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BRIEF REPORT

Perceiving Gratitude From a Romantic Partner Predicts Decreases in Attachment Anxiety

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Attachment anxiety is a form of attachment insecurity characterized by chronic worries about rejection and need for reassurance. Given the critical role a sense of security plays in maintaining healthy relationships, individuals high in attachment anxiety tend to struggle in romantic relationships, which carries serious implications for their broader physical and psychological well-being. Nevertheless, an individual's attachment anxiety continues to change throughout life and can be downregulated by later relationship environments. In this research, we used 7-year longitudinal data ($n = 2,057$) to examine 1 potential predictor of declines in attachment anxiety in an established romantic relationship: perceiving gratitude from a partner. Random intercept cross-lagged panel analyses supported our prediction that perceiving higher than typical levels of gratitude from a romantic partner was linked with reduced attachment anxiety at that time and, importantly, the following year. These results were independent of the individual's fluctuations in global relationship satisfaction, suggesting the unique power of gratitude. Our findings provide strong evidence that later interpersonal environments can indeed shape an individual's attachment anxiety.

Keywords: attachment insecurity, gratitude, close relationships

Supplemental materials: <http://dx.doi.org/10.1037/dev0000830.supp>


Stability and change in adult attachment have received much attention in recent empirical literature (e.g., Umemura, Lacinová, Kotrčová, & Fraley, 2018). Despite some degree of stability, individual differences in attachment orientations tend to change throughout adulthood (Chopik, Edelstein, & Grimm, 2019), and this change can be observed over an interval as short as a month (Fraley, Vicary, Brumbaugh, & Roisman, 2011). However, in contrast to the evidence demonstrating and quantifying changes in attachment orientations, little is known regarding the specific factors that contribute to such changes.

In the present research, we focus on attachment in romantic relationships, one of the major attachment bonds in adulthood

(Hazan & Shaver, 1987), and examine what relationship experiences can contribute to fluctuations in attachment anxiety. Attachment anxiety is one of the two dimensions of attachment insecurity (Mikulincer & Shaver, 2016), which is characterized by doubts about self-worth and concerns about rejection. Given the link between attachment anxiety and a broad range of indicators of poor relationship quality (see Li & Chan, 2012 for a review), it is important to examine the factors that can potentially down-regulate attachment anxiety. Integrating theoretical perspectives on reducing insecurity (Arriaga, Kumashiro, Simpson, & Overall, 2018) and on social functions of gratitude (Algoe, 2012), our research examined whether perceiving gratitude from a romantic partner can play a critical role in this process. Specifically, we used data from a large sample of romantically involved individuals surveyed over 7 years to examine if perceiving high levels of gratitude from a romantic partner is associated with declines in an individual's attachment anxiety toward the partner.

Development of Attachment Anxiety

According to attachment theory (Bowlby, 1969), humans have an innate behavioral system that evolved to keep people close to caring others who can provide support and security, and thus help with survival in the face of danger. However, interpersonal envi-

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ronments that do not afford the sense of security an individual needs can detract from their beliefs about the availability or responsiveness of others, which develop into relatively stable individual differences in the way they think and behave in relationships (Collins & Allard, 2003).

Researchers have studied individual differences in attachment insecurity in terms of two major dimensions: attachment anxiety and attachment avoidance (Brennan, Clark, & Shaver, 1998), especially in the context of romantic relationships (Hazan & Shaver, 1987). Attachment anxiety reflects the degree to which individuals are concerned about a partner's availability or potential rejection while attachment avoidance reflects the degree to which individuals feel uncomfortable relying on or being intimate with a partner. Although both insecurity dimensions have been consistently associated with low relationship quality (Li & Chan, 2012), attachment anxiety, the primary focus of the present research, is also linked to poor mental health and for reasons not directly related to the lower quality of their relationships (Shaver, Schachner, & Mikulincer, 2005). Specifically, the self-doubt, or the belief that one is vulnerable, needy, and reliant on others' support, which lies at the core of attachment anxiety, can easily transform into self-criticism or lack of self-compassion, which can contribute to mental health problems (Cantazaro & Wei, 2010; Wei, Liao, Ku, & Shaffer, 2011). Further, attachment anxiety is consistently correlated with high neuroticism (Nofle & Shaver, 2006), another risk factor for mental disorders (Lahey, 2009).

Nevertheless, attachment anxiety is not a fixed construct and can fluctuate even within the same relationship (Girme et al., 2018). In fact, researchers have called for the need to take a life span perspective on the development of attachment (Fraley & Roisman, 2019). Attachment fluctuations are particularly common in romantic relationships, presumably because people frequently interact with their partner and thus have more opportunities to revise their working models (compared to parental relationships; Fraley et al., 2011). The implications of changes in attachment within a specific relationship, however, are far-reaching as they can shape the individual's overall attachment orientations over time (Pierce & Lydon, 2001).

