns of personality change in early adulthood, we focused on the two younger cohorts born between 1991 and 1993 (emerging adults) and between 1981 and 1983 (young adults). In pairfam, data collection is administered by trained interviewers at participants' homes. Depending on the sensitivity of the topic, participants responded to questions either via computer-assisted personal interviews or via computer-assisted self-administered interviews. Personality scales were administered via computer-assisted self-administered interviews.

The Big Five personality traits were assessed in wave 2 (2009/2010) and again in wave 6 (2013/2014). Our analyses were based on the time interval between these two measurement occasions, which we will refer to as T1 and T2, respectively, in the remainder of this article. In total, 6176 emerging and young adults (49.85% female) participated at T1 and 3789 participated again at T2. All T1 participants were included in the longitudinal analyses. Of these, $n = 3555$ (48.72% female) belonged to the emerging adulthood group with a mean age of 17.03 years at T1 ($SD = 0.88$). The subgroup of young adults consisted of $n = 2621$ individuals (51.39% female) who were on average 27.12 years old at T1 ($SD = 0.88$).

The proportion of individuals who dropped out of the study between T1 and T2 ($n = 2583$) was balanced between emerging and young adults ($\chi^2(1) = 0.02$, $p = .888$), as well as between men and women ($\chi^2(1) = 1.09$, $p = .296$). However, those who dropped out had a slightly lower socio-economic status than those who continued their participation in the study (Mann–Whitney $U = 772\,080$, $p = .002$).[1] Mean differences between dropouts' and continuers' initial

[1]The International Socio-Economic Index of Occupational Status (Ganzeboom, de Graaf, & Treiman, 1992) was used as an indicator of participants' socio-economic status.

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(T1) Extraversion ($d = -0.01$), Neuroticism ($d = 0.07$), Agreeableness ($d = -0.03$), Conscientiousness ($d = -0.11$), and Openness ($d = 0.05$) were negligible (Gignac & Szodorai, 2016) and thus indicated no systematic attrition.

Measures

Big Five personality traits

To assess the Big Five personality dimensions Extraversion, Neuroticism, Agreeableness, Conscientiousness, and Openness to Experience, the German 21-item version of the Big Five Inventory was used (BFI-K; Rammstedt & John, 2005). For each trait, participants were asked to rate their agreement to four or five (Openness) items using a 5-point Likert-type scale ranging from 1 (*absolutely incorrect*) to 5 (*absolutely correct*). Despite its brevity, the BFI-K has been shown to be a reliable and valid personality measure (Rammstedt & John, 2005). At both measurement occasions, ω reliability coefficients were moderate to satisfactory for Extraversion ($\omega_{T1} = .78$, $\omega_{T2} = .82$), Neuroticism ($\omega_{T1} = .72$, $\omega_{T2} = .77$), Agreeableness ($\omega_{T1} = .67$, $\omega_{T2} = .73$), Conscientiousness ($\omega_{T1} = .72$, $\omega_{T2} = .74$), and Openness ($\omega_{T1} = .75$, $\omega_{T2} = .79$). All reliability estimates were comparable across the two groups of emerging and young adults (Table S1).

Life events

Each year, participants provided extensive information on multiple aspects of their life via an electronic event history calendar, including family structures, personal relationships, and work conditions. Based on this information, additional datasets were generated, which compiled all available information on ongoing and past partner relationships, mobility experiences, and occupational or educational activities (for detailed information on these generated datasets, see Brüderl et al., 2017). Based on these data, we extracted information on whether participants experienced one (or more) first-time events in the domains of love, work, and residential independence (for details on the coding scheme, see Table S2). Since a large sample size is required to detect effects in structural equation modelling (Wang & Wang, 2012), only those life events that occurred at least 100 times in each age group were included for further analyses (detailed information on all initially coded life events is available in Table S3). Four life events met this criterion: first coresidence with a partner, first separation from a partner, first job, and leaving the parental home. Although they did not meet the inclusion criterion, we further included the first romantic relationship and birth of the first child because these two events were found to be associated with personality change in multiple previous studies (Bleidorn et al., 2018; Jokela et al., 2009; Neyer & Asendorpf, 2001; Neyer & Lehnart, 2007; Specht et al., 2011; van Scheppingen et al., 2016; Wagner et al., 2015). For each participant, events were coded dichotomously according to whether they occurred between T1 and T2 (coded 1) or not (coded 0). We coded only life events that happened after T1 to rule out potential confounding effects of a prior experience of the respective event on the first personality measurement. The total count of the six life events and their distributions between the two age groups are displayed in Table 1. Emerging and young adults differed significantly in the relative number of occurrences with respect to all events except for leaving the parental home ($\chi^2(1) = 3.67$, $p = .055$). The percentage of individuals who experienced the first separation from their partner ($\chi^2(1) = 161.10$, $p < .001$) and who entered a romantic relationship for the first time ($\chi^2(1) = 39.74$, $p < .001$) was higher for emerging adults than for young adults. In contrast, young adults were more likely to move in with their partners for the first time ($\chi^2(1) = 85.93$, $p < .001$), begin their first job ($\chi^2(1) = 24.50$, $p < .001$), and experience the birth of their first child ($\chi^2(1) = 375.89$, $p < .001$) than emerging adults.

Analysis strategy

Multi-group latent change models

Our analyses at the level of single traits were based on a latent change modelling approach (McArdle, 2009). For each Big Five personality trait, one latent change model was separately fitted to the data (Figure 1). The models incorporated two factors representing the initial latent mean levels at T1 (*Level*) and four years later at T2, respectively, as well as a latent factor capturing the mean-level changes between T1 and T2 (*Change*). These models correct for measurement error in trait levels and changes. Negative values on a *Change* factor denote a mean-level decrease, whereas positive values denote a mean-level increase from T1 to T2. The variance of a *Change* factor represents the overall amount of inter-individual differences in intra-individual changes between T1 and T2.

All analyses were conducted within a multi-group framework to examine potential differences between emerging and young adults. In multi-group analyses, all measurement and

Table 1. Occurrences of single life events

	Overall occurrence		Occurrence within age groups			
			Emerging adults		Young adults	
Event	*N*	% Women	Yes (%)	No (%)	Yes (%)	No (%)
First coresidence	663	54.60	443 (21.78)	1591 (78.22)	220 (41.75)	307 (58.25)
First separation	762	49.08	656 (50.50)	643 (49.50)	106 (18.86)	456 (81.14)
First job	1432	49.16	1238 (58.76)	869 (41.24)	194 (74.90)	65 (25.10)
Leaving the parental home	982	54.18	829 (38.31)	1335 (61.69)	153 (33.41)	305 (66.59)
First relationship	705	44.40	639 (63.65)	365 (36.35)	66 (37.93)	108 (62.07)
First child	344	54.94	66 (3.19)	2003 (96.81)	278 (26.13)	786 (73.87)

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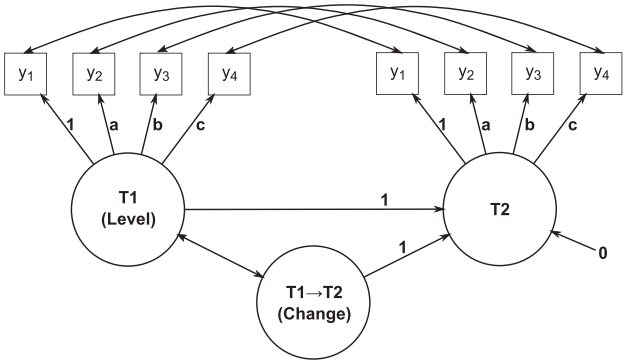

Figure 1. Measurement model used for the analyses at the level of single traits. Regression paths with identical letters and item intercepts (not displayed) were constrained to be equal across time and age groups. T1 and T2 represent measurement occasions. The *Change* factor represents latent mean-level changes from T1 to T2. Figure available at https://osf.io/z6ryh under CC-BY4.0 licence.

structural model parameters, such as intercepts or regression coefficients, can be either set equal across groups (constrained model) or estimated freely within each group (unconstrained model). If the constrained model fits the data worse than the unconstrained model, the latter should be favoured, thus indicating that the parameter in question differs between the groups. Reversely, if the fit of the constrained model is as good as the fit of the unconstrained model, the more parsimonious constrained model should be favoured (Brown, 2015; Little, 2013).

