How Large Are Actor and Partner Effects of Personality on Relationship Satisfaction? The Importance of Controlling for Shared Method Variance

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Abstract

Previous research suggests that the personality of a relationship partner predicts not only the individual's own satisfaction with the relationship but also the partner's satisfaction. Based on the actor–partner interdependence model, the present research tested whether actor and partner effects of personality are biased when the same method (e.g., self-report) is used for the assessment of personality and relationship satisfaction and, consequently, shared method variance is not controlled for. Data came from 186 couples, of whom both partners provided self- and partner reports on the Big Five personality traits. Depending on the research design, actor effects were larger than partner effects (when using only self-reports), smaller than partner effects (when using only partner reports), or of about the same size as partner effects (when using self- and partner reports). The findings attest to the importance of controlling for shared method variance in dyadic data analysis.

Keywords

Big Five personality traits, relationship satisfaction, dyadic data analysis, actor–partner interdependence model, self- and partner reports

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What are the personality characteristics of people who are involved in happy versus unhappy romantic relationships? Overall, research suggests that personality factors such as agreeableness and emotional stability are consequential for positive relationship outcomes such as relationship satisfaction, relationship stability, and a low level of conflict between relationship partners (Ozer & Benet-Martinez, 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). Given the dyadic nature of relationships, it is important to consider the personality of both partners when examining the link between personality and relationship outcomes (Dyrenforth, Kashy, Donnellan, & Lucas, 2010; Luo et al., 2008; Robins, Caspi, & Moffitt, 2000).

One analytical model that has received increasing attention in this field is the actor–partner interdependence model (APIM; Kenny & Cook, 1999; Kenny, Kashy, & Cook, 2006). However, as I will describe in more detail below, there is concern that the results of studies using the APIM may have been significantly biased by effects of shared method variance. The reason is that in most applications, actor and partner effects differ systematically with regard to the potential influence of shared method variance, because the partner effect is based on information from different sources, whereas the actor effect is based on information from a common source. Therefore, the goal of the present research is to test whether the results of the APIM are biased when the effect of shared method variance is not controlled for in examining the link between personality and relationship satisfaction. A methodologically rigorous analysis of the size of actor and partner effects is important, because partner effects are essential from a theoretical perspective. As Dyrenforth et al. (2010) have argued, partner effects "are by definition interpersonal effects" and their size illustrates the dyadic nature of close relationships (p. 700). Moreover, examining the impact of shared method variance on APIM estimates is important, because the APIM is frequently used in many fields. As of the time of writing, the APIM bibliography by Kenny and Ledermann (2012) lists more than 350 articles (excluding dissertations and master's theses) on a heterogeneous set of topics such as attachment, cognition, communication, emotion, goals, health, parenting, personality, sports, therapy, violence, and work.

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Previous Research on Actor and Partner Effects of Personality on Relationship Satisfaction

There is a growing body of research that examines whether the personality of relationship partners predicts satisfaction and fulfillment in marriage and close relationships. Importantly, many studies in this field not only tested for within-person effects (i.e., whether the personality of an individual predicts his or her own satisfaction) but also for between-person effects (i.e., whether the individual's personality predicts the satisfaction of his or her relationship partner). Ideally, within-person effects (also called actor effects) and between-person effects (also called partner effects) are tested simultaneously, as can be done with the APIM (Kenny & Cook, 1999; Kenny et al., 2006; Kenny & Ledermann, 2010). Actor and partner effects should be mutually controlled for because otherwise both effects can be significantly biased. One reason is that the individual's relationship satisfaction is typically correlated with the partner's relationship satisfaction, which causes the partner effect to be artificially inflated if the actor effect is not controlled for.

Several studies have used the APIM to examine personality effects on relationship satisfaction (Barelds, 2005; Donnellan, Assad, Robins, & Conger, 2007; Dyrenforth et al., 2010; Luo et al., 2008; Neyer & Voigt, 2004; Robins et al., 2000; Slatcher & Vazire, 2009; Watson et al., 2004). Overall, these studies suggest that many personality traits have significant actor and partner effects and that actor effects are typically larger than partner effects (often about twice as large). For example, in the study by Dyrenforth et al. (2010), who used data from national probability samples, the largest effects emerged for agreeableness, emotional stability, and conscientiousness, with actor effects ranging from .14 to .20 and partner effects ranging from .07 to .11 (averaged across studies).[1] Similarly, in the study by Barelds (2005), the actor effects of the Big Five personality traits were generally larger than their partner effects; the largest effects emerged for extraversion and emotional stability, with actor effects of .40 and .37 and partner effects of .19 and .24, respectively. Robins et al. (2000), using data from 360 couples who had completed the Multidimensional Personality Questionnaire, found that the higher order factors (i.e., positive emotionality, negative emotionality, and constraint) generally had significant actor effects on relationship satisfaction, with absolute values ranging from .07 to .36; in contrast, the partner effects were smaller (and half of them nonsignificant), with absolute values ranging from .01 to .14.

Additional evidence comes from two meta-analyses. Heller, Watson, and Ilies (2004) examined the within-person relations between personality and relationship satisfaction; thus, the meta-analysis provides information about actor effects, which are however not controlled for partner effects. The largest actor effects emerged for neuroticism, agreeableness, and conscientiousness, ranging from .25 to .29 (in absolute values), whereas the effects of extraversion and openness were smaller at .17 and .10, respectively.[2] Malouff, Thorsteinsson, Schutte, Bhullar, and Rooke (2010) conducted a meta-analysis on partner effects of personality on relationship satisfaction; however, the partner effects were not controlled for the corresponding actor effects. The largest effects resulted for neuroticism, agreeableness, and conscientiousness, with coefficients ranging from .12 to .22 (in absolute values), whereas the effects of extraversion and openness were smaller at .06 and .03, respectively. Thus, the results of the two meta-analyses suggest that actor effects of personality are notably larger than partner effects, corresponding to the findings of the primary studies cited above.[3]

Finally, several studies tested for gender differences in actor and partner effects of personality on relationship satisfaction, yielding inconsistent evidence. Whereas some studies suggest that there are significant differences between the genders (Neyer & Voigt, 2004; Robins et al., 2000), other studies did not find significant differences (Barelds, 2005; Malouff et al., 2010; Slatcher & Vazire, 2009) or did not find any significant differences that replicated across samples (Dyrenforth et al., 2010).

Potential Bias in Actor and Partner Effects Through Shared Method Variance

A methodological problem in this field is that the analyses are typically based on self-reports of the constructs and consequently the results may be influenced by method bias. Method bias is an important concern in all areas of psychological research (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Podsakoff, MacKenzie, & Podsakoff, 2012; but see Spector, 2006). Generally, method factors can compromise the validity of measures (Podsakoff et al., 2012), which is of course also true for measures of personality and relationship satisfaction. For example, if some individuals perceive their personality in an overly positive light, whereas others perceive their personality more negatively than warranted, then the validity of self-report measures of personality is reduced. These biases in self-reports may be caused both by ability factors (e.g., can the individual validly perceive a specific characteristic of the self) and by motivational factors (e.g., is the individual willing to provide an honest report of his or her self-perception).

