

Journal of Adult Development

Personality Traits and Attachment Orientations: Longitudinal Associations Around the Event of Childbirth --Manuscript Draft--

Manuscript Number:	JADE-D-16-00005R1
Full Title:	Personality Traits and Attachment Orientations: Longitudinal Associations Around the Event of Childbirth
Article Type:	Original Article
Corresponding Author:	Sarah Galdiolo, Ph.D. Universite de Mons Louvain-la-Neuve, BELGIUM
Corresponding Author Secondary Information:	
Corresponding Author's Institution:	Universite de Mons
Corresponding Author's Secondary Institution:	
First Author:	Sarah Galdiolo, Ph.D.
First Author Secondary Information:	
Order of Authors:	Sarah Galdiolo, Ph.D. Isabelle Roskam, Prof.
Order of Authors Secondary Information:	
Funding Information:	
Abstract:	The current study examined the longitudinal associations of the Big Five personality traits (i.e., Neuroticism, Extraversion, Agreeableness, Openness to Experience, and Conscientiousness) with attachment orientations (i.e., Anxiety and Avoidance) around the event of childbirth. For this purpose, the authors conducted a three-wave longitudinal research program (second prepartum trimester, 6 months postpartum, and 1 year postpartum) using cross-lagged models on 204 parental couples. Results showed that (a) Neuroticism was longitudinally associated with Anxiety and (b) Extraversion was within-time associated with Avoidance.
Response to Reviewers:	See attachment

Personality Traits and Attachment Orientations:
Longitudinal Associations Around the Event of Childbirth

Sarah Galdiolo and Isabelle Roskam

Université de Mons

Université catholique de Louvain

Word count : 4303 words

Author Note

Sarah Galdiolo,

Isabelle Roskam, Institute of Research in Psychological Science, Université catholique
de Louvain, Louvain-la-Neuve, Belgium

Correspondence concerning this article should be addressed to Sarah Galdiolo, Service
de Psychologie Clinique Systémique, Université de Mons, 20 Place du Parc, 7000 Mons,
Belgium. E-mail: sarah.galdiolo@uclouvain.be

Abstract

The current study examined the longitudinal associations of the Big Five personality traits (i.e., Neuroticism, Extraversion, Agreeableness, Openness to Experience, and Conscientiousness) with attachment orientations (i.e., Anxiety and Avoidance) around the event of childbirth. For this purpose, the authors conducted a three-wave longitudinal research program (second prepartum trimester, 6 months postpartum, and 1 year postpartum) using cross-lagged models on 204 parental couples. Results showed that (a) Neuroticism was longitudinally associated with Anxiety and (b) Extraversion was within-time associated with Avoidance.

Keywords: Personality Traits, Attachment Orientations, Childbirth, Longitudinal Associations

Running head: PERSONALITY TRAITS AND ATTACHMENT ORIENTATIONS
AROUND CHILDBIRTH

Personality Traits and Attachment Orientations:
Longitudinal Associations Around the Event of Childbirth

Abstract

The current study examined the longitudinal associations of the Big Five personality traits (i.e., Neuroticism, Extraversion, Agreeableness, Openness to Experience, and Conscientiousness) with attachment orientations (i.e., Anxiety and Avoidance) around the event of childbirth. For this purpose, the authors conducted a three-wave longitudinal research program (second prepartum trimester, 6 months postpartum, and 1 year postpartum) using cross-lagged models on 204 parental couples. Results showed that (a) Neuroticism was longitudinally associated with Anxiety and (b) Extraversion was within-time associated with Avoidance.

Keywords: Personality Traits, Attachment Orientations, Childbirth, Longitudinal Associations

Childbirth is considered one of the most significant events in the course of a family's life because it has the potential to drastically disrupt the lives of individuals within the family (Belsky & Pensky, 1988; Cowan & Cowan, 1992; Feeney, Hohaus, Noller, & Alexander, 2001). Consequently, Galdiolo and Roskam (2014, 2017) examined whether childbirth is transformative enough to influence parents' fundamental individual characteristics, i.e. personality traits (PT) and attachment orientations (AO). On one side, PT are defined as the relatively enduring patterns of thoughts, feelings, and behaviours that distinguish individuals from one another (McCrae & Costa, 1999). A five-trait structure of personality (i.e., the 'Big Five') is currently mostly used to assess personality, i.e. Neuroticism (withdrawal behaviour, anxiety and detection of threat), Extraversion (intensive pursuit of interpersonal relationships, activities, stimulations and joy), Agreeableness (empathic orientation), Openness to experience (intellectual curiosity, imagination and new cultural experiences), and Conscientiousness (ability to organize, plan and respect conventions). On the other side, adult attachment refers to the fact that over the course of repeated interactions with their first caregivers during childhood, individuals construct internal working models of attachment (Bretherton & Munholland, 1999) which are then internalized as sets of expectations about self and significant others. This is thought to influence the individual's perceptions of, and behaviors in, later relationships. Brennan, Clark, and Shaver (1998) showed that adult attachment measure could be reduced to two orthogonal dimensions: Anxiety (i.e., the degree to which individuals worry that their close relatives do not really love them and might be unavailable or unsupportive in stressful situations) and Avoidance (i.e., the degree to which individuals desire limited intimacy with, and strive to remain psychologically and emotionally independent from, close relatives).

In order to examine the distinct influence of childbirth on both constructs and because personality and attachment theories are distinct conceptual frameworks, Galdiolo and Roskam

(2014, 2017) conducted two separate studies: an examination of intra-individual and dyadic change around childbirth of PT as well as of AO. In both cases, the results have demystified the transformative nature of childbirth showing that PT and AO remain strongly stable over time, except for the father's Extraversion which decreases after childbirth. So, despite major shifts in environment associated with childbirth, parents do not demonstrate dramatic shifts in terms of PT and AO. How are these results explained? First, parents could tend more to interpret new familial information as validating than to respond to it by seeking to accommodate themselves: There would be according to this explanation mechanisms intervening between changes in environments and development in personality and attachment, with the result that any intra-individual changes are small (Roberts, Wood, & Caspi, 2008). The second one involves a selection effect (Luhmann, Orth, Specht, Kandler, & Lucas, 2014; Roberts et al., 2008): People who experienced specific events could differ systematically from people who did not, because of stable between-person differences (e.g., personality or attachment factors). Various constructs of personality have already been found to be associated with reproductive behavior and the probability of having children. For example, high extraversion, high openness to experience, and low neuroticism were related with a larger number of children in both sexes, while high agreeableness and low conscientiousness correlated with more offspring in women only (Jokela, Alvergne, Pollet, & Lummaa, 2011). Such stable differences in personality might influence how likely and how often individuals encountered opportunities for having children. The study of Galdiolo and Roskam (2014, 2017) showed significant differences at the baseline of the model (i.e., Time 1) between parents and nonparents: Childless adults had higher scores on Neuroticism and Anxious and Avoidant Attachment than primiparous parents. These results could be interpreted in light of the selection effect: People with lower scores on Neuroticism and Anxious and Avoidant Attachment could undergo the transition to parenthood more than people with higher scores

on both dimensions. Because PT and AO showed the same developmental trajectory in response to the childbirth, their longitudinal linkages needed to be examined. Therefore, this study employed longitudinal data from Galdiolo and Roskam's studies to examine the cross-lagged associations between PT and AO. Our current study constituted the occasion to evaluate the developmental relations between the two constructs of interest during childbirth.

