

Personality and Relationship Quality during the Transition from High School to Early Adulthood

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Objective: The post-high school transition period is believed to be associated with considerable changes in social networks, yet longitudinal studies documenting these changes are scarce. To address this gap, the current research explored three relevant issues. First, changes in participants' relationship characteristics during the transition from high school were examined. Second, the roles of personality traits as antecedents of these changes were studied. Third, the association between change in relationship characteristics and personality during the transition was explored.

Method: A sample of over 2000 German emerging adults, surveyed before leaving school and then two years after the transition from high school, was assessed on personality traits and a multidimensional assessment of the quality of their relationships.

Results: Findings indicated that participants experienced mostly positive changes in relationship quality during the transition from high school and that antecedent personality at school was an important predictor of the nature of this change. Finally, change in relationship quality was found to be associated with personality change during the post-school transition.

Conclusion: Findings indicated that personality traits may influence transition success and that change in relationships during this transition may influence personality development. The implications of the research for post-school transition success are discussed.

Keywords: Personality traits, relationship characteristics, development, longitudinal modeling, social investment.

The transition to post-high school life is a major developmental milestone marking the beginning of emerging adulthood and is associated with greater independence from parents and considerable change in established social networks (Arnett, 2000, 2006; Côté, 2006; Oswald & Clarke, 2003; Zarrett & Eccles, 2006). In particular, young people are faced with developing new social networks and the need to restructure existing networks formed during high school (Aquilino, 2006; Berzonsky & Kuk, 2000; Conger & Little, 2010; Fromme, Corbin, & Kruse, 2008; J. Parker, Summerfeldt, Hogan, & Majeski, 2004; Salmela-Aro & Nurmi, 1997; Tanner, 2006). This transition provides a context in which to explore several questions about young peoples' response to the relationship challenges of this major life transition. First, how do rela-

tionship characteristics change as individuals leave school? Second, do personality traits predict change in social networks during the transition from high school? Third, are changes in relationship characteristics associated with personality change in line with the social investment principle (Roberts, Wood, & Smith, 2005)?

Relationships in the Post-high School Transition Period

The move out of high school represents the beginning of emerging adulthood and it is associated with a number of demands, opportunities, and stresses (Arnett, 2000, 2006; Fromme et al., 2008; J. Parker et al., 2004; P. Parker, Martin, Martinez, et al., 2010; Roberts, Caspi, & Moffitt, 2001). This developmental period has come into prominence in the last 50 years, where young people from 18 to 30 show less commitment to long-term roles and relationships and considerably more identity exploration (Arnett, 2000, 2004). Drawing on Erikson's (1968/1994; see also Côté, 2006) concept of institutionalized moratorium and Levinson's (1978) concept of the novice phase of development, the period which commences after leaving school is characterized by extensive identity exploration, traditionally thought to be the remit of

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adolescence (Erikson, 1968/1994). This identity exploration is marked by an increase in agency as young people are given greater latitude to formulate their own plans for future roles, try different career paths, and take increasing control over the structure and nature of their social networks and intimate relationships (Arnett, 2000; 2006; Tanner, 2006). Previous research suggests that, on average, young people negotiate changes in social networks quite well. This research, however, is largely cross-sectional in nature and therefore subject to potential selection effects. Nevertheless, Furman and Buhrmester (1992) found that relationship characteristics among university students were more positive than those in late high school students. For example, relationship power was found to be higher and conflict lower in university students than in high school students. Support gained from relationships was also higher in university students than students in late high school (Furman & Buhrmester, 1992). These results are consistent with theories, which suggest that this transition period provides an important opportunity for young people to restructure their existing social networks to be closer and more positive (Aquilino, 2006; Arnett, 2000; Conger & Little, 2010; Tanner, 2006).

Relationship Quality with Parents, Siblings, and Friends

Past research has highlighted the importance of considering not just entire social networks but also key relationships such as those with parents, siblings, and friends (Furman & Buhrmester, 1992). For example, relationships with family were found to be more supportive and associated with less conflict and greater relationship power among university than high school students. Such differences are important, as one of the major developmental tasks during this period is the establishment of independence from one's natal family culminating in a process of restructuring relationships with parents (Aquilino, 2006; Arnett, 2004; Tanner, 2006; Zarrett & Eccles, 2006). This may result from young people leaving home, or because young people who stay home renegotiate expectation and living arrangements (see Aquilino, 2006; Arnett, 2000 for a review).

The restructuring of social networks that results from the post-high school transition is also associated with changes in the importance and nature of relationships with siblings (Goetting, 1986). Goetting notes that as individuals move away from home and experience important life events (entering university, getting married, etc.) the dynamics of the relationship between siblings change. These events change the relationship roles where youths who leave high school have increasing choice over how to structure the nature of their relationship with their siblings (Aquilino, 2006; Conger & Little, 2010). This generally takes the form of relationships becoming more adult-to-adult and communication and social interactions becoming less frequent and intense. As with parents (see Arnett, 2000), less contact with siblings is associated with closer relationships and less conflict (Conger & Little, 2010).

The post-high school life is thought to be associated with

non-family relationships, such as friends becoming increasingly important sources of social support (Berzonsky & Kuk, 2000; Conger & Little, 2010; Oswald & Clarke, 2003; Salmela-Aro & Nurmi, 1997). Unlike changes with family that are associated with a restructuring of relationships, the post-high school transition is frequently associated with the need to establish new friendship networks (J. Parker et al., 2004). Indeed, Oswald and Clarke (2003) observed that friendships established in high school typically become less important and less close during the first year at university. The development of new, stable, and close networks during this period is critical as failure to do so can negatively affect well-being, self-esteem, and university retention (see Kantanis, 2000 J.Parker et al., 2004).