Although several studies have explored relational factors that can potentially affect an individual's level of attachment anxiety, the existing findings are hard to generalize given the focus on a specific period (e.g., transition to parenthood; Simpson, Rholes, Campbell, & Wilson, 2003) or a specific sample (e.g., newly dating couples; Mizrahi, Hirschberger, Mikulincer, Szepeswol, & Birnbaum, 2016), and also have been rather inconsistent. For example, one study found that women who perceived greater support or less anger from a partner scored lower in attachment anxiety 6 months into parenthood (Simpson et al., 2003), while another failed to find similar effects of perceiving a partner's caregiving on changes in new mothers' attachment anxiety (Stern et al., 2018). Overall, the existing findings suggest that it is essential to take a more theoretically driven approach toward examining predictors of changes in adult attachment orientation.

Perceiving Gratitude From a Partner

A recently developed theoretical model (Attachment Security Enhancement Model; Arriaga et al., 2018) proposes that certain relationship situations can help challenge individuals' insecure

working models. In particular, because doubts about self-worth and a lack of self-confidence are what fundamentally sustain attachment anxiety, a long-lasting change in anxiety is likely to occur when an individual comes to feel more worthy and competent in personal domains. Considering that critical opportunities to revise working models arise from interactions with the partner, this confidence-building process is dyadic in nature and its outcome (reduction in attachment anxiety) essentially benefits the couple.

One relational situation relevant to revising the self-model necessary for reduction in attachment anxiety (Arriaga et al., 2018) may be when individuals perceive gratitude from a romantic partner. People experience a sense of competence after helping an important other (Inagaki & Orehek, 2017), or more precisely, providing effective help to the other (i.e., perceiving oneself as instrumental; Orehek, 2018). Arguably, this perception that one has successfully helped the other arises from being appreciated or perceiving gratitude from the other. That is, because people express gratitude when they have received a benefit from another person (McCullough, Kimeldorf, & Cohen, 2008), individuals can infer that their help was effective upon perceiving the partner's gratitude. This message is particularly important in gaining a sense of personal competence for individuals harboring doubts regarding their ability to help their partner such as those high in attachment anxiety (Collins & Feeney, 2000). Taken together, perceiving a partner's gratitude may be one important contributor to the process of bolstering self-confidence in individuals high in attachment anxiety and thus may promote declines in attachment anxiety.

The Present Research

We used data from a large sample of participants at different stages of relationships to test our prediction that perceiving a partner's gratitude is associated with changes in an individual's attachment anxiety. We used random intercept cross-lagged panel models (RI-CLPM; Hamaker, Kuiper, & Grasman, 2015), which, by disaggregating the within- and between-person variance, allow us to more precisely capture the temporal precedence in the link between perceived partner gratitude and attachment anxiety. In other words, we can examine whether deviations from an average level of gratitude an individual generally perceives predict deviated changes in attachment anxiety. The focus on the within-person processes separated from the trait-like differences allows us to rule out the possibility that our effects are attributable to other factors that perceiving high levels of gratitude may represent (e.g., having an agreeable partner). Nevertheless, there is still a possibility that fluctuations in perceived gratitude may be a reflection of fluctuations in global positive feelings arising in a relationship. Thus, we conducted an additional analysis to examine if the predicted effects (increases in perceived gratitude preceding declines in anxiety) hold above and beyond any effects of changes in global satisfaction on changes in attachment anxiety.

Method

Data from Waves 1 through 7 in the German Family Panel (pairfam) study (Brüderl et al., 2017) were used to test our hypotheses. Pairfam is an ongoing longitudinal study funded by the German Research Foundation (DFG) focused on intimate relationships and family dynamics. In 2008, pairfam recruited a nationally

representative sample of 12,402 focal participants in three age ranges: adolescents aged 15 to 17 years old, young adults aged 25 to 27 years old, and adults aged 35 to 37 years. Survey data are collected annually from these participants in four thematic areas: intimate partnerships, parent–child relations, fertility, and inter-generational ties. Data are gathered through computer-assisted personal interviews and computer-assisted self-interviews for sensitive questions. Participants receive a €10 honorarium upon completion of the survey. Additional details about pairfam can be found in the study’s concept paper (Huinink et al., 2011) and website: <http://www.pairfam.de/en/study.html>. Ethics approval for the current study was granted to Matthew D. Johnson by the University of Alberta research ethics board (Protocol 00060173, Family Relations in the German Pairfam Study).

Sample Description

Given the focus of the current study, only those participants who reported being in a relationship with the same partner from Waves 1 to 7 were selected for the analyses, resulting in a sample of 2,057 participants (men = 834, women = 1,223). We examined if there were differences between participants who continued their relationship and those who ended their relationship (and thus were not included in our sample) in our key constructs at baseline (see the online supplemental material for full results). Those who did and did not continue their relationship did not consistently differ in terms of their perceptions of a partner’s gratitude at baseline, but the continuers tended to be lower in attachment anxiety than the noncontinuers. This likely reflects their longer relationship duration as research has shown that people who have been in the relationship for longer are lower in attachment anxiety (Davila, Karney, & Bradbury, 1999) and are also less likely to break up (Le, Dove, Agnew, Korn, & Mutso, 2010).