Evaluations of model fit were based on the comparative fit index (CFI), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), and the χ^2 fit statistic. Because χ^2 fit statistics can be biased when analysing large samples, we relied more on the other indices for evaluations of model fit. Based on conventional guidelines, a model was considered to adequately fit the data if its CFI value was close to or greater than 0.90 and both its RMSEA and SRMR values were close to or smaller than 0.08 (Marsh, Hau, & Grayson, 2005).

All models described below were run in R (R Core Team, 2018) using the structural equation modelling package lavaan (Rosseel, 2012). Standard errors were calculated using robust maximum likelihood estimation to account for potential non-normality of the data. Missing data were handled with the full information maximum likelihood procedure. Furthermore, we imposed strong measurement invariance on the models to ensure that the latent factors captured the same construct at each time for both emerging and young adults (Little, 2013; Meredith, 1993). To do so, we fixed the factor loadings and intercepts for each indicator to be equal across age groups and measurement occasions. For all Big Five traits, this resulted in overall adequate fits to the data (all CFI $\geq$ 0.912, all RMSEA $\leq$ 0.065, and all SRMR $\leq$ 0.054; for detailed results, see Table S4), thus allowing for the subsequent between-group difference tests regarding structural model parts (Little, 2013).[2]

[2]For results on step-wise tests of measurement invariance, see Table S5 (for invariance across age groups) and Table S6 (for invariance across time).

Tests of structural group differences

After establishing invariance regarding measurement parameters (i.e. strong measurement invariance) across age groups and time, we proceeded with the structural parts of our models. We adapted the multi-group models to examine age group differences regarding (i) latent mean-level changes, (ii) latent rank-order changes, (iii) inter-individual differences in change, (iv) profile change, and socialization effects on (v) single personality traits and (vi) personality profiles. After constraining the respective model parameters to be equal across emerging and young adults, we examined the model fit using Satorra–Bentler scaled χ^2 difference tests (Satorra & Bentler, 2001). To avoid interpreting false positive age group differences, we only considered $\Delta\chi^2$-statistics below the $p = .01$ threshold. For single selection and socialization effects of life events, we applied the conventional $p = .05$ alpha level.[3]

Mean-level change. First, we tested age group differences regarding latent *Change* factor intercepts. Since *Change* factors were not regressed on any predictor at this step, their intercepts represented mean-level changes in the two age groups. Age group comparisons were conducted by fixing latent *Change* intercepts to be equal across both age groups. If this model did not fit significantly worse than the unconstrained model, we kept the constraint in the model. Such a result indicated no significant age group difference of mean-level personality change in the respective trait. Conversely, if the constrained model fitted significantly worse than the unconstrained one, an age group difference was indicated. In this case, we released the constraint on the *Change* intercept.

Rank-order change. In a second set of multi-group models, we examined whether emerging and young adults differed regarding their rank-order changes. We based these analyses on latent retest correlations of T1 and T2 personality factors, which were analysed in multi-group models without *Change* factors. Higher rank-order change is indicated by a lower correlation coefficient. Again, age group comparisons were conducted by fixing the respective factor correlations to be equal across age groups and then evaluating its effect on χ^2 model fit.

Inter-individual differences in change. Third, inter-individual differences in change were addressed by comparing the fit of unconstrained models against the fit of models in which the *Change* factor variances were fixed to be equal across age groups. *Change* factor variances reflect the overall magnitude of inter-individual differences in intra-individual personality trait change. Thus, higher variances indicate that individuals more strongly deviated from the general mean-level change observed in their age group.

[3]This was done to avoid type II errors that are likely to occur for these effects. Although prior research has found selection and socialization effects associated with the life events investigated in the present study (e.g. Denissen et al., 2014; Jonkmann, Thoemmes, Lüdtke, & Trautwein, 2014; Leikas & Salmela-Aro, 2015; Specht et al., 2011), effect sizes were generally small. The detection of small selection and socialization effects requires a large number of individuals who experienced the respective event, which however cannot be ensured in natural experiment designs (Rutter, 2007) as used in the present study.

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Socialization effects on single trait change. In a fourth step, we extended the multi-group models by including life events as predictor variables to examine their age-differential associations with personality change. A significant regression weight predicting the latent *Change* factor indicated a socialization effect, showing that individuals who experienced the event under study displayed change trajectories different from those who did not experience it. Moreover, to account for the possibility that individuals selected life events based on their initial personality traits, *Level* factors were simultaneously regressed on life events. For each trait–event combination, separate multi-group models were specified, resulting in a total number of 30 models. Participants' sex (coded as 1 = male and 2 = female) was mean centred and entered as a covariate in all regressions. In a first step, an unconstrained model in which all regression paths were freely estimated across age groups was compared against a model in which only the effect of the life event on *Level* was constrained to be equal. A decrease in model fit, as indicated by a significant increase in the χ^2 value, signalled an age group difference in the respective effect. Consequently, we removed the constraint from the model. If the constrained model did not fit worse, we kept the effect fixed. Then, we proceeded with (additionally) constraining the effect of the life event on *Change* to test whether the life event had age-differential socialization effects on personality development. Being the focus of the present study, we discuss only the findings regarding the effects of life events on *Change* but not on *Level* factors.

Profile change. Profile change was assessed by calculating individual *q*-correlations for each participant (e.g. Furr, 2008; Roberts et al., 2001). Participants' sets of Big Five traits at T1 were correlated with their corresponding sets at T2, with lower values indicating higher profile change. For the analysis of age group differences, individuals' *q*-correlations were first transformed into Fisher's *Z* scores. With these *Z* scores, we then built multi-group models in which only the group-specific intercepts and variances of profile change were estimated. Again, χ^2 difference tests were carried out to compare emerging and young adults' profile changes with each other. If constraining the intercepts to be equal across age groups yielded a significant increase in χ^2, emerging and young adults' profile changes were considered different.

Socialization effects on profile change. In a final set of analyses, we extended the models by including single life events as predictors of individuals' Fisher's *Z* transformed *q*-correlations. A negative effect indicated that individuals who experienced the respective event showed more profile change than those who did not experience it. Conversely, a positive effect denoted that experiencing the respective event was associated with less profile change. To test age differences, socialization effects were constrained to be equal across emerging and young adults. If this model fit significantly worse than the unconstrained model (indicated by a significant change in χ^2), an age-differential socialization effect was indicated; if the constrained model did not fit worse than the unconstrained one, this indicated that the socialization effect was not significantly different between age groups.

RESULTS

Raw score means, standard deviations, and correlations of the Big Five are presented in Table 2. In this section, we report all parameter estimations, standard errors, and probability values. Additionally, 95% confidence intervals are reported in Tables S7 to S11.