Previous cross-sectional studies (Marušić, Kamenov, & Jelić, 2006; Nofle & Shaver, 2006; Picardi, Caroppo, Toni, Bitetti, & Di Maria, 2005) have already examined the associations between our constructs of interest without considering any developmental trajectory or life event. They have rather focused on associations at a particular point in time.

The most comprehensive study linking PT and AO comes from a set of studies by Nofle and Shaver (2006) based on more than 8,000 participants. They showed that Attachment Anxiety was mostly strongly linked to Neuroticism ($r = .42$) and also to Extraversion, Openness to Experience, Agreeableness, and Conscientiousness ($r = -.15, -.07, -.19$, and $-.23$, respectively). Attachment Avoidance was also correlated with all PT ($r = .14, -.21, -.09, -.22, -.20$ for Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness, respectively). The strongest association was between Neuroticism and Attachment Anxiety. Neuroticism is mainly characterized by negative emotionality which is reflected across a variety of situations and relations with others, which explains the association with Anxiety. However, there is no complete redundancy or substitutability between Anxiety and Neuroticism: Attachment Anxiety specifically involves feelings and behaviors in close relationships whereas Neuroticism is a broad trait connected with a range of negative emotions in relational and non-relational situations (Shaver & Brennan, 1992).

An interesting genetic research (Donnellan, Burt, Levendosky, & Klump, 2008) focused on genetic and environmental influences on adult PT and AO and the overlap between the two constructs of interest. Genetically influenced PT would play an important

1 role in attachment dynamics. PT may serve as one way that genetic effects on AO are
2 transmitted such as also suggesting that PT partially mediate genetic influences on
3 relationship processes (Jocklin, McGue, & Lykken, 1996). It seems possible that Attachment
4 Anxiety and Neuroticism are tapping into the biologically rooted system governing
5 susceptibility to the experience of aversive emotions (i.e., negative emotionality) (Crawford et
6 al., 2007). It seems also possible that Attachment Avoidance and Extraversion are tapping
7 into the biologically rooted differences in the willingness to approach situations, seek out
8 rewards from social situations and experience positive emotions (i.e., positive emotionality)
9 (Lucas, Diener, Grob, Suh, & Shao, 2000). Donnellan et al. (2008) posited that the “Big Two”
10 AO have some correspondence with two of the psychobiological dimensions of temperament
11 (i.e., positive and negative emotionality) that are identified in nearly all PT. According to
12 Donnellan et al. (2008), two processes could explain the association between PT and AO.
13 First, reactive processes reflect that temperamental dimensions shape how people construe
14 and respond to environmental experiences. For example, people susceptible to negative affect,
15 subjectively experienced more anxiety and fear in their close relationships when compared to
16 people lower in negative emotionality. Second, evocative processes reflect that certain traits
17 elicit particular responses from the social environment. As such, negative emotionality elicits
18 more hostile interactions with close friends or romantic partners and is linked to partner
19 reports of diminished relationship satisfaction (Donnellan, Assad, Robins, & Conger, 2007).
20 Consequently, negative emotionality may contribute to distressing relational events that could
21 affect the content of internal working models of attachment. Not only AO seem influenced by
22 PT, it is entirely plausible that there are environmental influences on AO at different points in
23 development (Bretherton & Munholland, 1999). One of the most significant and emotionally
24 focused events is childbirth: Parents experience a larger and more extreme panel of emotions
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

than childless adults (Palus, 2014). Such an emotional event could intensify the associations between PT and AO, hence the objectives of the current study.

Current Study and Hypotheses

Previous researches (Donnellan et al., 2008; Nettle & Shaver, 2006) showed that PT and AO were more strongly associated during adulthood and specifically, genetically influenced PT would play a role in attachment dynamics. What about longitudinal linkages between PT and AO around a strongly emotional event such as childbirth? Childbirth is an event prone to activate positive and negative emotionality which are two temperamental dimensions identified in nearly all PT and influencing AO. Consequently, we could expect that childbirth would intensify the longitudinal associations between PT and AO. For this purpose, a three-wave longitudinal study (pregnancy, 6 months postpartum, and 1 year postpartum) based on mother and father's self-reported measures of PT and AO was conducted. The objective was to infer the direction of effects between both constructs by means of cross-lagged models (Burkholder & Harlow, 2003). These models, in which within-time correlations and the relative stability of the constructs of interest are controlled for, are ideally suited to infer whether (a) PT predict AO, (b) AO predict PT, (c) there is a reciprocal process in which PT and AO mutually reinforce one another, or (d) there is no longitudinal association between both constructs. In agreement with previous studies, we expected cross-lagged associations between Neuroticism and Anxiety and between Extraversion and Avoidance. Finally, to isolate the specific developmental trajectory of these constructs in response to childbirth, childless couples (i.e., without the relevant life event), who constituted the control group, also participated and completed the longitudinal study in two waves with a 6-month interval.

Method

Sample and Procedure

The hypotheses generated were tested among parents and among childless adults, who constituted the control group. Participants were recruited with the assistance of gynecologists, sponsors, students, magazines, and newspapers. At each wave of data collection, they completed a questionnaire on the Internet via Lime Survey or completed a paper version if they lacked access to the Internet. For ethical reasons, this study was registered with the Commission for the Protection of Private Life. With regard to the parents, data were collected in 2012 from a sample of 204 XXXX – speaking heterosexual parental cohabitating couples ($n = 144$ primiparous, $n = 60$ multiparous), which corresponds to 408 parents ($n = 204$ mothers and $n = 204$ fathers). The parents were aged from 18 to 45 years old ($M = 29.56$, $SD = 4.42$ for the overall sample; $M = 28.32$, $SD = 3.71$ and $M = 30.79$, $SD = 4.72$, respectively for mothers and fathers). Three waves of data were collected in a longitudinal program study at three distinct points of parenthood: pregnancy (T1; $M = 23.67$ pregnancy weeks, $SD = 8.49$), 6 months postpartum (T2; $M = 25.03$ weeks postpartum, $SD = 4.81$) and 1 year postpartum (T3; $M = 12.76$ months postpartum, $SD = 1.66$). Both during pregnancy and at 6 months postpartum, depression was assessed by means of the Beck Depression Inventory Short Form Items (BDI-13) (Beck, Steer, & Garbin, 1988). As no parents showed major depression, none were excluded from the sample for that reason.