Although it is difficult to establish the sample size adequate for a model as complex as ours (Berry & Willoughby, 2017), we have conducted post hoc power analyses using Monte Carlo simulations in Mplus. Specifically, we generated 500 data sets based on the estimates from our results and examined the proportion of replications for which the probability of rejecting the null hypothesis was at the .05 level (Muthén & Muthén, 2012). For each of our key slope (perceived gratitude residuals predicting future attachment anxiety residuals), the power was estimated as 1.00, suggesting that we had sufficient power.

Participants were 31.95 years old on average ($SD = 5.59$; range = 15 to 38) at the first wave, and most ($n = 1,577$; 77%) reported their ethnicity as a native German with no migration background, 163 (8%) as other non-German background, 124 (6%) as half-German, 91 (4%) as ethnic German immigrant, and 59 (3%) as Turkish background (43 were unidentified). All but 17 participants identified as heterosexual. At the first wave, participants had known their partner for an average of 10 years and 10 months ($SD = 6$ years and 5 months; range = 2 to 34 years), and had been in a relationship for an average of 9 years ($SD = 5$ years and 11 months; range = 0 month to 35 years). A majority of the participants ($n = 1,266$; 62%) were married and living together, 483 (23%) were not married and cohabiting, 306 (15%) were neither married nor cohabiting, and two participants were married and currently living apart. By the seventh wave, there were 1,695 participants (82%) who were married to their partner.

Measures

Attachment anxiety. Five items assessing attachment anxiety were presented at Waves 1, 3, 5, and 7. Given the length of the pairfam survey, some questions were only asked biannually to minimize participant fatigue. The five items were assessed on scales ranging from 1 (*disagree completely*) to 5 (*agree completely*), and Cronbach’s alpha ranged from .69 to .78 across waves (see Table 1). Longitudinal parceling procedures were used to create three indicators of the latent attachment anxiety construct to aid in the estimation of our complex longitudinal analyses (Little, Cunningham, Shahar, & Widaman, 2002). Parceling provides several advantages such as reduced number of parameters to estimate, lower likelihood of correlated residuals and dual factor loadings, and reduced sources of sampling error compared to models that use items as indicators (Little, 2013).

We used the item-to-construct balance approach to build the parcels. First, each item was correlated with the total score of the construct at each wave. Each item’s average correlation across the waves was then used to pair items; the items with the highest and lowest correlations with the total score were assigned to Parcel 1, the next highest and lowest correlated items went in Parcel 2, and Parcel 3 contained the remaining item. Items in each parcel were as follows. Parcel 1: “Sometimes I’m not sure if my partner enjoys being with me as much as I enjoy being with him/her,” and “When I disappoint or annoy my partner, I am afraid that he/she won’t like me anymore.” Parcel 2: “I’m often afraid my partner thinks I’m silly or stupid if I make a mistake,” and “Sometimes I’m afraid that my partner would rather spend time with others than with me.” Parcel 3: “I have the feeling that I like my partner more than he/she likes me.”

Although these items have already been used as indicators of attachment anxiety in previous research (Kimmes, Durtschi, Clifford, Knapp, & Fincham, 2015), we established their validity prior to testing our hypotheses. Specifically, we conducted an online study ($n = 495$) in which participants responded to a well-established measure of attachment style, The Experiences in Close Relationships–Revised Questionnaire (ECR-R; Fraley, Waller, & Brennan, 2000), as well as the five pairfam items. When we computed a confirmatory factor analysis model in which the 18 items from the ECR-R assessing attachment anxiety and the five pairfam items were specified to load on to one latent construct, the model showed an adequate fit and the factor loading for the pairfam items was as strong as those for the ECR-R. These results suggest that the pairfam items are valid indicators of attachment anxiety (see the online supplemental material for further details on this analysis).

Perceived partner gratitude. At all waves, participants responded to two questions, “How often does your partner express recognition for what you’ve done?” and “How often does your partner show that he/she appreciates you?” on scales ranging from 1 (*never*) to 5 (*always*). Each item served as an indicator of a latent perceived partner gratitude construct at each wave of data. Cronbach’s alpha ranged from .69 to .82 across waves (see Table 1).

