Concurrent and longitudinal dyadic polynomial regression analyses of Big Five traits and
relationship satisfaction: Does similarity matter?

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Abstract

Being with a well-matched partner seems essential for a happy relationship. However, past research on personality similarity in couples has reported inconsistent findings. The current study employs a dyadic polynomial regression approach to take into account linear and curvilinear associations between similarity and satisfaction. The concurrent results based on data of 237 couples suggest that beyond actor effects for neuroticism, agreeableness, and conscientiousness and partner effects for agreeableness, similarity plays a negligible role for relationship satisfaction. Longitudinally, two similarity effects emerged. First, if partners reported dissimilar neuroticism levels, male partner reported lower relationship satisfaction. Second, if both partners reported modest levels in openness, female partners reported higher relationship satisfaction. Implications for couples are discussed.

Word count: 114

Keywords: Big Five, Relationship Satisfaction, Dyadic Polynomial Regression Analysis, Response Surface Analysis

Highlights

- Testing trait similarity effects on satisfaction with dyadic polynomial regression analyses only yielded few results.
- Concurrent APIM effects reflected the data equally well compared to more complex dyadic polynomial regression analyses.
- Longitudinal similarity effects emerged for neuroticism and males' satisfaction and openness and females' satisfaction.

Concurrent and longitudinal dyadic polynomial regression analyses of Big Five traits and relationship satisfaction: Does similarity matter?

“We’re all a little weird. And life is a little weird. And when we find someone whose weirdness is compatible with ours, we join up with them and fall into mutually satisfying weirdness — and call it love — true love.” Robert Fulghum

Finding a well-matched partner seems to represent a premise for satisfying romantic relationships. With regard to personality, research has not yielded a clear answer whether the similarity between romantic partners plays an important role in achieving a satisfying relationship (for a review, see Weidmann, Ledermann, & Grob, 2017). To study partners’ similarity, past research has used methods (e.g., difference scores, profile correlation) that may not be able to provide the appropriate answer to the question of whether similarity of two persons matters for their relationship satisfaction. The aim of the current study is to test the impact of couple similarity allowing for curvilinear associations in the examination of whether similarity or dissimilarity in personality traits predict relationship satisfaction concurrently and over a time span of two years.

Associations between Personality Traits and Satisfaction

A vast body of research has addressed the link between personality traits and relationship outcomes (Cooper & Sheldon, 2002). Personality reflects an enduring strength or vulnerability in romantic relationships potentially enhancing or impeding the adaptation to stress (Karney & Bradbury, 1995). Evidence sustains Karney and Bradbury’s Vulnerability-Stress-Adaptation Model (1995), indicating substantial actor (intrapersonal) and partner (interpersonal) effects of neuroticism, agreeableness, and conscientiousness on satisfaction in couples (Weidmann et al., 2017). In addition, some evidence corroborates a positive link between extraversion and openness to experience in predicting partners’ life and relationship

satisfaction (Dyrenforth, Kashy, Donnellan, & Lucas, 2010; Furler, Gomez, & Grob, 2013), whereas others do not find such associations (Furler, Gomez, & Grob, 2014; Slatcher & Vazire, 2009).

In the same vein, longitudinal evidence indicates that personality has the power to predict future levels of relationship satisfaction (Karney & Bradbury, 1995; Schaffhuser, Wagner, Lütke, & Allemand, 2014; Solomon & Jackson, 2014). More specifically, neuroticism predicted lower levels of satisfaction, whereas extraversion, agreeableness, and conscientiousness predicted higher levels of satisfaction. These results suggest that being low in neuroticism and high in agreeableness, conscientiousness, and extraversion is beneficial for one's own relationship satisfaction as well as the relationship satisfaction of the partner over time. However, results are contradictory for openness to experience (Karney & Bradbury, 1995; Mund & Neyer, 2014; Solomon & Jackson, 2014).

Similarity Effects of Big Five Traits and Relationship Outcomes

In addition to the main effects of personality, researchers have also tested whether the combination of both partners' personality traits jointly impacts relationship satisfaction. Big Five trait similarity reflects an important component in relationship quality and could lead to decreased conflict in romantic relationships and thus avert eventual relationship dissolution (Rammstedt, Spinath, Richter, & Schupp, 2013). Being similar to the romantic partner can be beneficial because partners who are similar to each other may experience comparable emotional involvement, experiences, and perception and, thus, be more attuned in coordinating their interactions and better able to understand each other's emotions, to experience similar responses during conflict situation, and to experience an increase in validation and intimacy (Anderson, Keltner, & John, 2003; Gonzaga, Campos, & Bradbury, 2007; Reis & Shaver, 1988).

Previous research used several methods to test similarity in couples. These include difference scores (i.e., algebraic difference; e.g., $X_{\text{male}} - X_{\text{female}}$), discrepancy score (i.e., absolute or squared differences; e.g., $|X_{\text{male}} - X_{\text{female}}|$ or $(X_{\text{male}} - X_{\text{female}})^2$) profile correlations across multiple personality dimensions or items, and product terms (i.e., moderated regression analysis). Though these different indexes refer to different aspects of similarity testing different hypotheses, they can be subsumed under the broader concept of similarity (Kenny, Kashy, & Cook, 2006).