Personality as a Predictor of Change in Relationship Quality

Although a longitudinal account of changes in social networks from high school to post-school life is needed, research also needs to identify the factors that predict these changes. Empirical research suggests that personality traits, as relatively enduring cross-time determinates of behavior, are associated with how well individuals manage changes in social networks (e.g. Asendorpf & Wilpers, 1998; Neyer & Asendorpf, 2001; Neyer & Lehnart, 2007; Lehnart, Neyer, & Eccles, 2010; Selfhout et al., 2010). Little research, however, has directly explored the association between personality traits and relationship change during the critical post-high school transition. Personality traits are likely to be important for this period because they predict the type of environments individuals choose and how they orientate themselves within them (Caspi & Bem, 1990). For example, individuals high on extraversion and agreeableness seek out new relationships and find it easier to make friends (Selfhout et al., 2010). Likewise, those high on conscientiousness are more effective at maintaining positive relationships with parents, while those high on neuroticism find it more difficult to maintain positive relationships over time (Robins, Caspi, & Moffitt, 2002; Selfhout et al., 2010).

Although little research has been conducted on the clear contextual change of the post-high school transition, empirical findings in other contexts indicate that personality traits do predict subsequent changes in relationship characteristics (e.g. Asendorpf & Wilpers, 1998; Neyer & Asendorpf, 2001; Neyer & Lehnart, 2007; Selfhout et al., 2010). In particular, research has found that extraversion, neuroticism, and agreeableness are important for predicting change in importance, conflict, and closeness in social relationships (Asendorpf & Wilpers, 1998; Neyer & Asendorpf, 2001; see also Lehnart & Neyer, 2007). However, prior research has examined social network changes that are more gradual (e.g. relationships that change during the course of university; Asendorpf & Wilpers, 1998; Neyer & Asendorpf, 2001; Selfhout et al., 2010), or focus on changes in a single relationship type (e.g. starting or discontinuing a romantic relationship; Robins et al., 2002). Leaving high school, however, is associated with extensive changes to individuals' entire social networks in-

cluding key relationships with parents, siblings, and friends (Aquilino, 2006; Furman & Buhrmester, 1992; Oswald & Clarke, 2003). As such, this period is critical for research exploring the role of basic personality traits in predicting relationship characteristics during major life transitions.

Personality Change during the Post-high School Transition

The post-school transition provides a potent natural experiment to explore how changes in social networks relate to changes in personality traits. Although personality traits are relatively stable over time, human personality is not fixed. There is now considerable evidence that personality does change across the lifespan, with most of the normative changes in personality happening in late adolescence and emerging adulthood (Roberts, Walton, & Viechtbauer, 2006). Thus, one key question is whether personality traits change in response to the post-high school transition. Significant change in personality has been observed in the current sample during this transition with increases in openness, agreeableness and conscientiousness, and declines in neuroticism observed (Lüdtke, Trautwein, & Husemann, 2009). The current research goes one step further to test whether this personality trait change is related to changes in relationship characteristics during this transition.

Intra-individual assessments of change have been used to study the association between change in relationship characteristics and changes in personality in other contexts, and thus provide a basis for forming hypotheses in the current research (e.g. Branje, van Lieshout, & van Aken, 2004; Neyer & Lehnart, 2007; Roberts & Chapman, 2002; Robins et al., 2002; Scollon & Diener, 2006; Sturaro et al., 2008; Van Aken, Denissen, Branje, Dubas, & Goossens, 2006). Research in this area has often focused on general relationship characteristics, like support or satisfaction, suggesting that changes in these factors are associated with changes in neuroticism, extraversion, and agreeableness, and to a lesser extent, conscientiousness and openness (Branje, et al., 2004; Scollon & Diener, 2006). More specifically, research has shown that increases in insecurity with family and friends are associated with increases in neuroticism (Neyer & Lehnart, 2007; Roberts & Chapman, 2002). Similar research has also found an association between conflict and increases in neuroticism and decreases in agreeableness (Robins et al., 2002; Sturaro et al., 2008). Although little research in this area has explored the post-high school transition, it is expected that the current research will observe significant associations between change in personality and relationship characteristics during the post-high school transition on the basis of the social investment principle (see Roberts et al., 2005). This principle suggests that individuals of similar ages tend to share many similar developmental challenges and that investments in age-graded tasks (e.g. beginning work or getting married) are important in providing a framework for explaining personality trait development. When engaging in the social roles, individuals confront expectations about appropriate behavior. These expectations result from invest-

ments in age appropriate tasks. In turn, society, through the actions of individuals in social networks, rewards the meeting of expectations while punishing deviations. As such, expectations encountered after investment in new social roles generally encourage behavior that is more agreeable and conscientious and less neurotic, thus promoting development in those traits. For example, empirical research has shown that key relationship transitions, such as marriage or beginning a serious romantic relationship, are associated with personality maturation (e.g., Lehnart et al., 2010; Neyer & Lehnart, 2007; Roberts & Bogg, 2004; Robins et al., 2002).