Global relationship satisfaction. At all waves, participants responded to a question, “All in all, how satisfied are you with your relationship?” on a scale ranging from 0 (*very dissatisfied*) to 10 (*very satisfied*). In the aforementioned online study, we also validated this one-item measure of satisfaction by computing a

Table 1
Correlations and Descriptive Statistics Among Study Variables ($n = 2,057$)

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---------------------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1. Anx. W1 | — | | | | | | | | | | | | | | | | | |
| 2. Anx. W3 | .45* | — | | | | | | | | | | | | | | | | |
| 3. Anx. W5 | .40* | .55* | — | | | | | | | | | | | | | | | |
| 4. Anx. W7 | .38* | .53* | .57* | — | | | | | | | | | | | | | | |
| 5. Grat. W1 | -.28* | -.21* | -.18* | -.18* | — | | | | | | | | | | | | | |
| 6. Grat. W2 | -.25* | -.26* | -.18* | -.22* | .57* | — | | | | | | | | | | | | |
| 7. Grat. W3 | -.23* | -.34* | -.25* | -.24* | .54* | .61* | — | | | | | | | | | | | |
| 8. Grat. W4 | -.20* | -.26* | -.26* | -.25* | .52* | .60* | .64* | — | | | | | | | | | | |
| 9. Grat. W5 | -.23* | -.27* | -.34* | -.30* | .52* | .55* | .64* | .65* | — | | | | | | | | | |
| 10. Grat. W6 | -.18* | -.30* | -.30* | -.31* | .46* | .53* | .57* | .61* | .68* | — | | | | | | | | |
| 11. Grat. W7 | -.18* | -.25* | -.26* | -.38* | .45* | .50* | .58* | .57* | .66* | .67* | — | | | | | | | |
| 12. Sat. W1 | -.28* | -.19* | -.16* | -.17* | .34* | .31* | .29* | .29* | .31* | .28* | .27* | — | | | | | | |
| 13. Sat. W2 | -.21* | -.25* | -.20* | -.20* | .31* | .41* | .33* | .32* | .32* | .30* | .31* | .41* | — | | | | | |
| 14. Sat. W3 | -.18* | -.31* | -.34* | -.21* | .24* | .29* | .39* | .32* | .33* | .31* | .31* | .37* | .42* | — | | | | |
| 15. Sat. W4 | -.16* | -.18* | -.27* | -.23* | .23* | .31* | .30* | .41* | .33* | .32* | .28* | .33* | .36* | .41* | — | | | |
| 16. Sat. W5 | -.18* | -.26* | -.23* | -.29* | .24* | .26* | .33* | .31* | .46* | .36* | .36* | .35* | .37* | .40* | .45* | — | | |
| 17. Sat. W6 | -.15* | -.25* | -.21* | -.28* | .25* | .32* | .34* | .36* | .43* | .49* | .41* | .33* | .40* | .42* | .44* | .49* | — | |
| 18. Sat. W7 | -.14* | -.23* | -.14* | -.33* | .23* | .27* | .32* | .31* | .39* | .38* | .46* | .26* | .36* | .39* | .41* | .47* | .51* | — |
| <i>M</i> | 1.57 | 1.62 | 1.67 | 1.69 | 3.85 | 3.80 | 3.74 | 3.75 | 3.67 | 3.66 | 3.61 | 8.51 | 8.25 | 8.14 | 7.74 | 7.87 | 7.79 | 7.74 |
| <i>SD</i> | .64 | .67 | .66 | .70 | .69 | .69 | .71 | .68 | .72 | .72 | .76 | 1.82 | 1.87 | 1.88 | 2.14 | 2.02 | 1.89 | 2.03 |
| <i>Cronbach's α</i> | .69 | .74 | .76 | .78 | .69 | .75 | .75 | .77 | .80 | .82 | .81 | — | — | — | — | — | — | — |
| % Missing | 4.70 | 7.50 | 5.50 | 3.90 | .90 | 8.00 | 4.60 | 3.30 | 2.90 | 3.00 | .60 | .02 | .09 | .05 | .05 | .04 | .04 | .02 |

Note. Anx. = attachment anxiety; Grat. = perceived gratitude; Sat. = relationship satisfaction. Possible values range from 1 to 5 for attachment anxiety and perceived gratitude, from 0 to 10 for relationship satisfaction.

* $p < .001$ (two-tailed).

confirmatory factor analysis model in which it was specified to load on to one latent construct with five items assessing satisfaction from an established measure (Investment Model Scale; Rusbult, Martz, & Agnew, 1998). The model fit the data well, suggesting that this one-item measure is a valid indicator of relationship satisfaction (see the online supplemental material for further details on this analysis).

Analytic Plan

Correlations and descriptive statistics were first computed among all study variables. We used a latent variable modeling approach computed in Mplus 8 (Muthén & Muthén, 2012) to test associations among constructs. Missing data were relatively low in this study, ranging from .20% to 8.00% (see Table 1 for an item-level report of missingness). We drew on full-information maximum likelihood estimation (FIML) to handle missing values, which utilizes all available information in the variance/covariance matrix. FIML provides more reliable estimates than deletion approaches or mean imputation and performs comparably to multiple imputation (Enders, 2011). To justify the assumption of FIML that missing data are random, we computed a series of 18 t tests comparing those who provided data on our focal constructs of interest to those with missing data on baseline reports of attachment anxiety and perceived partner gratitude. Accounting for family-wise error, there were no significant differences (all $ps \geq .003$), supporting the appropriateness of FIML to handle missing data in this study. Model fit was evaluated with commonly used global fit indices: the chi-square test (χ^2), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis Index (TLI), and standardized root-mean-square residual (SRMR). A nonsignificant chi-square, values greater than

.95 for CFI and TLI, and values smaller than .06 and .08 for RMSEA and SRMR are generally accepted criteria to suggest good model fit (Hu & Bentler, 1999).

