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# The Art of Sacrifice

Self-Other Dilemmas, Biased Perceptions,  
and the Emergence of Gratitude

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VRIJE UNIVERSITEIT

The Art of Sacrifice:  
Self-Other Dilemmas, Biased Perceptions, and the Emergence of Gratitude

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geboren te Stramproy

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# Contents

<b>Chapter 1: General Introduction</b>	<b>7</b>
Giving when it Costs	9
Overview of the Present Dissertation	14
<b>Chapter 2: Me or Us? Self-Control Promotes a Healthy Balance between Personal and Relationship Concerns</b>	<b>19</b>
Study 2.1	27
Study 2.2	30
General Discussion	38
Supplemental Materials 2.1	43
Supplemental Materials 2.2	45
<b>Chapter 3: To “See” is to Feel Grateful? A Quasi-Signal Detection Analysis of Romantic Partners’ Sacrifices</b>	<b>51</b>
Study 3.1	58
Study 3.2	64
General Discussion	67
Supplemental Materials 3.1	71
<b>Chapter 4: It’s the Motive that Counts: Perceived Sacrifice Motives and Gratitude in Romantic Relationships</b>	<b>79</b>
Study 4.1	89
Study 4.2	95
General Discussion	101
<b>Chapter 5: Taking Stock of Reality: Biased Perceptions of Romantic Partners’ Costs for Sacrifice</b>	<b>111</b>
Study 5.1	121
Study 5.2	127
General Discussion	131
Supplemental Materials 5.1	137
	5

<b>Chapter 6: General Discussion</b>	<b>139</b>
Overview of the Empirical Findings	141
Implications and Future Directions	144
Strengths and Limitations	149
Closing Remarks: The Art of Sacrifice	151
<b>Summary</b>	<b>151</b>
<b>References</b>	<b>155</b>
<b>Acknowledgments</b>	<b>169</b>
<b>Curriculum Vitae</b>	<b>173</b>

# **CHAPTER 1**

## General Introduction





Romantic relationships are one of the most important sources of people's health, well-being, and happiness (e.g., Holt-Lunstad, Smith, & Layton, 2010; Kamp Dush & Amato, 2005; Kiecolt-Glaser & Newton, 2001), which is no surprise given that romantic partners' lives become highly intertwined (Rusbult & Van Lange, 2003). This interdependence comes with a strong motivation to maintain and invest in the relationship, but also brings inevitable dilemmas between pursuing one's own self-interest and benefitting one's partner and the relationship. Realistically, relationships exist by some virtue of sacrifice. Couples are regularly confronted with situations in which partners' preferences diverge (Righetti, Gere, Hofmann, Visserman, & Van Lange, 2016), and these situations may call for one of the partners (or both) to sacrifice their own self-interest and invest in the relationship instead (Van Lange et al., 1997). The way couples navigate these inevitable conflicts of interests and the related sacrifices may be key to well-functioning and thriving relationships, but has received surprisingly little empirical attention. The present dissertation aims to uncover (a) how couples navigate these self-other dilemmas, (b) how partners perceive and appraise each other's sacrifices, and (c) how sacrifices affect gratitude.

## **Giving when it Costs**

Sacrifices come in many flavors. They can be substantial but rare, such as moving to a new city with your partner to meet their career ambitions. They can also be small and common, such as spending time with your partner's friends rather than your own. Sometimes people may *actively* forgo their self-interest by doing something that they do not like to do, such as going on a boring outing with one's partner's friends. At other times, people may *passively* give up what they would actually like to do, such as going out with one's own friends. Sacrifices can also be active and passive at the same time, such as when going out with the partner's boring friends instead of one's own (Van Lange et al., 1997). Whether they are substantial or small, sacrifices are essential for coordinating people's lives together (Righetti & Impett, 2017). However, little is known about people's experiences, perceptions, and appraisals of sacrifices.

Research on sacrifice started off with a focus on people's *willingness* to sacrifice, which is the motivation to make costly investments in the relationship. Research found that commitment predicts willingness to sacrifice (Etcheverry & Le, 2005; Van Lange et al., 1997; Wieselquist, Rusbult, Foster, & Agnew, 1999), and that willingness to sacrifice

fosters greater commitment and satisfaction in turn (Van Lange et al., 1997). But beside the motivation to forgo one's self-interest for the partner or relationship, what is the impact of performing an *actual* sacrifice for the relationship? The results of previous research in this regard are not very conclusive. Some research has found that frequently sacrificing reduces the individual's well-being and the quality of the relationship, especially when people feel that making these sacrifices is harmful to them (Whitton, Stanley, Markman, 2007). Other research suggests that sacrificing can promote the quality of the relationship, but under the condition that people feel satisfied with making these sacrifices (Stanley, Whitton, Sadberry, Clements, & Markman, 2006), and that they are "easy" to make (Ruppel & Curran, 2012).

Importantly, the outcomes of sacrifice greatly differ depending on the reasons why people choose to sacrifice. For example, when people sacrifice for approach motives (i.e., to achieve positive outcomes, such as making the partner happy, or increase intimacy in the relationship), they experience positive emotions and enhanced relationship quality. In contrast, when people sacrifice for avoidance motives (i.e., to avert negative outcomes, such as causing conflict in their relationship, disappointing the partner, or feeling guilty), they experience negative emotions and decreased relationship quality (Impett, Gable, Peplau, 2005; Impett, Gere, Kogan, Gordon, & Keltner, 2014; Impett et al., 2010). Interestingly, perceiving one's partner to sacrifice to achieve positive outcomes (i.e., approach motives) or to avert negative outcomes (i.e., avoidance motives) similarly impacts the perceiver's well-being and relationship quality (Impett et al., 2014). Thus, this literature demonstrates not only the impact of these different sacrifice motives for the individual who sacrificed, but also the power that *perceiving* these motives holds for the partner witnessing their partner's sacrifice.

Aside from the difference that perceiving approach or avoidance motives for sacrifice can make, little is known about how partners' sacrifices are perceived, and importantly the consequences of these perceptions. This inherent dyadic process calls for a dyadic perspective on studying sacrifice, that investigates both partners' behaviors, perceptions, and experiences related to the sacrifices that occur in their relationship. We start our investigation on sacrifice with a focus on the partners' challenges and dilemmas of pursuing both personal and relational goals, and with the implications of successfully balancing these concerns.

## **A Balancing Act**

Individuals are driven by both personal and relational needs (Aron & Aron, 1986; Baumeister & Leary, 1995; Deci & Ryan, 2000). People may want to spend time on their personal hobby, with their friends, or investing in their career. At the same time, when they are in a romantic relationship, people usually have a strong desire to spend time with one's partner and invest in the relationship. Although romantic partners strive to achieve an optimal balance in fulfilling both their personal and relational needs, they are inevitably challenged by how much time and effort they can dedicate to both sets of goals and needs. At times, people may invest a great deal in their personal goals, and neglect their relationship, while at other times they may overinvest in the relationship at the expense of their personal needs. Just as a thermostat that controls whether more or less heat is produced in order to redirect to its point of equilibrium (i.e., the temperature it is set to), so do people try to protect their preferred level of dedication to personal and relationship concerns. That is, they are motivated to redirect their attention and effort to restore the balance, to the point where they feel right about the amount of dedication to each domain (Kumashiro, Rusbult, & Finkel, 2008).

### ***The Importance of Balance***

When people are able to sustain their optimal balance they experience high levels of personal well-being and relationship quality, whereas immersing oneself in either one's personal goals or the relationship at the expense of the other domain will detract from both personal and relationship well-being (Kumashiro et al., 2008; Patrick, Knee, Canevello, & Lonsbary, 2007). Thus, being overly invested in one's personal goals may harm the relationship, but so too can neglecting one's personal needs when *overdedicating* to the relationship. Although greater dedication to the relationship intuitively should cultivate a high quality relationship, it will likely backfire and hurt the relationship when it comes at the expense of one's personal goals and needs (Kumashiro et al., 2008). To conclude, key to leading a happy life and enjoying a high quality relationship may lay in successfully balancing one's dedication to personal and relational concerns.

### ***The Ability to Balance***

Importantly, individuals may differ in their ability to achieve such balance on a regular basis. Although romantic partners are generally motivated to sustain a healthy personal-relational balance, it may require self-regulatory strength to act on this

motivation and attend to both concerns to a satisfactory level. Self-control is the ability to direct thoughts, motivations, and behaviors in a goal-directed manner (Baumeister, Heatherton, & Tice, 1994), and thus should provide the ability to achieve and maintain personal-relational balance and to prevent overdedication to either concern. High levels of self-control may enable people to monitor the status of one's balance, to inhibit overinvesting in one domain over the other, and to redirect their attention and effort when people do at times find themselves neglecting one domain at the expense of the other. Rather than self-control being recruited exclusively to behave in alignment with the best interest of the relationship or with one's personal best interest (Pronk & Righetti, 2015), this ability should help romantic partners with the challenge of attending to both concerns in a balanced manner. Moreover, successfully defeating this challenge may explain why high levels of self-control help people to cultivate high personal and relationship well-being (e.g., Hofmann, Luhmann, Fisher, Vohs, & Baumeister, 2014; Tangney, Baumeister, & Boone, 2004; Vohs, Finkenauer, & Baumeister, 2011). Ultimately then, this balancing effort may affect when partners are willing to sacrifice their personal goals for the relationship. When people do decide to sacrifice, do partners actually see each other's dedication to the relationship, and how do they appraise their partner's sacrifices?

### **Sacrifice in the Eye of the Beholder**

One may expect that romantic partners may know each other and observe each other's behaviors in a more accurate light than they would see any other person they interact with. Generally, people are moderately accurate in reading their interaction partners (Nater & Zell, 2015), and interestingly, romantic partners do not seem to "read" each other much better. In fact, exactly because romantic partners' lives are highly intertwined and they are highly invested in their relationship, they may *want* to see each other and their relationship in a certain way, and these motivational forces may bring about errors in judgment (Fletcher & Kerr, 2010; Gagné & Lydon, 2004). For example, people tend to see their romantic partner and their relationship together in an overly positive light (Murray, Holmes, & Griffin, 1996; Rusbult, Van Lange, Wildschut, Yovetich, & Verette, 2000), and such positive illusions function like self-fulfilling prophecies—they may give people the energy and spirit to accommodate to the partner's needs, which generally help maintain a satisfying relationship (Miller, Niehuis & Huston, 2006; Murray et al., 1996). Thus, romantic partners may see each other's behaviors in a biased

manner, and such biased perceptions may have evolved because they function to maintain a satisfying relationship.

To date, there has been no research that has uncovered how accurately or biased relational sacrifices are perceived, while this may greatly impact the consequences of sacrifice. Sacrifice behavior may be difficult to “read” due to ambivalent feelings that this behavior may bring about. Sacrificers may experience positive feelings as they benefit the relationship and may feel pride for what they have done. At the same time, they may also experience negative feelings such as feeling disappointed, let down, and not being able to attend to one’s own preferences (Righetti & Impett, 2017). Moreover, the decision to sacrifice, and the actual sacrificial behavior, may easily escape the perceiver’s eye as sacrificers may privately weigh the costs and benefits their sacrifice may bring. They may passively give up something they had actually wanted, and their sacrifice could be construed as normative behavior in the relationship that is not necessarily a departure from self-interest. At times though, partners may explicitly express their sacrifices to make sure that their partner appreciates what they have done, and to show their investments in the relationship. Further, errors in perceiving partners’ sacrifices may also originate from perceivers’ motivation to see their partner’s relationship investments, as they strongly signal their commitment to the relationship (Van Lange et al., 1997). Thus, there may be various reasons why partners’ perceptions of each other may be colored and that may affect how likely they are to see each other’s sacrifices, and the importance of what they gave up.

Once a sacrifice is detected, perceivers will appraise their partner’s sacrifice not only on how intensely the partner experienced the sacrifice, such as the costs they incurred, but may also act as intuitive psychologists in understanding the reasons *why* their partner made the sacrifice. Perceivers may not only construe ideas about whether their partner’s decision to sacrifice seemed guided by an approach or avoidance orientation, but also the intentions that their partner’s behavior seems to reflect. These perceptions may in turn have important implications for the consequences of sacrifice, such as whether or not partners’ sacrifices are welcomed with gratitude.