The post-high school transition provides a pertinent context from which to explore this framework as it is associated with a number of expectations about the restructuring of relationships including the development of greater independence, more adult-to-adult relationships, and more equitable bi-directional support with parents (Conger & Little, 2010; Salmela-Aro & Nurmi, 1997; Sturaro et al., 2008; Tanner, 2006). This is likely to take the form of reduced conflict and insecurity, and increased closeness, which may be associated with personality maturity, resulting in higher levels of agreeableness and conscientiousness as well as lower neuroticism (see Roberts et al., 2005).

Present Study

The current research explored change in relationship characteristics during the post-high school transition using longitudinal data and an extensive multidimensional measure of relationship characteristics. These relationship characteristics were explored for participant's total reported social networks and then separately for parents, siblings, and friends. For total networks, it was expected that intra-individual change in relationships would, on average, be positive. More specifically, given that friends were expected to become more important sources of social support, it is expected that they would increase in importance, closeness, and contact. Second, we expected that antecedent personality traits would predict changes in subsequent relationship characteristics. It is hypothesized that lower neuroticism and higher extraversion, agreeableness, and conscientiousness would predict decreases in conflict and more positive changes in other relationship characteristics. Third, in keeping with social investment theory, it was expected that change in relationship characteristics during the post-high school transition would be associated with change in personality. In particular, change in relationship characteristics, including conflict, insecurity, and closeness, was expected to be associated with change in neuroticism, extraversion, conscientiousness, and agreeableness. This was assessed using latent change score models (see Figure 2).

Method

Participants

Data for this research came from the *Transformation of the Secondary School System and Academic Careers*

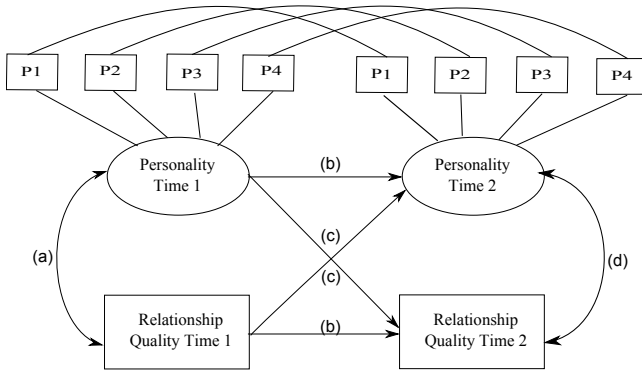


Figure 1. Longitudinal panel design model: (a) concurrent correlations, (b) autoregression effects, (c) cross-lagged effects, (d) correlated residuals.

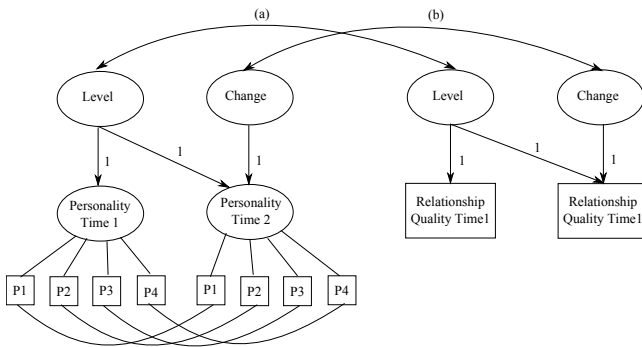


Figure 2. Latent change model. (a) concurrent correlations, (b) correlated change.

(TOSCA) project conducted in Germany (see Köller, Watermann, Trautwein, & Lüdtke, 2004; Lüdtke et al., 2009; Trautwein, Lüdtke, Marsh & Nagy, 2009). The data were obtained from students in 149 randomly selected upper secondary schools in a single German state, which were university or college track (Gymnasium). Ninety-nine percent of the schools approached took part in the research and a participation rate of 80% was achieved at the student level during the first time wave ($N = 4730$). At Time 1 the students were in their final year of upper secondary schooling; their mean age was 19.51 years ($SD = 0.77$) and 63% of the sample were women. At Time 2, 2173 participants, or 45% of the original sample, completed the survey, which included the instruments used in this research. Of these, the majority of participants were in university ($N = 1658$, 76%). However, a significant minority were not on this stereotypical developmental pathway. Of those not on the stereotypical pathway, 14% were in the workplace or in vocational training and three percent entered the labor force. The remaining participants were either on a ‘gap year’ or where not otherwise engaged in employment or education. This group of 2173 participants formed the analysis sample in the current research.

At Time 1, two trained research assistants administered

materials in each school between February and May 2002. Students participated voluntarily, without any financial incentive and completed the research during a specially assigned in-class session during school hours. During this session, all students were asked to provide written consent and contact information to take part in subsequent waves of data collection. Approximately 3000 of the original sample provided such information. Some of the missing contact information was due to a number of students not completing the survey in the time allotted. As noted above, of the participants who gave contact information 2173 agreed to participate in the second wave of the research. They were contacted two years after high school; first by mail and then again by mail and phone. Participants completed a questionnaire of approximately two hours in their own time, which they returned by mail in pre-paid envelopes in exchange for a financial reward of €10.