Mean-level change

As displayed in Table 3 and illustrated in Figure 2, our analyses revealed several age group differences with respect to mean-level personality change over four years (for standardized mean differences between T1 and T2, see Table S12; for standardized mean differences between emerging and young adults' *Level* and *Change* intercepts, see Table S13). All final models, which specified all variant and invariant intercepts as determined by the χ^2 difference testing, fitted the data well (Table S14).

The models estimating changes in Extraversion revealed no significant differences between emerging and young adults; both age groups declined in this trait to a similar degree (Figure 2, panel a), which was reflected in a negligible standardized mean difference between groups ($d = -0.05$; Gignac & Szodorai, 2016).

Furthermore, our analyses revealed different mean-level changes in Neuroticism for emerging and young adults (Figure 2, panel b): whereas young adults' average Neuroticism did not significantly change over four years, emerging adults demonstrated a significant increase in this trait. However, the difference in mean-level change between the two groups was in the range of relatively small to medium effect sizes ($d = 0.14$).

Looking at Agreeableness, constraining mean-level changes to be equal across age groups did not result in a significantly worse model fit (according to the $p < .01$ criterion). Both age groups became slightly more agreeable over the course of four years (Figure 2, panel c). Accordingly, the difference in mean-level change between the age groups was negligible ($d = -0.09$).

Moreover, there was a significant age group difference in mean-level change in Conscientiousness (Figure 2, panel d). Mean-level change differed markedly between age groups for this trait ($d = 0.34$), with the two groups evincing change in opposite directions; while emerging adults became more conscientious over the years, young adults became less conscientious.

Finally, Openness trajectories (Figure 2, panel e) substantially differed between emerging and young adults ($d = 0.24$). Although both groups became less open over time, this decline was more pronounced in young adults.

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Table 2. Descriptive statistics and correlations

	Emerging adults		Young adults		Correlations									
Variables	*M*	*SD*	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1. Extraversion (T1)	3.65	0.83	3.56	0.81	—	−.28***	.12***	.23***	.28***	.66***	−.25***	.11***	.17***	.20***
2. Neuroticism (T1)	2.66	0.81	2.70	0.82	−.28***	—	−.20***	−.20***	−.03	−.18***	.57***	−.13***	−.14***	.00
3. Agreeableness (T1)	3.20	0.74	3.25	0.74	.07***	−.14***	—	.13***	.03	.04	−.09***	.50***	.07**	.02
4. Conscientiousness (T1)	3.55	0.73	3.93	0.64	.18***	−.14***	.17***	—	.19***	.17***	−.14***	.12***	.55***	.09**
5. Openness (T1)	3.68	0.69	3.69	0.70	.20***	.06***	−.01	.14***	—	.19***	.01	.02	.10***	.65***
6. Extraversion (T2)	3.53	0.81	3.47	0.78	.61***	−.17***	.05*	.14***	.12***	—	−.31***	.14***	.28***	.24***
7. Neuroticism (T2)	2.79	0.81	2.73	0.79	−.19***	.48***	−.09***	−.04*	.10***	−.31***	—	−.23***	−.22***	.01
8. Agreeableness (T2)	3.18	0.72	3.28	0.70	.06**	−.06**	.42***	.13***	−.02	.15***	−.17***	—	.17***	.07**
9. Conscientiousness (T2)	3.59	0.67	3.84	0.58	.19***	−.11***	.14***	.47***	.03	.28***	−.21***	.17***	—	.16***
10. Openness (T2)	3.62	0.69	3.56	0.68	.12***	.06**	−.03	.00	.56***	.17***	.06**	−.02	.11***	—

Note: Emerging adults' correlations are below the diagonal, and young adults' correlations are above the diagonal. T1 = time 1; T2 = time 2. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 3. Age group comparisons of emerging and young adults' latent mean-level personality change

	Age group comparison		Emerging adults		Young adults	
Trait	$\Delta\chi^2$	*p*	*b* (*SE*)	*p*	*b* (*SE*)	*p*
Extraversion	1.11	.292	−0.11 (0.01)	<.001	−0.11 (0.01)	<.001
Neuroticism	15.23	<.001	0.12 (0.02)	<.001	0.01 (0.02)	.762
Agreeableness	4.76	.029	0.03 (0.01)	.001	0.03 (0.01)	.001
Conscientiousness	62.60	<.001	0.07 (0.01)	<.001	−0.08 (0.01)	<.001
Openness	23.67	<.001	−0.02 (0.01)	.006	−0.06 (0.01)	<.001

Note: Age group comparisons were carried out via scaled χ^2 difference tests of model fit. A model in which *Change* intercepts were freely estimated was compared against a model in which *Change* intercepts were set equal across age groups. If the $\Delta\chi^2$ statistic indicated age group invariance, identical *Change* intercepts are reported; if the $\Delta\chi^2$ statistic indicated an age group difference, freely estimated *Change* intercepts for each group are reported.

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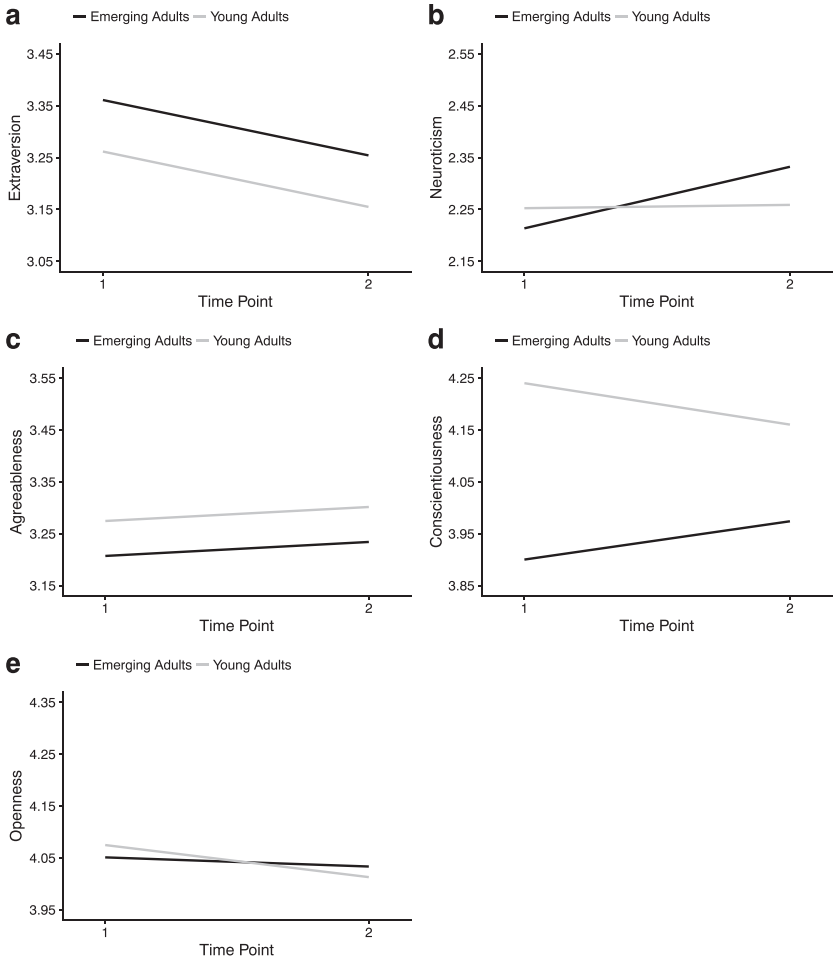

Figure 2. Personality mean-level changes over four years for emerging and young adults. Figure available at https://osf.io/z6ryh under CC-BY4.0 licence.