### **The (Un)Grateful Perceiver**

Gratitude is a positive emotion that people experience when they benefit from another person’s good deeds, that are both valuable to them and costly to the benefactor

(McCullough, Kilpatrick, Emmons, & Larson, 2001; Tesser, Gatewood, & Driver, 1968). Feeling grateful is powerful in promoting receivers' well-being (for a review see Wood et al., 2010), and this social emotion is crucial for strengthening people's relationships (Algoe, 2012). Feeling grateful toward one's partner helps identifying them as a responsive relationship partner (Algoe, 2012), increases the quality and stability of the relationship (e.g., Algoe, Gable, & Maisel, 2010; Gordon, Impett, Kogan, Oveis, & Keltner, 2012), and promotes further relationship maintenance behaviors in the grateful perceiver (Kubacka, Finkenauer, Rusbult, & Keijsers, 2011). Ultimately, these perceptions of partners' good deeds, the gratitude this may bring, and further pro-relational behavior in the receiver could instigate an upward cycle of positive perceptions and behaviors which strengthen commitment and trust in the relationship (Wieselquist, Rusbult, Foster, & Agnew, 1999).

Given these positive individual and relational consequences of feeling grateful, and the potential for strengthening the quality of the relationship, it is surprising how little is known about how people come to feel grateful in the first place, such as when their partner sacrifices their own self-interest. First, people may have to actually perceive their partner's costly investment, to "catch" the opportunity for feeling grateful to them, and this perception itself may be key to whether people feel grateful, regardless of whether their perception is accurate. In contrast, when perceivers do not detect their partner's sacrifice, they miss the opportunity to capitalize on their partner's investment with gratitude, and their partner may be left feeling unappreciated for what they gave up. Second, once a sacrifice is perceived, the intentions that people ascribe to why their partner sacrifices may greatly affect when they are most likely to feel grateful. Previous research indicates that gratitude is most likely to be elicited when the benefactor's behavior seems to be largely driven by benevolent, sincere, and altruistic intentions (Tesser et al., 1968; Tsang, 2006). Thus, it may be key to perceive one's partner's intentions for sacrifice as focused on benefitting the receiver specifically, and free from self-interest.

## **Overview of the Present Dissertation**

Research on sacrifice in relationships is young, and there is still much to uncover. Our aim is to advance the study of sacrifice from a dyadic perspective. First, we investigated how couples navigate the inevitable dilemmas between pursuing one's own personal needs and investing in the relationship. We examined the importance of

experiencing a healthy balance, and the ability to achieve and maintain such balance, which ultimately may have implications for the decision to sacrifice. Next, from a dyadic perspective, we investigated perceivers' appraisals of their partner's sacrifices. We aimed to uncover the level of accuracy and bias with which romantic partners perceive each other's sacrifices, that is how well they detect them, how costly they perceive their partner to experience them, and the intentions they attribute to their partners' sacrifices. Last, we investigated the consequences of perceiving one's partner to have sacrificed, and the specific intentions that seemed to drive their decision to sacrifice in promoting gratitude, or the absence thereof.

To investigate couples' daily experiences and perceptions of sacrifice, we used bi-hourly or daily experience sampling, which brings unique insights into these phenomena as they occur in couples daily, natural environments (Bolger, Davis, & Rafaeli, 2003). We also examined conversations in which couples conversed about important sacrifices in a controlled laboratory setting. Moreover, in all chapters we replicate our findings and generalize them across different Western cultures including the Netherlands and the United States. In Chapter 5 we additionally provide experimental evidence that replicates the findings obtained from these ecologically valid methods. Last, we analyzed our questions with new and advanced statistical approaches. In Chapter 3 we used a quasi-signal detection paradigm, that allows us to directly compare both partners' reports on whether a sacrifice occurred and whether it was detected. In Chapter 5 we used Truth and Bias modeling, that allows us to simultaneously model accuracy and bias when perceiving partners' costs for sacrifice benchmarked to the partner's report of their sacrifice. These methods reveal valuable and nuanced insights into partners' perceptions of each other's sacrifices, as they provide us with both partners' reports on the same events in the relationship, that are drawn from actual interactions in their daily lives.

### **Summary of the Empirical Chapters**

In Chapter 2 we focused on the inevitable challenge romantic couples face in attending to both their personal and relational needs. We challenged the idea that greater dedication to the relationship unequivocally benefits partners and their relationships, and we investigated the role of self-control in promoting personal-relational balance. In two studies, using daily experience sampling and laboratory assessments, we investigated romantic partners' dedication to both their personal and relational concerns in their daily



lives. Furthermore, we examined how balance or imbalance impacts people's personal and relational well-being. We examined the role of self-control as a key factor in sustaining a healthy personal-relational balance. We hypothesized that self-control should promote romantic partners' experience of personal-relational balance, and prevent imbalance, and in doing so should ultimately promote the well-being of individuals and their relationships.

The detection of one's romantic partner's sacrificial acts is the central topic of Chapter 3. *When* people decide to give up their own self-interest and sacrifice for the relationship, their partner may or may not be aware of their costly relationship investments. Thus, opportunities to trigger feelings of gratitude—which are essential to the well-being and stability of relationships—may or may not be utilized. Just as intriguingly, people may “see” a partner's sacrifice when the partner declares none, but gratitude may be triggered nevertheless. In two daily experience studies, we first explored how well people detect their partners' day-to-day sacrifices. Using a quasi-signal detection paradigm, we could directly map both partners' reports of each other's sacrifices onto each other, examining when people accurately see their partner's sacrifices (i.e., hit), miss them (i.e., miss), or overclaim such acts (i.e., false alarm). Next, we investigated the consequences of (in)accurately “seeing”, or failing to see partners' sacrifices for eliciting gratitude in perceivers. Furthermore, we investigated the impact on sacrificers' relationship satisfaction when their sacrifice is welcomed with gratitude or when they are left feeling unappreciated for what they have done.

In Chapter 4 we investigated more closely how gratitude emerges in response to perceiving a romantic partner's sacrifice, by focusing on people's perceptions of *why* their partner sacrificed. We tackled an important, but under emphasized question by investigating what intentions people ascribe to their partner for making a sacrifice, and how these perceived motives shape people's feelings of gratitude for their partner. Given the importance of genuine and altruistic intentions in eliciting gratitude, we distinguished perceived partner sacrifice motives by the level of self-interest (vs. altruistic intentions) that seems involved, resulting in partners' motives to reflect a focus on the self, the relationship, or the receiving partner. Further, given the general benefits of approach (i.e., to bring about positive outcomes) as opposed to avoidance motives for sacrifice (i.e., averting negative outcomes), these perceived motives were further distinguished into whether they seem guided by an approach or avoidance orientation, thus resulting in six

perceived partner sacrifice motives (partner-focused approach or avoidance, relationship-focused approach or avoidance, and self-focused approach or avoidance). In two daily experience studies and a couple's conversation in the laboratory, we examined the unique contributions of each of these perceived motives for gratitude to emerge, and the role of perceived partner responsiveness. Specifically, partner-focused approach motives (i.e., to promote the partner's well-being) should reflect the sacrificer's intentions as most free from self-interest and thus should be the prime candidate for eliciting gratitude, as these motives signal that the partner is responsive to one's needs.

Last, in Chapter 5, we investigated romantic partners' perceptions of the inherent costs that their partner incurs when they give up their own self-interest. Surely, sacrifices also bring benefits to both partners (especially in the long term), and sacrificers likely have weighed the costs and benefits when deciding to sacrifice. However, given that there is often ambiguity about the extent to which a sacrifice is beneficial or costly for the person who sacrifices, and the costs for sacrifice are often experienced privately, there can be considerable room for perceivers to evaluate partners' costs in a biased manner. To test the direction of this bias, we conducted a multimethod dyadic study using bi-hourly and daily experience sampling and a couple's conversation in the laboratory, and replicated findings with an experimental study. We set out to examine competing hypotheses as to whether people *underperceive* partners' costs for sacrifice (e.g., to reduce cognitive dissonance arising from seeing these costs and to maintain a rosy image of the relationship), or *overperceive* these costs (e.g., driven by the motivation to capitalize on partners' investments in the relationship rather than missing the importance of what they did). Using Truth and Bias modeling, we disentangled the extent which people accurately track their partner's costs, and at the same, whether they do so in a biased manner by either under- or overperceiving these costs.

The remainder of the dissertation consists of four empirical chapters, and a final chapter in which the key findings, their implications, and directions for future research are discussed. Each empirical chapter reflects an independent research article that is published in a peer-reviewed academic journal, or is currently submitted for publication.



## CHAPTER 2

### Me or Us? Self-Control Promotes a Healthy Balance between Personal and Relationship Concerns

This Chapter is based on Visserman, M. L., Righetti, F., Kumashiro, M., & Van Lange, P. A. M. (2017). Me or Us? Self-control promotes a healthy balance between personal and relationship concerns. *Social Psychological and Personality Science*, 88, 55-65.



## Abstract

Although romantic partners strive to achieve an optimal balance in fulfilling both personal and relational concerns, they are inevitably challenged by how much time and effort they can dedicate to both concerns. In the present work, we examined the role of self-control in successfully maintaining personal-relational balance, through promoting balance and preventing personal and relational imbalance (overdedication to personal or relational concerns, respectively). We conducted two studies among romantic couples (total  $N = 555$ ), using questionnaires and diary procedures to assess everyday experiences of personal-relational balance and imbalance. Both studies consistently showed that self-control promotes personal-relational balance. Moreover, findings partly supported our hypothesis that self-control prevents personal and relational imbalance (Study 2). Finally, findings also revealed that maintaining personal-relational balance is one of the mechanisms by which self-control can promote personal and relationship well-being. Implications of the present findings and avenues for future research are discussed.

*Keywords:* Romantic relationships, self-control, personal-relational balance, personal well-being, relationship well-being



Pro-relationship behaviors, such as sacrificing one's own interests and accommodating a partner's transgressions promote the stability, vitality, and ultimately the longevity of a romantic relationship (e.g., Rusbult, Verette, Whitney, Slovik, & Lipkus, 1991; Van Lange et al., 1997). Clearly, this is an important insight, because relationships are a substantial source of people's well-being (e.g., Kamp Dush & Amato, 2005; Kiecolt-Glaser & Newton, 2001). But is it really true that higher levels of pro-relational dedication unequivocally promote the well-being of a relationship, and consequently, one's own well-being? Some previous studies suggest that there is something as "too much" relationship dedication, such as when people are too forgiving (Luchies, Finkel, McNulty, & Kumashiro, 2010), immerse themselves too much in the relationship (Helgeson & Fritz, 1998), or silence their own opinions (Harper & Welsh, 2007), illustrating that relationship dedication can at times come at the expense of one's own needs. Similarly, people can immerse themselves too much in their personal goals and needs, at the expense of their relationship. Instead of (overly) dedicating to the relationship—or to personal goals—we argue that key to personal and relationship well-being lies in successfully balancing dedication to personal and relational concerns.

Our theoretical perspective focuses on two propositions. First, we propose that people are driven by strong motives to satisfy both sets of goals and needs (Deci & Ryan, 2000) but that successfully maintaining personal-relational balance can be challenging, given the limited amount of time and energy that are available to invest in both concerns (Kumashiro, Rusbult, & Finkel, 2008). Moreover, individuals may differ in their ability to achieve such balance on a regular basis. In the present work, we propose self-control as a key factor that enables people to sustain the balance between personal and relational concerns. Second, we propose that the ability to successfully maintain personal-relational balance is one of the reasons why self-control promotes personal and relational well-being (e.g., Hofmann, Luhmann, Fisher, Vohs, & Baumeister, 2014; Vohs, Finkenauer, & Baumeister, 2011).