The rate of attrition from Time 1 to Time 2 was moderately large but was not surprising, given that students must be tracked after they exited school, with many moving away from the original centre of testing. However, attrition was not simply due to logistics but was at least in part associated with variables of interest to this study. Previous research on the selection effects of this sample indicated that those who participated in both time periods had higher grade point averages and were more likely to be female (see Lüdtke et al., 2009). Relevant to the current study, continuers were observed to have higher conscientiousness ($d = .16$) and agreeableness scores ($d = .12$) than drop-outs. Selection effects in relationship characteristics have not yet been tested and as such are reported here. Significant ($p < .05$) selection effects consisted of continuers reporting less contact ($d = -.08$) and closeness ($d = -.10$) and greater insecurity ($d = .13$) in their social network at Time 1. When considered by relationship type, continuers were higher on contact with parents ($d = .10$), and insecurity ($d = .14$) and closeness ($d = .15$) with friends. They were also lower on conflict with siblings ($d = -.07$) and contact with friends ($d = -.08$). Although those who remained in the study were significantly different from those who dropped out, these differences were small and indicated only moderate selection effects.

Materials

Personality Traits. The big five personality traits of extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience were measured using the German version (Borkenau & Ostendorf, 1993) of the NEO-FFI (Costa & McCrae, 1992). Extensive work on the German translation has demonstrated the instrument’s high reliability, validity, and comparability with the English original (e.g., Borkenau Ostendorf, 1993). Items were rated on a four-point scale with poles of 1 = *strongly disagree* and 4 = *strongly agree* (see Lüdtke, Trautwein, Nagy, & Köller, 2004).

Personality trait scores were estimated using latent variable modeling, which has the advantage of controlling for unreliability (Kaplan, 2000; Raykov, 1992). Four-item parcels

were created for each personality factor consisting of every fourth item. Numerous authors (e.g., Bagozzi & Heatherton, 1994; Floyd & Widaman, 1995; Hull, Lehn, & Tedlie, 1991; West, Finch, & Curran, 1995) have noted the advantages of using item parcels in that they are (a) more normally distributed, (b) more reliable, (c) less influenced by idiosyncratic characteristics of individual items, and (d) necessitate the estimation of fewer parameters.

Social Network Questionnaire. The social network questionnaire was an adaptation of the social relationship inventory used by Asendorpf and Wilpers (1998; see also Neyer & Asendorpf, 2001). Participants were asked to consider significant persons that they had had contact with in the last three months. Participants were given a table of 25 rows in which they were asked to fill out the initials of each of these people, the person's gender and age, and what their relationship to the person was. In order to maximize the number of relationships that participants reported we used primer categories of partner, ex-partner, parent, sibling, grandparents, other relative, friend, and acquaintance. Participants then rated each relationship on a series of five-point scales including the amount of contact (1 = *less than once a month*, 5 = *daily*), importance (1 = *it would be better for me to end this relationship*, 5 = *ending this relationship would be stressful for me*), conflict (1 = *never*, 5 = *nearly whenever we are together*), closeness (1 = *very far*, 5 = *very close*), and insecurity (1 = *never*, 5 = *nearly whenever we are together*) in the relationship. Internal consistency for the participants' total social network ranged from .75 for contact to .90 for uncertainty at both time periods.

This idiographic approach to measuring relationship characteristics has been used in a number of studies where it has been shown to be consistently associated with personality and the developmental trajectory found with this method is relatively consistent with other approaches (e.g. Furman & Buhrmester, 1992). One of the major advantages of this idiographic approach is that research can focus on different levels of aggregation and thus provide both a general perspective of social networks and a specific picture of central elements in this network. In the current research we focused on the total network level where we explored relationship characteristics across all the relationships participants considered to be significant. We also considered specific types of relationships, separately including parents, siblings, and friends.

Statistical Analysis

To explore the antecedent effects of personality on change in relationship characteristics, the current research used a set of longitudinal panel models (see Figure 1) in which the association between each personality construct with each relationship characteristic was analyzed separately. This model provided an assessment of the antecedent effects of one variable on change in another variable via cross-lagged paths, while controlling for construct stability over time (Duncan, Duncan, & Strycker, 2006). Associations in change have typically been assessed within the longitudinal panel model framework utilizing correlated residuals (see Figure 1 path

[d]; e.g. Neyer & Asendorpf, 2001; Sturaro et al., 2008). However, correlated residuals not only include information on associations in change, but also contain all of the variance not explained by Time 1 variables (Figure 2; Ferrer & McArdle, 2010; Sutin & Costa, 2010). In the current research we use latent change score models as a more direct approach to assessing change in personality and relationship characteristics (Ferrer & McArdle, 2010; McArdle & Hamagami, 2001; Raykov, 1992; see also Allemand, Zimprich, & Martin, 2008).

Analyses explored relationship characteristics (e.g. conflict, closeness, etc.) of participants' entire social networks and then for parents, friends, and siblings separately. This resulted in a large number of models submitted to the data, including 25 separate models (5 personality by 5 relationship characteristics) for participants' entire social networks and 75 models (5 personality by 5 relationship characteristics) for parents, siblings, and friends) for both the longitudinal panel and the latent change models. As such, inflation of type I error was a potential concern. In order to account for this, effects were only considered if they were statistically significant at $p < .01$ and if standardized regression coefficients were $|\beta| \geq .10$, consistent with the approach typically taken in research of this kind (see Neyer & Asendorpf, 2001; Roberts, Caspi, & Moffitt, 2003; Sutin & Costa, 2010). The latent variable modeling software Mplus (Muthén & Muthén, 1998-2006) was used for estimating the longitudinal panel and latent change score models. Full information maximum likelihood estimation was used to account for missing data (see Enders, 2010).