However, besides general concerns about the effects of method factors, method bias might be of particular importance in research using the APIM, because in most applications actor and partner effects differ with regard to the potential influence of shared method variance (Ackerman, Donnellan, & Kashy, 2011; Donnellan et al., 2007; Kenny & Cook, 1999; Krasikova & LeBreton, 2012). The reason is that—when constructs are assessed using one single method such as self-report—the actor effect is based on information from one source (e.g., self-reports on personality and relationship satisfaction by one individual),

whereas the partner effect is based on information from different sources (e.g., self-report on personality by one partner and relationship satisfaction reported by the other partner).

Consequently, the actor effect is based on measures that have more method variance in common than the measures on which the partner effect is based. Although in many situations shared method variance results in artificially inflated relations between constructs, it can also deflate estimates of the relation; thus the direction of the bias cannot be known with certainty (Cote & Buckley, 1987; Podsakoff et al., 2003; Podsakoff et al., 2012; Siemsen, Roth, & Oliveira, 2010). Moreover, bias in the actor effect may cause bias in the partner effect because the effects are (and should be) mutually controlled for each other. As reviewed by Podsakoff et al. (2012), the magnitude of method bias can be large. For example, a meta-analysis of multitrait-multimethod data suggested that method variance accounted for 26% of the variance in the measures, and that the observed correlation between traits was inflated by 45% through shared method variance (Cote & Buckley, 1987; for the computations, see Podsakoff et al., 2012). Another example is the study by Biderman, Nguyen, Cunningham, and Ghorbani (2011), who examined five independent samples and found that method factors accounted for 40% to 47% of the systematic variance in measures of the Big Five. Finally, it should be noted that besides biasing estimates of relations between constructs, method bias can also affect significance tests (Podsakoff et al., 2012). For these reasons, method bias may have systematically distorted the results reported in the literature on actor and partner effects. Importantly, the problem of shared method variance cannot be resolved by using partner reports instead of self-reports; although then the actor effect is based on measures from different sources, the partner effect suffers the problem of being based on measures from the same source. Consequently, when using partner reports, the partner effects should be inflated by shared method variance and the relative size of actor and partner effects should be reversed.

One straightforward way to control for shared method variance is to collect data from more than one source and to use a multimethod approach to measure the constructs. Then, if shared method variance among the indicators is controlled for, latent construct factors can be modeled that are free of shared method variance (Podsakoff et al., 2012; Sadler & Woody, 2003). Admittedly, however, collecting multimethod data increases the complexity and costs of research designs and therefore may not be feasible in most research studies. In fact, none of the studies on actor and partner effects of personality on relationship satisfaction, as reviewed in the previous section, controlled for the effect of shared method variance. Although few studies included non-self-report measures of personality (e.g., partner reports) in addition to self-reports, the effect of shared method variance was not controlled for in the analyses of actor and partner effects (Cundiff, Smith, & Frandsen, 2012; Watson et al., 2004). Likewise, in other fields (besides research on the link between personality and relationship satisfaction), few studies using the APIM used multi-informant data. I am aware of only two studies examining actor and partner effects that were controlled for method variance by combining information from more than one source. Busby and Gardner (2008) tested for the dyadic effects of empathy on relationship satisfaction, using self- and partner reports of empathy as indicators of latent constructs. Matthews, Conger, and Wickrama (1996) examined the dyadic effects of work–family conflict on psychological distress, using self- and partner reports to measure work–family conflict and self-, partner, and observer reports to measure psychological distress. However, in these studies the impact of controlling for shared method variance was not examined.

The Present Research

The goal of this research was to examine whether actor and partner effects of personality on relationship satisfaction are biased when the same method (e.g., self-report) is used for the assessment of predictor and outcome. I therefore compared the results from three types of models. The first type of model used only self-reports of personality; thus, actor effects were based on variables assessed with the same method, whereas partner effects were based on variables assessed with different methods. The second type of model used only partner reports of personality; now, the partner effects were based on variables assessed with the same method and, consequently, might be inflated by shared method variance. To overcome this problem, the third type of model used self- and partner reports of personality to measure latent construct factors that capture only variance shared between self- and partner reports. In so doing, it was possible to separate construct variance from method variance, and to test the effect of construct factors that are controlled for variance that is unique to self- and partner reports. Before using self- and partner reports to measure latent personality factors, I examined the consistency between self- and partner reports and the bias included in partner reports (specifically, bias in the direction of assumed similarity), using the accuracy-bias model suggested by Kenny and Acitelli (2001).

Method

Participants

Data came from the study "My Partner and I" (MPI), a German-language study of personality and well-being with a sample of couples living in Switzerland (Erol & Orth, 2013). The data collection included a baseline assessment, a subsequent phase with diary assessments, and a 6-month follow-up assessment; the present research uses data from the baseline assessment. Data were collected using Web-based questionnaires. Participants were recruited by contacting members of a university-based online panel, which includes individuals who are interested in occasionally participating

Table 1. Means, Standard Deviations, and Cronbach's Alphas of the Measures, Correlations Between Partners, and Standardized Mean Differences Between Partners.

	Female			Male				
Measure	*M*	*SD*	α	*M*	*SD*	α	$r_{F,M}$	$d_{F,M}$
Self-report								
Extraversion	3.58	0.78	.87	3.35	0.63	.79	.02	0.23*
Agreeableness	3.60	0.56	.72	3.57	0.52	.71	.15*	0.04
Conscientiousness	3.62	0.66	.81	3.55	0.65	.81	.11	0.09
Neuroticism	2.97	0.73	.84	2.57	0.72	.84	.11	0.42*
Openness	3.81	0.65	.80	3.66	0.66	.84	.14	0.18*
Partner report								
Extraversion	3.73	0.75	.85	3.57	0.83	.87	.01	0.14
Agreeableness	3.67	0.69	.81	3.82	0.67	.80	.10	−0.15*
Conscientiousness	3.77	0.67	.81	3.72	0.68	.82	−.03	0.05
Neuroticism	3.03	0.78	.86	2.45	0.82	.85	.02	0.51*
Openness	3.78	0.69	.85	3.65	0.73	.83	.20*	0.15*
Relationship satisfaction	5.02	0.64	.86	4.97	0.64	.83	.67*	0.08

Note. The label "partner report" denotes the partner report on the target (e.g., the partner report in the column "Female" is the partner report on the woman by the woman's partner). The Response Scale ranged from 1 to 5 for self- and partner reports of personality and from 1 to 6 for relationship satisfaction. $r_{F,M}$ = correlation between female and male partner; $d_{F,M}$ = standardized mean difference between female and male partner (positive values indicate that female partners scored higher than male partners). To account for the dependency between data from female and male partners, $d_{F,M}$ is computed by standardizing the mean difference by the standard deviation of the difference score (Roberts, Kuncel, Viechtbauer, & Bogg, 2007). The significance of $d_{F,M}$ was tested using the *t* test for paired samples.
*$p < .05$.

in Web-based studies. Individuals were invited to participate (a) if they were currently in a relationship, (b) if their relationship partner was also willing to participate, and (c) if both partners were 18 years or older. Participants received information on the purpose and procedure of the study and were informed that their data would be treated as strictly confidential. After providing informed consent, each partner received individual links to the assessments, and participants were asked to complete the questionnaires without their partner being present. After completion of the study, participants were provided with individualized feedback on selected study variables (i.e., how their scale scores compared with population norms) and received CHF80 in exchange for participation in the study.