For the importance of couples' similarity in personality with regard to relationship satisfaction, evidence is mixed. One study examining two large representative samples from Australia and the United Kingdom yielded some evidence for personality similarity on relationship satisfaction above and beyond actor and partner effects (Dyrenforth et al., 2010). More specifically, for the panel data from Australia, similarity in the form of absolute difference scores significantly predicted relationship satisfaction for extraversion and openness. For the panel data from the UK, only differences in emotional stability were predictive for relationship satisfaction (Dyrenforth et al., 2010). Decuyper, De Bolle, and De Fruyt (2012) used profile similarity and found that Big Five traits similarity predicted relationship satisfaction, but mostly in women. In a different study, Gonzaga et al. (2007) used profile correlations across Big Five traits and found a positive association with relationship quality. In contrast, Barelds (2005) calculated difference scores to predict relationship quality and found that partners' difference in agreeableness had a negative effect. Further, Luo and Klohnen (2005) tested the effect of profile similarity and difference scores on Big Five traits on observed and self-reported marital quality of both partners. The results suggest effects for agreeableness and openness for both partners' relationship quality, reflecting that if both partners were more similarly agreeable and open, self-reported and observed relationship quality was higher. In addition, some gender-specific effects emerged.

For example, neuroticism similarity was positive for female relationship quality and conscientiousness similarity was positive for male relationship quality (Luo & Klohnen, 2005). Finally, Gattis, Berns, Simpson, and Christensen (2004) studied distressed and non-distressed couples using difference score similarities. The authors compared very similar couples (1 *SD* above the study mean) with very dissimilar couples (1*SD* below the study mean) and found no effects of similarity in Big Five traits on marital satisfaction.

Beyond absolute and directed difference scores, researchers also addressed the role of similarity for partners' satisfaction by using product interaction terms of both partners' personality (i.e., moderated regression analysis). One study suggests that the link between extraversion and marital quality was strongest when one was low on extraversion (Barelds, 2005), which implies a compensational mechanism for extraversion. For agreeableness, the opposite emerged: If both partners reported high levels of agreeableness, marital quality was higher (Barelds, 2005). In contrast, results with a large representative sample from Australia tested interaction effects above and beyond linear actor and partner effects and found no same-trait significant interaction predicting relationship satisfaction (Solomon & Jackson, 2014). In sum, even though some evidence on similarity effects — in the form of difference scores, profile correlations, or interaction terms — exists for some personality dimensions, the evidence is mixed. We add to this literature by testing the effect of Big Five traits similarity on relationship satisfaction in couples using polynomial regression analysis (Edwards & Parry, 1993), which includes linear and curvilinear estimates between a predictor variable and an outcome measured in both partners.

The Present Study

The present study investigates whether couples that are similar (congruent) or dissimilar (incongruent) in their Big Five personality traits are happier with their romantic relationship. Based on the inconsistent literature, we are not able to formulate hypotheses in

favor or against similarity effects. However, the above-mentioned theoretical assumptions speak for the benefits of personality similarity. Two reasons might be responsible for the inconsistent results. First, studies have used a variety of indexes to test similarity. These indexes range from directed and absolute difference scores, and profile correlations, to interaction terms. Aside from drawbacks discussed elsewhere (Edwards, 1993; Gaunt, 2006; Griffin, Murray, & Gonzalez, 1999; Nestler, Grimm, & Schönbrodt, 2015), difference scores, profile similarity, and interaction terms are often used to test congruence effects assuming a linear relationship (Edwards & Parry, 1993; Nestler et al., 2015). A hypothetical example for a linear association between similarity and satisfaction is that couples, which are very similar, report high relationship satisfaction, whereas couples that are dissimilar report low relationship satisfaction. However, recent evidence corroborates the notion that for some traits moderate similarity might yield the best effect on relationship satisfaction (Hudson & Fraley, 2014). Further, the results of difference scores and profile similarity differ commonly from results of polynomial regressions (Edwards, 1993; Edwards & Van Harrison, 1993). Second, most of these measures do not accurately measure the best fit, which includes whether a specific level of one partner with a specific level of the other partner predict the highest levels of satisfaction or, in other words, whether an optimal combination of both partner's variables yields the best outcome.

Therefore, the “question about who is a person's perfect match has not yet been answered satisfactorily” with respect to the Big Five traits (Furler et al., 2013, p. 369). We add to past research by employing polynomial regression analysis testing for the linear, quadratic, and interactive assumption in romantic couples (Nestler et al., 2015). Further, polynomial regression analysis is an adequate method to clarify the question of best fit and similarity and have “more explanatory potential than do difference scores or traditional moderated regression analyses” (Shanock, Baran, Gentry, Pattison, & Heggestad, 2010, p.

543). Using this method, we go beyond the above mentioned similarity indices to measure congruence effects in romantic partners and test the fit-hypothesis between partners' personality traits and their satisfaction (Shanock et al., 2010). In contrast to profile similarity indices, polynomial regression models give information on specific dimensions—such as each Big Five trait (Edwards, 1993). In addition, it is important to not merge two indicators into one single score (Edwards, 2012) but to depict the three-dimensional relationship between two dimensions and the outcome (Edwards, 1993), for which polynomial regression models are an appropriate tool.

Testing polynomial regression models is more appropriate relative to the above reviewed similarity indices (Edwards & Parry, 1993). Thus, for ease of interpretation, we will display the results of each model on a surface (Edwards & Parry, 1993). Finally, we will compare each dyadic polynomial regression model with a model including only linear main effects to test whether this simpler model is able to explain the association between personality traits and satisfaction in couples comparably well as a dyadic polynomial model.

In employing these methods, we hope to give a more comprehensive picture of the similarity effect of both partners' personality characteristics on relationship satisfaction and aim to extend current literature that has worked with various similarity indices. In addition, we investigate concurrent and longitudinal associations to consider the cross-sectional association and longitudinal impact of similarity in couples. To the best of our knowledge, no study has employed the dyadic polynomial regression analysis approach with regard to Big Five traits and relationship satisfaction in couples. We therefore extend previous literature on similarity effects using a more appropriate tool to test the fit-hypothesis in romantic couples.