Model fit was judged on conventional criteria: the CFI, and the RMSEA. The practical fit indexes were employed because the χ^2 statistic is known to be problematic in the context of very large data sets (e.g., Hoyle, 1995). Several guidelines for cut-off values have been suggested. CFI values greater than .90 are typically taken to reflect an acceptable fit to the data (Marsh, Hau, Grayson, 2005). RMSEA values lower than .05 and .08 reflect a close fit and a reasonable fit, respectively. Correlated uniquenesses were included for the matching personality and relationship quality measures at T1 and T2 and factor loadings were constrained to be equal over time reflecting longitudinal measurement invariance (Raykov, 2004).

Results

The analyses were conducted in three steps. The first step explored the stability and change in relationship characteristics during the post-high school transition via rank order consistency and mean level changes¹. The second step consisted of a series of longitudinal panel models, which explored the predictive effects of personality and relationship characteristics, controlling for construct stability. In the final step, the association between latent change in personality and relationship characteristics was explored using latent change

¹ Stability and change in personality traits for the current sample are covered in detail elsewhere (Lüdtke et al., 2009).

score models. All steps were investigated for both participants' total reported social network (relationship characteristics for participants social network) and then for parents, siblings, and friends separately.

Rank-order Consistency and Mean Stability in Relationship Characteristics

Participants provided information on 18,473 ($M = 8.51$, $SD = 4.41$) relationships at Time 1 and 23,220 at Time 2 ($M = 10.69$, $SD = 5.37$). The results reported in Table 1 provide an indication of the change in the number of relationships from school to post-school life. There was a statistically significant increase in the total number of relationships reported, which largely consisted of reports of more friends. The rank order consistency of the number of relationships reported was moderate, indicating considerable change in the relative ordering of participants from Time 1 to Time 2. There was also some evidence of gender differences at Time 2, with women reporting fewer relationships in general than men, particularly with family.

We next examined relationship characteristics in terms of contact, importance, closeness, conflict, and insecurity (see Table 2). For participants' entire social networks, insecurity and conflict displayed moderate levels of rank order consistency² and decreased over time. Contact displayed weaker rank order consistency and a greater decrease, while importance displayed low rank order consistency and little change. Ratings of closeness displayed relatively low rank order consistency and it was the only relationship characteristic to increase over time. As with the quantity of relationships, ratings of relationship characteristics differed slightly for key relationships (see Table 2). However, the pattern across contact, importance, closeness, conflict, and insecurity was relatively similar for each relationship type.² In line with predictions, contact, conflict, and insecurity with parents and siblings declined while importance increased. Relationships with friends did not increase in closeness, importance, or contact, and in the case of importance a statistically significant, though small, decline was observed.

Differences in gender were also observed at the total social network level, with women (coded 1) reporting higher levels of relationship importance at both time periods (Time 1: $d = .20$; Time 2: $d = .21$), and greater conflict at Time 1 ($d = .18$) and closeness at Time 2 ($d = .33$) than men (coded 0). A number of gender effects were also found in relationship characteristics when results were explored by relationship type. Again, the majority of these effects were greater in women than men. Thus, women reported higher levels of importance (Time 1: $d = .24$; Time 2: $d = .25$), greater closeness with friends (Time 1: $d = .26$; Time 2: $d = .30$), and greater conflict with parents (Time 1: $d = .21$; Time 2: $d = .16$) and siblings (Time 1: $d = .21$; Time 2: $d = .16$) at both time periods. Women also reported greater insecurity with siblings at Time 2 ($d = .17$).

Antecedent Effects of Personality on Change in Relationship Characteristics

In order to test the effect of personality traits at Time 1 on change in relationship characteristics a total of 25 (5 relationship characteristics dimensions by 5 personality traits) models were estimated³. The fit of all models was satisfactory (RMSEA: $M = .04$, $SD = .02$; CFI: $M = .99$, $SD = .01$). In line with hypotheses, higher neuroticism at Time 1 predicted increases in relationship insecurity ($\beta = .16$, $p < .001$). Agreeableness predicted declines in conflict ($\beta = -.13$, $p < .001$), extraversion predicted greater closeness ($\beta = .10$, $p < .001$), and conscientiousness predicted declines in conflict ($\beta = -.11$, $p < .001$) and insecurity ($\beta = -.11$, $p < .001$). Openness to experience predicted a statistically significant decline in contact ($\beta = -.16$, $p < .001$). In line with expectations, antecedent relationship characteristics did not predict changes in personality traits.

We then tested the association between personality traits and change in relationship characteristics by relationship type. A total of 75 (5 relationship characteristics dimensions by 3 relationship types \times 5 personality traits) models were estimated; again, the fit of the models was satisfactory (RMSEA: $M = .03$, $SD = .02$; CFI: $M = .99$, $SD = .01$). Consistent with hypotheses, neuroticism predicted increasing insecurity with parents ($\beta = .16$, $p < .001$), siblings ($\beta = .15$, $p < .001$), and friends ($\beta = .19$, $p < .001$). Extraversion predicted increasing closeness with siblings ($\beta = .10$, $p < .01$), agreeableness predicted decreasing insecurity with siblings ($\beta = -.10$, $p < .001$), and conscientiousness predicted decreasing insecurity with parents ($\beta = -.18$, $p < .001$). Although not hypothesized, openness to experience predicted decreasing levels of contact with parents ($\beta = -.15$, $p < .001$), siblings

² When interpreting the rank order consistency coefficients, it should be kept in mind that the measures of relationship quality for relationship type were achieved by aggregating ratings of similar relationships for each participant (e.g. all ratings of conflict with friends made by a participant). In contrast to traditional scale score indicators, measures of relationship quality differed in the number of relationships used to form them. This can affect the reliability of the average score and thus the rank order consistency (Lüdtke & Trautwein, 2007).