Rank-order change

Retest correlations between latent personality factors at T1 and T2 are displayed in Table 4. Age group comparisons revealed that rank-order changes differed significantly for three out of five traits: compared with young adults, emerging adults showed larger rank-order changes in Extraversion, Neuroticism, and Conscientiousness; for Agreeableness and Openness, no significant differences were found. Overall, rank-order correlations were relatively high in both groups, ranging from $r = .64$ to $r = .89$ in emerging adults and from $r = .73$ to $r = .89$ in young adults.

Inter-individual differences in change

As displayed in Table 5, three out of five *Change* variances differed significantly between age groups. Inter-individual differences in change were more pronounced in emerging adults than in young adults, except for Neuroticism and

Table 4. Age group comparisons of emerging and young adults' latent rank-order change

	Age group comparison		Rank-order stability (*r*)	
Trait	$\Delta\chi^2$	*p*	Emerging adults	Young adults
Extraversion	9.57	.002	.76	.83
Neuroticism	8.66	.003	.64	.73
Agreeableness	2.86	.091	.76	.76
Conscientiousness	37.75	<.001	.70	.86
Openness	5.32	.021	.89	.89

Note: Rank-order stabilities pertain to the latent correlations between T1 and T2 factors. These models did not include a *Change* factor. Age group comparisons were carried out via scaled χ^2 difference tests of model fit. A model in which rank-order stabilities were freely estimated across age groups was compared against a model in which rank-order stabilities were set equal across age groups. If the $\Delta\chi^2$ statistic indicated age group invariance, identical correlations are reported for emerging and young adults; if the $\Delta\chi^2$ statistic indicated an age group difference, freely estimated correlations for each group are reported. All estimated correlations were significant at the $p < .001$ level.

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Table 5. Age group comparisons of emerging and young adults' inter-individual differences in change

	Age group comparison		Inter-individual differences in change (σ^2)	
Trait	$\Delta\chi^2$	p	Emerging adults	Young adults
Extraversion	9.47	.002	0.39	0.27
Neuroticism	6.39	.011	0.44	0.44
Agreeableness	3.36	.067	0.14	0.14
Conscientiousness	33.54	<.001	0.26	0.12
Openness	7.05	.008	0.04	0.03

Note: Inter-individual differences in change pertain to the variances of the latent *Change* factors. Age group comparisons were carried out via scaled χ^2 difference tests of model fit. A model in which *Change* factor variances were freely estimated across age groups was compared against a model in which *Change* factor variances were set equal across age groups. If the $\Delta\chi^2$ statistic indicated age group invariance, identical variances are reported for emerging and young adults; if the $\Delta\chi^2$ statistic indicated an age group difference, freely estimated variances for each group are reported. All estimated variances were significant at the $p < .001$ level.

Table 6. Age group comparisons of emerging and young adults' socialization effects on single personality traits

		Age group comparison				Event → Level				Event → Change			
		Event → Level		Event → Change		Emerging adults		Young adults		Emerging adults		Young adults	
Event	Trait	$\Delta\chi^2$	p	$\Delta\chi^2$	p	b (*SE*)	p	b (*SE*)	p	b (*SE*)	p	b (*SE*)	p
First coresidence													
	E	0.65	.419	0.01	.943	**0.23 (0.04)**	**<.001**	**0.23 (0.04)**	**<.001**	−0.08 (0.04)	.062	−0.08 (0.04)	.062
	N	1.79	.181	0.82	.364	−0.05 (0.04)	.211	−0.05 (0.04)	.211	−0.04 (0.05)	.379	−0.04 (0.05)	.379
	A	0.01	.927	0.60	.438	−0.04 (0.02)	.099	−0.04 (0.02)	.099	**0.06 (0.03)**	**.027**	**0.06 (0.03)**	**.027**
	C	0.79	.374	5.65	.017	**0.08 (0.03)**	**.010**	**0.08 (0.03)**	**.010**	−0.02 (0.03)	.614	−0.02 (0.03)	.614
	O	0.10	.749	1.16	.282	−0.01 (0.01)	.491	−0.01 (0.01)	.491	**−0.04 (0.01)**	**.008**	**−0.04 (0.01)**	**.008**
First separation													
	E	1.89	.169	0.29	.588	**0.26 (0.05)**	**<.001**	**0.26 (0.05)**	**<.001**	0.03 (0.04)	.510	0.03 (0.04)	.510
	N	1.40	.236	0.70	.404	0.05 (0.05)	.324	0.05 (0.05)	.324	−0.04 (0.05)	.398	−0.04 (0.05)	.398
	A	0.43	.513	0.73	.392	**−0.10 (0.02)**	**<.001**	**−0.10 (0.02)**	**<.001**	0.05 (0.03)	.090	0.05 (0.03)	.090
	C	0.26	.609	0.10	.758	0.01 (0.03)	.696	0.01 (0.03)	.696	0.05 (0.03)	.107	0.05 (0.03)	.107
	O	0.28	.597	1.07	.301	0.03 (0.02)	.059	0.03 (0.02)	.059	−0.01 (0.01)	.379	−0.01 (0.01)	.379
First job													
	E	1.68	.195	2.88	.089	**0.20 (0.04)**	**<.001**	**0.20 (0.04)**	**<.001**	−0.06 (0.04)	.100	−0.06 (0.04)	.100
	N	0.02	.879	0.85	.358	−0.07 (0.04)	.075	−0.07 (0.04)	.075	0.08 (0.04)	.067	0.08 (0.04)	.067
	A	0.45	.503	1.58	.209	<0.01 (0.02)	.867	<0.01 (0.02)	.867	−0.01 (0.02)	.785	−0.01 (0.02)	.785
	C	1.27	.259	0.81	.367	**0.06 (0.03)**	**.029**	**0.06 (0.03)**	**.029**	0.04 (0.03)	.152	0.04 (0.03)	.152
	O	0.43	.514	2.36	.125	−0.02 (0.01)	.059	−0.02 (0.01)	.059	<0.01 (0.01)	.730	<0.01 (0.01)	.730
Leaving the parental home													
	E	3.09	.079	0.91	.341	**0.09 (0.04)**	**.026**	**0.09 (0.04)**	**.026**	−0.05 (0.04)	.144	−0.05 (0.04)	.144
	N	1.41	.236	0.35	.557	0.05 (0.04)	.202	0.05 (0.04)	.202	<0.01 (0.04)	.937	<0.01 (0.04)	.937
	A	3.73	.054	0.18	.670	−0.01 (0.02)	.547	−0.01 (0.02)	.547	0.03 (0.02)	.210	0.03 (0.02)	.210
	C	<0.01	.984	0.04	.834	−0.01 (0.03)	.843	−0.01 (0.03)	.843	0.02 (0.03)	.414	0.02 (0.03)	.414
	O	4.60	.032	1.29	.255	**0.03 (0.01)**	**.011**	**0.03 (0.01)**	**.011**	<0.01 (0.01)	.850	<0.01 (0.01)	.850
First relationship													
	E	**10.55**	**.001**	0.39	.533	**0.34 (0.06)**	**<.001**	−0.09 (0.13)	.490	0.02 (0.05)	.693	0.02 (0.05)	.693
	N	1.31	.253	0.42	.516	−0.07 (0.06)	.238	−0.07 (0.06)	.238	−0.02 (0.06)	.721	−0.02 (0.06)	.721
	A	0.53	.468	0.93	.335	−0.03 (0.03)	.358	−0.03 (0.03)	.358	0.05 (0.03)	.120	0.05 (0.03)	.120
	C	<0.01	.956	1.69	.193	**0.09 (0.04)**	**.025**	**0.09 (0.04)**	**.025**	0.03 (0.04)	.402	0.03 (0.04)	.402
	O	0.02	.880	0.39	.534	0.01 (0.02)	.470	0.01 (0.02)	.470	**−0.04 (0.02)**	**.021**	**−0.04 (0.02)**	**.021**
First child													
	E	4.29	.038	0.05	.829	0.09 (0.06)	.111	0.09 (0.06)	.111	−0.03 (0.06)	.646	−0.03 (0.06)	.646
	N	1.51	.219	0.08	.781	**−0.14 (0.06)**	**.013**	**−0.14 (0.06)**	**.013**	−0.05 (0.05)	.335	−0.05 (0.05)	.335
	A	3.30	.069	2.41	.120	−0.01 (0.03)	.692	−0.01 (0.03)	.692	−0.01 (0.03)	.794	−0.01 (0.03)	.794
	C	0.99	.319	0.58	.446	**0.12 (0.04)**	**.001**	**0.12 (0.04)**	**.001**	**−0.08 (0.04)**	**.030**	**−0.08 (0.04)**	**.030**
	O	0.15	.697	0.47	.492	−0.02 (0.02)	.263	−0.02 (0.02)	.263	**−0.04 (0.02)**	**.023**	**−0.04 (0.02)**	**.023**