With regard to the control group, data were collected from a large sample of 126 XXXX-speaking childless heterosexual cohabitating adults ($n = 63$ women and $n = 63$ men) aged from 19 to 52 years old ($M = 27.24$, $SD = 6.66$ for the overall sample; $M = 26.48$, $SD = 6.96$ and $M = 27.95$, $SD = 6.35$, for women and men respectively). Two waves of data were collected with a 6-month interval.

Educational level was distributed as follows: secondary education for 24.3% of women and 39.6% of men, bachelor's degree for 41.6% and 30.2%, respectively, and master's degree for 34.2% and 30.2%. Family monthly incomes were low (€0 – 1999) for 19.8% of the couples, middle (€2000 – 3499) for 56.7%, middle- high (€3500 – 4999) for 19.3%, and high (more than €5000) for 3.5%.

At the last wave of data collection, a stressful-life-events measure led us to exclude couples who had incurred a relative's death, marital conflicts, divorce/breakup of a romantic relationship, loss of a job, and/or diagnosis of a serious illness in a close relative or oneself in the last year (Sutin, Costa, Wethington, & Eaton, 2010). The participants assessed the emotional impact of the events that they had experienced on a 5-point Likert-type scale (1 = *Not at all affected* and 5 = *Absolutely affected*).

Measures

Sociodemographic variables. Sociodemographic variables were collected during the first wave of data collection: gender, date of birth, educational level, and family income. In addition, parents were asked for details of primiparity and number of weeks of pregnancy (T1, pregnancy) or for the child's age (T2, 6 months postpartum and T3, 1 year postpartum).

Longitudinal variables: (1) Personality (NEO-60). In each of the three (or two) waves of data collection, personality was assessed by means of a short self-report version of NEO-PI-R, the NEO-60 (Aluja, Garcia, Rossier, & Garcia, 2005). This questionnaire consists of five subscales (12 items each): Neuroticism, Extraversion, Agreeableness, Openness to Experience, and Conscientiousness. A 5-point Likert-type scale was provided for each item ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). The NEO-60 shows good reliability coefficients, factor structure, and correlations with the NEO-PI-R domain scores. Cronbach's alphas (α s) were ranged from .70 to .87. In our sample, the NEO-60 shows good psychometric

properties with a five-factor solution explaining 39.44% (T1), 43.03% (T2), and 44.30% (T3) of the variance and α s ranging from .79 to .86 for T1, from .81 to .89 for T2, and from .81 to .88 for T3.

Longitudinal variables: (2) Attachment style: ECR-R. In each of the three (or two) waves of data collection, adult attachment was assessed by means of the “Experiences in Close Relationships Questionnaire – Revised” (ECR-R) (Brennan et al., 1998; Fraley, Waller, & Brennan, 2000). This questionnaire consists of two subscales (18 items each): Anxiety (e.g. I worry about being abandoned) and Avoidance (e.g. I prefer not to show a partner how I feel deep down). A 5-point Likert-type scale (1 = *completely disagree* and 5 = *completely agree*) was provided. The ECR-R has been used in many studies since 1998 and has been found to be highly reliable and to have high construct and predictive validity (Sibley & Liu, 2004). Latent variable path analyses showed that longitudinal measures of both the Anxiety and Avoidance subscales were remarkably stable over a 6-week assessment period (86% shared variance over time), which suggests that the ECR-R provides stability estimates of attachment that are largely free from measurement error over short periods of time (Sibley & Liu, 2004). Finally, α s were initially .91 for Anxiety and .94 for Avoidance (Brennan et al., 1998). Good psychometric properties were displayed in our sample with a two-factor solution, explaining 39.95% (T1), 43.42% (T2), and 45.77% (T3) of the variance. α s ranged from .88 to .90 (T1) and were above .90 for T2 and T3.

Analytical Strategy

The main statistical analyses were carried out using the SEM software AMOS 18.0 (Arbuckle, 2007). The data were checked for normality. Because attrition is common in longitudinal designs, the drop-out was analyzed. Among the 404 parents who were enrolled in the program research, data was fully completed both for T1 and T2. Only 64 parents (15.8%

of the sample) dropped out at T3. In order to maintain as much power as possible, the full-information maximum likelihood was used to estimate missing data (Allison, 2003). Also, statistical comparisons between parents who dropped out and parents who completed the three waves revealed no systematic significant differences ($p < .01$).

Structural equation modeling analyses included a measurement phase and a structural phase where each association between one Big Five trait and one attachment orientation was tested. In the structural phase, three models were tested and compared: the full model, the baseline, and the trimmed model. The first one tested a full process including stability paths, within-time correlations, and cross-lagged paths. A sample model is shown in Figure1. The second one was the baseline model, which only took account of stability paths and within-time correlations. Finally, the full model was trimmed in order to obtain the most parsimonious model.

[Insert Figure 1 about here]

Evaluation of the fit of the models was carried out on the basis of inferential goodness-of-fit statistics (χ^2) and χ^2/df , the comparative fit index (CFI) (Marsh & Hau, 2007), and the root mean square error of approximation (RMSEA) (Cole & Maxwell, 2003). Chi-square compares the observed variance-covariance matrix with the predicted variance-covariance matrix. χ^2/df is considered as satisfactory when it is inferior to 2.5 in medium-sized sample ($100 < N < 200$) (Byrne, 2001). Values close to or greater than .90 are desirable on the CFI while the RMSEA should preferably be less than or equal to .06 (Byrne, 2001). The chi-square difference test was used to compare the relative fit between the tested models: A significant $\Delta\chi^2$ indicates a significant difference in fit between the two compared or nested models.

Results

Preliminary Analyses and Validity of the Measurement Models

The means and standard deviations are presented in Table 1 for the PT and the AO.

[Insert Table 1 about here]

Measurement models provided an acceptable fit to the data for parents [$\chi^2(15) = 7.07 - 22.97$, *ns*; $\chi^2/df < 1.53$; CFI = 1.00; RMSEA < .04] and childless adults [$\chi^2(5) = 1.00 - 5.12$, *ns*; $\chi^2/df < 1.02$; CFI = 1.00; RMSEA < .01].

Longitudinal Associations Between PT and AO

To infer our question of research relative to the cross-lagged associations between PT and AO for parents compared to childless adults, we ran ten cross-lagged models per subsample (parents vs. non-parents), with one Big Five trait and one attachment orientation per model. Each model contained 3 (i.e., in parents' models) or 2 (i.e., in childless adults' models) consecutive measurement waves of a Big Five trait and an attachment orientation. Big Five PT and AO were modeled as latent variables. The estimated models contained stability paths of a PT and an AO, within-time associations between variables, and cross-lagged paths from the PT to the AO and from the AO to the PT (Figure 1). The resulting model parameter estimates are presented in Table 2 for the stability paths and the within-time correlations and in Table 3 for the cross-lagged effects. The stability paths for the AO appear in the footnotes under Table 2. Because of the multiple testing, we decided to apply a Bonferroni Correction and to set the significance cut-off at .001.