### **Personal-relational balance**

The optimal level of balance<sup>1</sup> between personal and relational concerns can vary across people. Some individuals may place more importance on personal concerns (e.g., having a successful career), while others prefer to spend time and energy on their relational concerns (Kumashiro et al., 2008). In either case, individuals are likely to face



situations of imbalance in their preferred dedication to either set of concerns. Personal imbalance results from a subjective feeling that the individual is overdedicating to personal concerns at the expense of relational concerns. For example, people may feel that they are spending too much time and effort on their own goals and are neglecting their partner. Relational imbalance results from a subjective feeling that the individual is overly dedicating to relational concerns at the expense of personal concerns. This might occur when people feel that they are giving too much to the relationship (e.g., spending too much time with their partner, accommodating, sacrificing or forgiving too much) and are neglecting their personal goals and needs. In contrast, personal-relational balance occurs when an individual feels right about the amount of time and resources that (s)he is dedicating to both personal and relational concerns (Kumashiro et al., 2008). Importantly, these perceptions may be independent from the actual time, effort and resources that are spent toward relational or personal goals.

Previous research has shown that experiencing imbalance over time—whether at the costs of personal or relational concerns—has detrimental consequences for one’s personal well-being and one’s relationship (Kumashiro et al., 2008). In contrast, maintaining an optimal personal-relational balance is associated with high levels of both personal and relationship well-being (Kumashiro et al., 2008; Patrick, Knee, Canevello, & Lonsbary, 2007). However, achieving and maintaining an optimal personal-relational balance can be challenging: relationship partners can find themselves neglecting each other for a long time because of being overinvolved with their career’s goals, or partners can become overly dedicated to their relationship and neglect their hobbies or their career opportunities.

### **Self-control**

Given that individuals typically strongly desire to fulfill important needs and goals in both the personal and relational domains (Aron & Aron, 1986; Baumeister & Leary, 1995; Deci & Ryan, 2000), they are likely to hold a long-term goal of achieving personal-relational balance. In the present research, we propose that to successfully balance personal and relational concerns, people need to have the *ability* to maintain personal-relational balance and prevent personal and relational imbalance. Specifically, we argue that self-control provides such ability because self-control is the ability to direct thoughts, motivations, and behaviors in a goal-directed manner (Baumeister, Heatherton, & Tice,

1994). Self-control enables the inhibition of undesired responses, and promotes behaviors that are in accordance with one's (long-term) standards (Baumeister, Vohs, & Tice, 2007; Hofmann, Schmeichel, & Baddeley, 2012). Accordingly, self-control may help individuals to achieve personal-relational balance (i.e., their preferred level of dedication to both concerns) and to maintain it.

Specifically, self-control enables individuals to inhibit behaviors that may lead to divergence from balance (e.g., preventing overinvestment in either domain). Consistent with this idea, previous research has shown that self-control enables people to manage their competing motivations in such a way that people experience less goal conflict and greater fulfillment of multiple goals in their daily life (Galla & Duckworth, 2015; Gillebaart & DeRidder, 2015; Hofmann et al., 2014). Moreover, self-control may promote behaviors that help regain the balance when it is lost (e.g., redirecting attention and effort to the neglected domain). Certain situations (e.g. high professional demands) and individual factors (e.g., communal orientation) may trigger impulses that tempt people to overinvest in one domain over the other. Self-control can provide the ability to change those behavioral impulses and redirect them to re-establish balance. Thus, high self-control individuals should be more likely to experience personal-relational balance and should be less prone to experience either personal or relational imbalance.

There is growing evidence that self-control provides the ability to inhibit selfish impulses and behave in a pro-relationship manner instead (Pronk & Righetti, 2015; Karremans, Pronk, Van der Wal, 2015). For example, self-control fosters derogation of attractive alternative partners (Pronk, Karremans, & Wigboldus, 2011; Ritter, Karremans, & Van Schie, 2010), constructive responses to destructive partner behaviors (Finkel & Campbell, 2001), forgiveness in the face of a partner's transgressions (Pronk, Karremans, Overbeek, Vermulst, & Wigboldus, 2010; Burnette, Davisson, Finkel, Van Tongeren, Hui, & Hoyle, 2014), and some forms of sacrifice for the partner or relationship (Findley, Carvallo, & Bartak, 2014; Pronk & Karremans, 2014). However, although self-control provides the ability to behave in the interest of one's relationship, it does not necessarily need to be used as such. Given that self-control is a global ability that enables the self to bring its responses in line with one's standards (Baumeister et al., 2007), we argue that self-control may also promote self-interested behaviors when necessary. Consistent with this idea, researchers found that although self-control helps people to achieve their personal goals, it is not necessarily used to benefit close others (Cortes,

Kammrath, Scholer, & Peetz, 2014). Moreover, Righetti, Finkenauer, and Finkel (2013) found that in communal relationships, self-control reduces sacrificing one's own needs, to avoid neglecting personal concerns. Finally, Kammrath et al. (2015) found that self-control reduces communal actions toward one's partner in established relationships.

In the present work, for the first time, we propose that instead of self-control actively promoting either pro-relationship or pro-self behaviors, self-control may be used in the challenging task of trying to control one's optimal balance between personal and relational concerns. Self-control may provide the ability to bring thoughts, motivations, and behaviors in line with one's desired level of balance, and thus, we expect self-control to be positively related to experiencing personal-relational balance and negatively related to experiencing imbalance (i.e., overdedication to either personal or relational concerns). Moreover, extending our main focus to also consider broader outcomes on well-being, we propose that the ability to balance personal and relational concerns may be one of the mechanisms by which self-control promotes personal and relationship well-being. This notion is rooted in research showing several benefits of self-control for personal and relationship well-being, including greater life satisfaction, psychological adjustment, relationship satisfaction, and dyadic adjustment (e.g., Hofmann et al., 2014; Tangney, Baumeister, & Boone, 2004; Vohs et al., 2011), as well as in research showing the benefits of personal-relational balance for personal and relationship well-being (Kumashiro et al., 2008). Thus, self-control may help achieve personal and relationship well-being in part due to being able to successfully balance personal and relationship concerns.

## **Research overview**

This article presents a novel model in which we propose that self-control plays an important role in regulating personal-relational balance, which in turn leads to higher levels of both personal and relational well-being. In two studies of romantic couples<sup>2</sup>, employing a daily diary procedure and laboratory assessments, we tested the hypothesis that self-control promotes personal-relational balance (i.e., experiencing higher levels of balance and lower levels of personal and relational imbalance). Furthermore, we tested whether personal-relational balance mediates associations between self-control and personal and relationship well-being.

## Study 2.1

Study 1, conducted among a Dutch sample of romantic couples, employed a diary procedure which allowed us to capture everyday experiences of romantic couples while minimizing memory bias. We examined whether self-control is positively associated with daily experiences of personal-relational balance and negatively associated with both personal and relational imbalance. Furthermore, we examined whether personal-relational balance and imbalance mediate the associations between self-control and personal and relationship well-being.

### Method

**Participants.** Participants were 125 heterosexual couples (and 1 individual) and 1 lesbian couple ( $N = 253$ ), residing in The Netherlands. Participants' mean age was 23.33 years ( $SD = 3.65$ ), and 64% were students. On average, couples were involved for 2.84 years ( $SD = 29.01$  months), and 35% lived together. The sample size was not specifically determined for the current research, because the data are derived from a larger project on romantic relationships. Originally, 130 couples participated, but one couple broke up before the diary procedure, and two couples and one individual did not follow instructions.

**Measures and procedure.** First, self-control was assessed during a laboratory session, using the 11-item Tangney self-control questionnaire (Tangney et al., 2004; "I have a hard time breaking habits";  $\alpha = .76$ ), scaled from 1 (*do not agree at all*) to 7 (*agree completely*). Additionally, the Stroop color-word task (Stroop, 1935) assessed response inhibition (an important aspect of self-control; e.g., Hofmann et al., 2012)<sup>3</sup>. In this task, participants indicated the color in which color-words were presented, which was either congruent or incongruent with the meaning of the color-words. Response latencies for congruent trials were subtracted from incongruent trial latencies, with higher latencies reflecting higher Stroop interference. At the end of the laboratory session, participants were instructed to start the 8-day diary procedure (using SurveySignal; Hofmann & Patel, 2015). In general, participants responded to 87.6% of the daily surveys ( $M = 7.35$  out of 8 days). All items in the diary procedure were scaled from 0 (*not at all*) to 6 (*very much*), and were assessed with one item each to minimize participant fatigue and attrition (Bolger, Davis, & Rafaeli, 2003).

During the laboratory session, participants were instructed with a PowerPoint presentation on the definition of personal-relational balance and imbalance. Personal-relational balance was explained as an overall feeling of satisfying both personal and relational goals and needs. Participants were instructed to indicate for each day of the diary procedure to which extent they felt like their personal and relational concerns were balanced (“My personal and relational needs were optimally balanced”). To assess personal imbalance, participants were asked to indicate to which extent they felt like they had been too immersed in personal goals and needs, at the expense of their relational concerns (“I mainly focused on my personal needs, at the expense of my relational needs”), and to assess relational imbalance, they were asked to indicate whether they felt like they were too immersed in relationship goals and needs, at the expense of their personal concerns (“I mainly focused on my relational needs, at the expense of my personal needs”).<sup>4</sup> Life satisfaction (“My life is close to ideal”) and stress (“I feel stressed”) indicated personal well-being, and relationship satisfaction (“I feel satisfied with our relationship”) indicated relationship well-being. See *Supplemental Materials 2.1* for descriptive statistics and correlations between all variables.

## **Results**

Multilevel-modeling, using random intercepts and fixed slopes, was used to take into account the occurrence of multiple measurement occasions (level 1) within participants (level 2) and the nesting of participants within couples (level 3; Raudenbush & Bryk, 2002). This allowed us to examine individual differences while taking into account the within-person variability throughout the diary procedure (Bolger, Davis, & Rafaeli, 2003). Personal-relational balance, personal imbalance, and relational imbalance (level 1 variables) were each separately regressed onto self-reported self-control and Stroop interference (level 2 variables). Participants’ sex did not reliably moderate the effects; therefore dyads were treated as indistinguishable (Kenny, Kashy, & Cook, 2006). To test for mediation, we used the Monte Carlo Method for Assessing Mediation (MCMAM), using unstandardized estimates. This simulation method shows 95% confidence intervals for the indirect effects using 20,000 simulations (Selig & Preacher, 2008).<sup>5</sup>

Results of separate multilevel modeling analyses revealed that self-control and Stroop interference were significantly associated with personal-relational balance. However, neither self-control nor Stroop interference were significantly associated with personal and relational imbalance.<sup>6</sup> See Table 1 for the main associations of self-control and Stroop interference with personal-relational balance and imbalance.

Table 1.

*Associations of self-control and Stroop interference with personal-relational balance, personal imbalance, and relational imbalance (Study 1)*

<b>Self-control</b>	$\beta$	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Self-control					
<i>Personal-relational balance</i>	.11	.002, .22	222	1.99	.048
<i>Personal imbalance</i>	-.05	-.17, .08	237	-0.73	.466
<i>Relational imbalance</i>	.001	-.12, .12	243	0.02	.983
Stroop interference					
<i>Personal-relational balance</i>	-.14	-.25, -.03	233	-2.41	.017
<i>Personal imbalance</i>	.04	-.08, .16	244	0.61	.540
<i>Relational imbalance</i>	.03	-.09, .15	248	0.48	.630

*Note.* Higher Stroop interference indicating lower response inhibition.

Furthermore, self-control significantly predicted higher life satisfaction and lower stress, and personal-relational balance reliably mediated the associations between self-control and life satisfaction and stress, although these indirect effects were relatively small in magnitude. However, relationship satisfaction was not significantly predicted by self-control ( $p = .424$ ). Finally, Stroop interference was not significantly associated with life satisfaction ( $p = .952$ ), stress ( $p = .933$ ), and relationship satisfaction ( $p = .310$ ). See Table 2 for the associations between self-control and life satisfaction and stress. Also, see *Supplemental Materials 2.2* for all direct associations of personal-relational balance, personal imbalance, and relational imbalance with well-being.

Table 2.