Prior to computing our longitudinal analyses, we first tested measurement invariance across time to provide confidence that results are not due to differences in measurement as the study unfolded. We tested measurement invariance of attachment anxiety and perceived partner gratitude using procedures outlined by Widaman, Ferrer, and Conger (2010). Change in CFI $\leq .01$ was used to determine whether the application of longitudinal constraints did not significantly worsen model fit since chi-square difference testing is overpowered in tests of measurement invariance (Little, 2013).

We then computed RI-CLPM (Hamaker et al., 2015) to answer our research questions. The RI-CLPM partitions variance into a stable between-person differences component captured in a random intercept variable, and within-person differences component reflected in the residual variance in the constructs at each wave of measurement. In other words, the random intercept terms reflect stable levels of attachment anxiety and perceptions of partner's gratitude while the residuals at each measurement occasion capture intraindividual fluctuations in each construct. Autoregressive and cross-lagged paths are then added to the residuals to model longitudinal associations among the constructs.

We compared the fit from a series of nested models representing different patterns of associations over time to empirically determine the temporal ordering of the constructs under investigation. A between-person differences model served as our baseline model. In this model, the random intercepts for each construct and the within-time construct residuals were allowed to covary, and autoregressive pathways among residuals were included. We then

compared competing unidirectional models to the between-person differences model by adding cross-lagged paths from one construct residual to the other (e.g., intraindividual fluctuations in attachment anxiety predicting future fluctuations in perceived partner gratitude and vice versa). A final bidirectional model was compared to the previous best-fitting model and tested whether intraindividual fluctuations in each construct predict future deviations in the other. Model comparisons were made with the chi-square difference test (χ^2_{diff}). Degrees of freedom were the same for some unidirectional models, so the model with a smaller chi-square value had better fit. The rationale underlying the model selection in this phase of the analysis is based on the parsimony principle of structural equation modeling: a simpler model is preferred over a more complex model because there are more opportunities (degrees of freedom) for it to be rejected, so long as the simpler model is theoretically plausible (Kline, 2015). Thus, in conducting these model comparisons, a more complex model must be empirically justified by a significant improvement in model fit (as evidenced by the chi-square difference test) in order to be selected as better than its simpler comparator.

Results

Descriptive statistics for all study variables can be found in Table 1. Each construct was positively associated with itself across time, and attachment anxiety was associated with less perceived partner gratitude at all waves (r s ranged from $-.38$ to $-.28$, p s $< .05$). In addition, being a woman, being older, and being in a longer relationship were all linked to lower levels of perceived partner gratitude (r s ranged from $-.11$ to $-.07$ for sex, $-.14$ to $-.07$ for age, and $-.16$ to $-.06$ for relationship length, p s $< .05$). As such, we included sex, age, and relationship length as covariates in our primary model.

Tests of Measurement Invariance

We computed a series of longitudinal confirmatory factor analysis (CFA) models for each construct to evaluate measurement invariance over time. Covariances among corresponding indicator variables across time were included in these models, following standard longitudinal CFA methods (Little, 2013). A baseline model was first computed with factor loadings and intercepts of the indicator variables freely estimated at each wave of measurement. The baseline model for each construct

proved good fit to the data (see Table 2). We then computed the factorial invariance model by constraining corresponding factor loadings to equality across time. This procedure tests whether the associations among the indicators and the construct are equal across time. The application of these constraints did not substantively decrease model fit, so we computed the metric invariance model by constraining the corresponding indicators to equality across time. The application of intercept constraints tests whether participants used the response scale in the same way across time. Again, application of these constraints did not substantively worsen model fit. All constructs under investigation in this study achieved metric invariance, providing confidence that the measurement did not change as the study progressed and supporting further longitudinal analysis.

Longitudinal Links Between Attachment Anxiety and Perceived Partner Gratitude

Next, we computed a series of RI-CLPMs examining the associations between attachment anxiety and perceived partner gratitude while controlling for sex, age, and relationship length. The unidirectional model with within-person changes in perceived partner gratitude predicting within-person changes in future attachment anxiety proved the best fit to the data, providing support for our prediction (full model fit indices are shown in Table 3). In particular, the model specifying the opposite direction (i.e., changes in attachment anxiety predicting changes in future perceived partner gratitude) did not fit the data better than the between-person differences model without any cross-lagged pathways, ruling out the possibility that changes in anxiety can predict changes in perceptions of partner's gratitude. This unidirectional model was also selected over the bidirectional model where intraindividual fluctuations in each construct predict future deviations in the other because the bidirectional model did not significantly improve fit beyond the simpler unidirectional model (see Table 3). Once the best-fitting model was identified, we applied equality constraints to the cross-lagged pathways from the perceived partner gratitude residual to the future attachment anxiety residual and computed chi-square difference tests to determine whether the strength of these three paths differed. Application of these constraints did not worsen model fit ($\chi^2_{diff}(2) = 3.020$, $p = .221$), so they were retained. The final model is depicted in Figure 1.