[Insert Tables 2 and 3 about here]

Table 2 reveals substantial stability of PT and AO for parents and childless adults, with PT appearing to be more stable across time than AO. The within-time associations between our constructs of interest revealed (a) positive moderate associations between

Neuroticism and Anxiety for parents and nonparents and (b) negative moderate associations between Extraversion and Avoidance only for parents. The other variables showed no correlations or with small size.

We now proceed to the cross-lagged paths in both samples and considering both women and men (Table 3). Concerning parents, Table 3 shows that Neuroticism at Time 2 predicted Anxiety at Time 3, whereas the paths in the inverse direction were not significant. Table 4 reveals the chi square difference tests for the comparison between the full, the baseline, and the trimmed models. Here, the comparison between the full cross-lagged and baseline models revealed that the full cross-lagged model fit the data better than the baseline model ($\Delta\chi^2(4) = 19.54, p < .001$). Once the full cross-lagged model was trimmed by removing the non-significant paths, the fit of the trimmed model with the significant path from Neuroticism at Time 2 to Anxiety at Time 3 was good, as observed in Table 4. The comparison between the trimmed and the baseline models showed that the trimmed one fitted the data better than the baseline model, $\Delta\chi^2(1) = 14.22, p < .001$. Tables 3 and 4 reveal no other significant prediction between PT and AO or cross-lagged models for parents and nonparents.

[Insert Table 4 about here]

Multi-group Analyses: Differences Between Women and Men. The multi-group analyses aim to compare pairs of path coefficients for identical models (e.g., cross-lagged models between PT and AO) but based on different samples (e.g., mothers vs. fathers or childless women vs. childless men), which interest us here. Did mothers and fathers' models (or childless women and men's models) differ from each other? Or did they present the same cross-lagged models between PT and AO? Tables 5 and 6 compare the cross-path coefficients (z score) and give the critical ratios between mothers and fathers (or childless women and

men). Results showed that mothers' (women's) and fathers' (men's) models did not differ from each other and had the same cross-lagged models between PT and AO.

[Insert Tables 5 and 6 about here]

Discussion

The objective of the current study was to examine the cross-lagged associations between PT and AO in a longitudinal model in parental couples compared to childless couples. Drawing on the ideas that (a) genetically influenced PT would play a role in attachment dynamics and (b) childbirth would be an event prone to activate positive and negative emotionality, we hypothesized strong associations between PT and AO over the course of parenthood, and specifically higher cross-lagged scores from PT to AO than in the inverse direction. Moreover, previous researches (Nofle & Shaver, 2006) led us to specifically expect associations between (a) Neuroticism and Anxious Attachment and (b) Extraversion and Avoidant Attachment.

First, both constructs showed high coefficients of stability between measurement waves, as already mentioned in Galdiolo and Roskam's studies (2014, 2017). However, a higher stability of PT over time than AO has been observed. One explanation could be found in the life-event model of change (Davila & Cobb, 2004) which assumed that change in attachment could occur in response to emotionally and relationally significant life events. So, AO could be less stable than PT over time because of their higher susceptibility to relational life events. A second explanation could rely on the influence of genetic factors over time. Previous researches (Donnellan et al., 2008; Plomin & Caspi, 1999) showed that genetic factors typically account for somewhere around 50% of the variability in the PT and 40% of the variability in the AO. Consequently, enduring genetic influences on PT would be stronger over time.

Second, when comparing parents' and childless couples' cross-lagged models, the single result showed that Neuroticism was longitudinally associated with Anxiety only for parents. It was then found that Neuroticism at 6 months postpartum influenced Anxiety at 1 year postpartum. Nettle and Shaver (2006) had already showed a within-time association between Neuroticism and Anxiety: Neuroticism is mainly characterized by negative emotionality which is reflected across a variety of situations and relations with others, which explains the association with Anxiety. Our study climbed up a rung by showing a longitudinal association between Neuroticism and Anxiety after childbirth. Childbirth could be an event prone to activate reactive and evocative processes. To recall (Donnellan et al., 2008), reactive processes reflect that emotionality shape how individuals construe and respond to environmental experiences. For example, parents susceptible to negative affect (i.e., with higher scores on Neuroticism), subjectively would experience more anxiety and fear in their close relationships. Yet, parenthood is especially a relational event that reinforces the interdependence between parents, children and significant others (e.g., grandparents). Evocative processes reflect that emotionality elicits particular responses from the social environment. For example, parents with higher scores in Neuroticism and so negative emotionality would elicit more hostile interactions with close relatives and partners (Donnellan et al., 2007) which may contribute to distressing relational events that could increase the level of Anxious Attachment.

Third, our results showed moderate within-time associations between Extraversion and Avoidance only for parents. People who avoid intimacy and are relatively distant in their relationships, generally seek less interpersonal contact, show less warmth in this contact, are less temperamentally prone to exhibit positive emotions and so are less extraverted (Marušić et al., 2006). Why has this association been found only for parents? One plausible explanation would concern the family as a context of interdependence with close relationships defined as

relationships with a “strong, frequent, and diverse interdependence that lasts over a considerable period of time” (Kelley et al., 1983). We can imagine that such interdependence could make stronger the association between Extraversion and Avoidant Attachment. Now, except for these two results, no differences were found between parents’ and childless couples’ models and no specific association nor reciprocal linkages between the two constructs were highlighted. It partially disconfirmed our hypothesis. Only Neuroticism and, to a lesser extent, Extraversion had moderate associations with AO around childbirth. Yet, Neuroticism and Extraversion have the more correspondence with the two temperamental dimensions, i.e. positive and negative emotionality. Finally, the multi-group analyses revealed no differences between mothers’ (childless women) and fathers’ (childless men) models. By way of conclusion, the only difference between parents and childless adults concerned the cross-lagged association between Neuroticism and Anxiety and the within-time association between Extraversion and Avoidance. No other systematic difference was found between parents and childless adults concerning the cross-lagged associations, nor between women and men.

The current study had some limitations that need to be addressed in future research. A first limitation pertained to the length of the intervals between the assessments. There was a lapse of 6 months between each time point. More frequent measurements of PT and AO would have perhaps allowed more specific cross-lagged analyses. A second limitation concerns our reliance on self-report measures to assess the constructs of interest. However, while other-reported measures are available, a study (Wood, Harms, & Vazire, 2010) has shown that such other-reported data might be as informative about the rater’s PT and AO as they are about the PT and AO of the person being rated. Thus, despite their limitations, self-reports are still among the best measures to assess the constructs of interest. A final limitation concerned the use of Galdiolo and Roskam’s data. The current study was a part of a general

work relative to the influence of childbirth on parents' PT and AO. Both constructs had been previously separately studied and the current study was the occasion to analyze the longitudinal linkages between both constructs.