*Associations of self-control with life satisfaction and stress (Study 1)*

<b>Well-being</b>	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Life Satisfaction						
<i>Personal-relational balance</i>	.12	.02	.09, .15	1742	7.81	<.001
Self-control <i>Total effect</i>	.23	.06	.11, .36	215	3.78	<.001
<i>Direct effect</i>	.22	.06	.10, .34	213	3.71	<.001
<i>Indirect effect</i>			[.001, .03]			
Stress						
<i>Personal-relational balance</i>	-.09	.02	-.13, -.05	1822	-4.57	<.001
Self-control <i>Total effect</i>	-.12	.06	-.24, -.004	219	-2.02	.045
<i>Direct effect</i>	-.11	.06	-.23, .005	219	-1.88	.061
<i>Indirect effect</i>			[-.02, -.0004]			

*Note.* All results are obtained from mediation analyses, using unstandardized estimates. Numbers between brackets are 95% confidence intervals using the MCMAM to test the indirect effects of self-control on life satisfaction and stress mediated by personal-relational balance.

## Study 2.2

Study 1 provided novel support for our hypothesis that self-control promotes personal-relational balance in daily life, which was additionally supported by Stroop interference, which may be regarded as a behavioral measurement of self-control. Also, the findings were largely consistent with the hypothesized mediation model, in which personal-relational balance may be one of the mechanisms by which self-control may affect personal well-being. However, Study 1 did not reveal a significant association between self-control and relationship well-being nor significant associations between self-control and personal and relational imbalance. Given that perceptions of imbalance may not occur on a daily basis, Study 2 examined general levels of personal-relational balance and imbalance across a wider timeframe.

## Method

**Participants.** Participants were 149 romantic couples (145 heterosexual, 4 lesbian), and 4 individuals (whose partners did not respond;  $N = 302$ ), residing in the USA. The data were taken from Time 1, 2, and 4 of a five-wave longitudinal study (separated by 6 months between each wave), in which measures relevant to this study were assessed. At 30

Time 2, when the dependent variables were first assessed, participants' mean age was 25.83 years ( $SD = 4.41$ ), and 46% were students. On average, couples were involved for 3.79 years ( $SD = 25.81$  months), 74% were engaged or married, and 95% lived together. The sample size was determined as in Study 1. Originally, 159 couples (and 4 individuals) participated at Time 2, but ten couples did not complete Time 1's self-control assessment.

**Measures and procedure.** Self-control was measured during a laboratory session at Time 1, using the same scale as in Study 1 (Tangney et al., 2004;  $\alpha = .77$ ), scaled from 0 (*do not agree at all*) to 8 (*agree completely*). At Time 2 and 4, participants received questionnaires by mail, which assessed personal-relational balance and imbalance (Kumashiro et al., 2008) and personal and relationship well-being.

Participants' general levels of personal-relational balance and imbalance were assessed (0 = *do not agree at all*; 8 = *agree completely*), with two items assessing personal-relational balance (e.g., "I make both my relational needs and personal needs a major priority in life"; Time 2 and 4  $\alpha$ s = .83 and .78), four items assessing personal imbalance (e.g., "I dedicate almost all of my time and resources to my personal needs and interests", and "I tend to neglect my relational needs and interests"; Time 2 and 4  $\alpha$ s = .78 and .78), and three items assessing relational imbalance (e.g., "I tend to make my relationship too much of a priority in my life", and "I tend to neglect my personal needs and interests"; Time 2 and 4  $\alpha$ s = .80 and .83).<sup>7</sup>

Furthermore, personal well-being was measured with life satisfaction, subjective well-being, and psychological adjustment. Life satisfaction was assessed using the 5-item life satisfaction scale (Diener, Emmons, Larsen, & Griffin, 1985; e.g., "I am satisfied with my life"; Time 2 and 4  $\alpha$ s = .89 and .90), scaled from 0 (*do not agree at all*) to 8 (*agree completely*). Subjective well-being was assessed by asking participants to describe their life using ten items, on a 9-point scale with two anchors (e.g., boring-interesting; enjoyable-miserable, reverse coded; Campbell, Converse, & Rodgers, 1976; Time 2 and 4  $\alpha$ s = .86 and .85). Psychological adjustment was measured with a composite score of the 'depression' and 'anxiety' scales of the Brief Symptom Inventory (Derogatis, 1993), assessing the prevalence of psychological problems (0 = *bothered me not at all*; 8 = *bothered me extremely*; Time 2 and 4  $\alpha$ s = .94 and .95). Scores were reversed so that higher scores reflected better psychological adjustment.



Relationship well-being was measured using the 30-item Dyadic Adjustment Scale (DAS; Spanier, 1976), providing a general indication of couple functioning (e.g., “How often do you think things are going well between you and your partner?”), answered on a 6-point scale (1 = *never*; 6 = *all the time*; Time 2 and 4 *as* = .90 and .91). A sum score was used in the analyses. Furthermore, the 10-item relationship satisfaction subscale of the DAS measured relationship satisfaction. For example, participants indicated the degree of happiness in their relationship (1 = *extremely unhappy*; 7 = *perfect*; Time 2 and 4 *as* = .81 and .85). See *Supplemental Materials 2.1* for descriptive statistics and correlations between all variables.

## Results

As in Study 1, multilevel-models with random intercepts and fixed slopes were used to take into account the occurrence of multiple measurement occasions within participants and the nesting of participants within couples (Raudenbush & Bryk, 2002), allowing us to examine individual differences while taking into account within-person variability throughout two measurement waves (Time 2 and 4). Personal-relational balance, personal imbalance, and relational imbalance were each separately regressed onto trait self-control. Furthermore, we performed lagged analyses to examine whether earlier assessment of self-control (Time 1) would continue to predict later assessment of personal-relational balance and imbalance (Time 4), while controlling for the criterion level of personal-relational balance and imbalance in the previous year (Time 2).

Results from concurrent analyses revealed that self-control was positively associated with personal-relational balance, and negatively associated with personal and relational imbalance.<sup>8</sup> Furthermore, lagged analyses showed a significant positive association between earlier self-control and later personal-relational balance, while controlling for earlier personal-relational balance. However, we did not find significant associations between earlier self-control and later personal imbalance and relational imbalance.<sup>9</sup> See Tables 3 and 4 for the concurrent and lagged associations of self-control with personal-relational balance, personal imbalance, and relational imbalance.

Table 3.

*Concurrent associations of self-control with personal-relational balance, personal imbalance, and relational imbalance (Study 2)*

<b>Self-Control</b>	$\beta$	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Self-control					
<i>Personal-relational balance</i>	.38	.24, .52	285	5.39	<.001
<i>Personal imbalance</i>	-.21	-.35, -.07	289	-2.88	.004
<i>Relational imbalance</i>	-.27	-.45, -.09	296	-3.02	.003

Table 4.

*Lagged associations of self-control with personal-relational balance, personal imbalance, and relational imbalance (Study 2)*

<b>Lagged Associations</b>	$\beta$	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Later personal-relational balance from					
<i>Earlier personal-relational balance</i>	.46	.27, .62	204	4.68	<.001
<i>Self-control</i>	.22	.03, .41	215	2.24	.026
Later personal imbalance from					
<i>Earlier personal imbalance</i>	.82	.65, .99	213	9.47	<.001
<i>Self-control</i>	-.01	-.18, .15	211	-0.14	.886
Later relational imbalance from					
<i>Earlier relational imbalance</i>	.84	.64, 1.04	200	8.18	<.001
<i>Self-control</i>	-.04	-.25, .16	210	-0.43	.669

*Note.* Associations of self-control with later personal-relational balance and later imbalance are obtained from lagged analyses, in which later (Time 4) personal-relational balance and imbalance were regressed onto earlier self-control (Time 1) while controlling for earlier (Time 2) balance and imbalance.

Furthermore, as shown in Tables 5a to 5e, results of separate concurrent multilevel modeling analyses showed that self-control predicted higher life satisfaction, subjective well-being, psychological adjustment, dyadic adjustment, and relationship satisfaction. Moreover, separate tests of indirect effects showed that personal-relational balance, personal imbalance, and relational imbalance all reliably mediated the associations between self-control and all well-being indicators, although these indirect effects were relatively small in magnitude. See *Supplemental Materials 2.2* for all direct associations of personal-relational balance, personal imbalance, and relational imbalance with well-being.

Table 5a.  
*Associations between self-control and life satisfaction (Study 2)*

<b>Life satisfaction</b>	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Personal-relational balance	.28	.04	.21, .35	454	7.96	<.001
Self-control <i>Total effect</i>	.35	.06	.23, .46	252	5.92	<.001
<i>Direct effect</i>	.26	.06	.16, .37	254	4.79	<.001
<i>Indirect effect</i>			[.05, .13]			
Personal imbalance	-.121	.04	-.20, -.04	465	-2.92	.004
Self-control <i>Total effect</i>	.35	.06	.23, .46	252	5.92	<.001
<i>Direct effect</i>	.32	.06	.21, .44	248	5.50	<.001
<i>Indirect effect</i>			[.004, .04]			
Relational imbalance	-.15	.03	-.22, -.09	471	4.90	<.001
Self-control <i>Total effect</i>	.35	.06	.23, .46	252	5.92	<.001
<i>Direct effect</i>	.31	.06	.20, .42	246	5.36	<.001
<i>Indirect effect</i>			[.01, .06]			

*Note.* All results are obtained from mediation analyses, using unstandardized estimates. Numbers between brackets are 95% confidence intervals using the MCMAM to test the indirect effect of self-control on life satisfaction mediated by personal-relational balance and imbalance.

Table 5b.

*Associations between self-control and subjective well-being (Study 2)*

<b>Subjective well-being</b>	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Personal-relational balance	.27	.03	.22, .33	485	9.46	<.001
Self-control <i>Total effect</i>	.22	.05	.13, .32	289	4.64	<.001
<i>Direct effect</i>	.14	.04	.05, .23	299	3.18	.002
<i>Indirect effect</i>			[.05, .13]			
Personal imbalance	-.15	.04	-.22, -.08	502	4.27	<.001
Self-control <i>Total effect</i>	.22	.05	.13, .32	289	4.64	<.001
<i>Direct effect</i>	.21	.05	.12, .30	294	4.35	<.001
<i>Indirect effect</i>			[.01, .05]			
Relational imbalance	-.17	.03	-.23, -.12	504	6.69	<.001
Self-control <i>Total effect</i>	.22	.05	.13, .32	289	4.64	<.001
<i>Direct effect</i>	.19	.05	.09, .28	289	4.01	<.001
<i>Indirect effect</i>			[.01, .07]			

*Note.* All results are obtained from mediation analyses, using unstandardized estimates. Numbers between brackets are 95% confidence intervals using the MCMAM to test the indirect effect of self-control on subjective well-being mediated by personal-relational balance and imbalance.

Table 5c.

*Associations between self-control and psychological adjustment (Study 2)*

<b>Psychological adjustment</b>	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Personal-relational balance	.19	.03	.12, .25	478	5.59	<.001
Self-control <i>Total effect</i>	.39	.05	.28, .49	290	7.15	<.001
<i>Direct effect</i>	.33	.05	.23, .44	292	6.31	<.001
<i>Indirect effect</i>			[.03, .09]			
Personal imbalance	-.13	.04	-.21, -.05	498	-3.34	<.001
Self-control <i>Total effect</i>	.39	.05	.28, .49	290	7.15	<.001
<i>Direct effect</i>	.37	.05	.26, .47	285	6.91	<.001
<i>Indirect effect</i>			[.01, .05]			
Relational imbalance	-.20	.03	-.26, -.15	500	-7.03	<.001
Self-control <i>Total effect</i>	.39	.05	.28, .49	290	7.15	<.001
<i>Direct effect</i>	.34	.05	.24, .44	283	6.61	<.001
<i>Indirect effect</i>			[.02, .08]			

*Note.* All results are obtained from mediation analyses, using unstandardized estimates. Numbers between brackets are 95% confidence intervals using the MCMAM to test the indirect effect of self-control on psychological adjustment mediated by personal-relational balance and imbalance.

Table 5d.

