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Taking Stock of Reality:
Biased Perceptions of the Costs of Romantic Partners' Sacrifices

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Abstract

When romantic partners sacrifice their own self-interest to benefit the relationship, the sacrificer or recipient may—for various reasons—be biased in how they perceive the costs that the sacrificer incurs. In Study 1, romantic couples ($N=125$) rated their own and their partner's costs after a conversation about a sacrifice in the laboratory, followed by extensive experience sampling in their natural environment. In Study 2, a pre-registered experiment, individuals ($N=775$) imagined a scenario in which they, their partner, or an unknown person sacrificed and rated the associated costs and benefits. Both studies demonstrated a consistent discrepancy between perceptions of own and partner sacrifice, driven primarily by people underestimating their own sacrifice costs and overestimating the benefits (Study 2). Results across studies showed that this underestimation bias helps people to feel better and feel more satisfied in the relationship when giving up their own goals and preferences for the relationship.

Keywords. Sacrifice costs, perception, estimation, accuracy and bias.

Taking Stock of Reality:

Biased Perceptions of Romantic Partners' Costs for Sacrifice

Imagine two partners, Sara and David, who want to spend Sunday afternoon together. Sara wants them to visit her family, while David wants to see their common friends. To solve this divergence of interests and spend their Sunday together, either Sara or David may have to sacrifice their preference. Such situations are common in couples' everyday interactions (Righetti, Gere, Hofmann, Visserman, & Van Lange, 2016); and although sacrifices can benefit the relationship, they are inherently costly for the partner making the sacrifice (Righetti & Impett, 2017). Indeed, sacrifices evoke both positive and negative affect, in the sacrificer and recipient (Righetti, et al., 2019). Thus, there may be ambiguity about the extent to which a sacrifice is beneficial or costly for the person who sacrifices, which may create room for varying interpretations of the costs and benefits of sacrifice. Hence, when people sacrifice, do sacrificers' and recipients' perceptions of the sacrifice align, and is there a general tendency to interpret sacrifices as more or less costly than the sacrificer perceives them to be?

Romantic relationships are characterized by high interdependence (Rusbult & Van Lange, 2003), rooted in the desire to maintain the relationship (e.g., Rusbult & Buunk, 1993). This interdependence may drive partners to be especially motivated to accurately perceive each other's behaviors and experiences in the relationship, and indeed they do so fairly accurately (Nater & Zell, 2015). However, when trying to gauge other people's feelings and experiences, there will inevitably be room for interpretation, and cognitive biases are likely to occur and shape what people see and think (Tversky & Kahneman, 1974). Cognitive biases are usually driven by motives to arrive at beneficial conclusions (e.g., holding overly positive self-perceptions; Kunda, 1990), and can be functional to maintain well-being and foster social relationships (Taylor &

Brown, 1988). In romantic relationships, partners' strong interdependence leaves them prone to various biased perceptions (Fletcher, 2015; Gagné & Lydon, 2004), such as seeing one's partner and relationship in an overly positive light (Rusbult, Van Lange, Wildschut, Yovetich, & Verette, 2000), that help to maintain relationship satisfaction (Miller, Niehuis & Huston, 2006).

Perceiving Sacrifices

While interpersonal perceptions may be fairly accurate, to the extent that partners' perceptions do not align (West & Kenny, 2010), there can be various biases at play that may result in recipients of sacrifice perceiving a partner's sacrifice costs as higher, or lower, than their partner appraises them to be. Indeed, the ambiguous nature of sacrifice challenges recipients' perceptions of these acts, as people fail to detect about half of their partner's daily sacrifices, *and* they also "see" sacrifices when the partner did not actually report making a sacrifice (Visserman et al., 2019). When people *do* accurately detect their partner's sacrifice behavior, they are likely also challenged in interpreting their partner's experience of this prosocial but costly behavior.