References

- Allison, P. D. (2003). Missing data techniques for structural equation modeling. . *Journal of Abnormal Psychology, 112*, 545 - 557.
- Aluja, A., Garcia, O., Rossier, J., & Garcia, L. F. (2005). Comparison of the NEO-FFI, the NEO-FFI-R and an alternative short version of the NEO-PI-R (NEO-60) in Swiss and Spanish samples. *Personality and Individual Differences, 38*, 591 - 604.
- Arbuckle, J. L. (2007). *Amos 16.0 user's guide*. Chicago: SPSS.
- Beck, A. T., Steer, R. A., & Garbin, M. G. (1988). Psychometric properties of the beck depression inventory: Twenty-five years of evaluation. . *Clinical Psychology Review, 8*(1), 77 - 100.
- Belsky, J., & Pensky, E. (1988). Marital change across the transition to parenthood. . *Marriage and Family Review, 12*(3-4), 133 - 156.
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. . In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46 - 76). New York, NY: Guilford Press.
- Bretherton, I., & Munholland, K. A. (1999). Internal working models in attachment relationships: A construct revisited. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment theory and research* (pp. 89 - 111). New York, NY: Guilford Press.
- Burkholder, G. J., & Harlow, L. L. (2003). An illustration of a longitudinal cross-lagged design for larger structural equation models. . *Structural Equation Modeling, 10*(3), 465 - 486. doi:10.1207/S15328007SEM1003_8
- Byrne, B. M. (2001). Structural Equation Modeling With AMOS, EQS, and LISREL: Comparative Approaches to Testing for the Factorial Validity of a Measuring Instrument. *International Journal of Testing, 1*(1), 55 - 86.

- Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. . *Journal of Abnormal Psychology, 112*(4), 558 - 577. doi:10.1037/0021-843X.112.4.558
- Cowan, C. P., & Cowan, P. A. (1992). *When partners become parents: The big life change for couples*. . New York, NY: Basic Books.
- Crawford, T. N., Livesley, W. J., Jang, K. L., Shaver, P. R., Cohen, P., & Ganiban, J. (2007). Insecure attachment and personality disorder: A twin study of adults. *European Journal of Personality, 21*, 191 - 208.
- Davila, J., & Cobb, R. J. (2004). Predictors of change in attachment security during adulthood. In W. S. Rholes & J. A. Simpson (Eds.), *Adult attachment: Theory, research and clinical implications*. (pp. 133 - 156). New York, NY: Guilford Press.
- Donnellan, B. M., Assad, K. K., Robins, R. W., & Conger, R. D. (2007). Do negative interactions mediate the effects of negative emotionality, communal positive emotionality, and constraint on relationship satisfaction? *Journal of Social and Personal Relationships, 24*, 557 - 573.
- Donnellan, B. M., Burt, A. S., Levendosky, A. A., & Klump, K. L. (2008). Genes, Personality, and Attachment in Adults: A Multivariate Behavioral Genetic Analysis. *PERSONALITY AND SOCIAL PSYCHOLOGY BULLETIN, 34*(1), 3 - 16.
- Feeney, J. A., Hohaus, L., Noller, P., & Alexander, R. P. (2001). *Becoming parents: Exploring the bonds between mothers, fathers, and their infants*. . New York, NY: Cambridge University Press.
- Fraley, C. R., Waller, N. G., & Brennan, K. A. (2000). An Item Response Theory Analysis of Self-Report Measures of Adult Attachment. *Journal of Personality and Social Psychology, 78*(2), 350 - 365. doi:10.1037//0022-3514.78.2.350

- Galdiolo, S., & Roskam, I. (2014). Development of personality traits in response to childbirth: A longitudinal dyadic perspective. *Personality and Individual Differences*, 69, 223-230. doi:10.1016/j.paid.2014.06.002
- Galdiolo, S., & Roskam, I. (2017). Development of attachment orientations in response to childbirth: A longitudinal dyadic perspective. *Personality and Individual Differences*, 108, 136 - 143.
- Jocklin, V., McGue, M., & Lykken, D. T. (1996). Personality and divorce: A genetic analysis. *Journal of Personality and Social Psychology*, 71, 288 - 299.
- Jokela, M., Alvergne, A., Pollet, T. V., & Lummaa, V. (2011). Reproductive Behavior and Personality Traits of the Five Factor Model. *European Journal of Personality*, 25, 487 - 500. doi:10.1002/per.822
- Kelley, H. H., Berscheid, E., Christensen, A., Harvey, J. H., Huston, T. L., Levinger, G., . . . Peterson, D. R. (1983). Analyzing close relationships. In H. H. Kelley, E. Berscheid, A. Christensen, J. H. Harvey, T. L. Huston, G. Levinger, E. McClintock, L. A. Peplau, & D. R. Peterson (Eds.), *Close relationships*. New York, San Francisco: W. H. Freeman and company.
- Lucas, R. E., Diener, E., Grob, A., Suh, E. M., & Shao, L. (2000). Cross-cultural evidence for the fundamental features of extraversion. *Journal of Personality and Social Psychology*, 79, 452 - 468.
- Luhmann, M., Orth, U., Specht, J., Kandler, C., & Lucas, R. E. (2014). Studying changes in life circumstances and personality: It's about time. *European Journal of Personality*, 28, 256-266. doi:10.1002/per.1951
- Marsh, H. W., & Hau, K. (2007). Applications of latent-variable models in educational psychology: The need for methodological-substantive synergies. . *Contemporary Educational Psychology*, 32(1), 151 - 170. doi:10.1016/j.cedpsych.2006.10.008

- Marušić, I., Kamenov, Ž., & Jelić, M. (2006). Personality and attachment to romantic partners. *Review of Psychology*, 13(1), 9 - 18.
- McCrae, R. R., & Costa, P. T. (1999). A five-factor theory of personality. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed.) (pp. 139 - 153). New York, NY: Guilford Press.
- Noftle, E. E., & Shaver, P. R. (2006). Attachment dimensions and the big five personality traits: Associations and comparative ability to predict relationship quality. *Journal of Research in Personality*, 40, 179 - 208.
- Palus, C. J. (2014). Transformative experiences of adulthood: A new look at the seasons of life. In J. Demick, K. Bursik, & R. Di Biase (Eds.), *Parental Development* (Vol. 2, pp. 39 - 59). New York, NY: Psychology Press.
- Picardi, A., Caroppo, E., Toni, A., Bitetti, D., & Di Maria, G. (2005). Stability of attachment-related anxiety and avoidance and their relationships with the five-factor model and the psychobiological model of personality. *Psychology and Psychotherapy: Theory, Research and Practice*, 78, 327 - 345.
- Plomin, R., & Caspi, A. (1999). Behavioral genetics and personality. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (Vol. 2, pp. 251 - 276). New York, NY: Guilford Press.
- Roberts, B. W., Wood, D., & Caspi, A. (2008). The development of personality traits in adulthood. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality psychology: Theory and research* (3rd ed.). New York: Guilford Press.
- Shaver, P. R., & Brennan, K. A. (1992). Attachment styles and the "big five" personality traits: Their connections with each other and with romantic relationship outcomes. . *PERSONALITY AND SOCIAL PSYCHOLOGY BULLETIN*, 18(5), 536 - 545.