Method

Participants

Couple data of a sample from a large-scale family study entitled *Co-Development in Personality*¹ were used. This study aims to investigate personality development in relationships with significant others (e.g., Furler et al., 2014; Schaffhuser, Allemand, & Martin, 2014). For our cross-sectional analyses, we used data of both partners from 237 heterosexual couples. For the longitudinal analyses, 141 couples participated again 2 years after the first assessment. Couples lived in German-speaking Switzerland and had been together for an average of 23.5 years at time 1 ($SD = 17.6$, range = 1 month to 63 years). Mean age was 48.4 years ($SD = 19.6$) for women and 50.7 years ($SD = 20.1$) for men. The majority of couples were married (70.9%).

Measures

At both time points, participants were asked to rate statements on Big Five traits and relationship satisfaction. For the current study, we used data on Big Five traits at time point 1, and relationship satisfaction at time 1 and time 2.

Big Five traits. The German version of the Big Five Inventory was used to assess the Big Five personality traits (John & Srivastava, 1999; Rammstedt & John, 2005). Participants rated their personality on 45 items on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Internal consistencies (Cronbach's alpha) for neuroticism, agreeableness, conscientiousness, extraversion, and openness to experience were .85, .71, .81, .84, and .76, respectively.

Relationship satisfaction. The German version of the Relationship Assessment Scale was employed to measure relationship satisfaction (Hendrick, 1988; Sander & Böcker, 1993). Seven items were rated on a five-point scale ranging from 1 (low satisfaction) to 5 (high

satisfaction) on items such as “How well does your partner meet your needs?”. Alpha reliability was .91.

Statistical Approach

We built on the actor–partner interdependence model (Kenny, 1996) and employed polynomial regression analysis using R and the package lavaan (Rosseel, 2012) and full-information maximum likelihood estimation, which is superior to other methods, including restricted maximum likelihood estimation or ordinary least-square, when there are missing data (Ledermann & Kenny, 2017). The response surfaces were created with the RSA package (Schönbrodt, 2016). Before the analyses, all variables were standardized with pooled standard deviations across partners (Ackerman, Donnellan, & Kashy, 2011).

Because of the dyadic nature of our data, we followed current recommendations (Nestler et al., 2015; Schönbrodt, Humberg, & Nestler, 2017) and tested path models with polynomial regressions (see Figure 1). Equation 1 and 2 describe the dyadic polynomial regression equations for female partners’ and male partners’ relationship satisfaction, Y_f and Y_m , being predicted by partners’ personalities (X_f and X_m), the interaction term, $X_f X_m$, and the quadratic terms X_f^2 and X_m^2 .

$$Y_f = b_{10} + b_{11}X_f + b_{12}X_m + b_{13}X_f X_m + b_{14}X_f^2 + b_{15}X_m^2 + e \quad (1)$$

$$Y_m = b_{20} + b_{21}X_f + b_{22}X_m + b_{23}X_f X_m + b_{24}X_f^2 + b_{25}X_m^2 + e \quad (2)$$

Insert figure 1 about here

Each equation tests several coefficients: Two linear associations (both partners’ personality traits), one interaction involving the two linear terms, and two quadratic associations. Hence, dyadic polynomial regressions use the standard APIM that is extended by two interaction and four quadratic terms.

Using these polynomial regression coefficients, we computed response surface parameters, termed $a1$, $a2$, $a3$, and $a4$ to visualize the results of the polynomial regression. A three-dimensional response surface (RS) plot is created based on the coefficients of the polynomial regression. The RS plot encompasses a line of congruence (LOC: $X = Y$) and a line of incongruence (LOIC: $X = -Y$). The LOC constitutes of a linear slope ($a1$) and a curvilinear slope ($a2$). An example for a positive linear slope includes individuals who experience high relationship satisfaction when both partners report high agreeableness, whereas when both partners are disagreeable, lower relationship satisfaction is reported (see Figure 2). A positive curvilinear slope indicates that relationship satisfaction is highest if partners are both either high or low in a certain trait, whereas relationship satisfaction is lower when both partner report modest levels of a trait.

Likewise, the LOIC is defined by a linear slope ($a3$) and by a curvilinear slope ($a4$) (Edwards & Parry, 1993; Schönbrodt, 2016; Shanock et al., 2010). An example for a linear slope on the LOIC would include individuals who report high relationship satisfaction if one partner reports a high trait level and the other partner reports low trait-level. Figure 3 shows a negative quadratic slope on the LOIC ($a4$ parameter) suggesting that if both partners report similar personality, independent of the level, relationship satisfaction is high.

Insert figures 2 and 3 about here

For our analyses, response surface parameters that are fueled by only one regression coefficient are not interpreted above and beyond that regression coefficient. This is the case for instance when a significant actor effect emerges but the partner effect is non-significant, the response surface parameter $a1$ might be significant, however, it only reflects a significant actor effect and not an additive effect of an actor and a partner effect.

In addition, due to the large number of models tested and to avoid Type 1 error rates, we follow the procedure of past research on personality and relationships and only interpret standardized regression coefficients larger than .10 that are significant on a $p < .01$ level (Mund & Neyer, 2014; Parker, Lüdtke, Trautwein, & Roberts, 2012). For the longitudinal analyses, we additionally controlled for the stability (autoregressive effect) in relationship satisfaction.

To examine possible gender effects within the final models, we tested whether path coefficients could be set invariant for males and females. The Tucker-Lewis Index ($TLI > .95$), the comparative fit index ($CFI > .95$), and the root-mean-square error of approximation ($RMSEA < .06$) were considered for model fit examination (Hu & Bentler, 1999). Nested model comparisons (e.g., imposing gender constraints) were evaluated with the test of small difference in fit (MacCallum, Browne, & Cai, 2006), which is less sensitive to sample size than the chi-square difference test.

