






# Differing Levels of Gratitude Between Romantic Partners: Concurrent and Longitudinal Links With Satisfaction and Commitment in Six Dyadic Datasets

Yoobin Park<sup>1</sup> , Amie Gordon<sup>2</sup> , Sarah Humberg<sup>3</sup> , Amy Muise<sup>4</sup> ,  
Emily A. Impett<sup>5</sup> 

[1] Department of Psychiatry and Behavioral Sciences, University of California, San Francisco, San Francisco, CA, USA.

[2] Department of Psychology, University of Michigan, Ann Arbor, MI, USA. [3] Department of Psychology, University of Münster, Münster, Germany. [4] Department of Psychology, York University, Toronto, Canada. [5] Department of Psychology, University of Toronto, Mississauga, Canada.

Personality Science, 2023, Vol. 4, Article e10537, <https://doi.org/10.5964/ps.10537>

**Received:** 2022-11-10 • **Accepted:** 2023-01-11 • **Published (VoR):** 2023-01-26

**Handling Editor:** John F. Rauthmann, Bielefeld University, Bielefeld, Germany

**Reviewing:** This paper has undergone a streamlined process as it has been transferred from another journal including peer reviews. No open reviews are available.

**Corresponding Author:** Yoobin Park, Department of Psychiatry and Behavioral Sciences, University of California, San Francisco. 675 18th St, San Francisco, CA 94107, USA. E-mail: [yoobin.park@ucsf.edu](mailto:yoobin.park@ucsf.edu)

**Supplementary Materials:** Materials [see [Index of Supplementary Materials](#)]



## Abstract

Gratitude promotes high quality relationships, but what happens when partners differ in their levels of gratitude? We examined the dyadic nature of gratitude in relationships using six longitudinal datasets (562 couples). Approaching the dyadic effect from the perspective of a “weak-link” hypothesis, we tested if the link between one partner’s gratitude and relationship quality is reduced if the other partner is low in gratitude. Our results overall did not support this hypothesis as they indicated that grateful individuals were more satisfied and committed at baseline, and more grateful and committed over time, regardless of their partner’s level of gratitude. As an alternative way to conceptualize the dyadic effect of gratitude, we explored a potential similarity effect using Dyadic Response Surface Analysis. Our results revealed no unique effect of having two partners reciprocating the same levels of gratitude above and beyond the effect of each partner’s gratitude.

## Keywords

gratitude, appreciation, relationship quality, dyadic effects, Response Surface Analysis



This is an open access article distributed under the terms of the [Creative Commons Attribution 4.0 International License](#), CC BY 4.0, which permits unrestricted use, distribution, and reproduction, provided the original work is properly cited.

### Relevance Statement

We took two approaches to conceptualizing and testing dyadic effects of gratitude and found that a) links between one's gratitude and relationship quality are not weakened by the other's low levels of gratitude, and b) there is no unique benefit to reciprocating the same degree of gratitude.

### Key Insights

- Gratitude is related to better relationship quality concurrently and longitudinally.
- These links are not undermined by having less grateful partners.
- Reciprocating the same degree of gratitude had no additional benefit.

Given the broad health and well-being implications of satisfying romantic relationships (Kansky, 2018; Kiecolt-Glaser & Newton, 2001), researchers have long been interested in understanding how couples maintain high-quality relationships. Over the past decade, gratitude has emerged as one answer to this question. According to the find-remind-bind theory (Algoe, 2012), gratitude serves the purpose of helping people find valuable partners, remind them of their partners' value, and bind people to their partners by promoting relationship maintenance behaviors. Research has shown that people who are more grateful for their romantic partners are more satisfied (Algoe et al., 2010; Joel et al., 2020) and committed (Baker, 2021; A. M. Gordon et al., 2012), more responsive to their partner's needs (Brady et al., 2021; Kubacka et al., 2011), and less likely to break up (A. M. Gordon et al., 2012).

## Dyadic Effects of Gratitude

Given the interdependent nature of relationships, researchers often consider both partners when studying gratitude and there is some evidence for cross-partner effects, such as people with more grateful partners feeling more satisfied and connected (e.g., Algoe et al., 2010; C. L. Gordon et al., 2011). But what happens if partners have differing levels of gratitude? Below, we outline two approaches to understanding the dyadic effects of gratitude that generate different predictions about if and how having one partner low in gratitude might be related to the grateful person's relationship quality.

### Weak-Link Perspective

One approach to conceptualizing the dyadic effects of gratitude considers the conditional nature of any effects one partner's gratitude has. Specifically, a weak-link hypothesis suggests that the extent to which one grateful person feels satisfied and committed may depend on the other partner's levels of gratitude, such that a grateful person's relationship quality might be *undermined* by the other partner's low gratitude.

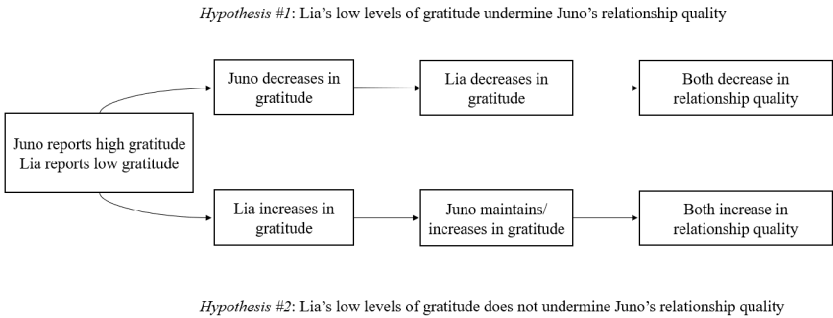
Imagine being grateful for your partner, expressing your gratitude, and having your partner not respond in kind. Over time, in relationships where one partner is low in gratitude, not feeling appreciated by the less grateful partner might diminish the more grateful partner's gratitude and relationship quality. In one study supporting this perspective (McNulty & Dugas, 2019), whereas grateful people with a partner also high in gratitude were highly satisfied and maintained satisfaction over time, grateful people with a partner low in gratitude were no more likely than those who were less grateful to be satisfied in the relationship and actually decreased in satisfaction over time. In another study (Baker, 2021), receiving a partner's gratitude when people were not grateful themselves fostered more positive deliberative self-evaluations (higher self-rated mate value) as well as less positive partner evaluations. An increased discrepancy between self and partner evaluations in turn was associated with lower commitment.

The weak-link finding seems to contrast with what early work on gratitude has suggested, which is that when people are more grateful, they are more likely to behave in ways that help them maintain their relationships, such as being more responsive to their partner's needs (Brady et al., 2021; A. M. Gordon et al., 2012). These relationship maintenance behaviors ensure their partner feels appreciated, which, in turn, promotes their partner's gratitude. If dyadic gratitude operates in this way, we would expect to see grateful people maintain or increase in their already high levels of gratitude and relationship quality even if their partner is less grateful, while their less grateful partner would become more grateful and experience higher relationship quality over time.