Sibley, C. G., & Liu, J. H. (2004). Short-term temporal stability and factor structure of the revised experiences in close relationships (ECR-R) measure of adult attachment.

Personality and Individual Differences, 36, 969-975. doi:10.1016/S0191-8869(03)00165-X

Sutin, A. R., Costa, P. T., Wethington, E., & Eaton, W. (2010). Turning points and lessons learned: Stressful life events and personality trait development across middle adulthood. *Psychology and Aging*, 25(3), 524 - 533. doi:10.1037/a0018751

Wood, D., Harms, P., & Vazire, S. (2010). Perceiver effects as projective tests: What your perceptions of others say about you. *Journal of Personality and Social Psychology*, 99(1), 174 - 190. doi:10.1037/a0019390

Table 1

Descriptive Statistics of Personality Traits (PT) and Attachment Orientations (AO)

		Mothers		Fathers		Childless women		Childless men	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Neu	T1	2.78	0.69	2.36	0.62	3.06	0.65	2.52	0.63
	T2	2.81	0.77	2.44	0.67	2.99	0.75	2.57	0.67
	T3	2.78	0.63	2.40	0.69				
Ext	T1	3.75	0.55	3.67	0.59	3.79	0.46	3.71	0.53
	T2	3.73	0.64	3.60	0.64	3.76	0.48	3.64	0.53
	T3	3.71	0.68	3.52	0.58				
Op	T1	3.24	0.64	3.13	0.63	3.45	0.66	3.39	0.67
	T2	3.24	0.69	3.13	0.70	3.43	0.62	3.38	0.63
	T3	3.17	0.71	3.12	0.67				
Agr	T1	3.64	0.55	3.35	0.63	3.50	0.49	3.21	0.58
	T2	3.69	0.59	3.37	0.68	3.49	0.52	3.22	0.49
	T3	3.59	0.63	3.37	0.64				
Co	T1	4.07	0.49	3.93	0.56	3.92	0.52	3.89	0.51
	T2	4.11	0.56	3.93	0.63	3.88	0.55	3.82	0.45
	T3	4.02	0.61	3.95	0.59				
Anx	T1	2.15	1.08	1.98	0.97	2.50	1.12	1.98	0.85
	T2	2.11	1.07	1.88	0.91	2.41	1.05	1.98	0.78
	T3	2.08	1.08	1.92	0.92				
Av	T1	2.48	1.04	2.72	1.00	2.25	0.69	2.54	0.77
	T2	2.44	1.11	2.74	1.03	2.22	0.68	2.55	0.79
	T3	2.57	1.11	2.79	1.04				

Note: *N* = 408 parents and 128 childless adults

Table 2

Stability Paths and Within-Time Correlations

Variable	Stability paths		Within-time correlations					
			T1		T2		T3	
	T1 – T2	T2 – T3	Anx	Av	Anx	Av	Anx	Av
<i>Neuroticism</i>								
Parents	.76*	.91*	.51*	.11	.21*	-.04	.21*	-.06
Childless adults	.80*		.36*	.03	.07	.00		
<i>Extraversion</i>								
Parents	.79*	.84*	-.07	-.21*	-.06	-.15*	-.03	-.12*
Childless adults	.83*		-.11	-.08	-.02	-.01		
<i>Openness</i>								
Parents	.94*	.93*	-.04	-.15*	.00	-.01	.01	-.03
Childless adults	.82*		.15	.01	-.02	.00		
<i>Agreeableness</i>								
Parents	.79*	.84*	-.05	-.10	-.02	-.07	-.06	.00
Childless adults	.84*		.07	.03	-.07	.01		
<i>Conscientiousness</i>								
Parents	.65*	.72*	-.07	-.07	-.07	-.07	-.09*	-.03
Childless adults	.64*		.03	-.02	-.01	-.01		
<i>Anx Anxiety, Av Avoidance</i>								

Stability paths for Anxiety ranged from .58 to .73 between T1 and T2 and from .43 to .66 between T2 and T3 across models ($ps < .001$). Stability paths for Avoidance ranged from .58 to .88 between T1 and T2 and from .64 to .66 between T2 and T3 across models ($ps < .001$)

* $p < .001$

Table 3

Cross-lagged Effects of PT on AO and of AO on PT

		<i>PT on AO</i>				<i>AO on PT</i>			
		Anxiety		Avoidance		Anxiety		Avoidance	
		T1 – T2	T2 – T3	T1 – T2	T2 – T3	T1 – T2	T2 – T3	T1 – T2	T2 – T3
Neu									
Parents		.15	.33*	.08	.10	.04	-.13	.05	.14
Non-par		.15		.03		.13		.03	
Ext									
Parents		-.00	-.06	-.06	-.04	-.02	-.00	.00	-.11
Non-par		-.21		-.10		-.03		-.04	
Op									
Parents		-.02	.03	-.16	.02	-.03	.03	-.15	-.08
Non-par		-.02		.13		.03		-.02	
Ag									
Parents		.06	.03	.01	.01	-.05	.03	.01	.02
Non-par		-.04		-.18		-.00		-.16	
Con									
Parents		.00	-.11	.02	.04	-.02	.05	-.02	-.05
Non-par		-.13		-.02		-.09		-.10	

Neu Neuroticism, *Ext* Extraversion, *Op* Openness to experience, *Ag* Agreeableness, *Con* Conscientiousness

Non-par childless adults

* $p < .001$

Table 4

Comparisons of Fit between the Full, the Baseline, and the Trimmed Models and Chi-Square Difference Tests