*Associations between self-control and dyadic adjustment (Study 2)*

<b>Dyadic adjustment</b>	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Personal-relational balance	2.32	.30	1.73, 2.91	467	7.82	<.001
Self-control <i>Total effect</i>	2.08	.46	1.16, 2.99	227	4.48	<.001
<i>Direct effect</i>	1.43	.45	.54, 2.31	244	3.16	.002
<i>Indirect effect</i>			[.43, 1.08]			
Personal imbalance	-2.39	.33	-3.04, -1.73	432	-7.22	<.001
Self-control <i>Total effect</i>	2.08	.46	1.16, 2.99	227	4.48	<.001
<i>Direct effect</i>	1.68	.43	.82, 2.53	229	3.86	<.001
<i>Indirect effect</i>			[.12, .72]			
Relational imbalance	-.74	.27	-1.27, -.22	462	-2.79	.006
Self-control <i>Total effect</i>	2.08	.46	1.16, 2.99	227	4.48	<.001
<i>Direct effect</i>	1.80	.46	.90, 2.70	218	3.95	<.001
<i>Indirect effect</i>			[.03, .36]			

*Note.* All results are obtained from mediation analyses, using unstandardized estimates. Numbers between brackets are 95% confidence intervals using the MCMAM to test the indirect effect of self-control on dyadic adjustment mediated by personal-relational balance and imbalance.

Table 5e.

*Associations between self-control and relationship satisfaction (Study 2)*

<b>Relationship satisfaction</b>	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Personal-relational balance	.08	.01	.06, .10	442	8.19	<.001
Self-control <i>Total effect</i>	.04	.02	.01, .08	238	2.71	.007
<i>Direct effect</i>	.02	.02	.01, .05	230	1.37	.173
<i>Indirect effect</i>			[.02, .04]			
Personal imbalance	-.09	.01	-.11, -.07	411	-8.22	<.001
Self-control <i>Total effect</i>	.04	.02	.01, .08	238	2.71	.007
<i>Direct effect</i>	.03	.02	.001, .06	218	2.02	.045
<i>Indirect effect</i>			[.01, .03]			
Relational imbalance	-.03	.01	-.05, -.02	446	-3.74	<.001
Self-control <i>Total effect</i>	.04	.02	.01, .08	238	2.71	.007
<i>Direct effect</i>	.03	.02	.002, .07	220	2.13	.035
<i>Indirect effect</i>			[.002, .02]			

*Note.* All results are obtained from mediation analyses, using unstandardized estimates. Numbers between brackets are 95% confidence intervals using the MCMAM to test the indirect effect of self-control on relationship satisfaction mediated by personal-relational balance and imbalance.

Table 5f.

*Lagged associations between self-control and all well-being indicators (Study 2)*

<b>Well-being</b>	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Life satisfaction						
Later personal-relational balance	.27	.05	.17, .37	210	5.38	<.001
Self-control <i>Total effect</i>	.20	.06	.08, .32	216	3.30	.001
<i>Direct effect</i>	.14	.06	.02, .26	212	2.40	.017
<i>Indirect effect</i>			[.01, .10]			
Subjective well-being						
Later personal-relational balance	.27	.04	.19, .35	212	6.10	<.001
Self-control <i>Total effect</i>	.06	.05	-.04, .16	209	1.15	.250
<i>Direct effect</i>	.01	.05	-.09, .11	212	0.28	.782
<i>Indirect effect</i>			[.01, .10]			
Psychological adjustment						
Later personal-relational balance	.22	.05	.12, .32	214	4.52	<.001
Self-control <i>Total effect</i>	.19	.06	.07, .31	214	3.17	.002
<i>Direct effect</i>	.15	.06	.03, .27	213	2.56	.011
<i>Indirect effect</i>			[.005, .08]			
Dyadic adjustment						
Later personal-relational balance	1.97	.42	1.14, 2.80	209	4.73	<.001
Self-control <i>Total effect</i>	.83	.47	-.10, 1.76	194	1.74	.083
<i>Direct effect</i>	.67	.48	-.28, 1.62	204	1.39	.166
<i>Indirect effect</i>			[.04, .73]			
Relationship satisfaction						
Later personal-relational balance	.06	.01	.03, .08	195	4.08	<.001
Self-control <i>Total effect</i>	.02	.02	-.01, .06	185	1.49	.139
<i>Direct effect</i>	.02	.02	-.01, .05	187	1.03	.305
<i>Indirect effect</i>			[.001, .02]			

*Note.* Total effects are obtained from analyses in which self-control predicted each of the well-being indicators one year later (Time 4), while controlling for earlier (Time 2) well-being. All other estimates are obtained from lagged mediation analyses, in which self-control predicted later well-being, while controlling for later personal-relational balance (the mediator), earlier personal-relational balance, and earlier well-being. Estimates are unstandardized, and numbers between brackets are 95% confidence intervals using the MCMAM to test the indirect effect of self-control on later well-being mediated by later personal-relational balance.

Moreover, as shown in Table 5f, results from separate lagged multilevel modeling analyses provided support for lagged indirect effects of self-control on each of the well-being indicators one year later, through later levels of personal-relational balance, controlling for earlier personal-relational balance and earlier well-being. Although some total effects of self-control on later well-being were marginally significant (dyadic adjustment) or non-significant (subjective well-being, relationship satisfaction), later personal-relational balance reliably mediated associations of self-control with all later well-being indicators; though note that most of the indirect effects were relatively small in magnitude.

### **General Discussion**

With the present research, we challenged the predominant focus in the literature on the role of self-control in promoting mainly pro-relationship behaviors (e.g., Finkel & Campbell, 2001; Findley et al., 2014; Pronk & Karremans, 2014). Rather than focusing on self-control either promoting pro-relationship or pro-self dedication, our findings show that self-control promotes an optimal balance between personal and relationship concerns. Also, results partly supported our hypothesis that self-control prevents personal and relational imbalance (Study 2). Furthermore, we demonstrated that successfully maintaining personal-relational balance (Studies 1 and 2) and preventing personal and relational imbalance (Study 2) may be one of the mechanisms by which self-control can promote personal well-being (e.g., higher life satisfaction, psychological adjustment, and lower stress) and relationship well-being (e.g., better couple functioning and higher relationship satisfaction; except for Study 1). Thus, these findings show the importance of self-control in maintaining a healthy balance between personal and relational concerns, which in turn can promote personal and relationship well-being.

It was unexpected that self-control was not significantly associated with personal and relational imbalance in the daily diary study. We suggest the following possible explanations. One is that participants reported low levels of personal and relational imbalance on average (see *Supplemental Materials 2.1*), suggesting that in general participants did not experience problematic levels of imbalance, and thus there may have been less of a call for self-control. Another possibility is that efforts to repair personal or relational imbalance do not occur on a daily basis but over a longer period of time.

In Study 2, self-control was in fact associated with lower personal and relational imbalance, presumably because in this study measures of balance and imbalance were tapping into general tendencies in attending to personal and relational concerns across a wider time frame. Study 2 complemented Study 1 also by including more interdependent couples (e.g., 95% of Study 2's couples lived together vs. 35% in Study 1). Perhaps in more established relationships, partners are more likely to be concerned with maintaining personal-relational balance while being able to attend to both their personal and relational concerns. For example, partners may become even more reliant on self-control to prevent oneself from neglecting important personal goals and needs (Kammrath et al., 2015). A complementary possibility is that partners in highly interdependent relationships face more challenges: for example, demands from work may be more intense or the division of household chores more of an issue. Clearly, self-control and personal-relational balance are key ingredients to healthy relationships and well-being among highly interdependent and increasingly interdependent relationships. Greater insight into how partners address their personal and relational concerns may help us understand what it takes from partners to maintain healthy relationships, and to maintain or promote their own well-being.

A strength of the present research is that results were replicated in two different countries, The Netherlands and the USA, providing some evidence for the generalizability of the findings across Western populations. Furthermore, we employed a diary procedure to capture daily experiences of romantic couples, providing valuable insight into romantic couples' experiences in their daily lives. Findings also revealed that self-control significantly predicted personal-relational balance over time (Study 2). While this is not a demonstration of causality, it is consistent with the idea that self-control could play an important role in shaping personal-relational balance over time. Future research could complement these findings by using experimental procedures to examine how self-control minimizes personal and relational imbalance, such as by examining balance restoration efforts after experiencing imbalance. Also, future research could seek to generalize the current findings to other types of interpersonal relationships (e.g., friendships, family relations).



Our research shows that balancing personal and relational concerns requires self-control; therefore, future research could explore how people can regulate this balance in ways that are less demanding of self-control. Also, as previous research has shown that self-control can be improved by extensive training (e.g., Baumeister, Gailliot, DeWall, & Oaten, 2006; Baumeister, Vohs, & Tice, 2007), therapists could make use of such training to increase people's ability to maintain a well-balanced life.

## **Conclusion**

Romantic partners are inevitably challenged by how much time and effort they can dedicate to both their personal and relationship concerns: two domains that are both driven by strong motives to fulfill goals and needs within these domains. The present research has challenged the predominant research focus on self-control in fostering efforts to behave pro-relationally. While most would agree that an extensive focus on personal interests poses a threat to relationships, there is also merit in the claim that there is something like “too much investment” in one's relationship. Although more research is needed, we close by concluding that self-control provides people with the ability to control a healthy balance between personal and relational interests and that this is one possible—and unrecognized—key to well-functioning relationships, as well as to well-functioning and happy people.

## Footnotes

<sup>1</sup> Previous work (Kumashiro et al., 2008) has used the term “(dis)equilibrium” to indicate (im)balance. Note that both labels refer to the same state.

<sup>2</sup> Data of Study 2 were partly used in Kumashiro et al. (2008), examining fluctuations in balance and accompanied well-being over time. The current research examined general levels of balance, and its relations to general levels of well-being, and importantly, the role of self-control in maintaining balance. Study 1 consists of newly collected data.

<sup>3</sup> Stroop interference and self-reported self-control were not significantly correlated ( $p > .250$ ). This is consistent with Toplak, West, and Stanovich (2013), showing correlations between self-reported self-control and executive functioning tasks to be non-significant or small at most.

<sup>4</sup> High levels of personal-relational balance and low levels of either personal or relational imbalance may be considered underlying the same construct. However, the three items did not yield an acceptable level of internal consistency ( $\alpha = .39$ ).

<sup>5</sup> Although within-person centering is usually recommended to assess the simple relationship between variables in diary procedures (see Bolger & Laurenceau, 2013; Enders & Tofighi, 2007), in the mediation analysis we sought to compare the total effect of self-control with the direct effect of self-control (which is a between-person variable assessed only at intake). Thus, to assess the reduction of the explained variance of self-control in the presence of the mediator, we did not within-person center personal-relational (im)balance, but examined the between participant variance of these variables. Mediation results, and direct daily association with personal and relational well-being, are similar when we within-person center personal-relational balance.

<sup>6</sup> Additionally, we controlled for relationship commitment and positive feelings toward the partner to ensure that our findings were not attributable to global positive relationship perceptions. All main effects of self-control on personal-relational balance and imbalance held when controlling for these relationship perceptions.

<sup>7</sup> In contrast to Study 1, the more general operationalized measures of personal-relational balance, personal imbalance, and relational imbalance reliably fit in an overall balance composite measure ( $\alpha = .68$ ). Indeed, self-control was significantly associated with overall balance ( $\beta = .33$ , 95% CI = [.19, .47],  $t(280) = 5.01$ ,  $p < .001$ ). Furthermore, overall balance similarly mediated associations between self-control and all well-being indicators.

<sup>8</sup> To ensure that our findings are not attributable to social desirable responding, we ran our key analyses controlling for this tendency (Paulhus, 1984) in Study 2. All main effects of self-control on personal-relational balance and imbalance held when controlling for social desirable responding. Furthermore, as in Study 1, all main effects of self-control on personal-relational balance and imbalance held when controlling for relationship commitment.

<sup>9</sup> Personal-relational balance at Time 2 and Time 4 were moderately correlated ( $r = .36$ ), while personal imbalance and relational imbalance were highly correlated ( $r = .56$  and  $.49$ , respectively). The high associations between Time 2 and 4 levels of the criterion leaves less variance to be explained by other predictors. Furthermore, the attrition of 84 participants from Time 2 to Time 4 may have further challenged the test of this lagged model (i.e., less power to detect the effect and less variance to be explained over time).

#### Acknowledgements

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## Supplemental Materials 2.1: Descriptive Statistics and Correlations

Table 1.