The sample includes 186 couples ($N = 372$). Twenty percent of the couples were married, 32% were cohabiting, and 48% were dating. Length of relationship ranged from 0.1 to 33 years ($M = 5.2$, $SD = 5.4$). Mean age of participants was 27.7 years for female partners ($SD = 8.2$, range = 18 to 59) and 30.4 years for male partners ($SD = 9.3$, range = 19 to 61). Of the participants, 10% had completed the obligatory 9 school years or less, 54% had completed secondary education (approximately 12 years), 15% had a bachelor's degree, 19% had a master's degree, and 2% had a doctoral degree.

Measures

For all measures, Table 1 shows the means, standard deviations, and Cronbach's alphas separately for male and female partners, and correlations and standardized mean differences between partners.

Big Five personality traits (self- and partner reports). The Big Five personality traits were assessed with the 44-item Big Five Inventory (BFI; John, Donahue, & Kentle, 1991; John, Naumann, & Soto, 2008; for the German version see Lang, Lüdtke, & Asendorpf, 2001), a well-validated measure of the Big Five dimensions (John et al., 2008; Rammstedt & John, 2007; Soto & John, 2009; Srivastava, John, Gosling, & Potter, 2003).[4] Previous research suggests that the BFI scales show substantial convergence between self-reports and informant reports (DeYoung, 2006; Soto & John, 2009). In the first section of the questionnaire, participants provided a self-report; the instruction was "I see myself as someone who . . . " In a later section of the questionnaire, participants assessed their relationship partner; the instruction was "I see my partner as someone who . . . " Responses were measured using a 5-point scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). Extraversion was assessed with 8 items, agreeableness with 9 items, conscientiousness with 9 items, neuroticism with 8 items, and openness to experience with 10 items.

Relationship satisfaction. Relationship satisfaction was assessed with eight items of the Dyadic Satisfaction subscale of the Dyadic Adjustment Scale (DAS; Spanier, 1976; for the German version see Dinkel & Balck, 2006; Klann, Hahlweg, & Heinrichs, 2003), a well-validated measure of satisfaction

in close relationships (Heyman, Sayers, & Bellack, 1994; Sabourin, Lussier, Laplante, & Wright, 1990; South, Krueger, & Iacono, 2009). Item examples are, "How often do you think that things between you and your partner are going well?" "Do you confide in your mate?" "Do you ever regret that you married (or have a relationship with your partner)?"[5] (reverse-scored), and "How often do you and your partner quarrel?" (reverse-scored). Responses were measured using a 6-point scale ranging from 1 (*never*) to 6 (*all the time*).

Statistical Analyses

Analyses were conducted with the Mplus 6.1 program (Muthén & Muthén, 2010). An alpha level of .05 was used for all tests of statistical significance. To deal with missing values, I used full information maximum likelihood estimation to fit models directly to the raw data, which produces less biased and more reliable results compared with conventional methods of dealing with missing data, such as listwise or pairwise deletion (Allison, 2003; Schafer & Graham, 2002).

Model fit was assessed using the comparative fit index (CFI), the Tucker–Lewis index (TLI), and the root mean square error of approximation (RMSEA), based on recommendations of Hu and Bentler (1999) and MacCallum and Austin (2000). Hu and Bentler suggest that good fit is indicated by values greater than or equal to .95 for CFI and TLI, and less than or equal to .06 for RMSEA. To test for differences in model fit, I used the test of small difference in fit recommended by MacCallum, Browne, and Cai (2006, Program C) instead of the more commonly used chi-square difference test. The chi-square difference test evaluates the null hypothesis of no difference in fit in the population. However, as MacCallum et al. state,

> as with any test of a point hypothesis . . . it can be argued that this null hypothesis is essentially never true in practice and is of limited empirical interest. We do not realistically expect that two nested models would ever fit exactly the same in the population. (p. 27)

Therefore, the test of small difference in fit tests whether the difference is greater than an a priori specified small difference. Thus, a nonsignificant test statistic indicates that the true difference is small, assuming that the sample size provides sufficient statistical power. For comparisons between APIMs, statistical power was high, with values ranging from .82 to 1.00; for comparisons between accuracy-bias models, statistical power ranged from .73 to .87 (MacCallum et al., 2006, Program D).

Results

Actor and Partner Effects Based on Self-Reports of Personality

In the first part of the analyses, I examined actor and partner effects of the Big Five personality traits using only self-reports but not partner reports. The analyses were based on the APIM and the constructs were modeled as latent variables (Kenny & Cook, 1999; Kenny et al., 2006). Figure 1 provides a generic illustration of the model.[6] Item parcels were used as indicators of the latent factors because item parcels produce more reliable latent variables than individual items (Little, Cunningham, Shahar, & Widaman, 2002). For each measure, the items were aggregated into three parcels. For each construct (e.g., extraversion, relationship satisfaction), parcels were created in identical ways across partners (female vs. male) and methods (self-report vs. partner report; the partner reports are relevant only in later sections of the results), using the item-to-construct balance technique recommended by Little et al. (2002).

In the present research, models included residual correlations for identical indicators in two situations (see Cole & Maxwell, 2003). First, residuals were correlated if the same object (i.e., the personality of an individual or the relationship between the partners) was assessed by different persons (i.e., the two partners) using the same measure (i.e., the items included in an item parcel). Second, residuals were correlated if the same individual used the same measure to assess different objects (i.e., the personality of the self and the personality of the partner). Consequently, when using self-reports only, the APIM included residual correlations for relationship satisfaction (e.g., the correlation between *e7* and *e10* in Figure 1). By including correlated residuals between indicators, the models account for indicator-specific systematic variance that is not part of the latent construct (Cole & Maxwell, 2003). Across the models tested, the mean residual correlation for relationship satisfaction was .16 (SD = .14, range = .03 to .36). However, residual correlations were not included for self-reported personality because here two different persons (i.e., the two partners) assessed two different objects (i.e., each partner assessed his or her own personality). When residual correlations for self-reported personality were tested, their mean was virtually zero (M = −.01, SD = .14, range = −.25 to .25); thus, for theoretical and empirical reasons, these residual correlations were not included.