Models																Chi-square difference test	
Full					Baseline					Trimmed							
	χ^2	df	χ^2/df	CFI	RMSEA	χ^2	df	χ^2/df	CFI	RMSEA	χ^2	df	χ^2/df	CFI	RMSEA	Base - Full	Base – Trim
x	197.44*	106	1.86	0.97	.05	216.98*	110	1.97	0.97	.05	202.76*	109	1.86	0.97	.05	$\chi^2(4) = 19.54^*$	$\chi^2(1) = 14.22^*$
	184.09*	106	1.74	0.97	.04	196.36*	110	1.78	0.97	.04	189.83*	109	1.74	0.97	.04	$\chi^2(4) = 12.27$	$\chi^2(1) = 6.53$
	205.58*	106	1.94	0.97	.05	211.10*	110	1.92	0.97	.05	207.22*	109	1.90	0.97	.05	$\chi^2(4) = 5.52$	$\chi^2(1) = 3.88$
	168.74*	106	1.59	0.98	.04	179.55*	110	1.63	0.98	.04	170.33*	108	1.58	0.98	.04	$\chi^2(4) = 10.81$	$\chi^2(2) = 9.22$
	142.00	106	1.34	0.99	.03	146.98	110	1.34	0.99	.03	142.94	109	1.31	0.99	.03	$\chi^2(4) = 4.98$	$\chi^2(1) = 4.04$
<i>Adults</i>																	
x	49.42	42	1.18	0.99	.04	55.26	44	1.26	0.99	.04	49.50	43	1.15	0.99	.03	$\chi^2(2) = 4.84$	$\chi^2(1) = 5.76$
	52.90	42	1.26	0.98	.04	61.43	44	1.40	0.97	.06	52.90	42	1.26	0.98	.04	$\chi^2(2) = 8.53$	$\chi^2(2) = 8.53$
<i>Neu</i> Neuroticism, <i>Ext</i> Extraversion, <i>Op</i> Openness to experience, <i>Co</i> Conscientiousness, <i>Agr</i> Agreeableness, <i>Anx</i> Anxiety, <i>Av</i> Avoidance																	

Neu Neuroticism, *Ext* Extraversion, *Op* Openness to experience, *Co* Conscientiousness, *Agr* Agreeableness, *Anx* Anxiety, *Av* Avoidance

Base baseline model, *Trim* trimmed model

* $p < .001$

Table 5

Comparison of Cross-Path Coefficients (z score) and Critical Ratios Between Mothers and Fathers

		Mothers	Fathers	CR
Neuroticism - Anxiety	N1 → An2	0.86	1.52	$t(402) = 0.29, p = 0.77$
	N2 → An3	2.52	1.66	$t(402) = 1.46, p = 0.14$
	An1 → N2	-0.96	3.12	$t(402) = 2.18, p = 0.03$
	An2 → N3	0.58	-1.46	$t(402) = 1.49, p = 0.14$
Neuroticism - Avoidance	N1 → Av2	0.86	1.99	$t(402) = 0.45, p = 0.65$
	N2 → Av3	1.69	1.66	$t(402) = 0.15, p = 0.88$
	Av1 → N2	0.49	0.97	$t(402) = 0.55, p = 0.59$
	Av2 → N3	1.96	2.51	$t(402) = 0.67, p = 0.50$
Extraversion – Anxiety	Ex1 → An2	0.16	-0.57	$t(402) = 0.46, p = 0.65$
	Ex2 → An3	-1.50	-0.18	$t(402) = 0.96, p = 0.34$
	An1 → Ex2	-0.33	0.02	$t(402) = 0.24, p = 0.81$
	An2 → Ex3	-0.38	1.04	$t(402) = 1.06, p = 0.29$
Extraversion – Avoidance	Ex1 → Av2	0.58	-1.53	$t(402) = 1.37, p = 0.17$
	Ex2 → Av3	-0.59	-0.26	$t(402) = 0.19, p = 0.85$
	Av1 → Ex2	0.51	-0.15	$t(402) = 0.48, p = 0.63$
	Av2 → Ex3	-0.71	-2.20	$t(402) = 1.28, p = 0.20$
Openness to Experience – Anxiety	Op1 → An2	-0.66	0.64	$t(402) = 0.91, p = 0.36$
	Op2 → An3	0.43	0.05	$t(402) = 0.34, p = 0.73$
	An1 → Op2	-0.23	-0.48	$t(402) = 0.25, p = 0.80$
	An2 → Op3	1.29	-0.38	$t(402) = 1.20, p = 0.23$
Openness to Experience – Avoidance	Op1 → Av2	-2.05	-0.87	$t(402) = 0.67, p = 0.50$
	Op2 → Av3	1.27	-1.15	$t(402) = 1.69, p = 0.09$
	Av1 → Op2	0.65	2.18	$t(402) = 1.44, p = 0.15$
	Av2 → Op3	-0.92	-0.15	$t(402) = 0.57, p = 0.57$
Agreeableness – Anxiety	Ag1 → An2	-0.89	2.35	$t(402) = 2.14, p = 0.03$
	Ag2 → An3	0.30	0.28	$t(402) = 0.76, p = 0.45$
	An1 → Ag2	-1.41	-0.40	$t(402) = 0.91, p = 0.36$
	An2 → Ag3	0.12	1.12	$t(402) = 0.05, p = 0.96$
Agreeableness – Avoidance	Ag1 → Av2	-0.68	0.95	$t(402) = 1.12, p = 0.26$
	Ag2 → Av3	0.69	-0.06	$t(402) = 0.54, p = 0.59$
	Av1 → Ag2	0.13	0.45	$t(402) = 0.24, p = 0.81$
	Av2 → Ag3	0.37	-0.04	$t(402) = 0.28, p = 0.78$
Conscientiousness - Anxiety	C1 → An2	1.09	-1.15	$t(402) = 1.58, p = 0.11$
	C2 → An3	-1.97	-1.22	$t(402) = 0.50, p = 0.62$
	An1 → C2	-0.89	0.37	$t(402) = 0.90, p = 0.37$
	An2 → C3	0.55	0.58	$t(402) = 0.18, p = 0.86$
Conscientiousness – Avoidance	C1 → Ax2	0.91	-0.20	$t(402) = 0.80, p = 0.42$
	C2 → Ax3	0.48	0.66	$t(402) = 0.18, p = 0.85$
	Ax1 → C2	-0.45	-0.11	$t(402) = 0.26, p = 0.79$
	Ax2 → C3	-0.73	-0.37	$t(402) = 0.17, p = 0.87$

* $p < .001$

Table 6

Comparison of Cross-Path Coefficients (z score) and Critical Ratios Between Childless Women and Men