There may be various motives at play that may result in a discrepancy between partners' perceptions of sacrifice in either of two directions: a) recipients perceive the partner's costs as *higher*, and the potential benefits of the sacrifice as lower, than the sacrificer appraises their own sacrifice, or b) recipients perceive the costs as *lower*, and the benefits as higher, than the sacrificer appraises these to be. Thus, we accommodated these competing hypotheses and the underlying motives in either the sacrificer or recipient that would drive these discrepancies.

Recipients Perceive Sacrifice Costs as *Higher* than Sacrificers

We may find a discrepancy between partners' perceptions of sacrifice costs and benefits because either the recipient or the sacrificer may be biased. First, recipients may perceive the

sacrifice costs as higher, as they may be motivated to capitalize on their partner's costly investment into the relationship. In committed relationships, people strongly value their partner's investments in the relationship as a sign of mutual commitment (Rusbult, 1980). Thus, people may be motivated to see their partner's costly sacrifices to feel reassured about their partner's commitment and may reward their partner by expressing gratitude (Joel, Gordon, Impett, MacDonald, & Keltner, 2013). Given the benefits of gratitude for cultivating high relationship quality and longevity (Algoe, 2012; Gordon, Impett, Kogan, Oveis, & Keltner, 2012), it may be functional to overperceive partners' costs for sacrifice, and underestimate the benefits that the sacrifice yields, rather than missing the importance of the partner's investment. In fact, many perceptual biases in relationships seem ultimately adaptive for achieving positive relationship outcomes (Fletcher, 2015). For example, underestimating partners' forgiveness after an offense may function to acknowledge partners' hurt and motivate efforts to repair the relationship (Friesen, Fletcher, & Overall, 2005). Similarly, overperceiving a partner's sacrifice costs may be adaptive in order to capitalize on the partner's costly investment and not leave them feeling underappreciated (Visserman et al., 2019), and thus ultimately serving the relationship.

Alternatively, the discrepancy between partners' perceptions of sacrifice may originate from the sacrificing partner. Incurring costs to resolve a conflict of interests in the relationship may induce negative affect and reduce relationship satisfaction (Righetti & Impett, 2017; Whitton, Stanley, & Markman, 2007), suggesting that sacrificers may benefit from appraising their costly act in a more positive light. Moreover, making a sacrifice may threaten people's perception of the quality and superiority of their relationship (Rusbult et al., 2000), as people incur costs to resolve a conflict of interests with their partner. In this situation, sacrificers may hold two dissonant cognitions: seeing their relationship in a positive light and seeing the costs

they had to incur to resolve a conflict of interests in the relationship, compromising their own needs and well-being. To reduce psychological discomfort resulting from these dissonant perceptions (Elliot, & Devine, 1994), sacrificers may downplay the costs they had to incur in order to justify forgoing their own needs and to minimize the demands that the relationship has posed to them. In fact, people tend to overestimate positive attributes of their partner and their relationship and downplay dissatisfying incidents as “perfectly normal” (Van Lange, Rusbult, Semin-Goossens, Görts, & Stalpers, 1999). Similarly, people may downplay the costs they incur and magnify the benefits of their sacrifice to maintain personal and relational well-being.

Recipients Perceive Sacrifice Costs as *Lower* than Sacrificers

It is also possible that partners' discrepancy in perceptions of sacrifice originates from the recipient appraising their partner's sacrifices as less costly, because they may feel bad or guilty that their partner sacrificed something important for them (Righetti & Impett, 2017). Indeed, when people perceive their partner to invest and commit to the relationship more than they do, they may feel indebted and pressured to return the favor (Peng, Nelissen, & Zeelenberg, 2018), and feel guilty that their partner incurred costs for their own benefit or for the relationship (Drigotas, Rusbult, & Verette, 1999). To reduce feelings of discomfort, guilt, and indebtedness, perceivers may be motivated to downplay the costs that their partner incurred, and perhaps “play-up” the benefits that the partner may receive from making the sacrifice.