At their essence, both perspectives consider changes in gratitude in both partners as the key mechanism underlying increases or decreases in relationship quality over the long-term. That is, as illustrated in the conceptual model in Figure 1, when considering a couple with discrepant levels of gratitude, the weak-link perspective (Hypothesis #1) focuses on how the "weak-link" partner (i.e., Lia) elicits changes (i.e., decreases) in their partner's gratitude, which reduces their gratitude, and in turn undermines their relationship quality. In contrast, the other perspective (Hypothesis #2) focuses on how the grateful partner (i.e., Juno) ultimately maintains or even increases in relationship quality via eliciting changes (i.e., increases) in their partner's gratitude, which fuels back into their gratitude.

Figure 1

A Conceptual Model of the Two Potential Processes by Which Discrepant Levels of Gratitude Can Shape Relationship Quality



Arguably, as most studies (e.g., [Algoe et al., 2010](#)) in support of the latter perspective have focused on examining the main effects of own and partner gratitude, they were limited in evaluating the weak-link idea. To test whether the association between an individual's gratitude and their relationship quality is reduced by their partner's low level of gratitude, we would need to test an interaction between actor and partner gratitude (as in [McNulty & Dugas, 2019](#)). It is possible that when accounting for such interactive effects, we will find that the previously documented main effects were in fact conditional on the other partner's level of gratitude. In addition, early models of dyadic gratitude focused on relationship maintenance and commitment to the relationship, rather than relationship satisfaction. It is possible that we could see a weak-link effect for one's evaluation of the relationship (satisfaction) but not for their desire to maintain the relationship (commitment), although of course satisfaction is a key predictor of commitment ([Le & Agnew, 2003](#)). Thus, we sought to examine the interactive effects of dyadic gratitude on both satisfaction and commitment in a large sample of couples.

Similarity Perspective

While the idea of a weak-link effect is one promising way to conceptualize the dyadic effects of gratitude, there are alternative approaches to understanding how two partners' gratitude *jointly* contribute to relationship quality. One underexplored approach involves considering the levels of similarity between two partners' gratitude as a potential predictor of relationship quality. For example, assuming two couples with the same average levels of gratitude, would the couple with similar levels (e.g., both partners scoring 6 or both scoring 2) show greater satisfaction or commitment compared to the other couple with discrepant levels (e.g., one scoring 3 and the other 9, or one scoring 1 and the other 3)? Indeed, even if we find evidence for a weak-link effect (i.e., a less grateful partner

undermines a grateful partner's relationship quality), this does not necessarily mean that couples similarly grateful to each other are more satisfied and committed to the relationship compared to couples with discrepant levels of gratitude. To directly test the idea of a similarity effect and extend our understanding of the dyadic effects of gratitude, we conducted Response Surface Analyses.

## Current Research

We took two different approaches to test the dyadic effects of gratitude on relationship satisfaction and commitment, both in the moment and over time, as well as on future gratitude. In Part 1, we used traditional dyadic methods (i.e., the Actor-Partner Interdependence Model; APIM) to test the unique effects of actor gratitude, partner gratitude and their interaction. Fundamentally, both hypotheses in [Figure 1](#) assume the presence of both (or at least one) actor and partner effects of gratitude—that is, being or having a more grateful partner would be linked to better relationship quality. The divergence in the hypotheses lies in the conditional nature of these effects—that is, when an individual is highly grateful, does having a less grateful partner undermine the benefits of that individual's gratitude? In Part 2, approaching the dyadic effects of gratitude from the perspective of similarity, we used Dyadic Response Surface Analysis (DRSA) to assess the effect of (dis)similarity between partners' gratitude while accounting for absolute levels. Here, we examine the implications of partners' differing levels of gratitude by focusing on the possibility of additional benefits of having both partners high or low in gratitude above and beyond what is expected from each partner's individual levels of gratitude.

## Method

### Participants and Procedure

Our research questions, details on the samples and methods, and analytic plans were pre-registered (see [Supplementary Materials](#)). As outlined in the pre-registration, data access requires contacting the authors. We analyzed six dyadic longitudinal samples, collected in multiple labs (see [Table 1](#) for a summary of the sample characteristics). Follow-ups varied from two weeks to six months. Excluding those with no dyadic data available (i.e., either or both partners did not respond to our key items), the final sample consisted of 1,124 individuals (562 couples). The APIM power calculator ([Ackerman & Kenny, 2016](#)) indicated that a minimum of 89 couples is required to detect small-to-medium main effects ( $r = .20$ ) with 80% of power at an alpha of .05. As our models also included an interaction (in Part 1) and polynomial terms (in Part 2), effects which require a larger sample size to be detected, we tried to pool as many datasets as we could. For more information about the studies our samples were drawn from (e.g., eligibility criteria), please see the [pre-registration](#).

**Table 1**  
*Sample and Study Characteristics*

Variable	Sample 1 (n = 236)	Sample 2 (n = 196)	Sample 3 (n = 188)	Sample 4 (n = 208)	Sample 5 (n = 144)	Sample 6 (n = 158)
Data collection	2012	2016	2013	2015–2017	2010–2012	2016–2018
Gender	117M, 119W	91M, 96W, 1O	96M, 100W	101M, 104W, 3O	M71, W73	76M, 81W, 1O
Age <i>M</i> ( <i>SD</i> )	31.6 (10.30)	33.1 (7.80)	26.0 (7.07)	26.8 (7.09)	21.8 (5.40)	31.6 (8.08)
Relationship length <i>M</i> ( <i>SD</i> )	5 yr (5 yr 4 mo)	7 yr 10 mo (5 yr)	4 yr 7 mo (3 yr 11 mo)	4 yr 5 mo (3 yr 4 mo)	1 yr 9 mo (1 yr 9 mo)	5 yr 3 mo (5 yr 1 mo)
Satisfaction	PRQC (7-point)	PRQC (7-point)	IMS (7-point)	CSI (6-point)	CSI (6-point)	CSI (6-point)
Commitment	PRQC (7-point)	PRQC (7-point)	IMS (7-point)	—	IMS (9-point)	IMS (9-point)
Follow-up length	3 months	3 months	3 months	2 weeks	6 months	6 months
Retention rate	72%	91%	81%	99%	51%	63%

*Note.* M = Men, W = Women, O = Other/unidentified. CSI = Couples Satisfaction Index; IMS = Investment Model Scale; PRQC = Perceived Relationship Quality Components Inventory.