Note: Age group comparisons were carried out via scaled χ^2 difference tests of model fit. In a first step, a model in which all effects on *Level* and *Change* were freely estimated was compared against a model in which the effects on *Level* were set equal across age groups. Based on the result of this difference test, the more favourable model was in a second step compared against a model in which the effects on *Change* were (additionally) fixed to equality. The presented unstandardized regression coefficients (b) pertain to the respective final model as determined by the two age comparisons. Thus, if the $\Delta\chi^2$ statistic indicated age group invariance, identical coefficients are reported; if the $\Delta\chi^2$ statistic indicated an age group difference, freely estimated coefficients for each group are reported. Participants' sex was mean centred and included as a covariate. Significant regression coefficients ($p < .001$) are printed in bold. E = Extraversion; N = Neuroticism; A = Agreeableness; C = Conscientiousness; O = Openness.

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Agreeableness. For these traits, inter-individual differences in change did not significantly differ between the age groups. Moreover, the magnitude of inter-individual differences in change differed with respect to the trait under study: in both groups, they were largest for changes in Neuroticism and Extraversion, less pronounced for changes in Agreeableness and Conscientiousness, and smallest for changes in Openness.

Socialization effects of life events on single trait change

Socialization effects of single life events on trait change are displayed on the right-hand side of Table 6. All models controlled for the effects of life events on *Level* factors (reported on the left-hand side of Table 6) and had a good fit to the data (Table S15).

First coresidence with a partner
Our analyses revealed that the first coresidence with a partner had a socialization effect on individuals' Agreeableness and Openness that did not significantly differ between the age groups. Both emerging and young adults who had moved in with their partners showed stronger increases in Agreeableness and stronger decreases in Openness than those who had not.

First separation from a partner
Experiencing the first separation was not significantly associated with personality change in neither emerging nor young adults. Accordingly, age group comparisons revealed no differences between the two groups.

First job
Age group comparisons regarding socialization effects of the first job revealed no differences between emerging and young adults. Beginning the first job had no significant effects on changes in any of the Big Five traits.

Leaving the parental home
Regarding socialization effects of leaving the parental home, no differences between the age groups were found. Neither emerging nor young adults who had left their parental home for the first time significantly differed in their personality change from those who had not.

First romantic relationship
Beginning the first romantic relationship was associated with steeper declines in Openness levels in both emerging and young adults. No significant socialization effects or age group differences were found with respect to the remaining traits.

First child
The birth of the first child had two socialization effects that did not significantly differ between the age groups. First, having the first child attenuated emerging adults' increases in Conscientiousness and predicted more pronounced decreases in young adults' Conscientiousness. Second, experiencing this event was associated with stronger decreases in Openness in both age groups.

Profile change

In the group of emerging adults, the mean profile correlation amounted to $r = .56$ ($SD = 0.41$). In comparison, young adults' mean profile correlation was significantly higher ($r = .67$, $SD = 0.36$; $\Delta\chi^2(1) = 69.49$, $p < .001$). Hence, on average, emerging adults experienced more profile change than young adults. Moreover, individual profile correlations covered nearly all possible values—ranging from −.99 to 1 in emerging adults and from −.95 to 1 in young adults—indicating considerable inter-individual differences in profile change.

Socialization effects of life events on profile change

The estimated socialization effects of the six first-time life events on emerging and young adults' profile changes are presented in Table 7. Individuals who experienced a life event did not differ significantly in their profile change from individuals who did not experience it. This was true for all life events under investigation and for both age groups. Thus, there were no moderations by age, as indicated by non-significant χ^2-difference tests.

Table 7. Age group comparisons of emerging and young adults' socialization effects on profile change

	Age group comparison		Emerging adults		Young adults	
Event	$\Delta\chi^2$	*p*	*b* (*SE*)	*p*	*b* (*SE*)	*p*
First coresidence	2.40	.122	−0.05 (0.04)	.169	−0.05 (0.04)	.169
First separation	0.08	.780	0.01 (0.04)	.822	0.01 (0.04)	.822
First job	2.25	.134	0.04 (0.03)	.204	0.04 (0.03)	.204
Leaving the parental home	0.21	.644	0.06 (0.03)	.083	0.06 (0.03)	.083
First relationship	0.45	.504	−0.02 (0.05)	.654	−0.02 (0.05)	.654
First child	5.27	.022	0.05 (0.05)	.339	0.05 (0.05)	.339

Note: The estimated unstandardized regression coefficients (*b*) pertain to models in which individuals' profile correlations were regressed on the respective life events. Age group comparisons were carried out via scaled χ^2 difference tests of model fit. A model in which the effects of the respective event on profile correlations were freely estimated across age groups was compared against a model in which the effects of the respective event on profile change were set equal across age groups. If the $\Delta\chi^2$ statistic indicated age group invariance, identical regression coefficients are reported for emerging and young adults; if the $\Delta\chi^2$ statistic indicated an age group difference, freely estimated regression coefficients for each group are reported.