A three-step procedure was followed to test the link between personality similarity and satisfaction in couples. First, we computed dyadic polynomial path models to examine the simple actor and partner effects as well as the interaction and higher-order terms. Second step, we tested whether the simpler APIM — by constraining all higher terms to zero — would be equally able to depict the data well. If that was the case, the results of that simpler model were reported in addition to the results of the polynomial model. However, if the APIM did significantly differ to the more complex polynomial regression models, we created RS plot to examine the similarity effects (for a tutorial on dyadic polynomial regression analyses, see Schönbrodt et al., 2017).

Power analyses

Because no power analysis tool exists for dyadic polynomial regressions, we used the program written by Ackerman and Kenny to determine the power of the simple APIM

(Ackerman, Ledermann, & Kenny, 2016). Based on earlier findings on Big Five traits and relationship satisfaction (Dyrenforth et al., 2010; Solomon & Jackson, 2014), we assumed a small to medium actor effect (standardized estimate = .15) and a small partner effect (standardized estimate = .10). With a sample of 237 couples and a significance level of .01, the power to detect such effects is .83 for actor effects and .41 for partner effects.

Unfortunately, no tool exists to analyze the power of longitudinal APIMs; however, we estimate that due to the reduced sample size, our longitudinal models are able to detect effects that are medium in size.

Results

Means and standard deviations for the study variables are presented in Table 1. In Table 2, the bivariate correlations of Big Five traits and relationship satisfaction at both time points are displayed.

Cross-sectional results

The results of the cross-sectional dyadic polynomial regression analyses and the response surface parameters on relationship satisfaction are displayed in Table 3 for female relationship satisfaction and in Table 4 for male relationship satisfaction. On the grounds that no interaction effect or higher order coefficient term reached significance at the .01 significance level, we followed Garcia, Kenny, and Ledermann (2015) and tested whether simple APIM — by constraining all higher terms to zero — was not significantly worse than the polynomial regression models. The test of small difference in fit between the models did not yield any significant results suggesting that the simpler APIM displays the data equally well compared to the dyadic polynomial regressions (see supplemental online material for model fits of these and subsequent models). Therefore, from a concurrent perspective, above and beyond actor and partner effects, there is no evidence for similarity effects in personality traits.

Insert tables 1 and 2 about here

The actor and partner effects of the simple APIM analyses are shown in Table 5. Setting the paths equal for men and women yielded a good model fit ($CFI = 1.00$, $TLI \geq .99$, $RMSEA \leq .04$) and did not significantly worsen the fit ($p = .39 - .85$), with the exception for neuroticism. For neuroticism, only constraining partner effects yielded a good fit ($CFI = 1.00$, $TLI = 1.00$, $RMSEA < .01$). Thus, if both male and female partners reported higher agreeableness and conscientiousness, they were more satisfied with their relationship in general. Further, in men, higher neuroticism was linked with lower relationship satisfaction. In addition to actor effects, significant partner effects emerged for neuroticism, agreeableness, and openness. However, only for agreeableness the effect reached a significance level $< .01$. This interpersonal association reveals that individuals with a partner high on agreeableness report higher relationship satisfaction.

Insert table 3 about here

Longitudinal results

Tables 6 and 7 show the results for the longitudinal polynomial regression analyses. Significant higher-order terms emerged for openness and female relationship satisfaction resulting in a significant $a4$ responsive surface parameter ($b = -.31$, $p < .001$). With regard to men's relationship satisfaction, a significant interaction term for neuroticism was found ($b = .19$, $p < .001$). However, the majority of effects speak for no longitudinal effects of Big Five traits on relationship satisfaction two years later and, so, we tested whether the simpler APIM could be used instead of the more complex polynomial regression models (Table 5). No

significant differences were found for agreeableness, conscientiousness, and extraversion. However, the simpler APIM for neuroticism and openness was significantly worse than the APIM with polynomial terms ($p = .01$ and $p < .01$, respectively).

Insert tables 4 and 5 about here

Figure 4 shows the predicted values of the longitudinal associations between both partners' neuroticism and male relationship satisfaction. The RS plot revealed one significant parameter, $a2$ and a marginally significant $a4$ parameter. A positive parameter $a2$ demonstrates that male partners are more satisfied with their relationship if both partners are either highly neurotic or very emotionally stable (convex shaped LOC; Edwards & Parry, 1993). For openness and female relationship satisfaction, the results revealed a significantly positive $a4$ parameter, which represents a concave shaped LOIC signifying that if partners were dissimilar in terms of their openness levels, female partners reported low relationship satisfaction. However, if both partners reported modest openness to experience, female relationship satisfaction was high two years later (see Figure 5).

Insert tables 6 and 7 about here

For the other variables, where the simple APIM proved reliable, we constrained the paths to be equal for female and male partners ($df = 4$). All model fits were good (CFI = 1.00, TLI = 1.00, RMSEA < .01), and the constrained models were not significantly worse than the unconstrained models ($p > .41$ for all models). The longitudinal results of the simple APIM analyses are displayed in Table 5. No significant effects emerged, except an actor effect for agreeableness. Higher agreeableness predicted higher relationship satisfaction in the same

person two years later. However, this effect does not exceed the benchmark we set of .10 for interpreting results.

Insert figures 4 and 5 about here

Discussion

The current study aimed to address the similarity hypothesis concerning personality traits of romantic partners and their relationship satisfaction. We used cross-sectional and longitudinal data employing dyadic polynomial regressions. In general, we found only little evidence that the degree of personality similarity between two romantic partners plays a substantial role above and beyond linear actor and partner effects.