For all models, I tested three sets of constraints. First, I tested whether the latent factors show metric measurement invariance across partners (Reise, Widaman, & Pugh, 1993; Schmitt & Kuljanin, 2008), that is, whether the factor loadings of individual indicators can be set equal across partners. Metric invariance is essential because it ensures that the latent constructs have the same meaning for female and male partners. The results showed that metric invariance held in all models, given that loading constraints did not significantly reduce model fit (Table 2). Consequently, metric invariance constraints were retained in subsequent analyses. Second, I tested for equality of latent variances (including residual variances) across partners. If empirically justified, cross-partner equality constraints on variances are useful because they increase the parsimony of the model (Ledermann, Macho, & Kenny, 2011). For all models, the results showed that equality constraints on variances did not significantly reduce model fit

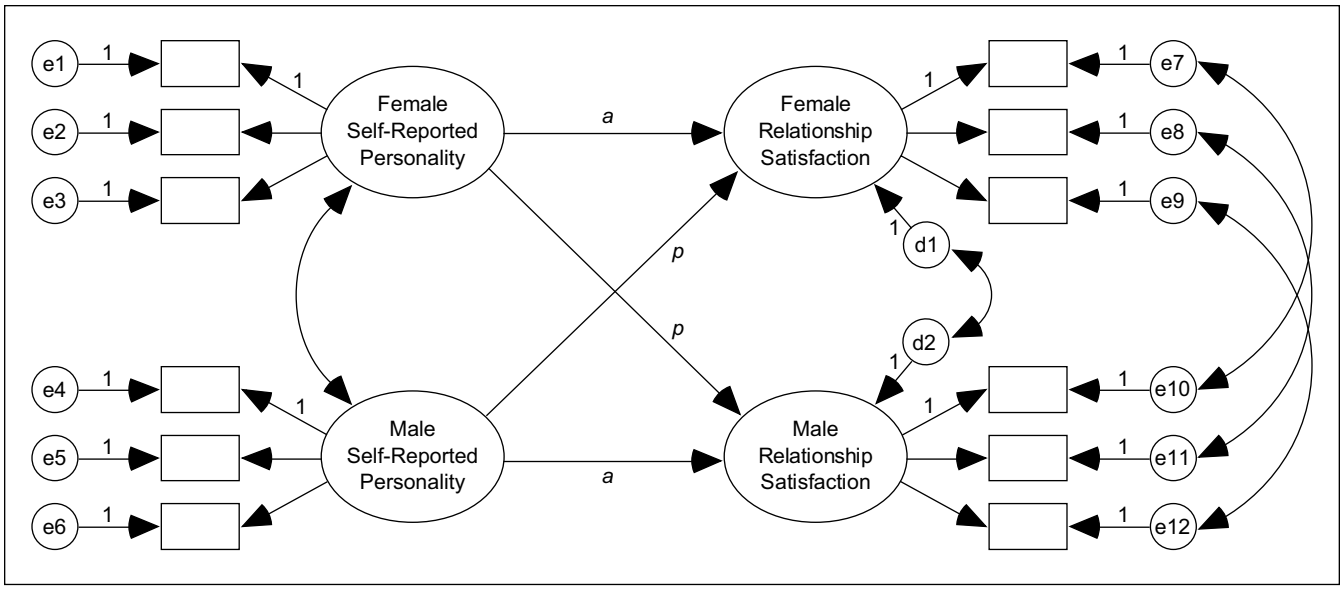

Figure 1. Actor–partner interdependence model of personality predicting relationship satisfaction, based on latent construct factors and self-reports of personality.

Note. Residual variances of indicators are denoted as *e1* through *e12*; residual variances (i.e., disturbances) of latent factors are denoted as *d1* and *d2*. The model included residual correlations for indicators of relationship satisfaction (e.g., the correlation between *e7* and *e10*). *a* = actor effect; *p* = partner effect.

Table 2. Tests of Model Constraints.

				Observed $\Delta\chi^2$				
Constraints	df_1	df_2	Critical $\Delta\chi^2$	E	A	C	N	O
APIM, self-report only								
Loadings	49	45	29.5	15.9	15.6	12.3	18.2	16.5
Variances	57	49	39.2	19.7	11.5	5.9	7.9	17.6
Structural effects	59	57	28.7	0.1	11.7	2.0	0.6	3.9
APIM, partner report only								
Loadings	49	45	29.5	4.7	17.1	16.1	18.8	13.4
Variances	57	49	39.2	9.8	16.1	11.7	9.2	9.8
Structural effects	59	57	28.7	0.0	19.6	6.8	3.6	0.0
Accuracy-bias model								
Loadings	42	36	31.2	5.4	7.2	6.0	10.9	4.8
Variances	50	42	37.2	22.8	12.0	8.4	6.0	15.7
Structural effects	52	50	26.6	2.0	2.7	1.6	1.4	3.8
APIM, self-, and partner report								
Loadings	120	112	56.3	18.6	29.8	16.5	23.0	19.0
Variances	133	120	68.3	30.2	26.1	16.0	11.7	22.6
Structural effects	135	133	49.8	0.1	17.4	4.7	2.1	1.4

Note. Given that the observed $\Delta\chi^2$ values were smaller than the critical $\Delta\chi^2$ values, the results indicated that the constraints did not significantly decrease fit. Constraints were tested by comparing the fit of the model with constraints and the model without constraints, using the test of small difference in fit (MacCallum, Browne, & Cai, 2006). For all tests, N = 186 and number of groups G = 1. APIM = actor–partner interdependence model; df_1 = degrees of freedom for the model with constraints; df_2 = degrees of freedom for the model without constraints; E = extraversion; A = agreeableness; C = conscientiousness; N = neuroticism; O = openness.

(Table 2) and therefore these constraints were retained. Third, I tested for cross-partner equality of actor and partner effects (i.e., the paths *a* and *p* shown in Figure 1), as recommended by Kenny and Ledermann (2010). For all models, the results showed that actor and partner effects could be constrained to be equal across partners without significant reduction in model fit (Table 2) and therefore these constraints were retained. Table 3 shows the fit of the final models including

Table 3. Fit of Models.

Model	χ^2	*df*	CFI	TLI	RMSEA [90% CI]
APIM, self-report only					
Extraversion	121.7*	59	.94	.94	.076 [.056, .095]
Agreeableness	109.9*	59	.95	.94	.068 [.048, .088]
Conscientiousness	77.8	59	.98	.98	.041 [.000, .065]
Neuroticism	93.5*	59	.97	.96	.056 [.033, .077]
Openness	123.4*	59	.94	.93	.077 [.058, .096]
APIM, partner report only					
Extraversion	129.1*	59	.94	.94	.080 [.061, .099]
Agreeableness	130.7*	59	.94	.93	.081 [.062, .100]
Conscientiousness	102.5*	59	.96	.96	.063 [.042, .083]
Neuroticism	100.4*	59	.96	.96	.061 [.040, .082]
Openness	102.4*	59	.97	.96	.063 [.042, .083]
Accuracy-bias model					
Extraversion	80.9*	52	.98	.97	.055 [.030, .077]
Agreeableness	66.0	52	.98	.98	.038 [.000, .063]
Conscientiousness	76.6*	52	.98	.97	.050 [.023, .073]
Neuroticism	76.4*	52	.98	.97	.050 [.023, .073]
Openness	68.2	52	.99	.98	.041 [.000, .066]
APIM, self- and partner report					
Extraversion	261.8*	135	.93	.92	.071 [.058, .084]
Agreeableness	272.5*	135	.91	.90	.074 [.061, .087]
Conscientiousness	208.9*	135	.96	.95	.054 [.039, .068]
Neuroticism	229.2*	135	.95	.94	.061 [.047, .075]
Openness	226.3*	135	.95	.95	.060 [.046, .074]

Note. CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; CI = confidence interval; APIM = actor–partner interdependence model.
*$p < .05$.

the three sets of constraints. The overall fit of the five models was satisfactory.