Measures

Gratitude

We used the nine-item Appreciative subscale from the Appreciation in Relationships scale (AIR; A. M. Gordon et al., 2012;  $\alpha$ s > .79) to assess the degree to which one tends to feel and express gratitude towards their partner.<sup>1</sup> The items were rated on a 7-point scale.

Satisfaction

Satisfaction was measured using five items from the Investment Model Scale (IMS; Rusbult et al., 1998;  $\alpha$ s > .88) in one study, three items from the Perceived Relationship Quality Components Inventory (PRQC; Fletcher et al., 2000;  $\alpha$ s > .84) in two studies, and the four-item Couple Satisfaction Index (CSI; Funk & Rogge, 2007;  $\alpha$ s > .94) in three studies. Both IMS and PRQC items were assessed using 7-point scales while CSI items were assessed using 6-point scales.

<sup>1</sup> Prior to full access to the datasets, we ran a validation study ( $N = 672$ ) to examine if prior measures of gratitude (McNulty & Dugas, 2019) would map onto the AIR scale ( $r = .79$ ). The results showed they don't map onto the same latent factor. A two-factor model was a better fit than a single-factor model, suggesting the AIR scale might be tapping into a different construct, a point we return to in the Discussion. Satisfaction mapped onto the same latent factor.

## Commitment

Commitment was measured using seven items from the IMS in three studies ( $\alpha s > .79$ ) and three items from the PRQC ( $\alpha s > .88$ ) in two studies. IMS items were completed on either 7-point or 9-point scales while PRQC items were completed on 7-point scales.

## Analytic Plan

We took an integrative data analysis (IDA; Curran & Hussong, 2009) approach pooled the data across samples. Specifically, we conducted a fixed-effects IDA (Curran & Hussong, 2009) which controls for the between-study heterogeneity by modeling the contributing sample as an additional predictor. IDA yields a large sample size with a great deal of heterogeneity, which is a particular strength when dealing with dyadic samples that are typically small due to financial and practical constraints. IDA also provides us with the ability to test moderations (e.g., by the length of the longitudinal follow-up) that are not feasible when analyzing a single dataset.

The first step of IDA involves creating comparable scores for a construct across the samples. We created a comparable score of gratitude that accounts for between-sample differences using moderated non-linear factor analysis (MNLFA; Bauer & Hussong, 2009; Curran et al., 2014). However, the same analytic approach was not possible for satisfaction and commitment, each of which were assessed using different scales (without shared items) across samples. Thus, we instead created standardized scores of satisfaction and commitment in each sample (see Jolink et al., 2022; McNulty et al., 2021, or Overall, 2020 for a similar approach). Although this approach arguably comes with an untested assumption that each scale (i.e., three scales for satisfaction and two for commitment) assessed the same underlying construct, we believed this was a reasonable assumption after cross-checking items across scales and given some supporting evidence in our validation study (i.e., IMS, PRQC, and CSI items loading onto one factor in a confirmatory factor analysis model).

In Part 1 of our analyses, we conducted dyadic analyses (Kenny et al., 2006) to examine the *interactive effect* of two partners' gratitude on satisfaction and commitment at baseline and at the follow-up. In Part 2 of our analyses, we used DRSA to examine the effects of *similarity* in partners' levels of gratitude on the same outcomes. Following our primary analyses, we ran sensitivity analyses to examine whether our results (a) held when controlling for gender, age, and relationship length and (b) were moderated by any of these variables.

We conducted all analyses in R (R Core Team, 2019) and Mplus version 8 (Muthén & Muthén, 1998–2017). We used the *aMNLFA* package (Gottfredson et al., 2019) to generate syntax for the MNLFA, the *lme4* package (Bates et al., 2015) for dyadic modeling, and the *lavaan* package (Rosseel, 2012) for DRSA.

Deviation From Pre-Registration

Although we had planned to analyze seven samples, we realized gratitude was assessed using 5-point scales in one sample, whereas all others applied 7-point scales. Given the importance of having comparable predictor variables for tests of matching in DRSA, we decided to exclude this sample from our analyses.

Results

Correlations Among Variables

We ran correlational analyses for indistinguishable dyadic data based on [Griffin and Gonzalez \(1995\)](#). [Table 2](#) presents the overall correlations among the variables in Sample 1, adjusting for dependent observations (using the effective sample size; [Griffin & Gonzalez, 1995](#)). The pattern of correlations was similar across all samples. Correlations for the other samples can be found in the [Supplementary Materials](#).

**Table 2**  
*Correlations Among Study Variables (Sample 1)*

Variable	1	2	3	4	5
1. Gratitude	—				
2. Satisfaction	.53**	—			
3. Commitment	.41**	.60**	—		
4. T2 Gratitude	.73**	.47**	.37**	—	
5. T2 Satisfaction	.36**	.55**	.41**	.62**	—
6. T2 Commitment	.24**	.45**	.54**	.48**	.77**

*Note.* T2 = reports at follow-up; Significance tests are based on adjusted sample size as in [Griffin and Gonzalez \(1995\)](#).  
\* $p < .05$ . \*\* $p < .01$ .

Part 1: Primary Analyses (Pre-Registered)

We ran two-level random intercept models in which participants were nested within dyads and participants’ outcomes were predicted by both their own gratitude (actor effect), their partner’s gratitude (partner effect), and the interaction between the two (i.e., actor-partner interaction effect). The predictors were grand-mean-centered. We controlled for sample membership by including respective dummy variables in the model ([Curran et al., 2014](#)). Results are summarized in [Table 3](#).



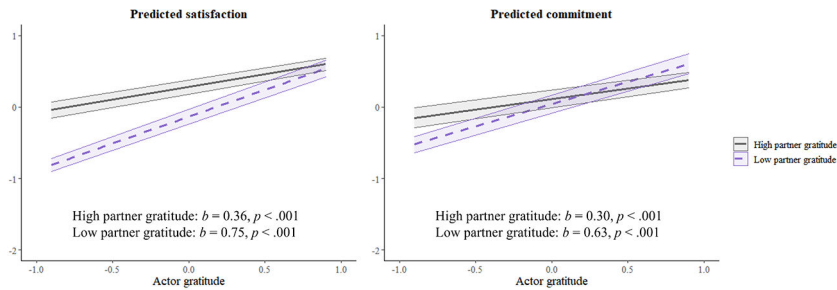
**Table 3**  
*Summary of Results From the Multilevel Models*