*Descriptive statistics and correlations among all variables in Study 1*

Variable	Mean	SD	1	2	3	4	5	6	7
1. Self-control (1-7)	4.23	.93	–						
2. Stroop interference	210.78	148.74	-.03	–					
3. Balance (0-6)	3.44	.93	.11 <sup>†</sup>	-.15*	–				
4. Personal imbalance (0-6)	1.79	.99	-.06	.05	-.33***	–			
5. Relational imbalance (0-6)	1.75	.96	-.004	.03	-.15*	.39***	–		
6. Life satisfaction (0-6)	4.16	1.00	.22***	-.003	.53***	-.07	-.09	–	
7. Stress (0-6)	1.03	.97	-.15*	-.02	-.23***	.27***	.16*	-.30***	–
8. Relationship satisfaction (0-6)	5.19	.81	.03	-.08	.46***	-.26***	-.12 <sup>†</sup>	.48***	-.22***

*Note.* Correlations represent zero order correlations, calculated based on person averages within the 8-day diary study, and thus the simple correlations do not take the multilevel (dyadic) structure of the data into account. The scale ranges for each variable are provided within parentheses. Note that Stroop interference reflects response latencies in milliseconds of incongruent trials minus congruent trials, with higher Stroop interference indicating lower response inhibition.

<sup>†</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Table 2.

*Descriptive statistics and correlations among all variables in Study 2*

Variable	Mean	SD	1	2	3	4	5	6	7	8
1. Self-control (0-8)	4.46	1.22	–							
2. Balance (0-8)	6.32	1.28	.31***	–						
3. Personal imbalance (0-8)	1.64	1.24	-.16***	-.39***	–					
4. Relational imbalance (0-8)	2.19	1.56	-.17***	-.45***	.19***	–				
5. Life satisfaction (0-8)	5.64	1.41	.34***	.51***	-.27***	-.29***	–			
6. Subjective well-being (1-9)	6.59	1.07	.28***	.50***	-.30***	-.36***	.71***	–		
7. Psychological adjustment (0-8)	6.15	1.26	.41***	.41***	-.30***	-.34***	.55***	.55***	–	
8. Dyadic adjustment (sum)	95.42	11.56	.28***	.48***	-.46***	-.32***	.54***	.56***	.48***	–
9. Relationship satisfaction (1-7)	3.34	.41	.22***	.46***	-.46***	-.27***	.51***	.55***	.47***	.83***

*Note.* Correlations represent zero order correlations, calculated based on person averages across two time points (T2 and T4), and thus the simple correlations do not take the multilevel (dyadic) structure of the data into account. The scale ranges for each variable are provided within parentheses.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

## Supplemental Materials 2.2: Main Associations between (Im)balance and Well-being

Table 1.

*Main associations of personal-relational balance and imbalance with life satisfaction, stress, and relationship satisfaction (Study 1)*

	$\beta$	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
<b>Personal-relational balance</b>					
Life satisfaction	.18	.13, .23	1738	7.84	<.001
Stress	-.15	-.21, -.09	1823	-4.65	<.001
Relationship satisfaction	.16	.12, .20	1765	8.55	<.001
<b>Personal imbalance</b>					
Life satisfaction	-.04	-.09, .005	1729	-1.58	.115
Stress	.12	.06, .18	1819	3.63	<.001
Relationship satisfaction	-.09	-.13, -.05	1760	-4.66	<.001
<b>Relational imbalance</b>					
Life satisfaction	.04	-.005, .09	1728	1.85	.065
Stress	.04	-.02, .11	1812	1.41	.160
Relationship satisfaction	-.01	-.05, .03	1757	-0.40	.686

*Note.* Results depict standardized estimates that are obtained from cross-sectional analyses across the eight diary days. Personal-relational balance, personal imbalance, and relational imbalance are tested in separate models to predict all well-being indices.

Table 2.

*Main associations of personal-relational balance and imbalance with life satisfaction, stress, and relationship satisfaction, controlling for relationship commitment (Study 1)*

	$\beta$	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
<b>Personal-relational balance</b>					
Life satisfaction	.16	.11, .21	1733	6.93	<.001
Stress	-.14	-.20, -.08	1811	-4.29	<.001
Relationship satisfaction	.11	.08, .14	1820	6.91	<.001
<b>Personal imbalance</b>					
Life satisfaction	-.02	-.07, .03	1730	-0.70	.484
Stress	.11	.05, .17	1813	3.36	<.001
Relationship satisfaction	-.04	-.07, -.01	1815	-2.66	.008
<b>Relational imbalance</b>					
Life satisfaction	.04	-.005, .09	1736	1.81	.070
Stress	.04	-.02, .11	1813	1.40	.161
Relationship satisfaction	-.01	-.04, .02	1811	-0.70	.484

*Note.* Relationship commitment was controlled for to ensure that associations of (im)balance with well-being could not be attributed to a global positive orientation toward the relationship. Results depict standardized estimates that are obtained from cross-sectional analyses across the eight diary days. Personal-relational balance, personal imbalance, and relational imbalance are tested in separate models to predict all well-being indices, controlling for relationship commitment.

Table 3.

*Main associations of personal-relational balance and imbalance with life satisfaction, stress, and relationship satisfaction, controlling for positive feelings toward partner*

*(Study 1)*

	$\beta$	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
<b>Personal-relational balance</b>					
Life satisfaction	.14	.09, .19	1727	6.20	<.001
Stress	-.12	-.18, -.06	1804	-3.76	<.001
Relationship satisfaction	.09	.05, .13	1797	5.13	<.001
<b>Personal imbalance</b>					
Life satisfaction	-.004	-.05, .04	1734	-0.18	.856
Stress	.10	.04, .16	1815	3.02	.003
Relationship satisfaction	-.03	-.07, -.001	1797	-2.07	.039
<b>Relational imbalance</b>					
Life satisfaction	.04	-.001, .09	1737	1.96	.050
Stress	.04	-.02, .10	1812	1.33	.182
Relationship satisfaction	-.005	-.04, .03	1787	-0.28	.778

*Note.* Positive feelings toward the partner was controlled for to ensure that associations of (im)balance with well-being could not be attributed to a global positive orientation toward the relationship. Results depict standardized estimates that are obtained from cross-sectional analyses across the eight diary days. Personal-relational balance, personal imbalance, and relational imbalance are tested in separate models to predict all well-being indices, controlling for positive feelings toward the partner.



Table 4.

*Main associations of personal-relational balance and imbalance with life satisfaction, subjective well-being, psychological adjustment, dyadic adjustment, and relationship satisfaction (Study 2)*

	$\beta$	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
<b>Personal-Relational Balance</b>					
Life satisfaction	.44	.34, .54	486	8.72	<.001
Subjective well-being	.43	.35, .51	527	10.63	<.001
Psychological adjustment	.33	.23, .43	512	6.71	<.001
Dyadic adjustment	.20	.16, .24	504	8.64	<.001
Relationship satisfaction	.18	.14, .22	477	8.45	<.001
<b>Personal Imbalance</b>					
Life satisfaction	-.18	-.30, -.06	498	-3.27	.001
Subjective well-being	-.21	-.31, -.11	533	-4.49	<.001
Psychological adjustment	-.20	-.30, -.10	527	-3.72	<.001
Dyadic adjustment	-.20	-.26, -.14	464	-7.55	<.001
Relationship satisfaction	-.20	-.24, -.16	438	-8.36	<.001
<b>Relational Imbalance</b>					
Life satisfaction	-.28	-.38, -.18	498	-5.29	<.001
Subjective well-being	-.32	-.40, -.24	536	-7.38	<.001
Psychological adjustment	-.39	-.49, -.29	528	-7.69	<.001
Dyadic adjustment	-.07	-.11, -.03	492	-3.26	.001
Relationship satisfaction	-.08	-.12, -.04	474	-3.93	<.001

*Note.* Results depict standardized estimates that are obtained from cross-sectional analyses across the two measurement occasions (Time 2 and Time 4). Personal-relational balance, personal imbalance, and relational imbalance are tested in separate models to predict all well-being indices.

Table 5.

*Main associations of personal-relational balance and imbalance with life satisfaction, subjective well-being, psychological adjustment, dyadic adjustment, and relationship satisfaction, controlling for relationship commitment (Study 2)*

	$\beta$	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
<b>Personal-Relational Balance</b>					
Life satisfaction	.37	.27, .47	483	7.07	<.001
Subjective well-being	.39	.31, .47	524	9.03	<.001
Psychological adjustment	.29	.19, .39	510	5.63	<.001
Dyadic adjustment	.14	.10, .18	503	6.28	<.001
Relationship satisfaction	.10	.06, .14	473	5.21	<.001
<b>Personal Imbalance</b>					
Life satisfaction	-.12	-.24, -.002	499	-2.04	.041
Subjective well-being	-.15	-.25, -.05	535	-3.32	<.001
Psychological adjustment	-.16	-.25, -.05	529	-2.83	.005
Dyadic adjustment	-.15	-.21, -.09	498	-5.73	<.001
Relationship satisfaction	-.13	-.17, -.09	469	-6.03	<.001
<b>Relational Imbalance</b>					
Life satisfaction	-.26	-.36, -.16	505	-4.91	<.001
Subjective well-being	-.31	-.39, -.23	542	-7.15	<.001
Psychological adjustment	-.37	-.47, -.27	533	-7.42	<.001
Dyadic adjustment	-.06	-.10, -.02	512	-2.95	.003
Relationship satisfaction	-.06	-.09, -.03	486	-3.74	<.001

*Note.* Relationship commitment was controlled for to ensure that associations of (im)balance with well-being could not be attributed to a global positive orientation toward the relationship. Results depict standardized estimates that are obtained from cross-sectional analyses across the two measurement occasions (Time 2 and Time 4). Personal-relational balance, personal imbalance, and relational imbalance are tested in separate models to predict all well-being indices, controlling for relationship commitment.



## CHAPTER 3

### To “See” is to Feel Grateful? A Quasi-Signal Detection Analysis of Romantic Partners’ Sacrifices

This Chapter is based on Visserman, M. L., Impett, E. A., Righetti, F., Muise, A., Keltner, D., & Van Lange, P. A. M. (2018). To “see” is to feel grateful? A quasi-signal detection analysis of romantic partners’ sacrifices. *Social Psychological and Personality Science*. Advanced online publication.



## Abstract

Although gratitude plays a central role in the quality of relationships, little is known about how gratitude emerges, such as in response to partners' sacrifices. Do people need to *accurately* see these acts to feel grateful? In two daily experience studies of romantic couples (total  $N = 426$ ), we used a quasi-signal detection paradigm to examine the prevalence and consequences of (in)accurately "seeing" and missing partners' sacrifices. Findings consistently showed that sacrifices are equally likely to be missed as they are to be accurately detected, and about half of the time people "see" a sacrifice when the partner declares none. Importantly, "seeing" partners' sacrifices—accurately or inaccurately—is crucial for boosting gratitude. In contrast, missed sacrifices fail to elicit gratitude, and the lack of appreciation negatively colors the partner's satisfaction with the relationship when having sacrificed. Thus, these findings illustrate the power that perception holds in romantic couples' daily lives.

*Keywords.* Sacrifice, detection, gratitude, relationship satisfaction.



Sacrifices come in many flavors. They can be substantial but rare, such as moving to a new city with your partner to meet their career ambitions. They can also be small and common, such as spending time with your partner's friends rather than your own. Although these relatively common, day-to-day sacrifices are important to relationships (Impett, Gable, & Peplau, 2005), they may be easily overlooked. As a result, feelings of gratitude—which are essential to relationship well-being and stability (e.g., Gordon, Impett, Kogan, Oveis, & Keltner, 2012)—may not be triggered. Just as intriguingly, people may “see” a sacrifice when the partner declares none, but gratitude may be triggered nevertheless.