³ It was possible that the relationship between personality and relationship characteristics noted in this research might vary by transition pathways (i.e. those on a stereotypical university or non-stereotypical pathway to vocational education or the workforce). Multi-group analysis was used to explore whether the association between personality and relationship characteristics differed across stereotypical or non-stereotypical developmental pathway. This was done by conducting a series of χ^2 difference tests, and comparing a model in which key parameters were held invariant across groups and a model in which these parameters were free to vary across groups. In all analyses (cross-lagged or latent change score models) there was little difference observed in the associations between personality and relationship quality. Indeed, in all the models tested, by both entire social network and by relationships type only, only two significant differences between traditional and non-traditional pathways were observed. On both occasions, however, the differences were in the strengths of the relationships rather than the direction.

Table 1
Means, Standard Deviations, Reliability, and Stability Estimates for Relationships Characteristics

Relationship Type	Time1		Time2		Rank order consistency	Mean level change ^b	Gender differences ^a	
	Mean	SD	Mean	SD			Time 1	Time 2
All Relationships ^c	8.51	4.41	10.69	5.37	.41	.41	.01	-.15
Parents	1.90	.58	1.92	.48	.24	.03	-.17	-.24
Siblings	1.47	.78	1.52	.81	.77	.09	-.08	-.04
Friends	3.50	2.48	4.50	3.03	.34	.32	-.06	-.17

^aWomen coded as 1 men as 0, Cohen’s d is used as the measure of effect size.

^bMean level change represented by Cohen’s d, corrected for the correlation between Time 1 and Time 2 data in line with Morris and DeShon’s (2002) recommendations for paired samples.

^cThe findings for all relationships are based on the total size of the social network reported by the individual, not just parents, siblings, and friends. Values in bold indicate statistically significant effects at $p < .01$.

Table 2
Means, Standard Deviations, Reliability, and Stability Estimates for Relationships Characteristics

Relationship Type	Contact		Importance		Closeness		Conflict		Importance	
	Rank order consistency	Mean level change	Rank order consistency	Mean level change	Rank order consistency	Mean level change	Rank order consistency	Mean level change	Rank order consistency	Mean level change
All Relationships ^a	.26	-.67	.27	-.07	.22	.23	.39	-.22	.45	-.15
Parents	.29	-.77	.33	.09	.50	.09	.46	-.28	.41	-.13
Siblings	.52	-.62	.42	.11	.44	.12	.48	-.23	.40	-.05
Friends	.15	-.65	.29	-.09	.26	.03	.32	-.17	.37	-.14

^aThe findings for all relationships are based on the total size of the social network reported by the individual, not just parents, siblings, and friends.

^bNumbers in bold indicate statistically significant effects at $p < .01$.

^cMean level change represented by Cohen’s d corrected for the correlation between Time 1 and Time 2 data in line with Morris and DeShon’s (2002) recommendations for paired samples.

($\beta = -.11, p < .001$), and friends ($\beta = -.11, p < .001$). Consistent with expectations, no statistically significant cross-lagged effects from relationship characteristics to personality traits were observed.

Associations between Personality Trait and Relationship Characteristics Change

After exploring the cross-lagged effects, a set of latent change models were calculated in order to investigate whether changes in relationship characteristics from school to post-school life were associated with changes in personality traits. Analyses were run for both the participants’ entire social network and then separately for parents, siblings and friends. For relationship characteristics of participants’ entire social network, the fit of the latent change models was satisfactory (RMSEA: $M = .04, SD = .02$; CFI: $M = .98, SD = .01$).

For participants’ entire social network, five statistically significant associations during the post-high school transition were observed (see Table 3). Changes in relationship insecurity were positively associated with change in neuroticism and negatively associated with change in extraversion and agreeableness. There were also statistically significant associations between change in conflict and importance with changes in agreeableness (see Table 3).

Out of the 75 latent change correlations explored for the association between change in relationship characteristics,

Table 3
Means, Standard Deviations, Reliability, and Stability Estimates for Relationships Characteristics

	Contact	Importance	Conflict	Closeness	Insecurity
	Concurrent Correlations				
Neuroticism	-.11*	-.05	.23**	-.13**	.40**
Extraversion	.07	.11**	-.05	.22**	-.19**
Openness	-.17**	-.02	.06	-.02	.14**
Agreeableness	.09	.20**	-.28**	.24**	-.17**
Conscientiousness	.06	.04	-.19**	.08	-.14**
	Correlated Change				
Neuroticism	.01	-.01	.09	-.03	.19**
Extraversion	-.03	.02	-.06	.04	-.10**
Openness	-.05	-.07	.01	-.05	.06
Agreeableness	-.01	.11*	-.20**	.06	-.12**
Conscientiousness	-.03	.01	-.05	.01	-.02

^a* $p < .01$ ** $p < .001$.

and change in personality by key relationship types, 10 were statistically significant (see Table 4), and centered on the personality factors of neuroticism or agreeableness. In particular, change in neuroticism was positively associated with change in insecurity with parents and friends, and conflict with parents. Likewise, change in neuroticism was observed to be negatively associated with change in closeness with parents. Change in agreeableness was negatively associated with change in conflict with parents, friends, and siblings and positively associated with change in closeness with parents. Finally, change in conscientiousness was negatively associ-

ated with change in conflict with parents and change in openness was positively associated with change in the importance of siblings.