Model	<i>b</i>	<i>t</i>	<i>p</i>	95% CI	<i>r</i>
<b>DV = Satisfaction (N = 1,123)</b>					
Gratitude (A)	0.55	19.70	< .001	[0.50, 0.61]	.51
Gratitude (P)	0.23	8.25	< .001	[0.18, 0.29]	.24
Gratitude (A) × Gratitude (P)	-0.22	-6.97	< .001	[-0.29, -0.16]	.28
<b>DV = Follow-up satisfaction (N = 872)</b>					
Baseline satisfaction	0.56	16.60	< .001	[0.49, 0.62]	.50
Gratitude (A)	0.05	1.41	.16	[-0.02, 0.12]	.05
Gratitude (P)	0.07	2.26	.02	[0.01, 0.13]	.08
Gratitude (A) × Gratitude (P)	0.00	0.09	.92	[-0.07, 0.07]	.00
<b>DV = Commitment (N = 916)</b>					
Gratitude (A)	0.46	13.65	< .001	[0.40, 0.53]	.41
Gratitude (P)	0.04	1.20	.23	[-0.03, 0.11]	.04
Gratitude (A) × Gratitude (P)	-0.19	-4.98	< .001	[-0.26, -0.11]	.23
<b>DV = Follow-up commitment (N = 666)</b>					
Baseline commitment	0.50	13.00	< .001	[0.42, 0.57]	.45
Gratitude (A)	0.10	2.58	.01	[0.02, 0.18]	.10
Gratitude (P)	0.03	0.73	.47	[-0.05, 0.10]	.03
Gratitude (A) × Gratitude (P)	-0.04	-1.05	.29	[-0.12, 0.04]	.06
<b>DV = Follow-up gratitude (N = 877)</b>					
Gratitude (A)	0.66***	25.74	< .001	[0.61, 0.71]	.67
Gratitude (P)	0.12***	4.58	< .001	[0.07, 0.17]	.16
Gratitude (A) × Gratitude (P)	-0.02	-0.86	.39	[-0.07, 0.03]	.04

*Note.* All models control for the sample membership. Effect sizes (*r*) were computed using Rosenthal and Rosnow's (2007) formula:  $r = \sqrt{t^2 / (t^2 + df)}$ .

**Do Actor and Partner Gratitude Interact to Predict Satisfaction at Baseline?**

We found significant main effects suggesting that both being and having a grateful partner were associated with greater satisfaction. However, there was a significant interaction between actor and partner gratitude such that actors' own gratitude mattered more if their partner was low (dotted line on the left of Figure 2) versus high (solid line) in gratitude. In other words, while people were less satisfied when either they or their partner were less grateful, an individual's own gratitude buffered against reduced satisfaction associated with having a less grateful partner.

**Figure 2***Actor and Partner Gratitude Interactions Predicting Actor Satisfaction and Commitment*

Note. High and low partner gratitude refer to values of +1 and -1 SD, respectively.

### Do Actor and Partner Gratitude Interact to Predict Satisfaction at the Follow-Up?

Controlling for baseline satisfaction, there was a significant partner effect such that individuals who had a grateful partner at baseline increased in satisfaction by the follow-up relative to those who had a less grateful partner. There was no evidence for actor or actor-partner interaction effects.

### Do Actor and Partner Gratitude Interact to Predict Commitment at Baseline?

People reported greater commitment the more grateful they were (i.e., significant actor effect). There was no main effect of partner gratitude, but there was a significant actor-partner interaction such that actors' own gratitude mattered more if the partner was low (dotted line on the right of Figure 2) versus high (solid line) in gratitude. That is, an individual's own gratitude buffered against lower relationship commitment associated with having a less grateful partner.

### Do Actor and Partner Gratitude Interact to Predict Commitment at the Follow-Up?

People reported increased commitment at follow-up the more grateful they were at baseline and this effect did not depend on their partner's level of gratitude (i.e., the actor-partner interaction was not significant). In other words, people who were more grateful became more committed over time compared to those who were less grateful regardless of their partner's level of gratitude.

### Do Actor and Partner Gratitude Interact to Predict Actor's Gratitude at the Follow-Up?

People reported greater gratitude at the follow-up if they and/or their partner were more grateful at baseline (i.e., actor and partner effects). In other words, people were

least (most) grateful at the follow-up if both they and their partner were low (high) in gratitude at baseline. Being or having a less grateful partner did not moderate the other partner's changes in gratitude.

Overall, our results provide little evidence for a weak-link effect in that any positive associations Juno's high gratitude had with his own or Lia's concurrent or future relationship quality were not weakened by Lia's low gratitude. In fact, regardless of Lia's levels of gratitude, Juno remained highly grateful in the future.

## Part 1: Sensitivity and Moderation Analyses

### Influence Analysis

We examined if any observations that, when deleted, influenced the estimates of the variance components or fixed effects (Loy & Hofmann, 2014). When we ran the model predicting follow-up satisfaction without the identified influential observations ( $n = 74$ ), the nonsignificant actor effect of gratitude in Table 3 emerged as significant along with the partner effect of gratitude. That is, those who were highly grateful themselves ( $b = 0.10$ ,  $t = 3.83$ ,  $p < .001$ , 95% CI [0.05, 0.15]) or had a more grateful partner ( $b = 0.10$ ,  $t = 3.89$ ,  $p < .001$ , 95% CI [0.04, 0.14]) at baseline increased in satisfaction by the follow-up. No other effects changed.

### Covariates

We ran an additional model including gender, age, and relationship length as predictors. None of the effects changed.

### Moderating Effect of Follow-Up Length

We examined whether the over-time effects of interest depended on the follow-up length (see Table 1). No significant interaction effect was observed.

### Moderating Effect of Gender

We explored the moderating role of gender and found no significant three-way interaction involving gender.

### Moderating Effect of Relationship Length (Not Pre-Registered)

Although not initially pre-registered, we also tested relationship length as another potential moderator of the effects found in our study. We tested the moderating role of relationship length in all models and found some consistent effects on actor-partner interactions (i.e., four out of five possible three-way interactions were significant). Full results can be found in the [Supplementary Materials](#). Overall, there was evidence that among couples who had been in their relationships for longer, there were significant actor-partner interactions suggesting that having a partner high (vs. low) in gratitude

could buffer against negative implications of low actor gratitude. That is, even when people were less grateful, they were relatively more satisfied at baseline, and remained satisfied, committed, and grateful at the follow-up if their partners were high (vs. low) in gratitude. On the other hand, for those who had been together for a shorter period, actor effects of gratitude were not qualified by an interaction (except for a model predicting satisfaction in which the actor-partner interaction was simply weaker compared to couples in a longer-term relationship). That is, having a highly grateful partner did not play the same protective role in relationships for less grateful actors among those in newer relationships.