Alternatively, the discrepancy may originate from how the sacrificing partner appraises their own sacrifice. When making a sacrifice, partners may—with or without intentions to do so—overestimate and exaggerate the costs they incur and perhaps suppress the potential benefits that the sacrifice yields for them. They may do so to ensure that their partner recognizes their behavior as a sacrifice, which may be adaptive given that many sacrifices are not recognized

(Visserman et al., 2019). Thus, people may attempt to signal the costs of their sacrifice to ensure that their partner sees their sacrifice, appreciates their action, and may reciprocate when new conflicts of interests arise (Rusbult & Van Lange, 2003; Wieselquist, Rusbult, Foster, & Agnew, 1999). However, if such signals do not actually reach the recipient of sacrifice, this may result in sacrificers appraising their sacrifice as more costly, and less beneficial to them, than recipients perceive their sacrifice to be.

Research Overview

In two studies, we set out to examine whether—and *how*—romantic partners are discrepant in their perceptions of costs and benefits of a sacrifice. In Study 1, we sampled romantic couples' experiences and perceptions of partners' sacrifice costs in a laboratory conversation and an extensive experience sampling procedure. In Study 2, a pre-registered experiment, participants rated an identical sacrifice scenario for themselves, their partner, or an unknown other. The latter served as a benchmark to which we compared perceptions of own and partner sacrifice costs and benefits in order to disentangle whether partners' discrepancies originate from biased perceptions of own or partner sacrifice. Across studies, we examined relevant outcomes (i.e., mood and relationship satisfaction) that speak to why such bias may be functional.

Study 1

Methods

Participants. Participants were 125 heterosexual couples and one lesbian couple ($N=252$) residing in The Netherlands. Participants' mean age was 23.3 years ($SD=3.7$), and on average couples were romantically involved for 2.8 years ($SD=29$ months), with 35% cohabitating. The data come from a larger project on sacrifice in romantic relationships (e.g., Righetti et al., 2016).

Originally, 130 couples participated in the study, but one couple broke up before completing the experience sampling procedure, and three couples did not follow the instructions properly.

Laboratory conversation. First, couples came to the laboratory and were instructed to discuss a situation of divergent interests that they currently experienced in their relationship. Couples were provided with examples that varied in terms of costliness (e.g., visiting in-laws, picking a holiday destination, or relocating to a different country for a partner's job opportunity). Couples were seated together in a private room and were timed to converse about this topic for seven minutes. Right after, partners went to separate rooms to answer some questions regarding this conversation. Relevant to the current investigation, they were asked how costly their sacrifice would be (i.e., the magnitude of their sacrifice), and how costly their partner's sacrifice would be. Both questions were assessed on a 7-point scale (1=*not at all* to 7=*extremely*) (see also *Supplemental Materials 1*).

Experience sampling. At the end of the laboratory session, the experimenter instructed couples on the experience sampling procedure, as well as on definitions and examples of sacrifice (see Visserman et al., 2019), and couples received a booklet containing all these instructions. The first Saturday after the laboratory session, participants started the experience sampling procedure. For eight days, six times a day (bi-hourly), participants received a link to a short survey on their mobile phone (using SurveySignal; Hofmann & Patel, 2015). Each survey expired after one hour to ensure sampling of participants' momentary experiences. Both partners received the link at the exact same time in order to match their replies as closely as possible. On average, participants responded to 86.6% of the bi-hourly surveys (see also Righetti et al., 2016).

In each survey, both partners were asked whether they and their partner encountered a situation of diverging interest in the past hour. If so, they were asked whether they had

sacrificed, their partner had sacrificed, they had compromised (they both sacrificed), neither person had sacrificed (they went separate ways), or they postponed the resolution to a later time (see *Supplemental Materials 1*). Note that we only analyzed timepoints when both partners reported on one partner's sacrifice (or compromise) (i.e., sacrifices that were accurately detected; Visserman et al., 2019) in order to compare partners' reports on this event. Across all bi-hourly surveys, on average participants reported 1.97 own sacrifices ($SD=1.94$, range=0-10), and 1.63 partner sacrifices ($SD=1.64$, range=0-7), with 135 timepoints on which both partners reported on the same sacrifice. Each time they reported having made a sacrifice, they were asked how costly their sacrifice was to them, and each time they reported that their partner had sacrificed, they were asked how costly the sacrifice was for their partner. Each question was assessed on a 7-point scale (0=*not at all* to 6=*very much*) (see *Supplemental Materials 1*).