Discussion

The current research provided answers to three research questions pertinent to changes in social networks that occur during the post-high school transition. First, results provided evidence that changes in relationship characteristics over this transition period were on average positive, with conflict and insecurity decreasing over time and closeness increasing. Second, cross-lagged analysis indicated that personality at school was an important antecedent predictor of changes in relationship quality from school to university. Third, latent change score models indicated that changes in relationship characteristics from school to university or the workplace were associated with changes in personality during the same period.

Relationship Change during the Post-high School Transition

The post-high school transition represents the beginning of emerging adulthood, a developmental period that is characterized by a number of changes in a variety of life domains (Arnett, 2006). In terms of relationships this includes not only establishing new friendship circles after school, but also learning to manage existing relationships with the family, which is altered by this transition (J. Parker et al., 2004). The challenges of this period were reflected in the current research, where considerable mean-level change was observed during this transition period for both relationship characteristics and social network composition. This dramatic change supports Arnett's (2006) suggestion that emerging adulthood is defined by dramatic changes in relationships, particularly with parents.

These relationship changes are not necessarily negative, however, as changes tended to be more positive on average with family (Conger & Little, 2010; Tanner, 2006). Given the importance of family in later life, the improvement in family relationship characteristics represents an important potential increase in social support resources. These positive changes in relationship characteristics occurred in the context of significantly less contact with family. Indeed, it is possible that the increase in quality and the decrease in contact with family is connected. Arnett (2000), in his review of the literature on emerging adulthood, notes that either moving away from home, or developing greater independence from parents during this period is associated with greater psychological health. Although the improvement in relationships with family was supported by this research, the theoretical increase in the importance of friendships during this transition period was not observed (Berzonsky & Kuk, 2000; Conger & Little, 2010; Oswald & Clarke, 2003; Salmela-Aro & Nurmi, 1997).

The Antecedent Effects of Personality on Changes in Relationship Characteristics

The change in relationship characteristics in the current research were on average positive, yet this obscured considerable variability in relationship change within the sample (Arnett, 2000; Conger & Little, 2010). We hypothesized that personality would therefore be an important predictor of how well young people navigate changes in social-networks in the post-high school transition. Consistent with these hypotheses, higher extraversion, agreeableness, and conscientiousness, and lower neuroticism were associated with positive change in several relationship characteristics as participants moved out of high school. Although exploring intervening mechanisms was outside the scope of this research, these personality traits may be associated with individuals who are more successful in coping with the social network changes that occur during this transition period. Indeed, in research on first year university students, Selfhout et al. (2010) found that agreeableness and extraversion were important in establishing and maintaining new social networks.

An interesting finding of note in the current research was that openness to experience predicted lower levels of later contact, particularly with family. Such a relationship has not been observed in research in other contexts. This may reflect the unique context of the post-high school transition. Openness to experience represents intellect, educational aptitude, and openness to new ideas, experiences, and thoughts (Bargeman, Chlpver, Plomin et al., 1993). Presumably, such factors are likely to be associated with a greater probability that individuals will undertake studies or employment which take them further from the family home, and thus result in less contact with individual family members. Supporting this assumption, research suggests that openness to experience is related to having more, and more varied, life experiences, including moving out of home (Lüdtke, Roberts, Trautwein, & Nagy, 2011). Given that moving from the parental home to attend university has many benefits, and is an important step in developing independence (see Arnett, 2000; Conger & Little, 2010; Turley, 2006), higher openness to experience may predict more adaptive post-school transitions. Alternatively, parents and siblings represent critical and ongoing sources of social support and moving away from home may introduce difficulties in accessing material and emotional resources from family. Thus, a greater understanding of how this transition is related to personality traits such as openness to experience and the experiences of emerging adults (e.g. experiences relating to social support, well-being, and self-esteem) is needed in order to understand transition success and the relationship between person and context.

The Association between Personality and Relationship Characteristics Change

In the current research, latent change scores provided an opportunity to explore the association between changes in relationship characteristics and changes in personality traits during the critical post-high school transition. Results sug-

Table 4
Means, Standard Deviations, Reliability, and Stability Estimates for Relationships Characteristics

	Contact			Importance			Conflict			Closeness			Insecurity		
	Par	Sib	Fri	Par	Sib	Fri	Par	Sib	Fri	Par	Sib	Fri	Par	Sib	Fri
	Concurrent correlations														
Neuroticism	-.02	-.09	-.09	-.03	.02	-.02	.25**	.10**	.10**	-.14**	-.05	-.03	.25**	.24**	.37**
Extraversion	.03	.04	.11**	.04	.11**	.10**	.00	-.03	-.07	.16**	.13**	.14**	-.12**	-.13**	-.21**
Openness	-.11**	-.07	-.10**	-.07	-.01	.04	.11**	.05	.04	-.08	-.03	.11**	.12**	.15**	.04
Agreeableness	.06	.12	.02	.11**	.13**	.13**	-.19**	-.08	-.22**	.18**	.14**	.14**	-.12**	-.12**	-.10**
Conscientiousness	.05	.15**	.00	.02	.03	-.01	-.19**	.00	-.12**	.10**	.08	.00	-.08	-.12**	-.12**
	Correlated Change														
Neuroticism	-.05	-.03	-.02	-.07	.01	.01	.12**	.02	.04	-.10**	-.03	.00	.15**	.07	.17**
Extraversion	.03	-.06	.07	.01	-.01	.03	-.01	.04	-.01	.05	.00	.05	-.08	-.02	-.09
Openness	.00	.00	.03	-.03	.11**	-.04	-.04	.02	-.01	.00	-.01	.02	.01	.00	-.01
Agreeableness	-.01	-.04	.01	.06	.03	.02	-.12*	-.13*	-.13**	.10*	.03	.02	-.09	-.09	-.09
Conscientiousness	.00	.01	.00	.06	.03	-.02	-.12**	.00	-.03	.05	.03	-.07	-.06	.00	-.09