Table 4 shows the standardized estimates for actor and partner effects. All coefficients were in the expected direction. Extraversion, agreeableness, and neuroticism had the largest actor effects (which were all statistically significant; the absolute values were at about medium effect size) and lower but still significant partner effects. Conscientiousness had a significant but small actor effect and no significant partner effect. Openness had neither a significant actor nor partner effect. Overall, the pattern of results was similar to the results reported in the literature, for example, to those by Dyrenforth et al. (2010).[7] To summarize, consistently with previous studies, the APIMs using self-reports suggest that most of the Big Five personality traits have significant actor and partner effects on satisfaction in marriage and close relationships. Averaged across the Big Five, absolute values of standardized actor effects were .09 larger than partner effects.

Actor and Partner Effects Based on Partner Reports of Personality

In the second part of the analyses, I examined actor and partner effects of the Big Five using only partner reports. The model was equivalent to the APIM used for self-reports (Figure 1), except that self-reports of personality were replaced by partner reports. As in the previous analyses, residual correlations were included for relationship satisfaction. Residual correlations were not included for partner-reported personality because here two different persons assessed two different objects. When residual correlations were tested for indicators of partner-reported personality, their mean was virtually zero ($M = .00$, $SD = .16$, range = −.38 to .24); consequently, these residual correlations were not included. I tested the same three sets of constraints as in models for self-reported personality (i.e., metric invariance of loadings, cross-partner equality of latent variances, and cross-partner equality of actor and partner effects). For all models, none of these constraints significantly reduced model fit (Table 2) and therefore these constraints were retained. Overall, the fit of the models was satisfactory (Table 3).

Table 4 shows the standardized estimates for actor and partner effects. With regard to actor effects, the models using partner reports yielded estimates that were somewhat larger than the estimates for the models using self-reports. As expected, however, the estimates of partner effects increased strongly. For each of the Big Five, the partner effect was now larger than the corresponding actor effect (on average, absolute values of partner effects were .11 larger than actor effects). Thus, depending on the research design (i.e., on whether self- or partner reports of personality were used), actor effects were larger or smaller than partner effects.

Actor and Partner Effects Based on Self- and Partner Reports of Personality

The goal of the third part of the analyses was to examine APIMs that used self- and partner reports of the Big Five, to control for potential bias due to shared method variance. To prepare for these analyses, I tested the consistency between self- and partner reports using the accuracy-bias model proposed by Kenny and Acitelli (2001). In this model, whose structure is similar to the APIM, the partner reports of two partners are predicted by their self-reports (Figure 2). The accuracy of a partner report is computed as the effect of a person's self-report on how he or she is assessed by his or her partner. The bias of a partner report is computed as the effect of a person's self-report on how he or she assesses his or her partner. Importantly, both effects are controlled for the partner's self-report. The accuracy effect essentially captures the consistency between self- and partner reports on the same person. In contrast, the bias effect captures the extent to which the discrepancy between self- and partner reports is explained by the rater's own personality. Positive bias means that the partner report is biased in the direction of assumed similarity between the partners (also called projection; for example, Hoch, 1987; Neyer, Banse, & Asendorpf, 1999).

Table 4. Actor and Partner Effects of Personality on Relationship Satisfaction.

	Self-report only		Partner report only		Self- and partner report	
Predictor	*a*	*p*	*a*	*p*	*a*	*p*
Extraversion	.25*	.13*	.26*	.32*	.29*	.23*
Agreeableness	.26*	.16*	.36*	.49*	.33*	.36*
Conscientiousness	.13*	.04	.22*	.30*	.21*	.21*
Neuroticism	−.24*	−.13*	−.33*	−.42*	−.34*	−.34*
Openness	.07	.06	.12*	.29*	.08	.20*

Note. The table shows standardized regression coefficients. *a* = actor effect; *p* = partner effect.
*$p < .05$.

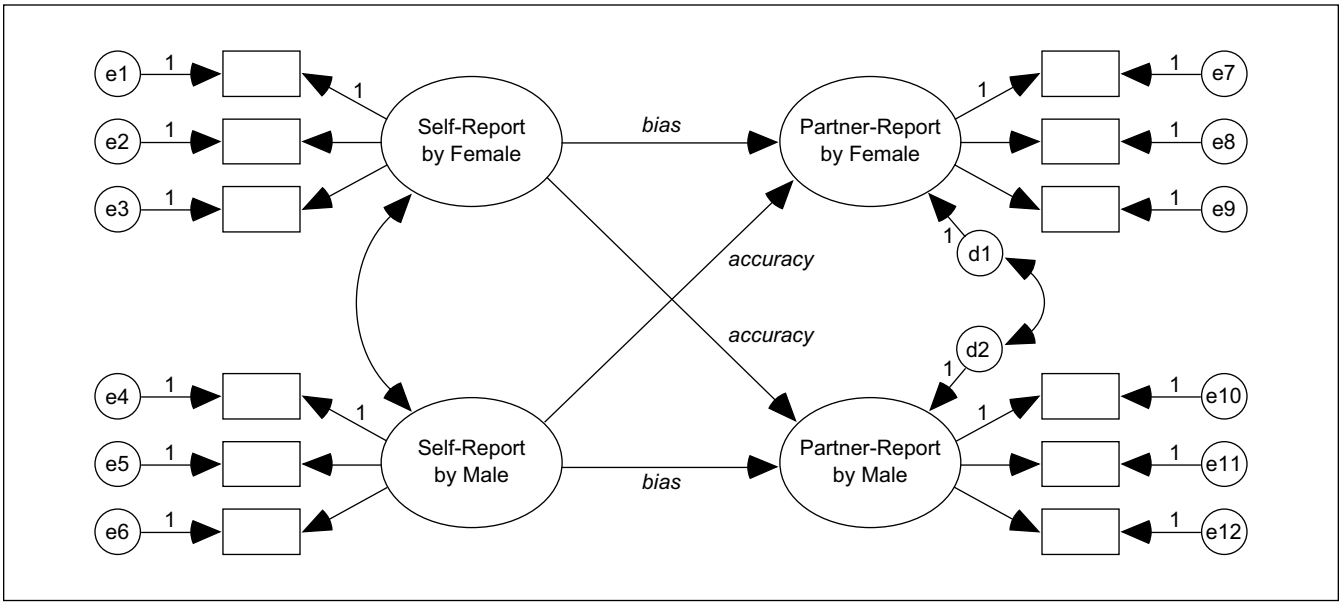

Figure 2. Model testing accuracy and bias in partner reports of personality (Kenny & Acitelli, 2001).
Note. Residual variances of indicators are denoted as *e1* through *e12*; residual variances (i.e., disturbances) of latent factors are denoted as *d1* and *d2*. The model included two types of residual correlations (not shown in the figure). First, residuals of indicators were correlated if the same object was assessed with the same measure (i.e., self- and partner reports on the same person). An example of this type of correlated residuals is the correlation between *e1* and *e10*. Second, residuals of indicators were correlated if the same person used the same measure to assess different objects (i.e., self- and partner reports by the same person). An example of this type of correlated residuals is the correlation between *e1* and *e7*.