Results

Analysis strategy. Multilevel-modeling, using SPSS v.22, was used to account for non-independence in the data (Kenny, Kashy, & Cook, 2006), with random intercepts. In the experience sampling data we employed a 2-level cross model in which participants and the within-person assessments (i.e., time) were treated as crossed and nested within the dyad, with slopes treated as fixed effects. Dyads were treated as indistinguishable¹ in all models because of the presence of one non-heterosexual couple (Kenny et al., 2006). The data and syntax are available on the Open Science Framework (osf.io/q7f2d).

We used the Truth and Bias model of judgment (West & Kenny, 2011) to simultaneously examine the extent to which partners' reports of sacrifice aligned, and—to the extent that they did not align—whether sacrifices were perceived in a biased manner (i.e., recipients of sacrifice perceived the costs to be higher, or lower, than the sacrificer appraises their costs). First, to

examine the extent to which partners' reports of sacrifice aligned, the partner's reported costs were grand-mean centered across dyads (and across time points of the experience sampling) and were entered to predict perceived partner costs. Its coefficient—normally positive—assesses *tracking accuracy* (West & Kenny, 2011), indicating to what extent perceivers accurately tracked their partners' costs (i.e., how much partners' reports of sacrifice costs aligned) after the conversation and across the experience sampling.

To examine biased perceptions, we centered the perceiver's reports of their partner's sacrifice costs around the grand-mean of all partners' costs (i.e., the mean across dyads) after the conversation and at each time point of the experience sampling. This centering strategy ensures that the intercept in this model tests whether, on average, perceivers' reports of their partners' costs differed from their partners' reported costs, as well as the direction of this discrepancy, referred to as *directional bias* (West & Kenny, 2011). A negative intercept indicates that perceivers systematically perceived their partner's sacrifice costs as lower than their partner reported their costs, whereas a positive intercept indicates that perceivers perceived their partner's costs as higher than partners reported their costs.

An additional component in the Truth and Bias model is *assumed similarity* (West & Kenny, 2011) or the extent to which perceivers project their own sacrifice costs in estimating their partner's costs. Romantic partners are likely to project their own experiences onto their partner (e.g., Lemay, Clark, & Feeney, 2007), and thus their perception of their partner's costs could—to some extent—be a result of the perceiver's own experience of sacrifice. In the laboratory conversation, partners reported on both their own and their partner's sacrifice costs, allowing us to account for the influence of assumed similarity in the effects for tracking accuracy and directional bias. We centered perceivers' own sacrifice costs around the grand-mean of all

partners' costs across dyads and entered this predictor in our model. Its coefficient—normally positive—indicates to which extent perceivers project their own costs onto their partner when estimating their partners' costs.

Key analyses. Results from couples' conversation and the experience sampling procedure demonstrated that while perceivers showed significant tracking accuracy (i.e., partners' reported sacrifice costs predicted perceptions of partners' costs), they also systematically perceived partners' costs as higher than partners rated their own costs, indicated by the significant and positive intercepts. These accuracy and directional bias effects remained significant after accounting for assumed similarity in the conversation (see Table 1).

Table 1.

Accuracy and directional bias in judgments of the partner's sacrifice costs in the laboratory conversation and the experience sampling in Study 1.