^a* $p < .01$ ** $p < .001$.

^bPar = Parents, Sib = Siblings, Fri = Friends

gested that changes in relationship characteristics, particularly with the family, were associated with changes in neuroticism, agreeableness, and extraversion. These results illustrate that personality in emerging adulthood is not fixed. Indeed, consistent with previous research, the findings of this research indicate that life transitions, such as the post-school transition, present external conditions that are associated with personality development. It was clear from the results that not all personality traits were related to all relationship characteristics. This is not only consistent with previous literature in this area but is also with personality theory. In particular, it would not be expected that an environmental change would be associated with change in an individual's entire personality system. Rather, certain types of experiences are likely to be pertinent for particular traits to which they are most logically associated with (Lüdtke et al., 2011). In the case of the current research, change in relationship characteristics were associated with traits that are most clearly interpersonal in nature.

From a social investment principle perspective (Roberts et al., 2005), change in personality is often due to changes in the expectations and experiences particular to young adulthood. For example, transitions such as entering the workforce or getting married have been found to be associated with personality maturation. The post-high school transition is associated with a number of expectations and experiences including a move toward independence, the development of more adult-to-adult relationships, and the requirement to provide more equitable bi-directional support (Conger & Little, 2010; Salmela-Aro & Nurmi, 1997; Tanner, 2006). Given that emerging adulthood has become increasingly defined by instability in work and relationship commitments, this transition may provide an important and clear contextual change that can be used in future research on the role of life experiences on personality trait change.

Limitations and Future Research

Although the current research had a number of key strengths, there are several limitations that should be noted. First, the current research consisted of self-report data. Self-report data holds a number of advantages and may even

be the method of choice for exploring intra-psychic factors (Crockett, Schulenberg, & Petersen, 1987; Howard, 1994), however, it does have several notable limitations (Schmitt, 1989, 1994). Of particular significance to the current research is that relationship characteristics were addressed via self-report measures as well. It is thus likely that participants' personalities may have influenced assessments of their relationships. Efforts were made to reduce this bias by asking participants to rate each relationship individually. Clearly, however, other methods, such as direct observation of relationship characteristics (as well as multiple raters of personality), would complement the current findings. Second, our study has a limitation common to practically all real world, non-experimental research: the possibility of third-variable explanations (Morgan & Winship, 2007). Although cross-lagged models are typically utilized to provide evidence of causal ordering (Duncan et al., 2006), it cannot be ruled out that unobserved variables were responsible for the associations between personality and relationship characteristics over the two years (e.g. changes in circadian typologies; Tonetti, Fabbri, & Natale, 2009). Further, evidence for a causal interpretation of the reported findings would be provided by identifying the mechanisms that, for example, lead persons high in particular personality characteristics to have certain types of relationship experiences. In addition, the initial wave of data collection did not represent a zero time point and, as such, a complex system of causation and reciprocal relationships between personality and relationship characteristics may have occurred before this period (Neyer & Asendorpf, 2001). For instance, the literature indicates that relationship attachment in childhood is an important determinant of personality and behavior pattern development (e.g. Fraley, 2007; J. Parker, Rubin, Earth, Wojslawowicz, & Buskirk, 2006). Thus, results are consistent with the social-investment principle, yet many alternative causal factors cannot be ruled out.

As is common with research that tracks individuals across a major life transition, particularly where the transition involves many participants moving from the original place of testing, attrition was moderately large. Although selection effects were relatively small, readers are advised to take into

account the issue of longitudinal attrition when interpreting these results. Furthermore, the current research focused on a relatively restricted sample of those in the university track school system in Germany. Research is thus needed to see if the current findings replicate in post-high school transitions more generally. Indeed, although only very small differences were observed in individuals who had different transition destinations (e.g. university or the workplace; see footnote 3), there is a need to explore the different psychological and developmental processes for young people who transition to university versus those that do not. As Hamilton and Hamilton (2006; see also Arnett, 2000; 2006) note, the post-high school transition is highly heterogeneous. Most research, however, continues to focus primarily on those that transition to university at the cost of a more robust understanding of emerging adulthood.

Conclusion

The current research suggested that the post-high school transition period is associated with significant changes in relationship characteristics, which were on average positive, particularly in relation to family. Results also indicated that lower neuroticism, and higher agreeableness, conscientiousness, and extraversion in high schools predicted positive changes in relationship characteristics. Moreover, latent change models indicated that change in conflict, insecurity, closeness, and importance in relationships may also have implications for changes in personality during the same period. Taken together, the research indicates that personality may be an important determinate of how individuals navigate the changes to relationships that occur during the post-school transition. In addition, these dramatic changes have important implications for personality development.

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