Because the model used self- and partner reports, two types of residual correlations were included. First, residuals were correlated if the same object was assessed with the same measure (i.e., self- and partner reports *on* the same person). An example of this type of correlated residuals is the correlation between *e1* and *e10* (Figure 2). Across the Big Five, the mean of these correlations was .19 (*SD* = .20, range = −.35 to .44). Second, residuals were correlated if the same person used the same measure to assess different objects (i.e., self- and partner reports *by* the same person). An example of this type of correlated residuals is the correlation between *e1* and *e7*. Across the Big Five, the mean of these correlations was .09 (*SD* = .10, range = −.08 to .30). I tested the same three sets of constraints as in models for self-reported personality and partner-reported personality. For all models, none of these constraints significantly reduced model fit (Table 2) and therefore these constraints were retained. The fit of the models was satisfactory (Table 3).

Table 5. Accuracy and Bias in Partner Reports.

Variable	Accuracy	Bias
Extraversion	.64*	.08
Agreeableness	.55*	.09
Conscientiousness	.57*	.03
Neuroticism	.63*	−.06
Openness	.67*	.15*

Note. The table shows standardized regression coefficients.
*$p < .05$.

Table 5 shows the standardized estimates for accuracy and bias effects. Across the Big Five, accuracy effects ranged

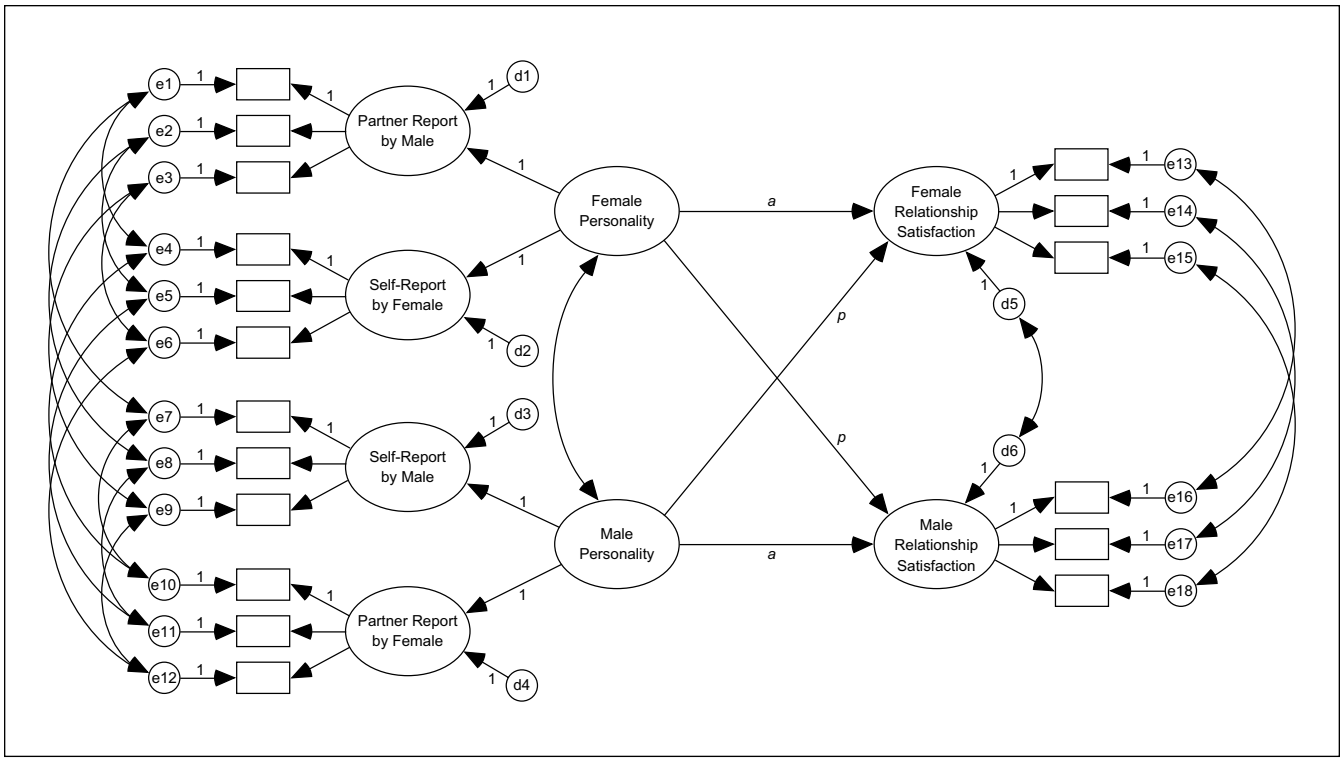

Figure 3. Actor–partner interdependence model of personality predicting relationship satisfaction, based on latent construct factors and both self- and partner reports of personality.

Note. Residual variances of indicators are denoted as *e1* through *e18*; residual variances (i.e., disturbances) of latent factors are denoted as *d1* through *d6*. The model included residual correlations for personality indicators of self- and partner reports on the same person (e.g., correlation between *e1* and *e4*), personality indicators of self- and partner reports by the same person (e.g., correlation between *e1* and *e7*), and indicators of relationship satisfaction (e.g., the correlation between *e13* and *e16*). *a* = actor effect; *p* = partner effect.

from .55 to .67, indicating a large degree of consistency between self- and partner reports. Moreover, the bias effects were small (range = −.06 to .15) and four out of five bias effects were nonsignificant. Compared with accuracy and bias effects reported in Kenny and Acitelli (2001) and Murray, Holmes, and Griffin (1996), the present accuracy effects are much larger and the present bias effects are much smaller. Thus, using the information provided by both self- and partner reports may provide for more valid assessment of personality than using self- or partner report alone.