Table 2
Model Fit Indices for the Tests of Longitudinal Measurement Invariance for Latent Constructs ($n = 2,057$)

| Model | $\chi^2(df)$ | RMSEA (90% CI) | CFI | TLI | SRMR | Model comparison: ΔCFI |
|----------------------|--------------------|--------------------------|--------------|--------------|-------------|--------------------------------|
| Attachment anxiety | | | | | | |
| Baseline | 37.790 (30) | .011 [.000, .021] | .999 | .998 | .014 | |
| Factorial invariance | 51.163 (36) | .014 [.000, .023] | .998 | .997 | .015 | $\Delta CFI = .001$ |
| Metric invariance | 62.305 (42) | .015 [.006, .023] | .998 | .996 | .016 | $\Delta CFI = .000$ |
| Perceived gratitude | | | | | | |
| Baseline | 7.029 (14) | .000 [.000, .006] | 1.000 | 1.003 | .003 | |
| Factorial invariance | 12.826 (20) | .000 [.000, .009] | 1.000 | 1.002 | .009 | $\Delta CFI = .000$ |
| Metric invariance | 26.346 (26) | .003 [.000, .018] | 1.000 | 1.000 | .010 | $\Delta CFI = .000$ |

Note. Bolded models have the best fit. RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis Index; SRMR = standardized root-mean-square residual.

Table 3
 Model Fit Indices for Bivariate Random Intercept Cross-Lagged Panel Models ($n = 2,057$)

| Model | $\chi^2(df)$ | RMSEA (90% CI) | CFI | TLI | SRMR | Model comparison: $\chi^2_{diff}(df_{diff})$ |
|--|----------------------|--------------------------|-------------|-------------|-------------|--|
| Attachment anxiety and perceived gratitude | | | | | | |
| Between-person diff. | 677.330 (313) | .024 [.021, .026] | .986 | .981 | .036 | Baseline: $\chi^2_{diff}(3) = 5.559, p = .135$ |
| Anxiety to gratitude | 671.771 (310) | .024 [.021, .026] | .986 | .981 | .036 | Baseline: $\chi^2_{diff}(3) = 32.306, p < .001$ |
| Gratitude to anxiety | 645.024 (310) | .023 [.020, .025] | .987 | .983 | .032 | Gratitude to Anxiety: $\chi^2_{diff}(3) = 6.094, p = .107$ |
| Bidirectional | 638.930 (307) | .023 [.020, .025] | .987 | .983 | .032 | |

Note. Bolded model indicates the final selected model. Diff. = differences; Anxiety = attachment anxiety; Gratitude = perceived gratitude; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis Index; SRMR = standardized root-mean-square residual. Between-person differences models include only the covariance between random intercepts, autoregressive paths among construct residuals, and within-time covariances between construct residuals. Models were computed while controlling for sex, age, and relationship length.

The negative covariance among the random intercept terms means those with higher average reports of attachment anxiety across time tended to consistently perceive their partners as less grateful. The within-time covariances among construct residuals signifies that during time points when participants perceived their partners as more grateful than they typically did across the study, they also reported lower than average levels of attachment anxiety. Most importantly, higher than average perceptions of partner gratitude foretold intraindividual reductions in attachment anxiety 1 year later. The autoregressive pathways were mostly significant (the one exception was between the attachment anxiety residuals at Wave 1 and Wave 3), suggesting that

intraindividual increases in either construct at a given point in time predicted subsequent increases from one's typical level in the future. Regarding covariates (not depicted in Figure 1), the attachment anxiety intercept was not associated with sex, age, or relationship length, but women ($\beta = -.10$), those who were older ($\beta = -.13$), and those in longer relationships ($\beta = -.08$) consistently perceived their partners as less grateful across time compared to men, younger participants, and those in newer relationships. Being older ($\beta = .09$) and being in a shorter relationship ($\beta = -.16$) also predicted higher than typical perceived partner gratitude at Wave 1. Sex did not predict either construct residuals at Wave 1.