## Part 2: Details of the Analysis

In estimating RSA models for indistinguishable partners, we followed [Schönbrodt and colleagues' \(2018\)](#) approach of using structural equation modeling (SEM). Standard errors were bootstrapped with 10,000 replications and we estimated all parameters based on all available data. We estimated path models with polynomial regressions, which regress each partner's outcome ( $Z_1$  and  $Z_2$ ) on both partners' gratitude, the two squared terms, and the interaction term between the two partners' gratitude. We included dummy variables encoding sample membership ( $S_k$ ) as covariates. That is, we estimated the following SEM:

$$Z_1 = b_{01} + b_{11}X_1 + b_{21}X_2 + b_{31}X_1^2 + b_{41}X_1X_2 + b_{51}X_2^2 + b_{61}S_1 + \dots + b_{(5+k)1}S_{k-1} + e_1$$

$$Z_2 = b_{02} + b_{12}X_2 + b_{22}X_1 + b_{32}X_2^2 + b_{42}X_1X_2 + b_{52}X_1^2 + b_{62}S_1 + \dots + b_{(5+k)2}S_{k-1} + e_2$$

$$e_1 \sim e_2$$

Full details of the path models with polynomial regressions can be found in the [pre-registration](#).

In accordance with the general strategy of RSA ([Edwards, 2002](#); [Humberg et al., 2019](#)), we computed auxiliary RSA parameters ( $a_1$ ,  $a_2$ ,  $a_3$ ,  $a_4$ , and  $a_5$ ) from the estimated regression coefficients which were used to infer support for the similarity hypothesis (similar levels of the two partners' gratitude are associated with higher relationship quality). Specifically, we examined if 1)  $a_4$  was significantly negative, 2)  $a_3$  did not significantly differ from 0, and 3)  $a_5$  did not significantly differ from 0 ([Schönbrodt et al., 2018](#)). When these conditions are satisfied, a congruence effect in a broad sense is supported. That is, when comparing two couples with the same within-couple average of gratitude, the more similar couple has the higher outcome value. In the case that we did not find support for the similarity hypothesis, we explored the patterns that were present in the data (e.g., linear and quadratic main effects of gratitude), which can be found in the [Supplementary Materials](#).

Part 2: Preliminary Analyses

We first examined whether the data contained enough couples with clearly discrepant gratitude values. Following the strategy described in Humberg et al. (2022; see also Fleenor et al., 1996), we found that 37% of couples could be classified as incongruent.

Part 2: Primary Analyses

As summarized in Table 4, there was no evidence for a similarity effect (e.g.,  $a_4$  was not significant) in any of the models (also see Figure 3). In other words, having both (vs. one) partner high or low in gratitude was not necessarily related to better outcomes above and beyond the unique effect of one partner’s gratitude.

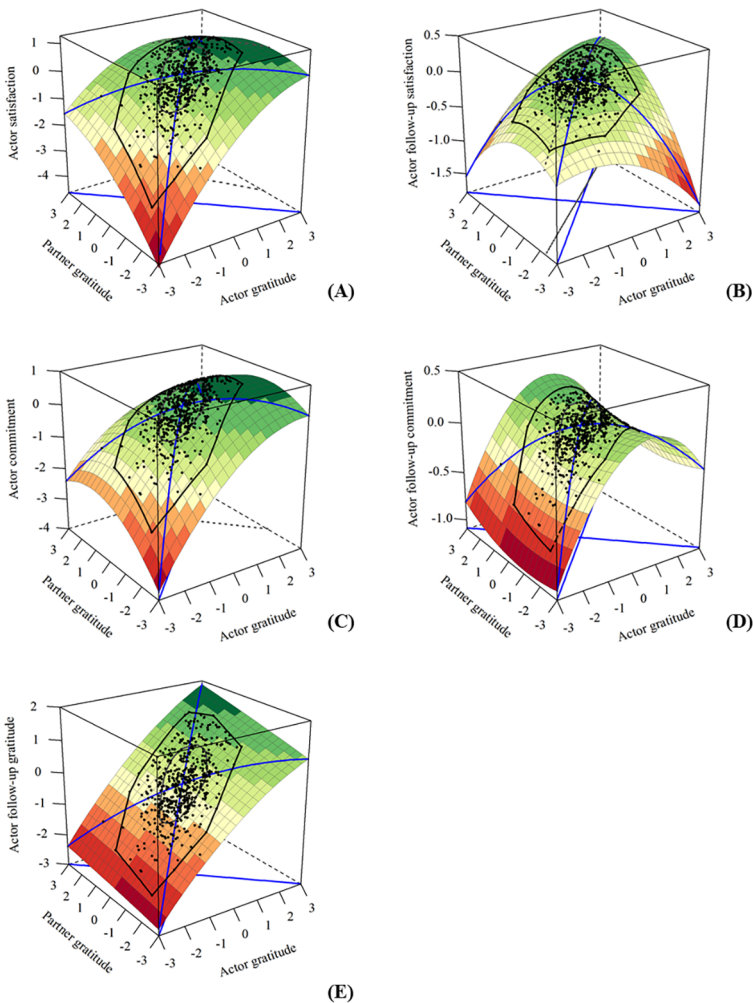
Table 4  
Summary of Results From the DRSA Models

Model	$b_1$	$b_2$	$b_3$	$b_4$	$b_5$	$a_1$	$a_2$	$a_3$	$a_4$	$a_5$	Model comparison
Satisfaction	<b>0.57</b>	<b>0.24</b>	<b>-0.12</b>	<b>-0.10</b>	<b>-0.07</b>	<b>0.80</b>	<b>-0.29</b>	<b>0.33</b>	-0.09	-0.05	$\Delta\chi^2(5) = 413.62,$ $p < .001$
Follow-up satisfaction	0.06	<b>0.08</b>	-0.05	0.07	<b>-0.06</b>	<b>0.14</b>	-0.04	-0.03	-0.18	0.01	$\Delta\chi^2(5) = 11.72,$ $p = .04$
Commitment	<b>0.47</b>	0.05	<b>-0.11</b>	-0.06	<b>-0.10</b>	<b>0.52</b>	<b>-0.27</b>	<b>0.42</b>	-0.15	-0.01	$\Delta\chi^2(5) = 201.80,$ $p < .001$
Follow-up commitment	<b>0.11</b>	0.03	-0.08	-0.00	0.02	<b>0.14</b>	-0.07	0.09	-0.07	<b>-0.10</b>	$\Delta\chi^2(5) = 16.14,$ $p = .006$
Follow-up gratitude	<b>0.67</b>	<b>0.12</b>	<b>-0.05</b>	0.02	-0.00	<b>0.78</b>	-0.04	<b>0.55</b>	-0.07	-0.05	$\Delta\chi^2(5) = 543.75,$ $p < .001$

Note. DRSA = Dyadic Response Surface Analysis. Regression coefficients  $b_1$  to  $b_5$  were from the following polynomial model:  $Z = b_0 + b_1X + b_2X + b_3X^2 + b_4X_1X_2 + b_5X_2^2$ . Model comparisons were made between the full DRSA model and the baseline model which includes the intercept and control variables (dummy variables for the sample membership only for models predicting baseline outcomes and baseline outcomes as well for models predicting follow-up outcomes). Significant effects ( $p < .05$ ) are in bold.