Although sacrifice and gratitude have received growing attention in recent years (e.g., Algoe, 2012; Visserman, Righetti, Impett, Keltner, & Van Lange, 2018), there is no published research on accuracy in recognizing sacrifice. The present research examines, for the first time, the level of accuracy in “seeing” partners' kind, prosocial, but costly acts, and how seeing or failing to see such acts impacts people's ensuing gratitude. Moreover, we examine the sacrificer's feelings toward the relationship when their sacrifices are unrecognized and unappreciated. These questions are studied by sampling people's daily experiences and perceptions in their natural environment (Bolger, Davis, & Rafaeli, 2003), using a quasi-signal detection paradigm to assess both partners' perspectives on the occurrence of daily events in their relationship (e.g., Gable, Reis, & Downey, 2003). These methods provide a unique and realistic account of the detection and consequences of partners' day-to-day sacrifices.

### **Detecting Sacrifice**

In general, people are moderately accurate in “reading” their interaction partner's experiences and behaviors (Nater & Zell, 2015). Within intimate relationships, many reasons, from smoother interactions to greater disclosure, may motivate partners to arrive at accurate perceptions of each other's intentions, actions, and feelings. At the same time, partners can be challenged by various biases distorting their perception of each other. For example, partners tend to hold overly positive views of each other and their relationship (Murray, Holmes, & Griffin, 1996; Rusbult, Van Lange, Wildschut, Yovetich, & Verette, 2000), and project their own experiences onto their partner (e.g., Clark, Von Culin, Clark-Polner, & Lemay, 2017). Such biases may create room for misinterpretation and shape what people “see” (Fletcher & Kerr, 2010; Gagné & Lydon, 2004).



Previous research using quasi-signal detection analysis suggests that romantic partners quite accurately detect each other's positive behaviors, and behaviors that express passionate love (Gable, Reis, & Downey, 2003; Finkenauer, Wijngaards-De Meij, Reis, & Rusbult, 2010; Reis, Maniaci, & Rogge, 2014, 2017). Negative behaviors may be recognized less accurately, and, at times, are just as likely to be missed as to be detected (Finkenauer et al., 2010; Gable et al., 2003). This disconnect between partners' "realities" seems especially pronounced for partners' supportive and responsive acts, which are accurately detected, missed, but also wrongly inferred at an equal rate (Algoe, Gable, & Maisel, 2010; Gable et al., 2003). This is an especially intriguing trend when applied to sacrifices, which are fairly concrete behaviors, but may not simply be positive, negative, or supportive, but acts that a sacrificer may be ambivalent about due to the personal costs they incur (Righetti & Impett, 2017). Further, partners' willingness to put their personal interests aside makes sacrifices especially important to detect, as they signal the partner's care and commitment to the relationship (Wieselquist, Rusbult, Foster, & Agnew, 1999). Thus, sacrifices represent an important opportunity to gauge the partner's pro-relationship dedication, and in response, to feel grateful (Algoe, 2012). However, it is unclear how accurately day-to-day sacrificial acts are observed, and importantly, how (in)accurate detection can (fail to) boost gratitude in response to them.

## **Gratitude**

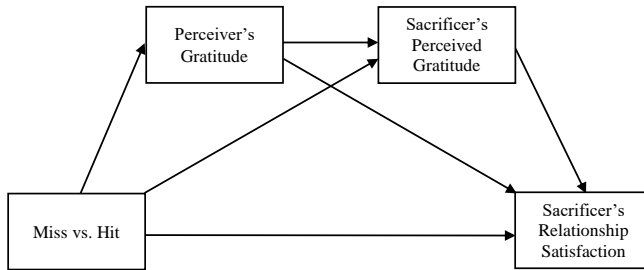
Gratitude arises from an individual's perception to have benefitted from another person's intentionally rendered good deeds that are both valuable and costly (McCullough, Kilpatrick, Emmons, & Larson, 2001). Gratitude helps people to identify a responsive relationship partner and reminds them of their partner's value to them (Algoe, 2012). Despite the well-documented benefits of gratitude for the receiver's well-being (Emmons & McCullough, 2003; Wood, Froh, & Geraghty, 2010) and the quality and longevity of relationships (Algoe et al., 2010; Gordon, Arnette, & Smith, 2011; Gordon et al., 2012), surprisingly little is known about *how* people come to feel grateful in close relationships.

Prior research has shown that gratitude can be fueled by perceiving a partner to have invested in the relationship (Joel, Gordon, Impett, MacDonald, & Keltner, 2013). This finding begs the question of whether or not partners accurately perceive each other's sacrifices in the first place. Gratitude is a response to the benefactor's behavior, so accurately seeing a partner's sacrifice should boost perceivers' gratitude. "Seeing" a

sacrifice that the partner did not declare should also boost gratitude since the perceiver thinks that the partner made a costly relationship investment, even if this reality is not shared by both partners. In contrast, missing a partner's sacrifice constitutes a missed opportunity to identify the partner's behavior as beneficial, valuable, and costly (Algoe, 2012; McCullough et al., 2001), and should fail to boost gratitude.

### Relationship Satisfaction

Replicating previous research (e.g., Algoe et al., 2010), we expect that this missed opportunity to feel grateful toward one's partner also poses a missed opportunity to feel satisfied with the relationship. Perhaps more importantly, and a focus of our investigation, are the consequences for the sacrificer whose act is not recognized by the receiver. When a sacrifice is not welcomed with gratitude, and the sacrificer perceives this lack of appreciation, they may perceive their sacrifice as more harmful to themselves, which can undermine their relationship satisfaction (Whitton, Stanley, & Markman, 2007). Thus, we propose that missed sacrifices and the recipient's lack of gratitude will translate into the sacrificer not feeling appreciated for what they have done, which may in turn leave them less satisfied with their relationship than when their sacrifice would be accurately detected (see *Figure 1*).



*Figure 1.* The conceptual model for the indirect effect of missed sacrifices (vs. hit) on sacrificers' relationship satisfaction, mediated by perceivers' gratitude and sacrificer's perception of their gratitude.

## Research Overview

In two daily experience studies of romantic couples, in the Netherlands and United States, we used a quasi-signal detection paradigm (e.g., Gable et al., 2003) to directly map both partners' daily reports of their own and their partner's sacrifices onto each other. First, we examined the prevalence of (in)accurate detection of partners' day-to-day sacrifices (i.e., hit, miss, false alarm, correct rejection). Next, we examined the daily consequences of (in)accurate detection for boosting—or failing to boost—perceivers' gratitude. Furthermore, we examined partners' relationship satisfaction in response to missed sacrifices, and the lack of appreciation they may yield. Last, in auxiliary analyses, we explored predictors of sacrifice detection and long-term effects of detection on gratitude.

### Study 3.1

#### 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 64% were university students. On average, couples reported being involved for 2.8 years ( $SD = 29$  months), and 35% lived together. The data come from a larger project on romantic relationships (e.g., Righetti, Gere, Hofmann, Visserman, & Van Lange, 2016; Visserman, Righetti, Kumashiro, & Van Lange, 2017), and with an anticipated small to medium effect size provided sufficient power to test our hypotheses ( $> .80$ ). Originally, 130 couples participated in the study, but one couple broke up before completing the daily diary, and three couples did not follow the instructions properly.

**Measures and procedures.** Couples completed an 8-day diary procedure and were contacted one year later to complete a follow-up survey. In a laboratory intake session, couples were carefully instructed by the experimenter on how to recognize daily sacrifices in their relationship. Sacrifices were explained as forgoing your own preference by doing something that you find unpleasant and that you would not like to do (active sacrifice; e.g. going on a boring outing with your partner's friends), or by giving up something that you find pleasant or would like to do (passive sacrifice; e.g. not going out with your best friend) (see Van Lange et al., 1997). We explained to participants that sacrifices can result from mundane differences in preferences, such as forgoing one's first preference for dinner and going with the partner's preference instead, as long as it involves some experience of

personal cost (e.g., unpleasantness). Afterward, participants received a booklet with definitions and examples of sacrifice, and instructions for completing the diary. The first Saturday after the laboratory session, participants started the daily diary procedure. They received a link to a short survey every evening on their mobile phone (using the SurveySignal application; Hofmann & Patel, 2015) for eight days (two blocks of four days with one rest day in between on Wednesday). In general, participants responded to 87.6% of the daily surveys ( $M = 7.35$  out of 8 days).

Relevant to the current investigation, both partners reported at the end of each day whether they had sacrificed—which could be more than once—and whether their partner had sacrificed (i.e., “Have you sacrificed today for your partner/relationship”). On average, participants reported to have sacrificed on 1.89 days ( $SD = 1.70$ , ranging from 0 to 8 days), and reported their partner to have sacrificed on 1.91 days ( $SD = 1.73$ , ranging from 0 to 7 days). By combining both partners’ reports, we could identify whether one of the partners had sacrificed (i.e., partner) and whether or not the other partner (i.e., perceiver) had perceived their partner to have sacrificed. Thus, both partners could—at different times—serve as “partner” or “perceiver” in our investigation. Hits occur when both the perceiver and the partner report the partner to have sacrificed; misses occur when the partner reports a sacrifice that is not detected by the perceiver; false alarms occur when the perceiver reports that their partner sacrificed, while the partner reports no sacrifice; and correct rejections occur when both the partner and the perceiver indicate that the partner did not sacrifice (see Table 1).

Table 1.

*Overview of the occurrence of hits, misses, false alarms, and correct rejections based on both partner’s reports on a partner’s sacrifice.*

<b>Sacrifice detection</b>	<b><i>Partner says “Yes”</i></b>	<b><i>Partner says “No”</i></b>
<b><i>Perceiver says “Yes”</i></b>	Hit	False Alarm
<b><i>Perceiver says “No”</i></b>	Miss	Correct Rejection

Each day, both partners reported their gratitude toward their partner (“I feel very grateful to my partner”), their perception of their partner’s expression of gratitude (“My partner expressed gratitude for what I have done for him/her”), and their relationship satisfaction (“I feel satisfied with our relationship”). All daily measures were assessed on a 7-point scale (0 = *not at all* to 6 = *very much*) with a single item to minimize participant fatigue and reduce attrition (Bolger et al., 2003).

## Results

**Analysis strategy.** Multilevel-modeling was used to take into account the occurrence of multiple measurement occasions within participants, and the nesting of participants within dyads (Kenny, Kashy, & Cook, 2006), using SPSS v.22. We employed a 2-level cross model in which participants and the daily measurements within participants (i.e., time) were treated as crossed and nested within the dyad. Furthermore, intercepts were allowed to randomly vary, whereas slopes were treated as fixed effects. Dyads were treated as indistinguishable because gender did not consistently moderate effects<sup>1</sup> and because of the presence of one non-heterosexual couple (Kenny et al., 2006) (access to the data and syntax on the Open Science Framework: <https://osf.io/dhmca/>).

For each day of the diary, participants’ and their partners’ reports were compared and coded to reflect either a hit, miss, or false alarm by assigning “1” to one of these events (i.e., did occur) and “0” to the other events (i.e., did not occur). For example, if a partner reported to have sacrificed and this was accurately perceived by the participant then “hit” was coded as “1” and all else as “0”. If hits, misses, and false alarms were all coded as “0”, this automatically reflects a “correct rejection” (i.e., no events occurred that day). Hits, misses, and false alarms were entered in one model predicting gratitude, and therefore correct rejection serves as the reference category to which hits, misses, and false alarms are contrasted in the analyses (see Gable et al., 2003). To examine whether hits, misses, and false alarms predict a boost in gratitude above and beyond the previous day, we controlled for previous day gratitude when predicting current’s day gratitude.

Because hits, misses, and false alarms are binary, they were not within-person centered to facilitate interpretation of our findings (i.e., an event did or did not occur), and because there were only few observations within participants from which to reliably draw their typical detection rates. Thus the unstandardized estimates as reported in our key analyses can be interpreted as the increase in gratitude on days when a specific event

occurred (i.e., a hit, miss, or false alarm), as compared to days when none of these events occurred (i.e., correct rejection).