Figure 3 shows a generic illustration of the APIM based on self- and partner reports. The structural part of the model (i.e., the actor and partner effects between the constructs) and the measurement part for relationship satisfaction were identical to the APIM based on self- or partner report only (Figure 1). However, the measurement part for the personality factors now included four first-order factors (e.g., partner report by male, self-report by female) and two second-order factors (e.g., female personality). Because the second-order factors capture only variance that the first-order factors have in common, unique variance of the first-order factors is explained by their residual variances (i.e., the disturbances shown in Figure 3). Given that the first-order factors are based on different methods (i.e., self- and partner reports), the second-order factors do not include variance that is unique for each method. Consequently, the model is no longer biased toward the actor effect (as in the APIM using self-report only) or the partner effect (as in the APIM using partner report only), because the personality factors are controlled for method variance. For each second-order factor, the unstandardized loadings of both first-order factors were set to 1.[8]

The model included the same residual correlations of personality indicators as the accuracy-bias model. Moreover, as the APIM for self- or partner report only, the model included residual correlations for relationship satisfaction.[9] In the analyses, the same three sets of constraints as in the previous models were tested. For all models, none of these constraints significantly reduced model fit (Table 2) and therefore the constraints were retained. Overall, the fit of the models was satisfactory (Table 3). As could be expected given the results of the accuracy-bias models, the loadings of the first-order factors on the second-order factors were large. The average standardized loading was .81 for self-report factors (range = .75 to .86) and .76 for partner-report factors (range = .68 to .81).[10]

Table 4 shows the standardized estimates for actor and partner effects. All actor and partner effects were significant and of about medium size (except for the actor effect of

openness, which was small and nonsignificant). Averaged across the Big Five, actor and partner effects were of about the same size (*M*s of absolute values = .25 vs. .27). Thus, whereas the APIMs using self-report yielded actor effects that were stronger than partner effects (*M*s = .19 vs. .10) and whereas the APIMs using partner report yielded actor effects that were smaller than partner effects (*M*s = .26 vs. .36), the APIMs using self- and partner reports suggested that actor and partner effects have about equal size.

Discussion

Previous research suggests that personality has actor and partner effects on relationship satisfaction. Based on the APIM, the present research tested whether actor and partner effects of personality are biased when the same method (e.g., self-report) is used for the assessment of personality and relationship satisfaction and, consequently, shared method variance is not controlled for. Data came from 186 couples, of whom both partners provided self- and partner reports on the Big Five personality traits. Depending on the research design, actor effects were larger than partner effects (when using only self-reports), smaller than partner effects (when using only partner reports), or of about the same size as partner effects (when using self- and partner reports and controlling for shared method variance). The findings attest to the importance of controlling for shared method variance in dyadic data analysis.

Implications of the Findings

As reviewed in the Introduction, previous research suggested that actor effects are about twice as large as partner effects (e.g., Barelds, 2005; Dyrenforth et al., 2010; Robins et al., 2000). However, in the present study—when using self- and partner reports of personality, and statistically controlling for the biasing effects of shared method variance—partner effects were of about the same size as actor effects (for all of the Big Five dimensions except openness) or even larger than the actor effect (for openness). Thus, under the assumption that the present analytical approach provides for more valid estimates of actor and partner effects, this research indicates that partner effects of personality on relationship satisfaction are larger than has been suggested by previous research. Overall, actor and partner effects were of about medium size, according to the conventions proposed by Cohen (1992). Importantly, when using self-reports only (and thus replicating the analyses in previous studies), the findings were consistent with previous research (i.e., actor effects were about twice as large as partner effects), which suggests that the present study is comparable with previous studies and, consequently, supports the validity of the present research.

The results for the APIMs with only self-report versus only partner report are consistent with the findings by Donnellan et al. (2007), who tested for actor and partner effects of personality on negative interaction behaviors, using self- and partner reports of interaction behaviors. When the authors replaced self-reports by partner reports, the relative size of actor and partner effects were reversed (Donnellan et al., 2007, did not examine APIMs in which self- and partner reports were combined into a single score). Thus, whereas the present research used self- and partner reports of predictors in the APIM, Donnellan et al. (2007) used self- or partner reports of outcomes in the APIM. The present research extends the analyses of Donnellan et al. (2007) by showing that the biasing effect of shared method variance can be controlled for by using latent variables that capture only variance shared between self- and partner reports but that exclude variance that is unique to each method.

In this research, gender did not moderate the strength of actor and partner effects of personality on relationship satisfaction, which is consistent with findings from many previous studies (Barelds, 2005; Dyrenforth et al., 2010; Malouff et al., 2010; Slatcher & Vazire, 2009) but not all (Neyer & Voigt, 2004; Robins et al., 2000). Thus, the moderator analyses provide support for the robustness of the actor and partner effects of personality. Of course, the finding that the actor and partner effects replicate across genders does not mean that men and women did not differ in their average level of the Big Five personality traits. In fact, in the present sample, women scored consistently higher (i.e., higher in self- and partner report) on neuroticism and openness. However, the results suggest that the structural relations between personality and relationship satisfaction are unaffected by gender.

An unexpected finding was that in the models including partner reports (i.e., in the APIM with self- and partner reports and the APIM with partner reports only), actor effects were somewhat larger than in the APIM with self-report only. When using self-report only, the actor effects are based on information from one source and consequently were expected to be positively biased by shared method variance. As stated in the Introduction, although shared method variance often results in inflated effects, the direction of the bias cannot be known with certainty (Cote & Buckley, 1987; Podsakoff et al., 2003; Podsakoff et al., 2012; Siemsen et al., 2010). Thus, it is possible that in the APIM with self-report only, shared method variance led to artificially deflated rather than inflated actor effects. However, the important point in this context is that the relative size of actor and partner effects depended, in the theoretically predicted way, on the sources of information used in the APIM. Moreover, the results for the accuracy-bias models indicated a large degree of consistency between self- and partner reports, which strengthens confidence in the validity of APIMs that used self- and partner reports to model latent personality factors.

The findings of the present research may have general implications for applications of the APIM, beyond analyses of the link between personality and relationship satisfaction. It is likely that method factors almost always lead to biased

estimates of actor and partner effects in many fields of psychological research. Whenever constructs can be validly assessed by more than one method, multimethod assessment should be used because it allows controlling for the effect of shared method variance and may provide for more valid estimates of actor and partner effects. Ideally, predictor and outcome variables in the APIM should be assessed by multiple methods (e.g., using a multitrait-multimethod design; Eid, Lischetzke, Nussbeck, & Trierweiler, 2003; Kenny & Kashy, 1992), which would also allow for more flexible modeling of residual correlations between method-specific factors and thereby further enhance the validity of the structural effects. However, it should be noted that multimethod assessment may not always be feasible or appropriate. For example, using data from non-self-report sources is not a valid method when "variables are capturing an individual's perceptions, beliefs, judgments or feelings" (Podsakoff et al., 2012, p. 549). Correspondingly, in the present research, the construct of relationship satisfaction was measured by self-report only, as relationship satisfaction is a subjective construct by definition. However, because method bias (i.e., the unique perspectives in self- and partner reports) was not included in the latent second-order personality factors, the estimates of actor and partner effects of personality on relationship satisfaction were unaffected by shared method variance even if one of the constructs involved (i.e., relationship satisfaction) was measured with a single method only.