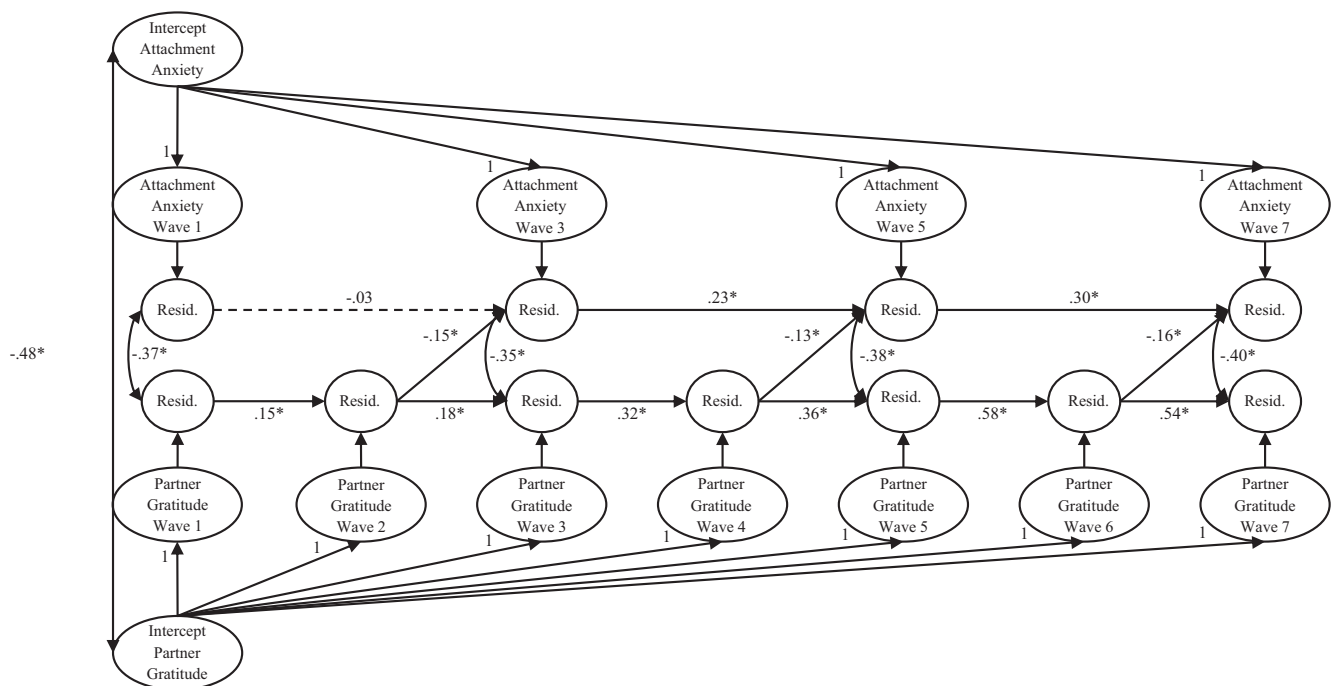


Figure 1. Standardized bivariate random intercept cross-lagged panel model depicting longitudinal associations between attachment anxiety and perceived gratitude ($n = 2,057$). Resid. = residual variance. Indicators of the latent attachment anxiety and perceived gratitude constructs are not shown for clarity. Coefficients for the cross-lagged paths from the perceived gratitude residuals to attachment anxiety residuals were constrained to equality. Sex, age, and relationship length were controlled by regressing the random intercepts and Wave 1 construct residuals on the covariates. Model fit indices: $\chi^2(312) = 648.044$; RMSEA = .023, 90% CI [.020, 0.025]; CFI = .987; TLI = .983; SRMR = .032. * $p < .05$ (two-tailed).

Additional Analyses

Next, we ran an additional model to distinguish the effects of increased perceived partner gratitude on declines in attachment anxiety from the effects of increased satisfaction in the relationship in general. Relationship satisfaction was represented in the same way as perceived partner gratitude and attachment anxiety with its variance partitioned into a stable between-person component (i.e., a random intercept) and within-person fluctuations at each wave (i.e., time-specific residual variance). We sought to determine whether the within-person longitudinal path from perceptions of gratitude to future attachment anxiety persisted when accounting for the influence of within-person fluctuations in relationship satisfaction. Thus, we regressed the attachment anxiety residuals on the relationship satisfaction residuals at the previous wave. We allowed the within-time residual variances for relationship satisfaction, perceived partner gratitude, and attachment anxiety to covary, along with the random intercepts for all constructs. This model fit the data well: $\chi^2(512) = 1,229.786$; RMSEA = .026, 90% CI [0.024, 0.028]; CFI = .976; TLI = .970; SRMR = .042.

Looking first at the random intercept associations, those with a higher average level of relationship satisfaction across time had lower levels of attachment anxiety ($\beta = -.48$) and had higher perceptions of partner gratitude ($\beta = .62$) on average. Looking at the cross-sectional residual associations, when individuals were more satisfied with their partnership than was typical for them, they also tended to perceive more gratitude from their partner than usual (β s from .16 to .38) and reported lower than typical levels of attachment anxiety (β s from $-.18$ to $-.23$). Regarding the lagged associations between relationship satisfaction and future attachment anxiety, within-person deviations in relationship satisfaction did not predict future intraindividual fluctuations in attachment anxiety (β s from $-.03$ to .05). Most critically, however, all associations between perceptions of partner gratitude and attachment anxiety were still significant in this model, including the longitudinal link between intraindividual increases in perceived gratitude predicting intraindividual decreases in attachment anxiety one year later (β s from $-.10$ to $-.12$). These findings rule out the possibility that declines in attachment anxiety following increased perceived gratitude are due simply to prior increases in relationship satisfaction.