The concurrent results on personality traits revealed actor effects for agreeableness, conscientiousness, and for males' actor effects in neuroticism. In addition, a partner effect emerged for agreeableness. Hence, in line with the Vulnerability-Stress-Adaptation Model (Karney & Bradbury, 1995), our results suggest that high neuroticism can be seen as enduring vulnerabilities for one's own and the partner's satisfaction, whereas agreeableness and conscientiousness reflect strengths in romantic relationships. Further, these results are in accordance with the majority of dyadic studies on similarity (Weidmann et al., 2017). Evidence corroborates our results by showing relationship processes linking these traits to satisfaction in couples. For instance, Finn, Mitte, and Neyer (2013) found that partners high in neuroticism negatively interpret ambiguous cues in their relationship, resulting in lower satisfaction for both partners. Further, high agreeableness is linked to positive behaviors and perceptions in social interactions (Cuperman & Ickes, 2009), which could also enhance relationship satisfaction. Despite some research emphasizing the importance of extraversion (Dyrenforth et al., 2010; Solomon & Jackson, 2014; Vater & Schröder-Abé, 2015), we found

no link between extraversion and relationship satisfaction; however, the effects of extraversion were comparable in size with larger studies (e.g., Dyrenforth et al., 2010). Across the time span of two years, only agreeableness predicted one's own satisfaction. Thus, how trusting, generous, forgiving, and cooperative an individual is links to higher satisfaction two years later. Aside from this effect, we found no long-term actor and partner effects of Big Five personality traits on relationship satisfaction, in contrast to previous studies on romantic couples (Karney & Bradbury, 1995; Mund & Neyer, 2014; Schaffhuser, Allemand, et al., 2014; Solomon & Jackson, 2014).

Interestingly, the longitudinal results revealed that in the case of neuroticism and openness to experience, the dyadic polynomial regressions were better suited to predicting relationship satisfaction compared to the simpler APIM analyses. More specifically, men benefitted most with regard to their relationship satisfaction two years later when both partners reported either high or low neuroticism. We hypothesize that similarity on high or low levels of neuroticism might benefit men in the long-term because partners share a greater sense of emotional understanding and coordination (Anderson et al., 2003). Why similarity was only beneficial either on the high end or the low end of neuroticism seems puzzling. However, highly neurotic and highly emotionally stable individuals might show more predictive behavior and, thus, similarity might facilitate emotional reactions in times of stress or anxiety and therefore fuel cohesion in romantic relationships. However, these exploratory findings were not predicted and await further evidence in future studies. Furthermore, the absence of this pattern in the cross-sectional analysis raises some doubts about the robustness of effects.

For women, high relationship satisfaction emerged when both partners reported modest levels of openness. Past results of openness to experience have been contradictory with regard to relationship outcomes (Dyrenforth et al., 2010; Furler et al., 2014; Orth, 2013;

Solomon & Jackson, 2014). Openness to experience could be advantageous for romantic relationships because it fuels excitement and new activities (Solomon & Jackson, 2014) although, on the other hand, openness to experience is also related to a person's infidelity (Orzeck & Lung, 2005). Furthermore, similarity in openness to feelings was significantly associated in wives' marital adjustment in the study of Nemechek and Olson (1999). The authors explain this result to the effect that stereotypically speaking women are more aware and more strongly prioritize openness to feelings relative to male partners (Nemechek & Olson, 1999). Our results suggest that modest levels of openness in both partners seem to be optimal for women's relationship satisfaction, which might explain previous diverging results, which employed linear models only. Notably, the simple APIM would not have been able to spot these differences, resulting in a non-significant effect. Polynomial regressions therefore helped to understand more clearly these longitudinal relations. Again, it should be noted that these results were exploratory and await replication.

Aside from these two exceptions, the simple APIM analyses depicted the data just as well as the more complex polynomial regression models. The results affirm that above and beyond linear actor and partner effects, similarity does not seem to play a substantial role in the satisfaction in couples. However, the fact that most personality traits do not show similarity reflects the emerging tenor from studies that controlled for actor and partner effects when investigating similarity (Weidmann et al., 2017). In line with previous studies, the effects found for the models with Big Five traits were small in size (e.g., Dyrenforth et al., 2010).

The study's results need to be considered in the light of some limitations. First, we relied upon self-reports, which might likely inflate actor effects due to shared method variance and deflate partner effects (Orth, 2013). Therefore, future research should complement self-reports with reports of informants, such as romantic partners (Vazire, 2006).

Second, since personality similarity effects have been found to be small in size, large couple samples are needed to detect similarity effects above and beyond actor and partner effects of personality (Dyrenforth et al., 2010; Solomon & Jackson, 2014). The size of our sample was larger than average couple studies (Cooper & Sheldon, 2002); however, it might not suffice for the detection of very small similarity effects. Third, our sample is culturally homogenous as only Swiss couples were surveyed. Cross-cultural studies are needed to test the robustness of effects across various countries and cultures. Although Big Five traits are consistently found across different cultures (McCrae & Costa, 1997), the effects of personality traits, and specifically similarity, might differ across cultures. Further, our community sample was fairly satisfied with their relationship, whereas similarity effects in distressed couples are expected to look different compared to non-distressed couple samples (Gattis et al., 2004). Finally, we only focused our analyses on Big Five traits. Other personality variables might yield possible effects on relationship satisfaction, such as similarity in emotion regulation strategies (Velotti et al., 2016).

Further investigations might focus not on actual but rather on perceived similarity in romantic couples (Iafrate, Bertoni, Margola, Cigoli, & Acitelli, 2012; Tidwell, Eastwick, & Finkel, 2013). Moreover, evidence suggests important moderating factors explaining the association between personality similarity and satisfaction in couples (Hudson & Fraley, 2014), for instance the importance ratings of similarity on specific personality characteristics (Lutz-Zois, Bradley, Mihalik, & Moorman-Eavers, 2006). Further, the majority of couple research, including the current study, focuses on heterosexual couples. Future studies might extend such analyses for same-sex couples to examine whether the effects of personality similarity are comparable. Kurdek (2005) suggested that predictors of relationship quality are comparable among opposite- and same-sex couples and therefore, the effect of personality

similarity—or the lack thereof—might also replicate in same-sex couples, as shown in a recent study (Solomon & Jackson, 2014).