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Supplemental analyses

Personality change in reaction to life events does not necessarily follow a strict linear course (Luhmann, Orth, Specht, Kandler, & Lucas, 2014). For example, life events might be accompanied by temporary shifts in personality levels that reverse over time, or their impact on personality change might unfold over an extended period of time. Thus, socialization effects on personality change across two time points might be moderated by the temporal distance between personality assessment and the event (e.g. van Scheppingen et al., 2016). In the current study, the six life events were coded using annually assessed information. Participants were asked to indicate the dates of specific life events and episodes in their family, love, and work lives (e.g. beginning and end of a relationship, birthdates of children, or residential episodes) as precise as possible. Based on this information, we created additional variables that provided information about the temporal distance between T1 and the experienced event in days for those who experienced the event between T1 and T2. Hence, larger values indicated that the respective event was experienced more recently, that is, closer to T2. In supplementary analyses, we entered these distance variables (scaled to years) as additional predictors of personality change. Again, we tested for age-differential effects by comparing unconstrained models with models in which the effects of the distance variables were fixed to be equal across emerging and young adults. In a first set of supplemental analyses, we added the distance variables to the multi-group latent change models addressing the role of life events for changes in single personality traits. All models had an adequate fit to the data (Table S18). Moreover, including the distance variables did not change the results for the average socialization effects reported in Table 5. Age group comparisons revealed that the effects of the distance variables on personality change did not significantly differ between emerging and young adults. However, we found five significant age-invariant effects (Table S16). First, having separated from the partner for the first time more recently (i.e. closer to T2) was negatively associated with changes in Neuroticism (Figure S1, panel a) and positively associated with changes in Agreeableness (Figure S1, panel b). Second, those who had left the parental home more recently showed more positive changes in Agreeableness (Figure S1, panel c). Third, beginning the first relationship more recently was associated with more positive changes in Extraversion (Figure S1, panel d). Finally, a more recent birth of the first child had a more positive effect on changes in Agreeableness (Figure S1, panel e).

In a second set of analyses, we included the temporal distance to the events as additional predictors of emerging and young adults' profile changes. Again, we found no age-differential effects with respect to all six life events (Table S17). However, we found two age-invariant effects. First, across both age groups, having moved in with the partner closer to T2 was associated with stronger profile change. Second, those who began their first job more recently demonstrated stronger profile change.

DISCUSSION

The goal of this study was to investigate age differences in personality development within early adulthood. By applying a multi-group structural equation modelling approach, we examined whether emerging and young adults differed regarding four aspects of personality change: mean-level change, rank-order change, inter-individual differences in change, and profile change. In addition, we investigated whether first-time life events had age-differential associations with changes in single personality traits and personality profiles. In the following sections, we discuss our findings with regard to each aspect of change.

Patterns of personality development in emerging and young adults

Mean-level change

A large number of previous studies found that, on average, individuals tend to become less neurotic and both more agreeable and conscientious during early adulthood (Bleidorn et al., 2018; Roberts et al., 2006). In accordance with this pattern, we found a slight average increase in Agreeableness in both age groups. Average levels of Conscientiousness, however, were found to increase in emerging adulthood, but not in young adulthood, thus underscoring the relevance of the emerging adulthood years for the development of this trait (Milojev & Sibley, 2017). This age-specific increase in Conscientiousness may be explained by the life goals that become most salient during these years. For instance, the prospects of increasing independence and self-responsibility may foster more conscientious behaviour. In stark contrast, young adults significantly decreased in Conscientiousness over the four years under study. Approaching the end of early adulthood, young adults' more settled lives and working conditions may allow them to focus more on family planning and the development of social relationships (Hutteman et al., 2014). In support of this notion, Salmela-Aro, Aunola, and Nurmi (2016) showed that individuals' strong focus on work-related and education-related goals at the beginning of adulthood levels out in their late twenties.

In addition, we found that emerging adults became more neurotic during the four years investigated in the present study, which was not the case for young adults. Notably, this result is at odds with the meta-analytical finding of decreases in Neuroticism throughout the whole range of early adulthood (Roberts et al., 2006). It rather points to substantial age differences within early adulthood, which corresponds to the notion of emerging adulthood as a time of instability (Arnett, 2000, 2007). Our results suggest that increases in neurotic feelings, thoughts, and behaviour are not uncommon during the emerging adulthood years. In fact, findings on emerging adults' well-being appear to be somewhat paradoxical. On the one hand, this period has been found to be associated with relative optimism and gradual increases in psychological functioning (e.g. Galambos, Barker, & Krahn, 2006). On the other hand, a substantial number of individuals may experience their early twenties as a time of augmented

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stress and uncertainty (Nelson & Barry, 2016; Nelson & Padilla-Walker, 2013; Robbins & Wilner, 2001; Salmela-Aro, Aunola, & Nurmi, 2008).

Rank-order change

Compared with young adults, emerging adults are considered to be a more heterogeneous age group characterized by greater psychological and demographic diversity (Arnett, 2000). Based on this assumption, we formulated the hypothesis that emerging adults would show larger rank-order changes than young adults, which was supported by the data for three of the Big Five traits. Compared with young adults, emerging adults' rank-order changes in Extraversion, Neuroticism, and Conscientiousness were substantially larger. Although we found slightly larger rank-order stabilities than other studies in both groups, these results are fully in line with the literature showing an increasing stability of inter-individual differences in various traits with age (Milojev & Sibley, 2014; Roberts & DelVecchio, 2000).

Inter-individual differences in change

As expected, our results indicate a general pattern of considerable age differences with respect to inter-individual differences in intra-individual trait change. Compared with young adults, emerging adults evinced larger inter-individual differences in Extraversion, Conscientiousness, and Openness trajectories. To our knowledge, only one previous study has investigated individual differences in Big Five latent personality change in relation to age. Compared with younger and older age groups, Schwaba and Bleidorn (2018) reported individual differences in change to be largest during emerging adulthood. Thus, the results of the present study add to the relatively sparse literature on age differences in inter-individual differences in change, supporting the idea that emerging adulthood is the time in life after childhood, during which personality traits can unfold into the most diverse directions.

Notably, changes in Neuroticism were marked by relatively large inter-individual differences in both the emerging and young adult groups. This finding highlights that one single developmental pattern does not suffice to describe all people equally well; instead, the large inter-individual differences in change might be attributable to several subgroups of individuals with specific developmental trajectories (Johnson, Hicks, McGue, & Iacono, 2007; Mund & Neyer, 2016; Nelson & Padilla-Walker, 2013). Identifying and describing these subgroups—regarding change in Neuroticism as well as in other traits—presents an important task for future research that aims at a better understanding of the antecedents and consequences of different developmental pathways.

Profile change

With regard to profile change, our analyses revealed substantial differences between the two age groups. On average, emerging adults had less stable profiles than young adults, meaning that emerging adults' intra-individual constellations of personality traits changed more strongly. This result is similar to findings from previous studies that demonstrated an increase in profile stability with age (Klimstra et al., 2009; Klimstra et al., 2010; Roberts et al., 2001; Terracciano et al., 2010). It is also consistent with the assumed peak of self-exploration and psychological instability in emerging adulthood (Arnett, 2000, 2007). Typically, a more stable personality profile is considered to indicate better psychological functioning and health (Roberts et al., 2001). The results of the present study might therefore point to an increased risk of poor well-being on the part of emerging adults. Indeed, Klimstra et al. (2010) found that college students' profile change was positively related to depressive symptoms and indicators of poor psychological adjustment. Whether or not profile change comes along with the same risks for emerging and young adults remains an open question.

The role of life events for emerging and young adults' personality change

Previous research has shown that numerous life events, particularly from the domains of love and family, work, and residential independence, dynamically interact with personality traits (Bleidorn et al., 2018). However, to date, systematic investigations of age differences in socialization effects are largely missing. In the present study, we therefore compared longitudinal associations between personality traits and six first-time life events—the first coresidence with a partner, the first separation from a partner, the first job, leaving the parental home for the first time, the first romantic relationship, and the birth of the first child—between emerging and young adults.