		Women	Men	CR
Neuroticism - Anxiety	N1 → An2	0.19	0.07	$t(124) = 0.43, p = 0.67$
	An1 → N2	0.04	0.17	$t(124) = 0.79, p = 0.43$
Neuroticism - Avoidance	N1 → Av2	0.86	0.04	$t(124) = 0.00, p = 1.00$
	Av1 → N2	0.49	-1.17	$t(124) = 0.00, p = 1.00$
Extraversion – Anxiety	Ex1 → An2	-2.30	-1.11	$t(124) = 1.57, p = 0.12$
	An1 → Ex2	-0.09	-0.48	$t(124) = 0.32, p = 0.63$
Extraversion – Avoidance	Ex1 → Av2	-1.45	1.14	$t(124) = 0.56, p = 0.58$
	Av1 → Ex2	-0.48	0.17	$t(124) = 0.81, p = 0.42$
Openness – Anxiety	Op1 → An2	-0.29	-0.26	$t(124) = 0.07, p = 0.94$
	An1 → Op2	-0.12	0.81	$t(124) = 0.75, p = 0.45$
Openness – Avoidance	Op1 → Av2	1.44	-0.11	$t(124) = 1.43, p = 0.15$
	Av1 → Op2	0.17	-1.29	$t(124) = 0.17, p = 0.86$
Agreeableness - Anxiety	Ag1 → An2	-1.59	0.47	$t(124) = 1.60, p = 0.11$
	An1 → Ag2	-1.14	0.06	$t(124) = 0.52, p = 0.60$
Agreeableness – Avoidance	Ag1 → Av2	-0.74	-1.09	$t(124) = 0.08, p = 0.94$
	Av1 → Ag2	-1.66	-1.40	$t(124) = 0.81, p = 0.42$
Conscientiousness - Anxiety	C1 → An2	-2.04	-0.27	$t(124) = 1.20, p = 0.23$
	An1 → C2	-2.05	-0.54	$t(124) = 1.16, p = 0.25$
Conscientiousness – Avoidance	C1 → Av2	-1.04	1.30	$t(124) = 1.67, p = 0.10$
	Av1 → C2	-1.73	0.89	$t(402) = 1.93, p = 0.06$

* $p < .001$

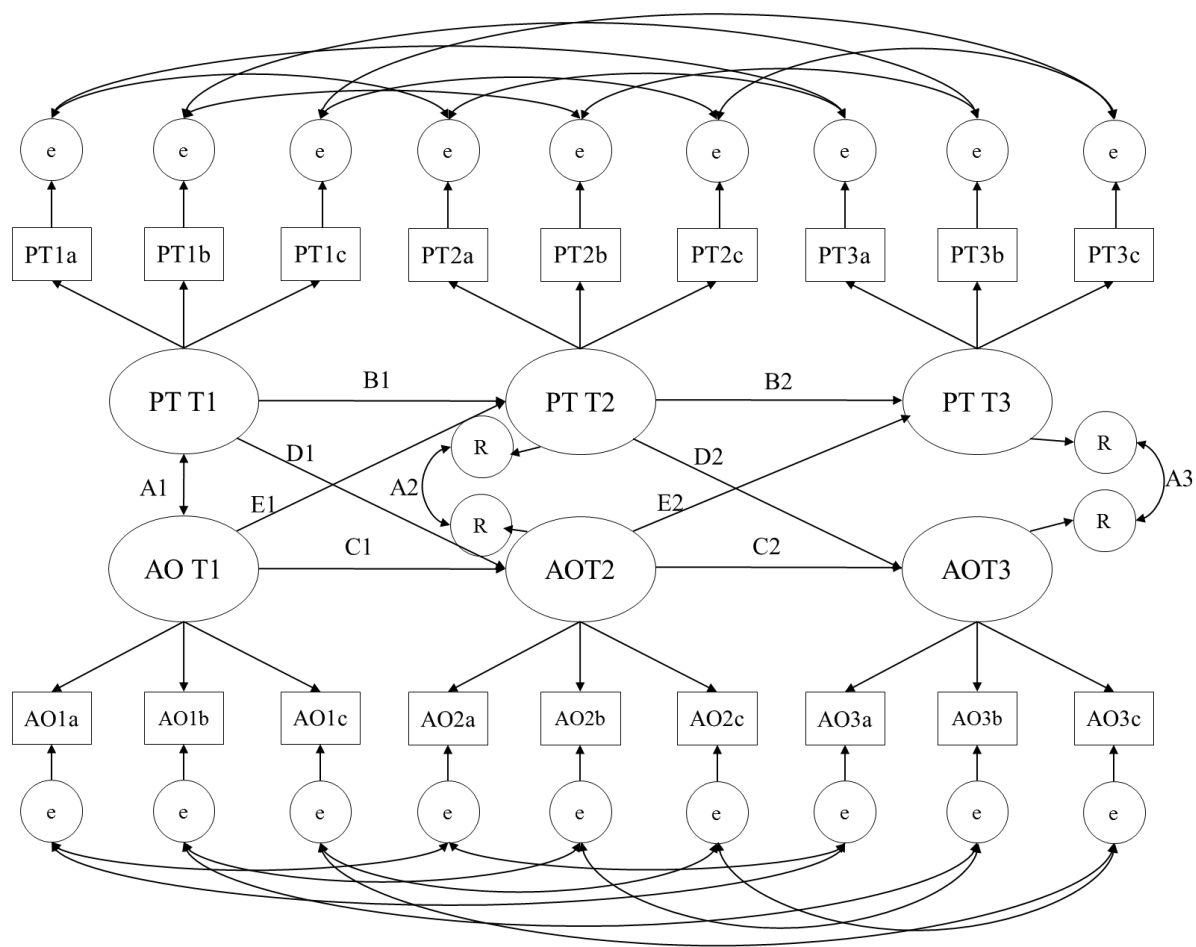
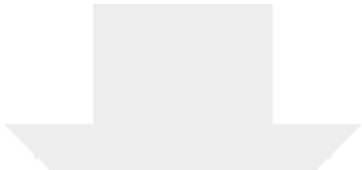
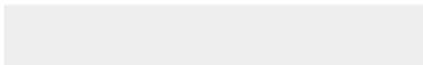
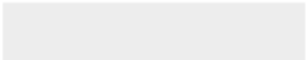


Figure 1. Full Cross-Lagged Model Between Personality Traits (PT T1 – PT T3) and Attachment Orientations (AO T1 – AO T3).

PT and AO are indicated by three items each (PTa, PTb, PTc; AOa, AOb, AOc), at each of the measurement occasions. Over-time correlations between errors (indicated with *e*) of identical items (e.g., correlations between PT1a and PT2a, PT2a and PT3a, PT1a and PT3a) were allowed. The most important associations estimated with the model were within-time correlations (i.e., associations A1, A2, and A3), stability paths of PT (i.e., B1 and B2) and AO (i.e., C1 and C2), and cross-lagged paths from PT to AO (i.e., D1 and D2) and from AO to PT (i.e., E1 and E2). It may further be noted that within-time correlations at Time 2 and Time 3 were actually correlations between residual variances (indicated with *R*). Therefore, these correlations should be interpreted as correlated relative change.



[Click here to access/download](#)
Supplementary Material
Cover letter.docx





Click here to access/download
Supplementary Material
Reviewers comments.docx