	<i>b</i> (<i>SE</i>)	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Conversation					
Tracking accuracy	.21 (.06)	.09, .32	243.3	3.59	<.001
Directional bias	.26 (.08)	.10, .42	124.0	3.16	.002
Assumed similarity	.23 (.06)	.12, .35	243.3	3.94	<.001
Experience sampling					
Tracking accuracy	.32 (.08)	.16, .49	106.7	3.90	<.001
Directional bias	.30 (.13)	.04, .57	42.0	2.29	.027

Study 2

Results from Study 1 consistently showed that while people accurately tracked their romantic partner's sacrifice costs, they also perceived their partner's sacrifice as more costly than the sacrificer reported their costs to be. Prior to Study 2, we first conducted a pre-registered study designed to replicate our initial highly ecologically valid—but correlational—findings in an experimentally controlled setting. Participants imagined several scenarios in which they themselves or their partner would sacrifice and rated the associated costs—as well as the benefits (Righetti & Impett, 2017). Results demonstrated that partners' sacrifices are rated as more costly and yielding fewer benefits as compared to estimation of own sacrifice costs and benefits (see *Supplemental Materials 2*).

Next, we designed and pre-registered Study 2 to disentangle whether the discrepancy between partners' perceptions of sacrifice is primarily driven by biased appraisals of costs of one's own or a partner's sacrifice. This study advances our first experiment by adding a third condition in which an unknown person makes a sacrifice, which serves as a control condition to which we compared the ratings of costs and benefits in the own sacrifice and partner sacrifice condition. We pre-registered our hypotheses before data collection. This pre-registration, data, and syntax are available on the Open Science Framework (osf.io/q7f2d).

Methods

Participants. The sample consisted of 775 romantically involved individuals (36% men, 63% women¹, 1% “other”), with a mean age of 35 years ($SD = 12.2$), and an average relationship length of 10.2 years ($SD = 9.8$). Participants' relationship status varied from being married (45.7%), engaged (11.5%), seriously dating (36.8%), to casually dating (0.6%), and 78% cohabiting with their partner. We targeted a sample of 800 participants, determined using a

power calculation (G*Power) allowing for 80% power to detect small to medium effect sizes ($d=.30$) when comparing differences between conditions as well as testing outcomes within a condition (see Auxiliary Analyses). Originally, we collected 869 participants, but one participant identified as single, four participants admitted to dishonesty, 14 participants failed the attention check (i.e., incoherent responses to an open-ended question about the sacrifice), 73 participants failed the manipulation check (i.e., failed to identify the condition they were in), and two participants were removed because of duplicated IP addresses.

Measures and procedures. Participants were recruited through the online platform Prolific (Palan & Schitter, 2017). They were randomly assigned to either the own, partner, or control sacrifice condition, in which they were all presented with the exact same sacrifice scenario, with a minimum display time of 20 seconds. This scenario depicted a couple in which partners had different preferences for an activity on Saturday night, which was inspired by previous research on divergence of interests and sacrifices that couples regularly encounter (Righetti et al., 2016; Visserman et al., 2019) and was successfully used in our additional experiment (see *Supplemental Materials 1* and 2). In the own sacrifice condition, participants were asked to imagine that they made the sacrifice, in the partner sacrifice condition they were asked to imagine that their partner made this sacrifice, and in the control condition they were asked to imagine that an unknown other (“Blair”) made this sacrifice in their relationship.

After reading the sacrifice scenario, participants rated the costs of the sacrifice using three items (i.e., how “big,” “costly,” and “hard” the sacrifice would be) that reliably fit together in one composite score indicating sacrifice costs ($\alpha=.92$, $.84$, and $.86$, in the own, partner, and control condition respectively). Participants also rated the benefits of the sacrifice using three items (i.e., how positively the sacrificer would appraise the sacrifice, and how beneficial they felt

the sacrifice would be for the sacrificer themselves and the relationship) that reliably fit together in one composite score indicating sacrifice benefits ($\alpha=.77$, $.59$, and $.63$, in the own, partner, and control condition respectively). All items were assessed on a 7-point scale (1 = *not at all* to 7 = *very much*) (see *Supplemental Materials 1*).

After participants had rated the scenario, they were asked to write a few sentences about the scenario they imagined, to probe for participants' attentiveness and validity of their participation (e.g., whether their response showed English proficiency and coherence). Next, a manipulation check was administered by asking whether participants imagined that they made the sacrifice, their partner made the sacrifice, an unknown other "Blair" made the sacrifice, or that they did not remember. Last, participants were asked whether they replied truthfully to all questions, and whether they were indeed romantically involved, while stressing that their answers would not affect their payment; after which they were financially compensated (£0.65).