Figure 3

DRSA Models With Satisfaction (A: At Baseline; B: At The Follow-Up), Commitment (C: At Baseline; D: At The Follow-Up), And Follow-Up Gratitude (E) As An Outcome



Note. Follow-up models control for the outcome at baseline.

Part 2: Sensitivity Analyses

Influence Analysis

We examined if there were any influential cases (i.e., single data points whose inclusion heavily affects the coefficients in the DRSA model) according to three criteria suggested

for RSA (Edwards, 2002) and pre-registered. In none of the models was there an influential case for which we needed to account.

### Covariates

We also ran additional models controlling for gender, age, and relationship length. None of our conclusions changed.

## Discussion

### Summary of the Findings

Gratitude is considered to play a key role in promoting the maintenance of high-quality relationships (e.g., Algoe, 2012), but what about when partners have differing levels of gratitude? Using two different approaches, we tested the dyadic effects of gratitude on relationship quality and future gratitude in a large dyadic longitudinal dataset. From the weak-link perspective, analyses using traditional dyadic methods did not reveal any evidence that having a less grateful partner particularly weakened any benefits of being more grateful. Instead, people who were more (vs. less) grateful appeared more satisfied and committed, even if their partner was low in gratitude. People with a more (vs. less) grateful partner were also more satisfied, even if their own gratitude was low. When looking at changes in relationship quality, more (vs. less) grateful people remained more committed over time while those with a more grateful partner remained more satisfied. Lastly, having at least one grateful member in a couple was linked with greater gratitude at the follow-up regardless of the other partner's initial gratitude.

In Part 2, we found no evidence of a dyadic effect of gratitude in the form of a similarity effect. This might be surprising considering that beneficial effects of similarity or mutuality have been discussed in terms of other relationship variables more generally (e.g., Chi et al., 2013; Drigotas et al., 1999). As such, a broad implication of our research may be that similarity might be more important in some relationship factors than others, and it is necessary to develop a comprehensive understanding of what they are, utilizing statistical techniques that provide a precise test of similarity, such as DRSA.

### (In)Consistency With Previous Findings

The present results conceptually diverge from McNulty and Dugas' (2019) findings in several ways. In their work, a partner's gratitude was associated with one's high levels of initial satisfaction as well as weaker declines in satisfaction over time only if one was more grateful themselves. In contrast, we found that the equivalent links held similarly even if one was initially low in gratitude. Further, whereas McNulty and Dugas' study did not reveal any evidence of interpersonal transmission of gratitude, we found that being a grateful partner or having one at baseline were both associated with greater

gratitude at the follow-up. Importantly, our data suggested that couples in which at least one partner was grateful at baseline were more grateful at the follow-up compared to couples in which both were low in gratitude at baseline, contrasting a robust weak-link effect. When looking at the cross-partner transmission of gratitude, we additionally found that people with a grateful partner may become more grateful because they feel appreciated by them (see the [Supplementary Materials](#) for full results).

One reason for the discrepancy between our and previous findings may be methodological differences. McNulty and Dugas focused on newlywed couples whereas we included both dating and married couples, with variability in relationship length across samples. Their study also included more frequent and longer follow-ups, which is a strength given that changes in outcomes can be hard to capture with only two time points (although notably, our baseline findings also diverged from theirs). Further, their measure of gratitude captured different aspects of the construct from the one in our research<sup>1</sup>. We hope future research with multiple, large samples with which we can precisely test moderations by study-specific characteristics (e.g., scales of gratitude, follow-up length) will help interpret the discrepancy between studies.

Our findings also differed from [Baker's \(2021\)](#) on discrepancies in gratitude influencing commitment, although consistent in suggesting that links between partner gratitude and commitment are complex. Whereas Baker found high levels of partner gratitude were indirectly associated with less commitment when people did not reciprocate gratitude (i.e., were low in gratitude), we actually found that a partner's gratitude was associated with greater concurrent commitment for less (vs. more) grateful actors.

One important difference between Baker's and our work was that our study looked at naturally-occurring (or dispositional levels of) gratitude, rather than manipulated gratitude. Perhaps, unreciprocated partner gratitude, when experienced chronically and naturally, may not necessarily shift people's evaluations of themselves and their partner the same way as it does when situationally elicited. In addition, we only found a main effect of actor gratitude on follow-up commitment, suggesting that a *partner's* gratitude may play a stronger role in shaping how committed people feel in the moment than over time. Combined, these findings point to the importance of considering the unique dyadic effects that emerge from the actor-partner interaction as well as the need for more research to help elucidate when, how, and for whom a partner's gratitude is beneficial.

## Implications

Conceptually, our findings provide additional evidence for the potential benefits of gratitude, suggesting that grateful people experience higher quality relationships, even if their partner is lower in gratitude. On the one hand, they thus have implications for gratitude interventions by suggesting that intervening with one partner might be enough to create changes in both partners (but see [Leong et al., 2020](#); [Loewenstein et al., 2015](#)). We also found differences in how gratitude was associated with changes in relationship



satisfaction and commitment, with partner gratitude predicting satisfaction over time but actor gratitude predicting commitment over time. These findings highlight the need to consider the nuanced ways in which gratitude might influence different aspects of relationship quality and suggest that gratitude interventions may also have different effects, depending on how they are deployed (e.g., focusing on the individual or the couple).

In terms of methodological implications, uniquely dyadic effects, assessed through actor-partner interactions or DRSA, are not as commonly considered as main actor and partner effects. Our findings highlight the importance of accounting for both partners' characteristics as well as examining the effects of (dis)similarity. Advances in dyadic analysis, such as DRSA, make these analyses increasingly accessible, thus it is important to apply these methods in other contexts and to answer questions for which these methods are most useful.

## Limitations (Constraints on Generality) and Future Directions

Our participants were from the USA and Canada, relatively young, and in established but relatively newer relationships. Thus, these analyses do not speak to the effects of gratitude in other cultures or among older, longer-term couples. In fact, our data suggested that gratitude might function differently depending on relationship length, with partner gratitude playing more of a buffering role for longer-term couples. We also cannot conclude how the longitudinal effects would change beyond our longest follow-up length.