In conclusion, the current study is one of the first to investigate the role of similarity between romantic partners' personality traits on relationship satisfaction using dyadic polynomial regression analysis and response surface parameters. In general, the current evidence does not confirm the assumption of a possible perfect combination of partners' personality promoting relationship satisfaction above and beyond the contribution of both partners' personality. However, future research needs to take a closer look at the longitudinal effects of neuroticism and openness and whether these effects might be better explained by polynomial regressions, rather than a simple APIM.

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Footnotes

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Table 1

Means and Standard Deviations of Big Five Traits and Relationship Satisfaction in Female and Male Partners

Variable	Women		Men	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Neuroticism	2.91	0.76	2.45	0.65
Agreeableness	3.90	0.48	3.78	0.48
Conscientiousness	4.04	0.59	3.95	0.58
Extraversion	3.73	0.71	3.53	0.66
Openness	3.66	0.54	3.68	0.58
Relationship Satisfaction	4.21	0.66	4.29	0.60
Relationship Satisfaction T2	4.26	0.64	4.33	0.55

Notes. Standard deviations in brackets. $N_{T1} = 237$ couples, $N_{T2} = 141$ couples.

Table 2

*Bivariate Correlations Between Big Five Traits and
Relationship Satisfaction at T1 and T2*

	N	A	C	E	O	RAS	RAS T2
N	.150*	-.412**	-.309**	-.319**	-.082	-.049	-.216*
A	-.347**	.153*	.213**	.049	.063	.134*	.259**
C	-.250**	.182**	.177**	.273**	.089	.140*	.231**
E	-.238**	.119	.227**	.145*	.310**	.047	.099
O	.026	.042	.129*	.348**	.206**	-.109	-.076
RAS	-.208**	.209**	.205**	.102	.008	.672**	.828**
RAS T2	-.135	.192*	.127	.135	.127	.794**	.681**

Notes. Correlations within male partners are below the diagonal, correlations within female partners are above the diagonal, and correlations between partners are displayed on the diagonal. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 3

Cross-Sectional Dyadic Polynomial Regression Coefficients and Response Surface Parameters of Both Partners' Personality Traits on Female Relationship Satisfaction.

	Neuroticism	Agreeableness	Conscientiousness	Extraversion	Openness
b ₁ actor rating	-.04 [-.17, .09]	.10 [.04, .23]	.17* [.02, .32]	.02 [.13, .17]	-.13† [.28, .01]
b ₂ partner rating	-.14 [.28, .01]	.12 [.02, .26]	.02 [.13, .17]	.07 [.07, .21]	-.03 [.16, .10]
b ₃ actor rating ²	-.04 [.14, .06]	-.07 [.15, .003]	.04 [.05, .13]	-.03 [.12, .07]	-.10† [.21, .02]
b ₄ actor rating x partner rating	.15* [.02, .29]	.08 [.04, .20]	.02 [.11, .16]	-.02 [.15, .11]	.01 [.14, .16]
b ₅ partner rating ²	-.04 [.18, .09]	-.04 [.12, .05]	.02 [.07, .10]	.09 [.04, .21]	.01 [.10, .11]
Response surface parameters					
a ₁	-.18† [.36, .004]	.21* [.04, .39]	.19* [.003, .38]	.09 [.11, .28]	-.16† [.34, .01]
a ₂	.07 [.11, .25]	-.03 [.19, .13]	.08 [.08, .24]	.04 [.13, .21]	-.08 [.27, .11]
a ₃	.10 [.11, .30]	-.03 [.24, .19]	.15 [.08, .38]	-.04 [.26, .17]	-.11 [.32, .11]
a ₄	-.24† [.48, .01]	-.19* [.35, -.02]	.03 [.17, .23]	.08 [.15, .31]	-.10 [.33, .14]

Notes. Polynomial regression coefficients (b₁ – b₅) are unstandardized b-weights but due to the pooled-standardization across partners, they can be interpreted as standardized β -weights. 95% confidence intervals are given in brackets []. Response surface parameters are computed as follows: a₁ = b₁ + b₂; a₂ = b₃ + b₄ + b₅; a₃ = b₁ – b₂; a₄ = b₃ – b₄ + b₅. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 4

Cross-Sectional Dyadic Polynomial Regression Coefficients and Response Surface Parameters of Both Partners' Personality Traits on Male Relationship Satisfaction.

	Neuroticism	Agreeableness	Conscientiousness	Extraversion	Openness
b ₁ actor rating	-.21** [-.34, -.08]	.16* [.03, .28]	.20** [.07, .33]	.09 [-.03, .22]	.03 [-.09, .15]
b ₂ partner rating	-.08 [-.19, .04]	.14* [.01, .26]	-.02 [-.16, .11]	-.01 [-.14, .13]	-.16* [-.29, -.03]
b ₃ actor rating ²	-.01 [-.12, .11]	-.04 [-.11, .04]	.00 [-.08, .07]	.04 [-.07, .15]	-.02 [-.11, .08]
b ₄ actor rating x partner rating	.08 [-.04, .21]	.01 [-.10, .12]	.03 [-.09, .15]	.05 [-.07, .17]	.02 [-.11, .15]
b ₅ partner rating ²	-.03 [-.12, .06]	-.01 [-.08, .06]	.02 [-.06, .10]	-.06 [-.14, .03]	-.04 [-.14, .06]
Response surface parameters					
a ₁	-.29*** [-.45, -.13]	.30*** [.14, .45]	.18* [.01, .34]	.09 [-.09, .26]	-.13† [-.29, .03]
a ₂	.05 [-.11, .21]	-.04 [-.18, .11]	.05 [-.10, .19]	.04 [-.12, .19]	-.04 [-.21, .13]
a ₃	-.14 [-.32, .05]	.02 [-.17, .21]	.22* [.02, .43]	.10 [-.09, .29]	.19† [-.01, .38]
a ₄	-.12 [-.34, .10]	-.06 [-.21, .09]	-.02 [-.19, .16]	-.07 [-.28, .14]	-.08 [-.29, .13]