In general, we found no evidence for age-differential socialization effects of first-time life events on single personality traits. Our analyses, however, yielded five socialization effects that did not differ across age groups. First, the first coresidence with a partner had a positive effect on Agreeableness and a negative effect on Openness levels. According to Neyer, Wrzus, Wagner, and Lang (2011), romantic relationships are characterized by high closeness and reciprocity. When partners move in together, they have to learn to share a household, negotiate ground rules, and adjust to each other's needs. Thus, showing concern for the partner might be particularly satisfying and desirable, eventually leading to increases in Agreeableness. At the same time, sharing a household likely leads to higher partner commitment and to some degree limits the exploration of new environments, which should, in the long run, lead to decreases in Openness. Similarly, the same mechanism of increasing commitment and decreasing opportunities for exploration might underlie the socialization effects of the first romantic relationship and birth of the first child on decreases in Openness. However, further research is needed to understand why and how these socialization effects occur.

Second, having the first child was negatively related to Conscientiousness levels, which replicates recent findings (Denissen et al., 2018; Specht et al., 2011). Although this finding opposes the social investment principle (Roberts, Wood, & Smith, 2005), it might be explained by increased stress after having the first child, which could deplete

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individuals' resources and opportunities to behave conscientiously. Moreover, Conscientiousness items typically aim to assess individuals' industriousness and achievement motivation (e.g. one item of the BFI-S reads 'I am proficient and work quickly'; Rammstedt & John, 2005), which have limited relevance for parenthood.

Unexpectedly, the present study did not find an increase in Conscientiousness after entering the labour force in either of the two age groups, which was reported in various previous studies (Hudson & Roberts, 2016; Roberts, Caspi, & Moffitt, 2003; Specht et al., 2011). Nevertheless, we found an association in the expected direction that might not have reached significance because of limited statistical power. Moreover, those who did not begin their first job might have pursued other life paths that demand increases in Conscientiousness similar to the first job, such as college entry (Lüdtke et al., 2011).

Also, the present study could not replicate previous findings of decreases in Neuroticism after beginning the first romantic relationship (Lehnart et al., 2010; Neyer & Asendorpf, 2001; Neyer & Lehnart, 2007). One potential explanation for this might be that the effect of the first relationship on Neuroticism is restricted to a very narrow age interval, as a recent study could replicate the effect only for individuals between 23 and 25 years old (Wagner et al., 2015). This age range was not included in the present data.

In addition to socialization effects on single personality traits, we investigated whether life events related to changes in emerging and young adults' personality profiles. Although several life events were found to relate to changes in single personality traits, emerging and young adults' personality profiles were altogether unresponsive to the life events considered in the present study. However, as both emerging and young adults' profile changes were marked by considerable inter-individual differences, there might be other potential moderators that need to be identified in future research (e.g. genetic factors or health; Bleidorn et al., 2012; Hopwood et al., 2009).

In supplemental analyses, we explored whether the socialization effects on trait and profile changes were moderated by the timing of the events. For two life events (first coresidence with a partner and first job), their effects on profile change depended on their timing. With respect to single traits, event timings had an influence on how much change was observed for five event–trait combinations. Notably, the results consistently showed that socialization effects were stronger the more recently the respective events were experienced. This has two important implications: first, albeit unrelated to long-term personality changes, some life events might have short-term socialization effects that could be obscured by long intervals between (successive) personality assessments. For instance, our results suggest that separating from the partner is related to temporary increases in Agreeableness that appear to wear off over a longer period of time. Second, life events might also have non-linear effects on personality traits over time (Luhmann et al., 2014). Our results suggest, for instance, that the birth of the first child is associated with short-term increases but long-term decreases in Agreeableness (for a similar finding for first-time fathers, see van Scheppingen et al., 2016). Taken together, we found some preliminary evidence for the relevance of the timing of life events in determining their effects on personality change. Future research that is specifically tailored to investigate this question—for example, using more frequent, temporally close personality assessments—is certainly worthwhile (Luhmann et al., 2014).

Differences between emerging and young adults' personality development

Although theoretically distinct, the four considered aspects of personality change are often empirically related (Mund, Zimmermann, et al., 2018). Therefore, we first summarize our findings in a trait-wise fashion before turning to the overall picture of age differences in early adults' personality development.

Our results suggest that the average early adult continuously decreases in Extraversion over time. Nevertheless, changes in Extraversion were marked by substantial inter-individual differences, particularly in emerging adulthood. Thus, whereas some emerging adults become less extraverted, others may increase in this trait. In contrast, change variabilities and rank-order changes were less pronounced in young adults. Taken together, this indicates that inter-individual differences in the change of Extraversion attenuate with age, and inter-individual differences in the levels of Extraversion tend to stabilize. Moreover, individual differences in Extraversion change were related to the timing of one life event: in the short (but not the long) run, beginning the first romantic relationship was associated with increases in Extraversion.

Although the average emerging adult increased in Neuroticism and the average young adult did not show any change, individual trajectories in both age groups were highly variable. Moreover, as indicated by the higher rank-order stability of young adults compared with emerging adults, these idiosyncratic changes might set off the amplification of inter-individual differences in the levels of Neuroticism over the course of early adulthood. Thus, although Neuroticism trajectories seem to be highly diverse, they might also be less reversible over time. For example, those who were initially more neurotic than others might increase in Neuroticism even further, whereas those with lower levels might further decrease. Individual differences in Neuroticism change were related to the timing of the first separation: a more recent separation from a partner for the first time was negatively associated with changes in Neuroticism for both emerging and young adults.

Changes in Agreeableness were largely comparable between emerging and young adults. In both groups, there was low variance around slight mean-level increases, and inter-individual differences in this trait were equally stable. Taken together, this might suggest that most early adults are confronted with the same societal expectations and demands for more agreeable behaviour, which they also easily comply with. Our results indicate that moving in with the partner might come along with such demands: in both age

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groups, those who experienced this event demonstrated steeper increases in Agreeableness than those who did not. In addition, there were positive short-term socialization effects involving the first separation, leaving the parental home, and the birth of the first child.

Changes in Conscientiousness were marked by considerable age differences. In emerging adulthood, we found an average increase in this trait. However, there were substantial inter-individual differences in emerging adults' Conscientiousness trajectories, which might also have affected the shifts in emerging adults' relative positioning on this trait. In contrast, the average decrease in Conscientiousness observed in young adults appears to be more uniform: there was lower variance around this mean-level trend and little change in the rank order. Taken together, the results might be due to increasing demands for conscientious behaviour for most, but not all emerging adults, that might become less pressing later in life. Consistent with this notion, we found a negative socialization effect of the birth of the first child, which was more commonly experienced by young adults.

Finally, mean-level changes in Openness were marked by small decreases in both age groups, which were slightly steeper in young adulthood. Interestingly, decreases in Openness appear to be a common phenomenon for the large majority of early adults. In both groups, rank-order changes and change variabilities for Openness were lowest among all Big Five traits. These patterns might be attributable to the accumulation of commitments over the course of early adulthood (Arnett, 2000, 2007). In support of this post hoc interpretation, three (first coresidence with a partner, first romantic relationship, and birth of the first child) of the six studied life events were associated with decreases in Openness.

Taken together, the results of the present study highlight the benefits of distinguishing between emerging and young adults. In line with our expectations, we found differences between age groups in each set of analyses on the four considered aspects of personality change. Besides showing different mean-level changes in three of the Big Five traits, age group comparisons revealed a pattern of larger rank-order change, larger inter-individual differences in change, and larger profile change in emerging adulthood. These findings are consistent with the idea that emerging adults form a more diverse, instable age group that is freer to explore new environments and less expected to take on adult responsibilities, compared with young adults.