Although we focused on dispositional gratitude in relationships, [Chang et al. \(2022\)](#) recently showed that situational gratitude (operationalized as daily deviations from one's average level of gratitude) has better predictive power for changes in daily relationship quality compared to dispositional gratitude (average levels of gratitude). This perhaps helps explain the relatively weak effects we found when predicting changes in satisfaction and commitment; future research may benefit from using datasets with multiple data points to test the role of both partners' situational gratitude.

## Conclusion

The present work adds to the growing literature highlighting the role of gratitude in the maintenance of high-quality relationships. Our findings suggest that being grateful, even if your partner is less grateful, may help individuals maintain a high-quality relationship.

---

**Funding:** This study was supported by a grant from The Love Consortium.

---

**Acknowledgments:** The authors have no additional (i.e., non-financial) support to report.

---

**Competing Interests:** The authors have declared that no competing interests exist.

---

**Author Contributions:** *Yoobin Park*—Idea, conceptualization | Design planning | Data management (storage, curation, processing, etc.) | Visualization (data presentation, figures, etc.) | Data analysis | Writing. *Amie Gordon*—Idea, conceptualization | Design planning | Resource provision (materials, participants, etc.) | Writing | Supervision, mentoring. *Sarah Humberg*—Data management (storage, curation, processing, etc.) | Visualization (data presentation, figures, etc.) | Data analysis | Feedback, revisions. *Amy Muise*—Idea, conceptualization | Design planning | Resource provision (materials, participants, etc.) | Feedback, revisions | Supervision, mentoring. *Emily A. Impett*—Idea, conceptualization | Design planning | Resource provision (materials, participants, etc.) | Feedback, revisions | Supervision, mentoring.

---

**Ethics Statement:** All studies from which the six samples were obtained were approved by the authors' institutional review board.

---

**Data Availability:** Data are not publicly available for ethical reasons and can be accessed by requesting it to the authors. Please see the preregistration for details.

---

## Supplementary Materials

Supplemental Materials include all study materials, pre-registrations, R code for analysis, and full results of additional or exploratory analyses discussed in the main text (for access see [Index of Supplementary Materials](#) below).

### Index of Supplementary Materials

Park, Y., Gordon, A., Humberg, S., Muise, A., & Impett, E. A. (2023). *Supplementary materials to "Differing levels of gratitude between romantic partners: Concurrent and longitudinal links with satisfaction and commitment in six dyadic datasets"* [Pre-registration, scales, R code]. PsychOpen GOLD. <https://doi.org/10.23668/psycharchives.12364>

## References

Ackerman, R. A., & Kenny, D. A. (2016). *APIMPower: An interactive tool for Actor-Partner Interdependence Model power analysis* [Computer software]. <https://robert-a-ackerman.shinyapps.io/apimpower/>

- Algoe, S. B., Gable, S. L., & Maisel, N. C. (2010). It's the little things: Everyday gratitude as a booster shot for romantic relationships. *Personal Relationships*, 17(2), 217–233.  
<https://doi.org/10.1111/j.1475-6811.2010.01273.x>
- Algoe, S. B. (2012). Find, remind, and bind: The functions of gratitude in everyday relationships. *Social and Personality Psychology Compass*, 6(6), 455–469.  
<https://doi.org/10.1111/j.1751-9004.2012.00439.x>
- Baker, L. R. (2021). Gratitude increases recipients' commitment through automatic partner evaluations, yet unreciprocated gratitude decreases commitment through deliberative evaluations. *Social Psychological & Personality Science*, 12(7), 1402–1411.  
<https://doi.org/10.1177/1948550620967817>
- Bates, D. M., Maechler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, 67(1), 1–48. <https://doi.org/10.18637/jss.v067.i01>
- Bauer, D. J., & Hussong, A. M. (2009). Psychometric approaches for developing commensurate measures across independent studies: Traditional and new models. *Psychological Methods*, 14(2), 101–125. <https://doi.org/10.1037/a0015583>
- Brady, A., Baker, L. R., Muise, A., & Impett, E. A. (2021). Gratitude increases the motivation to fulfill a partner's sexual needs. *Social Psychological & Personality Science*, 12(2), 273–281.  
<https://doi.org/10.1177/1948550619898971>
- Chang, Y.-P., Dwyer, P. C., & Algoe, S. B. (2022). Better together: Integrative analysis of behavioral gratitude in close relationships using the three-factorial interpersonal emotions (TIE) framework. *Emotion*, 22(8), 1739–1754. <https://doi.org/10.1037/emo0001020>
- Chi, P., Epstein, N. B., Fang, X., Lam, D. O., & Li, X. (2013). Similarity of relationship standards, couple communication patterns, and marital satisfaction among Chinese couples. *Journal of Family Psychology*, 27(5), 806–816. <https://doi.org/10.1037/a0034113>
- Curran, P. J., & Hussong, A. M. (2009). Integrative data analysis: The simultaneous analysis of multiple data sets. *Psychological Methods*, 14(2), 81–100. <https://doi.org/10.1037/a0015914>
- Curran, P. J., McGinley, J. S., Bauer, D. J., Hussong, A. M., Burns, A., Chassin, L., Sher, K., & Zucker, R. (2014). A moderated nonlinear factor model for the development of commensurate measures in integrative data analysis. *Multivariate Behavioral Research*, 49(3), 214–231.  
<https://doi.org/10.1080/00273171.2014.889594>
- Drigotas, S. M., Rusbult, C. E., & Verette, J. (1999). Level of commitment, mutuality of commitment, and couple well-being. *Personal Relationships*, 6(3), 389–409.  
<https://doi.org/10.1111/j.1475-6811.1999.tb00199.x>
- Edwards, J. R. (2002). Alternatives to difference scores: Polynomial regression analysis and response surface methodology. In F. Drasgow & N. W. Schmitt (Eds.), *Advances in measurement and data analysis* (pp. 350–400). Jossey-Bass.
- Fleenor, J. W., McCauley, C. D., & Brutus, S. (1996). Self-other rating agreement and leader effectiveness. *The Leadership Quarterly*, 7(4), 487–506.  
[https://doi.org/10.1016/S1048-9843\(96\)90003-X](https://doi.org/10.1016/S1048-9843(96)90003-X)