Results

Analysis of Variance (ANOVA) analyses revealed a total effect of experimental condition (partner sacrifice, own sacrifice, control) on sacrifice costs and benefits ratings. Tukey's HSD Posthoc comparisons revealed that whereas the partner sacrifice and control condition did not significantly differ in either costs or benefits appraisals, the costs were estimated as lower and the benefits as higher in the own sacrifice condition, as compared to either the partner sacrifice and control condition (see Tables 2 and 3). That is, people perceived their own sacrifice to be less costly and more beneficial than they perceive a partner's or unknown person's sacrifice, suggesting that the discrepancy between perceived and actual sacrifice costs found across studies is driven by sacrificers underreporting their costs.

Table 2.

Means and standard deviations for sacrifice costs and benefits in the own sacrifice, the partner sacrifice, and the control sacrifice conditions in Study 3.

Condition	Sacrifice costs		Sacrifice benefits		<i>n</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Own sacrifice	3.61 ^a	1.60	4.64 ^a	1.25	279
Partner sacrifice	4.40 ^b	1.40	4.32 ^b	1.03	278
Control sacrifice	4.58 ^b	1.30	4.37 ^b	1.03	218

Note. Means within one column (i.e., sacrifice costs or sacrifice benefits) with different superscripts are significantly different at $p < .05$.

Table 3.

Mean costs and benefits ratings in the own sacrifice, the partner sacrifice, and the control condition, and the comparisons between conditions in Study 3.

		<i>Difference (SE)</i>	95% CI	<i>Cohen's d</i>	<i>t</i>	<i>F</i>	η^2	<i>p</i>
Costs	Total effect					33.07	.08	< .001
	Own vs. partner	-.79 (.12)	-1.08, -.50	-.82	-6.44			< .001
	Own vs. control	-.97 (.13)	-1.28, -.66	-.98	-7.41			< .001
	Partner vs. control	-.18 (.13)	-.49, .13	-.13	-1.37			.357
Benefits	Total effect					6.59	.02	.001
	Own vs. partner	.32 (.09)	.10, .54	.28	3.42			.002
	Own vs. control	.27 (.10)	.03, .50	.24	2.68			.021
	Partner vs. control	-.05 (.10)	-.30, .18	-.05	-0.53			.856

Auxiliary Analyses Across Studies: Outcomes of Biased Sacrifice Perceptions

Across two studies (and an additional experiment reported in *Supplemental Materials 2*), we consistently found a discrepancy between perceived partner and perceived own sacrifice costs and benefits. Additionally, Study 2 revealed that this discrepancy was not driven by overperceiving a partner's sacrifice costs (and underperceiving their benefits), but rather by participants underestimating their own sacrifice costs, and overestimating the benefits their sacrifice would yield. As hypothesized, such bias should be functional in that it may help partners feel better after making a sacrifice and feel more satisfied in their relationship when giving up their own self-interests for the relationship. To test this hypotheses we conducted some additional analyses in the datasets of Study 1, and we pre-registered and conducted some auxiliary analyses in Study 2.²

In Study 1, we assessed partners' current positive and negative mood and relationship satisfaction before and after the sacrifice conversation, and at each bi-hourly experience sampling assessment (see *Supplemental Materials 1*). In all analyses, we centered own sacrifice costs perceptions around the grand mean of perceived partner's sacrifice costs, with higher scores indicating greater underestimation of own sacrifice costs. Indeed, partners reported being in a better mood and reported greater relationship satisfaction the more they underestimated their sacrifice costs after the sacrifice conversation and in daily life (see Table 4).