Conversely, our findings indicate that longitudinal associations between life events and personality traits do not substantially differ between emerging and young adults. We found some evidence for socialization effects but no evidence for age differences therein. Our analyses therefore indicate that emerging and young adults' personality traits generally did not react to the studied life events in different ways, suggesting that research on personality–environment transactions might not gain much from a distinction between the two age groups. However, because of the lack of comparable systematic studies on age-differential socialization effects, this conclusion might require refinement by additional research, replicating the present findings and examining additional life events.

Limitations and future directions

The present study has several limitations. First, personality traits were assessed twice over the time interval of four years, allowing us to model only linear changes. However, personality does not necessarily develop in a strict linear fashion. Instead, it has been suggested that personality changes can be discontinuous, non-linear, or even reversible over time (Luhmann et al., 2014; Milojev & Sibley, 2017). This might apply to personality change both inside and outside the context of life events. Such non-linear patterns may be worth investigating in future studies with higher temporal resolutions. In a similar vein, important short-term processes surrounding the events, such as anticipatory effects before the event (Luhmann et al., 2014; Mund, Zimmermann, et al., 2018), could not be analysed. It is plausible that some individuals might perceive the behavioural expectations and demands associated with a life event as more pressing than others. For example, Heckhausen, Wrosch, and Schulz (2010) argue that many transitions adhere to age-graded developmental deadlines and that individuals' engagement in them largely depends on their distance to this deadline. To address these issues, studies realizing more frequent and temporally closer personality assessments are necessary. More intensive longitudinal studies, particularly using cohort-sequential designs, would also allow for strict tests of independent effects of age and cohort on personality change.

Second, the present study focused solely on change in the broad Big Five personality traits. To draw a more complete picture of personality change in early adulthood, future research should investigate additional, finer-grained individual characteristics such as motives, values, or attitudes in order to unearth further and possibly even stronger age differences. For example, emerging adulthood is commonly described as a time of augmented self-focus and rapid increases in personal independence (Arnett, 2000), whereas young adults were found to shift their focus more towards others (Hutteman et al., 2014; Salmela-Aro et al., 2016). This might find expression in the age-differential development of agentic and communal motives (e.g. Hagemeyer, Neyer, Neberich, & Asendorpf, 2013). In a similar vein, future research should examine Big Five personality change not only on the broad dimensional level but also regarding their facets and nuances (Mõttus, Kandler, Bleidorn, Riemann, & McCrae, 2017; Mund & Neyer, 2014).

Third, although the results of the present study support differences in emerging and young adults' personality change, they do not offer an explanation of these differences. The observed differences may be attributable to either psychological or demographical differences or simply to continuous age trends that bear on the entire life span. Because of the lack of specific theoretical criteria, identifying distinct age groups is a difficult task. Although our findings cannot answer whether emerging adulthood is a distinct life stage or not, they are consistent with the notion that the concept of emerging adulthood might be helpful in formulating

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specific hypotheses about age-differential personality change in early adulthood. Theories concerned with finer-grained age differentiations may be useful for studying personality development in other age periods as well and could, for example, build on the concept of developmental deadlines (Heckhausen et al., 2010).

Fourth, the central aim of the present study was to find out whether research on personality development might profit from a finer-grained age differentiation in early adulthood, which is usually considered to represent a single age group. Given the growing evidence that personality traits can change throughout the entire life span (for recent reviews, see, for example, Donnellan & Robins, 2009; Mueller, Wagner, & Gerstorf, 2017; Specht, 2017a), future studies might extend this focus by including more age groups. Since the youngest participants in the present study were around 23 years old and the oldest participants around 33 years old at T2, there are several older and younger age groups left to investigate. Critics of Arnett's theory have argued that emerging adulthood is nothing more than a prolonged transition from adolescence to young adulthood (Syed, 2015). Hence, examining differences between personality development in emerging adulthood and adolescence remains another important task for future research.

Fifth, socialization effects should not be understood as the result of a life event per se but of specific situations that accompany these events and accrue to long-term changes. In fact, recent models such as the TESSERA framework of personality development (Wrzus & Roberts, 2017) stress the importance of short-term situational processes underlying long-term personality development. Moreover, these situations should be recursive and constitute a lasting environmental change (Finn, Zimmermann, & Neyer, 2017; Neyer et al., 2014; Wrzus & Roberts, 2017). This means that, after a life event occurred, the new subjective environment or social role needs to be consistent over a certain time span to instigate long-term behavioural changes. Hence, it is important to distil these underlying short-term situational processes to gain a more comprehensive understanding of personality development. For instance, future research could combine macro-longitudinal with micro-longitudinal (e.g. experience sampling) study designs.

Sixth, certain personality changes themselves might have led to the experience of certain first-time life events investigated in the present study, which offers an alternative explanation for the observed socialization effects. Although the observed significant associations between life events and personality change were largely unaffected by their timing within the four-year interval—thus speaking for their interpretability as socialization effects—future research is needed to directly test for such potential confounding.

Finally, life events may not only influence the development of personality characteristics independently but also interact with each other (Luhmann et al., 2014). Many life events are thematically interrelated and occur in a specific temporal sequence (Hutteman et al., 2014). For instance, moving in with a partner necessitates engaging in a partnership first. Therefore, the observed effect of one specific event might either be a distal consequence of an earlier event not covered in the present study or the joint result of experiencing both events.

Conclusion

The findings of the present study provide support for the empirical benefits of distinguishing between emerging and young adulthood when studying personality development. Big Five mean-level changes, rank-order changes, inter-individual differences in change, and profile changes differed markedly between the two age groups, which emphasizes the relevance of the emerging adulthood years with regard to individual development. All in all, the results of the present study highlight that integrating findings from research on personality development and emerging adulthood is indeed a fruitful endeavour. Moreover, our findings underline the importance of investigating age differences not only across but also within specific age periods to gain new and more specific insights into personality development over the life span. In addition to early adulthood, future theory and research might extend this idea to other age periods too.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Table S1 Scale Reliability Estimations (ω) of the Big Five Personality Traits for Emerging and Young Adults.
Table S2 Coding Scheme for the First-Time Life Events
Table S3 Occurrence of Single Life Events and Their Age Group Distribution
Table S4 Fit Indices of Strong Measurement Invariance Models Across Time and Age Groups.
Table S5 Tests of Measurement Invariance Across Emerging and Young Adults
Table S6 Tests of Measurement Invariance Across Time
Table S7 Latent Mean-Level Personality Change and Confidence Intervals
Table S8 Latent Rank-Order Stabilities and Confidence Intervals
Table S9 Inter-Individual Differences in Change and Confidence Intervals
Table S10 Effects of Life Events on Personality Trait Levels and Change and Confidence Intervals
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Table S12 Standardized Mean–Differences Between Latent T1 and T2 Personality Levels for Emerging and Young Adults
Table S13 Standardized Mean–Differences Between Emerging and Young Adults' Level and Change Intercepts
Table S14 Fit Indices of Final Multi-Group Models Estimating Level and Change Intercepts
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Table S16 Effects of Life Event Distance on Change in Emerging and Young Adults' Single Personality Traits
Table S17 Effects of Life Event Distance on Profile Change in Emerging and Young Adults
Table S18 Fit Indices of the Models Estimating the Effects of Life Event Distance on Change in Emerging and Young Adults' Single Personality Traits

Figure S1. Effects of the distance of life events (from T1) on their socialization effects on single personality traits.

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