- Fletcher, G. J., Simpson, J. A., & Thomas, G. (2000). The measurement of perceived relationship quality components: A confirmatory factor analytic approach. *Personality and Social Psychology Bulletin*, 26(3), 340–354. <https://doi.org/10.1177/0146167200265007>
- Funk, J. L., & Rogge, R. D. (2007). Testing the ruler with item response theory: Increasing precision of measurement for relationship satisfaction with the Couples Satisfaction Index. *Journal of Family Psychology*, 21(4), 572–583. <https://doi.org/10.1037/0893-3200.21.4.572>
- Gordon, A. M., Impett, E. A., Kogan, A., Oveis, C., & Keltner, D. (2012). To have and to hold: Gratitude promotes relationship maintenance in intimate bonds. *Journal of Personality and Social Psychology*, 103(2), 257–274. <https://doi.org/10.1037/a0028723>
- Gordon, C. L., Arnette, R. A., & Smith, R. E. (2011). Have you thanked your spouse today? Felt and expressed gratitude among married couples. *Personality and Individual Differences*, 50(3), 339–343. <https://doi.org/10.1016/j.paid.2010.10.012>
- Gottfredson, N. C., Cole, V. T., Giordano, M. L., Bauer, D. J., Hussong, A. M., & Ennett, S. T. (2019). Simplifying the implementation of modern scale scoring methods with an automated R package: Automated moderated nonlinear factor analysis (aMNLFA). *Addictive Behaviors*, 94, 65–73. <https://doi.org/10.1016/j.addbeh.2018.10.031>
- Griffin, D., & Gonzalez, R. (1995). Correlational analysis of dyad-level data in the exchangeable case. *Psychological Bulletin*, 118(3), 430–439. <https://doi.org/10.1037/0033-2909.118.3.430>
- Humberg, S., Nestler, S., & Back, M. D. (2019). Response surface analysis in personality and social psychology: Checklist and clarifications for the case of congruence hypotheses. *Social Psychological & Personality Science*, 10(3), 409–419. <https://doi.org/10.1177/1948550618757600>
- Humberg, S., Schönbrodt, F. D., Back, M. D., & Nestler, S. (2022). Cubic response surface analysis: Investigating asymmetric and level-dependent congruence effects with third-order polynomial models. *Psychological Methods*, 27(4), 622–649. <https://doi.org/10.1037/met0000352>
- Joel, S., Eastwick, P. W., Allison, C. J., Arriaga, X. B., Baker, Z. G., Bar-Kalifa, E., Bergeron, S., Birnbaum, G. E., Brock, R. L., Brumbaugh, C. C., Carmichael, C. L., Chen, S., Clarke, J., Cobb, R. J., Coolsen, M. K., Davis, J., de Jong, D. C., Debrot, A., DeHaas, E. C., . . . Wolf, S. (2020). Machine learning uncovers the most robust self-report predictors of relationship quality across 43 longitudinal couples studies. *Proceedings of the National Academy of Sciences of the United States of America*, 117(32), 19061–19071. <https://doi.org/10.1073/pnas.1917036117>
- Jolink, T. A., Chang, Y. P., & Algoe, S. B. (2022). Perceived partner responsiveness forecasts behavioral intimacy as measured by affectionate touch. *Personality and Social Psychology Bulletin* 48(2), 203–221. <https://doi.org/10.1177/0146167221993349>
- Kansky, J. (2018). What's love got to do with it? Romantic relationships and well-being. In E. Diener, S. Oishi, & L. Tay (Eds.), *Handbook of well-being*. DEF Publishers. <https://www.nobascholar.com/chapters/10>
- Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *The analysis of dyadic data*. Guilford Press.
- Kiecolt-Glaser, J. K., & Newton, T. L. (2001). Marriage and health: His and hers. *Psychological Bulletin*, 127(4), 472–503. <https://doi.org/10.1037/0033-2909.127.4.472>

- Kubacka, K. E., Finkenauer, C., Rusbult, C. E., & Keijsers, L. (2011). Maintaining close relationships: Gratitude as a motivator and a detector of maintenance behavior. *Personality and Social Psychology Bulletin*, 37(10), 1362–1375. <https://doi.org/10.1177/0146167211412196>
- Le, B., & Agnew, C. R. (2003). Commitment and its theorized determinants: A meta-analysis of the Investment Model. *Personal Relationships*, 10(1), 37–57. <https://doi.org/10.1111/1475-6811.00035>
- Leong, J. L. T., Chen, S. X., Fung, H. H. L., Bond, M. H., Siu, N. Y. F., & Zhu, J. Y. (2020). Is gratitude always beneficial to interpersonal relationships? The interplay of grateful disposition, grateful mood, and grateful expression among married couples. *Personality and Social Psychology Bulletin*, 46(1), 64–78. <https://doi.org/10.1177/0146167219842868>
- Loewenstein, G., Krishnamurti, T., Kopsic, J., & McDonald, D. (2015). Does increased sexual frequency enhance happiness? *Journal of Economic Behavior & Organization*, 116, 206–218. <https://doi.org/10.1016/j.jebo.2015.04.021>
- Loy, A., & Hofmann, H. (2014). HLMdiag: A suite of diagnostics for hierarchical linear models in R. *Journal of Statistical Software*, 56(5), 1–28. <https://doi.org/10.18637/jss.v056.i05>
- McNulty, J. K., & Dugas, A. (2019). A dyadic perspective on gratitude sheds light on both its benefits and its costs: Evidence that low gratitude acts as a “weak link”. *Journal of Family Psychology*, 33(7), 876–881. <https://doi.org/10.1037/fam0000533>
- McNulty, J. K., Meltzer, A. L., Neff, L. A., & Karney, B. R. (2021). How both partners’ individual differences, stress, and behavior predict change in relationship satisfaction: Extending the VSA model. *Proceedings of the National Academy of Sciences of the United States of America*, 118(27), Article e2101402118. <https://doi.org/10.1073/pnas.2101402118>
- Muthén, L. K. & Muthén, B. O. (1998–2017). *Mplus user’s guide* (8th ed.). Muthén & Muthén.
- Overall, N. C. (2020). Behavioral variability reduces the harmful longitudinal effects of partners’ negative-direct behavior on relationship problems. *Journal of Personality and Social Psychology*, 119(5), 1057–1085. <https://doi.org/10.1037/pspi0000231>
- R Core Team. (2019). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing.
- Rosenthal, R., & Rosnow, R. L. (2007). *Essentials of behavioral research: Methods and data analysis* (3rd ed.). McGraw-Hill.
- Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2), 1–36. <https://doi.org/10.18637/jss.v048.i02>
- Rusbult, C. E., Martz, J. M., & Agnew, C. R. (1998). The investment model scale: Measuring commitment level, satisfaction level, quality of alternatives, and investment size. *Personal Relationships*, 5(4), 357–387. <https://doi.org/10.1111/j.1475-6811.1998.tb00177.x>
- Schönbrodt, F. D., Humberg, S., Nestler, S., & Carlson, E. (2018). Testing similarity effects with dyadic response surface analysis. *European Journal of Personality*, 32(6), 627–641. <https://doi.org/10.1002/per.2169>



*Personality Science* (PS) is an official journal of the European Association of Personality Psychology (EAPP).



leibniz-psychology.org

PsychOpen GOLD is a publishing service by Leibniz Institute for Psychology (ZPID), Germany.