In Study 2, after participants imagined the sacrifice scenario, we assessed their anticipated positive and negative mood, and relationship satisfaction (see *Supplemental Materials 1*). As pre-registered, in regression analyses to predict these outcomes, we centered own sacrifice costs reports around the grand mean of costs in the partner sacrifice condition, with higher scores indicating greater underestimation of own sacrifice costs. Similarly, we centered

own sacrifice benefits reports around the grand mean of benefits in the partner sacrifice condition, with higher scores indicating greater overestimation of own sacrifice benefits. Indeed, participants anticipated being in a better mood and reported greater relationship satisfaction the more they underestimated their sacrifice costs and overestimated the benefits (see Table 5).

Table 4.

Outcomes from underestimation of own sacrifice costs in the laboratory conversation and bi-hourly experience sampling procedure in Study 1.

Underestimation of costs	<i>b</i> (<i>SE</i>)	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Laboratory conversation					
Positive mood	.12 (.03)	.06, .18	232.8	4.02	<.001
Negative mood	-.11 (.04)	-.18, -.04	242.5	-2.98	.003
Relationship satisfaction	.05 (.02)	.003, .09	242.7	2.09	.037
Bi-hourly Experience Sampling					
Positive mood	.12 (.04)	.04, .20	474.2	3.08	.002
Negative mood	-.23 (.04)	-.31, -.14	427.6	-5.33	<.001
Relationship satisfaction	.15 (.03)	.09, .22	485.4	4.70	<.001

Note. Outcomes in the laboratory conversation were also assessed before the conversation and are entered as a covariate in each regression model to examine whether greater underestimation of own sacrifice costs promotes positive and negative mood and relationship satisfaction above and beyond participants' previous levels of these outcomes.

Table 5.

Outcomes from underestimation of costs and overestimation of benefits in own sacrifice condition in Study 2.

	<i>b (SE)</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Underestimation of costs					
Positive mood	.53 (.05)	.44, .62	278	11.74	<.001
Negative mood	-.64 (.04)	-.73, -.54	278	-14.44	<.001
Relationship satisfaction	.44 (.04)	.36, .53	278	10.07	<.001
Overestimation of benefits					
Positive mood	.65 (.06)	.54, .77	278	11.11	<.001
Negative mood	-.59 (.07)	-.72, -.46	278	-8.89	<.001
Relationship satisfaction	.58 (.06)	.47, .69	278	10.43	<.001

General Discussion

Findings from extensive dyadic experience sampling data, couples' lab conversations about a partner's potentially major sacrifice, and a pre-registered experimental study uncovered a new phenomenon in the realm of perceptual biases in romantic relationships. Results consistently showed that while sacrificers' and recipients' perceptions of sacrifice costs align to some extent (Nater & Zell, 2015), there is also room for biases. Specifically, recipients of sacrifice perceived sacrifices as more costly, and saw fewer benefits, than sacrificers. However, rather than recipients of sacrifice misperceiving the costs and benefits of a partner's sacrifice, Study 2 revealed that sacrificers themselves seem to be the primary source of the partners' discrepancy, as they underestimate the costs and overestimate the benefits that their sacrifice may yield.

Across studies we consistently found that sacrificers experienced enhanced mood and felt more satisfied in their relationship the more they underestimated their sacrifice costs, and overestimated the benefits, suggesting that this biased perception of people's own sacrifices may protect sacrificers' well-being and views of the relationship (Miller et al., 2006; Taylor & Brown, 1988; Whitton et al., 2007) when they forgo their own needs to resolve a conflict of interests with their partner.

Broader Considerations

While people see their own sacrifices in an overly positive light, recipients of sacrifice seem unbiased in seeing the costs their partner incurs. Given that seeing a partner's costly relationship investment should evoke gratitude in the recipient (Joel et al., 2013; Visserman et al., 2019), unbiased recipients may show unwavering levels of gratitude. In turn, recipients' gratitude should ensure that the sacrificing partner feels appreciated (Visserman et al., 2019) which should promote the long-term quality and stability of the relationship (Gordon et al., 2012). Altogether, sacrificers may experience greater personal and relational well-being when underestimating the magnitude of what they give up, while recipients may nevertheless express their appreciation, and thereby uphold cycles of commitment, trust, and relationship maintenance behaviors in both partners (Wieselquist et al., 1999).