Notes. Polynomial regression coefficients (b₁ – b₅) are unstandardized b-weights but due to the pooled-standardization across partners, they can be interpreted as standardized β -weights. 95% confidence intervals are given in brackets []. Response surface parameters are computed as follows: a₁ = b₁ + b₂; a₂ = b₃ + b₄ + b₅; a₃ = b₁ – b₂; a₄ = b₃ – b₄ + b₅. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 5

Cross-Sectional and Longitudinal Results of the Simple Actor–Partner Interdependence Model with Partners' Personality Traits on Relationship Satisfaction.

	Neuroticism	Agreeableness	Conscientiousness	Extraversion	Openness
Cross-sectional models					
	-.05				
Actor effect	[-.16, .06]	.15***	.18***	.07	-.03
	-.18**	[.07, .24]	[.09, .26]	[-.02, .15]	[-.11, .06]
	[-.29, -.08]				
Partner effect	-.09*	.14**	-.02	.04	-.09*
	[-.18, -.01]	[.06, .23]	[-.10, .07]	[-.05, .13]	[-.18, -.01]
Longitudinal models					
Actor effects	-.07†	.07*	.01	.04	.03
	[-.14, .001]	[.004, .14]	[-.06, .08]	[-.03, .10]	[-.04, .09]
Partner effects	.01	.02	.00	-.03	.04
	[-.06, .08]	[-.05, .09]	[-.07, .07]	[-.09, .03]	[-.03, .10]

Notes: Regression coefficients are unstandardized b-weights but due to the pooled-standardization across partners, they can be interpreted as standardized β -weights. 95% confidence intervals are given in brackets []. Coefficients are constrained to be equal across female and male partners with the exception of neuroticism in the cross-sectional model. The first coefficient is for female partners, whereas the second coefficient reflects the coefficient for male partners. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 6

Longitudinal Dyadic Polynomial Regression Coefficients and Response Surface Parameters of Partners' Personality Traits on Female Relationship Satisfaction.

	Neuroticism	Agreeableness	Conscientiousness	Extraversion	Openness
Polynomial regression coefficients					
b ₁ actor rating	-.13** [-.23, -.04]	.03 [-.07, .14]	.07 [-.04, .19]	.06 [-.05, .17]	.01 [-.10, .11]
b ₂ partner rating	.02 [-.09, .13]	.07 [-.03, .17]	-.05 [-.16, .07]	-.07 [-.17, .03]	.04 [-.06, .13]
b ₃ actor rating ²	.02 [-.06, .10]	.01 [-.04, .06]	.06† [.00, .12]	-.04 [-.11, .02]	-.09* [-.17, -.01]
b ₄ actor rating x partner rating	.02 [-.09, .14]	.02 [-.08, .12]	.03 [-.08, .14]	.05 [-.06, .16]	.12* [.02, .22]
b ₅ partner rating ²	.04 [-.05, .14]	.05 [-.03, .13]	-.02 [-.12, .08]	-.07 [-.15, .02]	-.11** [-.18, -.03]
Response surface parameters					
a ₁	-.11 [-.24, .03]	.10 [-.03, .23]	.03 [-.11, .16]	-.01 [-.15, .13]	.04 [-.07, .16]
a ₂	.08 [-.05, .22]	.08 [-.04, .21]	.07 [-.04, .19]	-.06 [-.18, .05]	-.08 [-.20, .04]
a ₃	-.15† [-.31, .001]	-.04 [-.19, .12]	.12 [-.06, .31]	.13 [-.03, .29]	-.03 [-.18, .13]
a ₄	.04 [-.16, .24]	.04 [-.10, .19]	.00 [-.18, .19]	-.16† [-.35, .03]	-.31*** [-.48, -.14]

Notes: Polynomial regression coefficients (b₁ – b₅) are unstandardized b-weights but due to the pooled-standardization across partners, they can be interpreted as standardized β-weights. 95% confidence intervals are given in brackets. Response surface parameters are computed as follows: a₁ = b₁ + b₂; a₂ = b₃ + b₄ + b₅; a₃ = b₁ – b₂; a₄ = b₃ – b₄ + b₅. †*p* < .10, *p < .05, **p < .01, ***p < .001

Table 7

Longitudinal Dyadic Polynomial Regression Coefficients and Response Surface Parameters of Partners' Personality Traits on Male Relationship Satisfaction.