Limitations and Future Directions

Although the sample size in this research was not small (i.e., 186 couples, corresponding to 372 individuals), a larger sample size would be desirable to assess the impact of shared method variance on APIM estimates with greater precision. Future studies should replicate the present analyses in larger samples to gain robust evidence on the degree of bias in monomethod studies. Moreover, simulation studies could provide important insights into how shared method variance influences APIM estimates by examining parameters such as the proportion of construct versus method variance in measures, the size of actor and partner effects, and the within-dyad correlations for predictor and outcome variables. Simulation studies could also help to determine the sample size needed to assess actor and partner effects, and the difference between these effects, with sufficient precision (Muthén & Muthén, 2002).

Future research on the dyadic effects of personality on relationship processes and outcomes should include, in addition to partner reports, other non-self-report measures of the constructs to further increase the validity of the analyses. For example, reports by family members, friends, and coworkers, and assessments by neutral interviewers could provide additional information that could be used to model construct factors that are free of shared method variance (Podsakoff et al., 2012). Although partner reports provide important insights into an individual's personality from an informant perspective, other informants are of interest because partner reports might include specific biases that confound the dyadic effects of personality on relationship variables. For example, research shows that partner reports of personality are more strongly related to the rater's own relationship satisfaction than are self-reports (Watson, Hubbard, & Wiese, 2000; Watson & Humrichouse, 2006). However, because the causality of the relation is unknown, it is unclear whether this finding indicates that partner reports are biased by the rater's relationship satisfaction. Although higher levels of relationship satisfaction might cause positively biased assessments of the partner's personality, it is also possible that positive perceptions of the partner (which may be warranted or not) lead to higher satisfaction with the relationship. Nevertheless, future research would benefit from including third-party reports in the analyses.

The issue discussed in the previous paragraph raises the general question of what is the ideal approach to measure personality. Although each of the perspectives of the self, the partner, and third-party informants may provide valid insights into a person's personality that are not provided by the other perspectives, each perspective also includes important biases and blind spots. For example, the self has privileged access to traits that are low in observability (John & Robins, 1993; Vazire, 2010); however, research using self-reports is plagued by self-enhancement bias (John & Robins, 1994; Kwan, John, Kenny, Bond, & Robins, 2004). Relationship partners have intimate knowledge about a person's feelings and behaviors; however, partner reports might be influenced by idealization (Murray et al., 1996) or, as noted above, might be biased by the satisfaction with the relationship (Watson & Humrichouse, 2006). Some third-party informants might have a neutral perspective on a person; however, informants such as friends or coworkers may not have a representative sample of observations because they know the target person only in specific roles (Hofstee, 1994). For these reasons, the most valid approach might be to take advantage of all available perspectives and to use latent variable modeling that allows disentangling variance that is shared across perspectives and variance that is method-specific. Also, research suggests that using multiple informants further increases the accuracy of personality assessment (Hofstee, 1994; Kolar, Funder, & Colvin, 1996; Vazire, 2010).

Future research on actor and partner effects of personality on relationship satisfaction should test for the cognitive, emotional, behavioral, and social processes that mediate the effects (for one of the rare studies testing for mediation of personality effects on relationship outcomes, see Donnellan et al., 2007). It is likely that these processes differ across the Big Five dimensions. For example, a possible pathway explaining the partner effect of agreeableness is that agreeableness leads to providing more social support for the relationship partner and to behaving more constructively in

relationship conflicts (John et al., 2008). An explanation for the actor and partner effect of neuroticism might be that neurotic individuals tend to be more irritable and, consequently, might cause or intensify relationship conflicts, thereby reducing their own and their partner's satisfaction with the relationship. A final example is the partner effect of openness. Individuals with high scores are more imaginative, less conventional, and more psychologically minded (John et al., 2008). Consequently, openness might be linked to emotionally intelligent relationship behavior, in particular when providing social support for the partner. Given that most of these links are purely speculative, future research should focus on testing mechanisms that account for the dyadic effects of personality in relationships.

In conclusion, the present study attests to the importance of controlling for shared method variance in many fields of psychological research. In particular, when using the APIM, monomethod assessment may result in biased estimates because actor and partner effects differ systematically with regard to the influence of shared method variance. Using a multimethod design and controlling for shared method variance may help to overcome this methodological problem. With regard to the substantive question of the present research, the findings illustrate the truly dyadic nature of the relation between personality and satisfaction in close relationships and marriage. If future studies provide evidence for the causality of actor and partner effects of personality, then such knowledge may help designing more effective interventions aimed at enhancing satisfaction and fulfillment in relationships.

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Notes

1. All of the coefficients reported in this paragraph are standardized regression coefficients.
2. All of the coefficients reported in this paragraph are correlations.
3. A few additional studies examined actor and partner effects, which were however not mutually controlled for (Botwin, Buss, & Shackelford, 1997; Donnellan, Conger, & Bryant, 2004; Watson, Hubbard, & Wiese, 2000).
4. The German version of the Big Five Inventory (BFI) includes only 42 of the 44 items. The remaining two items were translated as follows: The item "can be moody" was translated as "Stimmungsschwankungen hat"; the item "likes to cooperate with others" was translated as "gerne mit anderen kooperiert."
5. The wording of this item has been adapted to include couples who are dating (in addition to couples who are married or cohabiting). The original item wording by Spanier (1976) is, "Do you ever regret that you married (or lived together)?"
6. For all models tested, sample Mplus scripts are provided as supplementary material.
7. To better compare the coefficients with the findings reported in the literature, I also ran actor–partner interdependence models (APIMs) with constructs modeled as observed variables instead of latent factors (Kenny & Cook, 1999). The coefficients were very similar to the coefficients reported in Table 4 (although slightly lower, which is a typical difference between analyses with observed vs. latent variables). For extraversion, the actor and partner effects were .21* and .11*, for agreeableness .21* and .14*, for conscientiousness .12* and .05, for neuroticism −.22* and −.13*, and for openness .06 and .08. *$p < .05$.
8. When only two first-order factors are available per second-order factor, a general methodological recommendation is to fix the unstandardized loadings of both first-order factors, which provides for more stable solutions (Kenny, Kashy, & Cook, 2006). In fact, in the present analyses, fixing only one of the loadings led to nonadmissible solutions for all of the Big Five. Moreover, setting both loadings to the same value is consistent with theory, which suggests that self- and informant reports of personality may have roughly the same degree of validity (Hofstee, 1994; Kolar, Funder, & Colvin, 1996; Vazire, 2010).
9. It was not possible to include residual correlations for latent factors that are based on reports by the same person (e.g., residual correlations between reports of the female partner on her personality, her partner's personality, and her relationship satisfaction). Including these correlations led to nonadmissible solutions for four of the five Big Five personality factors.
10. Although the loadings of the first-order factors were constrained to be equal, the constraints were imposed on unstandardized coefficients (as typically recommended), which led to slight variation in the resulting standardized coefficients.

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