Although people benefit from downplaying the costs when making a sacrifice, it is important to also consider the risks of this bias. When people give up their own needs to resolve a conflict of interests in the relationship, even when they underestimate the costs they incur, sacrifices are still inherently costly (Righetti & Impett, 2017). At times, it may be healthy to appraise sacrifices for what they are and redirect one's attention to personal needs when necessary. When people fail to recognize the negative personal consequences of sacrificing, this

may create an imbalance in attending to both personal and relational needs, that are both key to individual well-being and high quality relationships (Kumashiro, Finkel, & Rusbult, 2008; Visserman, Righetti, Kumashiro, & Van Lange, 2017). Future work could reveal whether, when adopted excessively, the underestimation bias may undermine the fulfilment of one's own needs and could potentially backfire over time.

It is also worth noting that the existing literature—including theorizing around Truth and Bias modeling (West & Kenny, 2011) and our own work on detecting partners' sacrifices (Visserman et al., 2019)—typically assumes discrepancies in partners' reports to originate from the perceiver not accurately picking up what the actor (i.e., sacrificer) experiences, or doing so in a biased manner. The present findings, as well literature on self-perceptions (Kunda, 1990), illustrate that people themselves are driven by motivated cognition and may appraise their own behaviors in a biased manner, while perceivers may be less biased in appraising their partner's behaviors. In fact, our findings align with recent findings showing that people are overly optimistic when appraising their own relationship behaviors (e.g., how often they will perform relationship-enhancing behaviors), but do not show bias when taking their partner's perspective (Peetz, Maccosham, & May, 2019).

Strengths and Limitations

A limitation of the present work is that in the experience sampling study we only examined sacrifices that were detected in order to compare recipients' and sacrificers' reports. This limited the available timepoints in our analyses, and may have skewed findings given that detected sacrifices may have been perceived as particularly costly. Partners' acts that are perceived as less costly might not have been identified as a sacrifice and thus would not have been considered in our analyses. However, findings from couples' conversations and two

experimental studies (see *Supplemental Materials 2*) confirmed partners' discrepancies in situations where missed sacrifices were not at play. Another limitation is that in Study 1's conversation and in Study 2 we assessed anticipated or imagined sacrifices, respectively, which may not capture participants' perceptions and experiences of an actual performed sacrifice. Importantly, in Study 1's bi-hourly experience sampling procedure we captured reports of actual sacrifices close to when they occurred, and findings replicated across all methods.

A strength of the present work is that our findings were obtained from couples' actual interactions in their daily natural environment, and close in time to when they occurred, complementing the two experimental studies which allowed for control over the level of sacrifice. Findings were also highly consistent across studies, as they replicated in a controlled laboratory setting in which couples discussed their own and their partner's more substantial sacrifices and in two pre-registered experiments in which we manipulated the actor of the sacrifice (self vs. partner vs. unknown other). Finally, results generalized across Western cultures (i.e., Dutch couples, and British and North American participants recruited online).

Conclusions

Taking stock of the reality of perceptions of romantic partner's daily, and potentially major sacrifices, we conclude that people see their own sacrifices in an overly positive light. In contrast, people do not seem biased when receiving a sacrifice from their partner, appraising the costs and benefits for what they are. Such biased perceptions of the costs and benefits of one's own sacrifices seem to serve to protect sacrificers' personal and relational well-being when making a sacrifice. Future research should investigate the long-term consequences of undermining the costs that people incur when giving up their own needs for their partner, shedding more light on the role and functions of such biased perceptions in relationships.

Footnotes

¹ Gender did not moderate the findings in either study.

² In Study 1 we explored whether sacrificers downplay their costs more when they are generally highly satisfied and committed to the relationship. Sacrificers' relationship satisfaction ($p=.074$) and commitment ($p=.058$) marginally significantly predicted a greater positive discrepancy (i.e., directional bias) between perceivers' and sacrificers' reports of costs in couples' laboratory conversation, but these effects did not replicate in the bi-hourly experience sampling procedure.

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