	Neuroticism	Agreeableness	Conscientiousness	Extraversion	Openness
Polynomial regression coefficients					
b ₁ actor rating	-.01 [-.11, .09]	.11* [.02, .21]	.00 [-.11, .11]	-.02 [-.11, .08]	.06 [-.04, .14]
b ₂ partner rating	-.04 [-.13, .05]	-.03 [-.12, .07]	.03 [-.08, .14]	-.04 [-.14, .07]	.02 [-.09, .12]
b ₃ actor rating ²	.05 [-.04, .14]	.01 [-.07, .08]	-.02 [-.11, .07]	-.05 [-.13, .04]	.03 [-.04, .10]
b ₄ actor rating x partner rating	.19*** [.08, .29]	-.02 [-.11, .08]	.04 [-.07, .14]	.01 [-.10, .11]	-.05 [-.15, .05]
b ₅ partner rating ²	-.05 [-.12, .03]	-.01 [-.06, .03]	.00 [-.06, .05]	-.03 [-.09, .03]	.04 [-.04, .11]
Response surface parameters					
a ₁	-.05 [-.17, .07]	.09 [-.04, .21]	.02 [-.11, .15]	-.05 [-.19, .08]	.07 [-.04, .18]
a ₂	.19** [.07, .32]	-.03 [-.15, .09]	.02 [-.10, .13]	-.07 [-.18, .05]	.01 [-.11, .13]
a ₃	.02 [-.12, .17]	.14† [-.01, .29]	-.03 [-.21, .15]	.02 [-.13, .17]	.04 [-.11, .19]
a ₄	-.19† [-.37, .001]	.01 [-.13, .15]	-.06 [-.24, .12]	-.08 [-.26, .10]	.12 [-.05, .28]

Notes: Polynomial regression coefficients (b₁ – b₅) are unstandardized b-weights but due to the pooled-standardization across partners, they can be interpreted as standardized β-weights. 95% confidence intervals are given in brackets []. Response surface parameters are computed as follows: a₁ = b₁ + b₂; a₂ = b₃ + b₄ + b₅; a₃ = b₁ – b₂; a₄ = b₃ – b₄ + b₅. †*p* < .10, *p < .05, **p < .01, ***p < .001

Figure 1. Dyadic polynomial regression model with personality of both partners as predictor and both partners' satisfaction as outcome variables

Figure 2. Response surface suggesting an additive main effect of actor and partner effects. LOC = line of congruence. LOIC = line of incongruence

Figure 3. Response surface suggesting a similarity effect. LOC = line of congruence. LOIC = line of incongruence

Figure 4. Response surface suggesting a similarity effect. LOC = line of congruence. LOIC = line of incongruence. The dyadic polynomial regression model controlled for relationship satisfaction at T1.

Figure 5. Response surface suggesting an interaction effect. LOC = line of congruence. LOIC = line of incongruence. The dyadic polynomial regression model controlled for relationship satisfaction at T1.

Supplementary Material

Supplementary Material Table 1

Model Comparisons and Model Fit Indices of Cross-Sectional Polynomial APIM and the simple APIM for the Prediction of Relationship Satisfaction

	Model comparison		Model fit of simple APIM		
	Observed $\Delta\chi^2$	<i>p</i> -value	CFI	TLI	RMSEA
Personality characteristics					
Neuroticism	5.13	.53	1.00	1.00	.00
Agreeableness	8.50	.20	.98	.97	.04
Conscientiousness	1.48	.96	1.00	1.00	.00
Extraversion	5.04	.54	1.00	1.00	.00
Openness	3.46	.75	1.00	1.00	.00

Notes. Degrees of freedom (*df*) in the model comparisons were: $df_{unconstrained} = 0$, $df_{constrained} = 6$.

Critical $\Delta\chi^2$ for all models was 12.59.

Supplementary Material Table 2

Model Comparisons and Model Fit Indices of Longitudinal Polynomial APIM and the simple APIM for the Prediction of Relationship Satisfaction

	Model comparison		Model fit of simple APIM		
	Observed $\Delta\chi^2$	<i>p</i> -value	CFI	TLI	RMSEA
Personality characteristics					
Neuroticism	17.50**	.01	.97	.92	.09
Agreeableness	3.27	.77	1.00	1.00	.00
Conscientiousness	5.16	.52	1.00	1.00	.00
Extraversion	4.56	.60	1.00	1.00	.00
Openness	21.22**	.00	.96	.89	.10

Notes. Degrees of freedom (*df*) in the model comparisons were: $df_{unconstrained} = 0$, $df_{constrained} = 6$.

Critical $\Delta\chi^2$ for all models was 12.59. ** $p < .01$.

Supplementary Material Table 3

Model Fits and Model Comparisons of Cross-Sectional Actor–Partner Interdependence Predicting Relationship Satisfaction with Actor and Partner Effects Constrained to be Equal for Both Genders

	Model comparison			Model fit of constrained model		
	Critical $\Delta\chi^2$	Observed $\Delta\chi^2$	<i>p</i> -value	CFI	TLI	RMSEA
Personality characteristics						
Neuroticism	3.84	0.41	.52	1.00	1.00	<.01
Agreeableness	5.99	0.68	.71	1.00	1.00	<.01
Conscientiousness	5.99	0.32	.85	1.00	1.00	<.01
Extraversion	5.99	0.32	.85	1.00	1.00	<.01
Openness	5.99	1.87	.39	1.00	1.00	<.01

Notes. Degrees of freedom (*df*) in the model comparisons were: $df_{unconstrained} = 0$, $df_{constrained} = 2$. For neuroticism, we were not able to constrain the actor effects without worsening the fit indices, resulting in $df = 1$.

Supplementary Material Table 4

Model Fits and Model Comparisons of Longitudinal Actor–Partner Interdependence Predicting Relationship Satisfaction with Actor and Partner Effects Constrained to be Equal for Both Genders

	Model comparison			Model fit of constrained model		
	Critical $\Delta\chi^2$	Observed $\Delta\chi^2$	<i>p</i> -value	CFI	TLI	RMSEA
Personality characteristics						
Neuroticism	9.49	3.63	.46	1.00	1.00	<.01
Agreeableness	9.49	1.95	.75	1.00	1.00	<.01
Conscientiousness	9.49	0.79	.94	1.00	1.00	<.01
Extraversion	9.49	1.47	.83	1.00	1.00	<.01
Openness	9.49	0.52	.97	1.00	1.00	<.01

Notes. Degrees of freedom (*df*) in the model comparisons were: $df_{unconstrained} = 0$, $df_{constrained} = 4$.