Discussion

Despite our knowledge about the pliability of attachment orientations in adulthood (Chopik et al., 2019), and in particular toward a romantic partner (Girme et al., 2018), there is a lack of research on factors associated with shifts in attachment. In this study, we found strong longitudinal evidence that perceiving higher than typical levels of gratitude from a romantic partner can foretell declines in an individual's variable levels of attachment anxiety toward the partner. It is important that our model took into account both the stable and malleable aspects of attachment anxiety, which have been largely overlooked in existing studies, possibly because to do both requires having more than two data points (Hamaker et al., 2015) or given the recency of the development of such models. The separation of the two components in our model allows us to more precisely delineate the developmental trajectories of attachment orientations (Fraley, 2002) and also capture the temporal precedence of the link between attachment anxiety and gratitude in

a more accurate manner compared to the few existing studies on attachment changes (Mizrahi et al., 2016). Further, our sample included individuals varying in relationship length, suggesting the generalizability of our findings and extending the existing research (Arriaga, Kumashiro, Finkel, VanderDrift, & Luchies, 2014).

In addition to making important empirical contributions to the literature, our findings carry practical implications for boosting relationship well-being of individuals high in attachment anxiety. In particular, as an individual's attachment anxiety undermines both partners' relationship quality (Mikulincer & Shaver, 2016), its reduction has been of great interest among couples therapists; nevertheless, the existing interventions focusing on alleviating negative couple interactions have been largely unsuccessful in eliciting changes in attachment anxiety (Johnson et al., 2016). Although we did not specifically focus on couples seeking therapy, the present findings suggest that targeting increases in positive interactions such as expressing gratitude may be valuable in therapeutic settings and could help couples in which either or both partners have high attachment anxiety.

Moreover, the benefits accrued from decreases in attachment anxiety toward a partner are by no means expected to be limited to the romantic domain. Not only can changes in romantic anxiety generalize to shape the individual's global attachment orientations across relationships and affect other relationships (Pierce & Lydon, 2001), but having a more secure romantic bond, or perceiving the availability of a caring partner, can itself confer benefits beyond a satisfying romantic relationship. Indeed, even experimentally priming security has been found to boost people's mood and help them regulate their emotions (see Mikulincer & Shaver, 2007 for a review). As an essential component in shifting people toward security, reducing attachment anxiety can thus contribute to an individual's broader psychological well-being.

Lastly, our findings also add to the growing evidence for the relational function of gratitude (Algoe, 2012). Although we focused on perceptions of gratitude from a partner, research suggests that people are able to accurately track their partner's gratitude (independent of levels of attachment anxiety; Park, Impett, MacDonald, & Lemay, 2019), suggesting that our effects can reflect actual interactions to some extent. Further, our additional analyses showed that there is a unique aspect to perceiving gratitude that is distinguishable from having a satisfying relationship in general. Changes in satisfaction did not play the same role as gratitude perceptions, nor did controlling for them interfere with the gratitude effects. Overall, there was compelling evidence for another relational benefit a partner's gratitude can confer: mitigating one's attachment anxiety.

Nevertheless, we note a possible limitation in generalizing our results given that the present sample had been with their partner for a relatively longer period of time and were lower in attachment anxiety at baseline than individuals who were not included in our sample. Although we believe that perceiving gratitude should have similar effects of bolstering security among individuals higher in attachment anxiety, some clinical studies have indeed suggested difficulties in shifting attachment orientations among distressed couples who may be on the higher end of the range (Johnson et al., 2016). Future research on the early stages of relationships (when couples are relatively higher in attachment anxiety; Davila et al., 1999) can help extend the generalizability of our findings. Further, in future research, the full dynamics of benefiting and perceiving

gratitude from the partner and how each contributes to changes in anxiety should be examined in depth and importantly, using both partners' reports given the reliance on self-reports in the current study. Of course, by showing the uniqueness of gratitude perceptions, our additional analyses could address some concerns about whether self-reported gratitude perceptions are a valid way of capturing the construct we intended to assess or are merely a reflection of some general relational positivity. Our separation of within-person and between-person variance also allows us to address some sources of potential common method variance (Gabriel et al., 2018). However, future research relying on a different source of report (i.e., partner) will be necessary to fully address the limitation in the current study design.

To conclude, the present research demonstrated the important role of perceiving a romantic partner's gratitude in the process of changes in attachment orientations. By exploring the relatively unaddressed issue of what specific relational experiences can affect the natural course of an individual's attachment anxiety in romantic relationships, our research adds important, novel insights to the study of stability and change in attachment orientations in adulthood.

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