To examine the indirect effects on relationship satisfaction when a sacrifice is missed, we did not test the full detection model (which contrasts hits, misses, and false alarms against correct rejections). Due to ambivalent feelings that may arise from making or perceiving a sacrifice (Righetti & Impett, 2017), we did not expect misses or hits to affect relationship satisfaction as compared to days on which no sacrifice was reported or perceived. Indeed, we did not find consistent support for such effects across studies, but present these results in a footnote for interested readers.<sup>2</sup> Instead, we selected only days on which hits or misses occurred, as this comparison is essential for examining the impact on relationship satisfaction in response to whether or not a sacrifice is detected, *when* a partner sacrificed. The “Miss vs. Hit” variable was dummy coded into “1” reflecting missed sacrifices, and “0” reflecting accurately detected sacrifices. We first examined the indirect effect of sacrifices being missed (vs. hit) on perceivers’ relationship satisfaction, mediated by gratitude. Further, we examined a sequential mediation model in which we tested the indirect effect of missed sacrifices on sacrificers’ relationship satisfaction, mediated by perceivers’ gratitude and sacrificers’ perception of their gratitude, following the steps as recommended by Taylor, MacKinnon, and Tein (2008). We used Mplus (version 8) to test each step of these indirect effect models.

### **Key analyses.**

*Sacrifice detection.* See Table 2 for the occurrence of hits, misses, false alarms, and correct rejections over the course of the daily diary procedure across the whole sample. In 38% of the diary reports, participants and/or their partners reported on a partner’s sacrifice. When a partner reported making a sacrifice, participants accurately perceived their partner’s sacrifice in about half of the cases (52.6%), and similarly missed the sacrifice the other half of the times (47.3%). In fact, the number of hits and misses did not significantly differ ( $Z$  difference = 1.53,  $p = .126$ ). Furthermore, when participants reported to have perceived a partner’s sacrifice, they were accurate (53.7%) as often as inaccurate (46.3%), as false alarms were statistically just as likely as hits ( $Z$  difference = 1.14,  $p = .254$ ).

*Perceiver's gratitude.* We conducted analyses in which hits, misses, and false alarms were entered simultaneously in a model predicting gratitude for the partner. As shown in Table 3, participants felt more grateful on days when they accurately perceived their partner to have sacrificed, or when they wrongly inferred their partner to have made a sacrifice, but not when they missed the partner's sacrifice.<sup>3</sup>

Table 2.

*The numbers and percentages of hits, misses, false alarms, and correct rejections over the course of the daily diary procedures across the whole sample in Studies 1 and 2.*

Sacrifice detection	Study 1		Study 2	
	Number	%	Number	%
Hit	234	13.6	218	13.2
Miss	202	11.8	194	11.8
False Alarm	210	12.2	144	8.7
Correct Rejection	1,073	62.4	1,093	66.3

Table 3.

*Main effects of hit, miss, and false alarm on gratitude in Study 1.*

Sacrifice detection	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Hit	.19	.08	.04, .34	1215.5	2.44	.015
Miss	-.11	.08	-.26, .04	1244.2	-1.41	.159
False Alarm	.18	.08	.04, .33	1231.0	2.44	.015

*Relationship satisfaction.* When a partner reported a sacrifice and it was missed by the perceiver (vs. hit), the perceiver reported lower relationship satisfaction, which was mediated by lower gratitude that day (see Table 4). As for the sacrificer, missed sacrifices were marginally associated with lower relationship satisfaction ( $b = -.16, SE = .09, 95\% CI = [-.34, .01], z = -1.82, p = .069$ ). As step one of the sequential mediation model, and in accordance with our key findings, misses (vs. hits) were associated with lower gratitude in the perceiver ( $b = -.35, SE = .11, 95\% CI = [-.56, -.13], z = -3.17, p = .002$ ). Second, perceivers' lack of gratitude was associated with lower perception of perceivers' gratitude in the sacrificer ( $b = .25, SE = .07, 95\% CI = [.13, .38], z = 3.91, p < .001$ ), while controlling for miss vs. hit. Last, sacrificers' lower perceived gratitude in turn detracted from

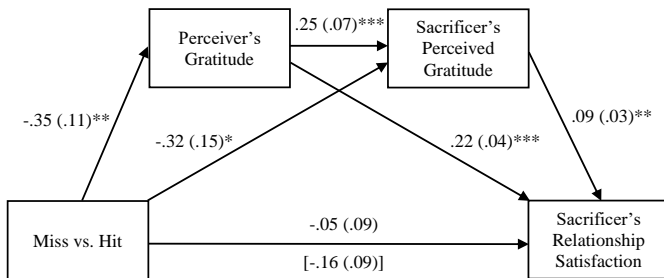
sacrificers' relationship satisfaction ( $b = .09$ ,  $SE = .03$ , 95% CI =  $[-.15, -.04]$ ,  $z = -3.45$ ,  $p = .001$ ), while controlling for miss vs. hit and perceivers' reported gratitude (see *Figure 2*). The direct effect of misses on sacrificers' relationship satisfaction was reduced to non-significance ( $p = .566$ ), while the indirect effect was significant ( $b = -.008$ ,  $SE = .004$ , 95% CI =  $[-.02, .00]$ ,  $z = -2.00$ ,  $p = .045$ ).

Table 4.

*Associations of miss (vs. hit) with perceiver's relationship satisfaction, mediated by perceiver's gratitude in Study 1.*

Miss vs. Hit	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>z</i>	<i>p</i>
Gratitude	-.35	.11	-.56, -.13	436	-3.17	.002
Relationship satisfaction						
<i>Total effect</i>	-.19	.09	-.37, -.002	436	-1.98	.048
<i>Direct effect</i>	-.01	.08	-.16, .14	436	-0.16	.869
<i>Indirect effect</i>	-.17	.06	-.28, -.06	436	-3.10	.002

*Note.* "Miss vs. Hit" is coded as "1" reflecting misses, and "0" reflecting accurately detected sacrifices. All results are obtained from mediation analyses, using unstandardized estimates (*b* values). The direct effect of miss vs. hit on relationship satisfaction was examined while controlling for gratitude.



*Figure 2.* The sequential mediation model for the association between miss vs. hit and sacrificers' relationship satisfaction. "Miss vs. Hit" is coded as "1" reflecting misses, and "0" reflecting accurately detected sacrifices. All reported values are unstandardized estimates (*b* values), with their standard errors between parentheses. Between brackets are the values for the total effect of miss vs. hit on sacrificers' relationship satisfaction.

*Note.* \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .



## Study 3.2

In this study we sought to replicate findings of Study 1 in another daily experience study, in a different Western culture (United States).

### Methods

**Participants.** Participants were 75 heterosexual couples, four lesbian couples, and one gay male couple ( $N = 160$ ) recruited from the San Francisco Bay Area (California, US). Participants' mean age was 23.9 years ( $SD = 6.4$ ), and about half of the participants were university students. On average, couples reporting being involved for 1.3 years ( $SD = 44$  months), and 48% lived together. The data come from a larger project on romantic relationships (e.g., see Impett et al., 2012), and with an anticipated small to medium effect size provided sufficient power to test our hypotheses ( $> .80$ ).

**Measures and procedures.** Participants went through a 14-day diary procedure, and were also contacted three months later to complete a follow-up survey. As in Study 1, couples were carefully instructed on what daily sacrifices are and how to recognize them in their relationship. Each day of the diary, participants were asked whether their partner had sacrificed that day, and partners were asked whether they had made a sacrifice (i.e., "Today, did you do anything that you did not particularly want to do for your partner? Or, did you give up something that you did want to do for the sake of your partner?"). On average, participants reported to have sacrificed on 2.88 days ( $SD = 2.57$ , ranging from 0 to 11 days), and reported their partner to have sacrificed on 2.49 days ( $SD = 2.65$ , ranging from 0 to 12 days). As in Study 1, both partners' reports were combined which, for each day, resulted in either a hit, miss, false alarm, or correct rejection.

Next, we measured both partners' general experience of how "grateful/appreciative/thankful" they felt that day, how appreciated they felt by their partner ("My partner made sure I felt appreciated today"), and the extent to which they felt "satisfaction" in their relationship that day. All daily measures were assessed on 5-point scales (1 = *not at all* to 5 = *a lot*).

### Results

**Analysis strategy.** The data analysis strategy was similar to Study 1 (access to the data and syntax on the Open Science Framework: <https://osf.io/dhmca/>).

### Key analyses.

*Sacrifice Detection.* The relative occurrence of hits, misses, false alarms, and correct rejections was fairly similar to Study 1 (see Table 2). In 34% of the reports, participants and/or their partners reported on a partner's sacrifice. As in Study 1, when a partner reported a sacrifice, participants missed their partner's sacrifice half of the times, indicated by a non-significant difference between the occurrence of hits (52.9%) and misses (47.1%) ( $Z$  difference = 1.18,  $p = .238$ ). In contrast to Study 1, when participants reported to have "seen" a partner's sacrifice, they were more often accurate than inaccurate, indicated by a significant difference between the occurrence of hits (60.2%) and false alarms (39.8%) ( $Z$  difference = 3.89,  $p < .001$ ).

*Perceiver's gratitude.* As in Study 1, hits, misses, and false alarms were entered simultaneously in a model predicting participants' gratitude. As shown in Table 5, participants felt more grateful on days when they accurately perceived their partner to have sacrificed, or when they wrongly inferred them to have sacrificed, but not when they missed a partner's sacrifice.

Table 5.

*Main effects of hit, miss, and false alarm on gratitude in Study 2.*

Sacrifice detection	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Hit	.38	.08	.23, .54	1266.4	4.83	<.001
Miss	.03	.08	-.12, .19	1240.0	0.43	.671
False Alarm	.41	.09	.24, .59	1244.2	4.74	<.001

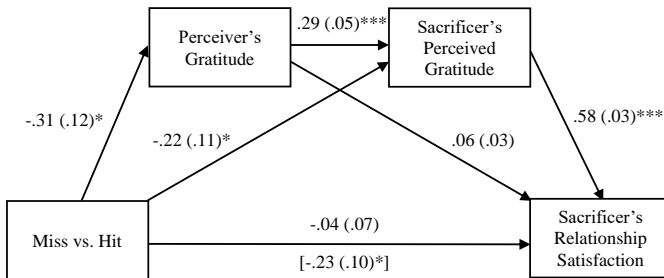
*Relationship satisfaction.* As in Study 1, we specifically focused on days on which the partner sacrificed, thus whether a miss or a hit occurred.<sup>2</sup> When perceivers missed a partner's sacrifice (vs. hit), they reported lower relationship satisfaction, which was mediated by lower gratitude (see Table 6). As for the sacrificer, missed sacrifices were significantly associated with lower sacrificers' relationship satisfaction ( $b = -.23$ ,  $SE = .10$ , 95% CI = [-.43, -.04],  $z = -2.39$ ,  $p = .017$ ). Firstly in examining the sequential mediation model, and in accordance with our key findings, missed sacrifices were associated with lower perceiver's gratitude ( $b = -.31$ ,  $SE = .12$ , 95% CI = [-.54, -.07],  $z = -2.51$ ,  $p = .012$ ). Second, perceivers' lack of gratitude was associated with sacrificers feeling less appreciated by their partner ( $b = .29$ ,  $SE = .05$ , 95% CI = [.20, .38],  $z = 6.03$ ,  $p < .001$ ),

while controlling for miss vs. hit. Last, the sacrificers' lower felt appreciation detracted from their relationship satisfaction ( $b = .58, SE = .03, 95\% CI = [.52, .64], z = 18.99, p < .001$ ), while controlling for miss vs. hit and perceivers' reported gratitude (see *Figure 3*). As in Study 1, the direct effect of miss vs. hit reduced to non-significance ( $p = .600$ ), while the indirect effect was significant ( $b = -.05, SE = .02, 95\% CI = [-.09, -.01.], z = -2.29, p = .022$ ).

Table 6.  
*Associations of miss (vs. hit) with perceiver's relationship satisfaction, mediated by perceiver's gratitude in Study 2.*

Miss vs. Hit	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>z</i>	<i>p</i>
Gratitude	-.29	.12	-.52, -.05	412	-2.35	.019
Relationship satisfaction						
<i>Total effect</i>	-.24	.10	-.43, -.06	412	-2.54	.011
<i>Direct effect</i>	-.13	.08	-.29, .03	412	-1.55	.122
<i>Indirect effect</i>	-.11	.05	-.21, -.01	412	-2.30	.021

*Note.* "Miss vs. Hit" is coded as "1" reflecting misses, and "0" reflecting accurately detected sacrifices. All results are obtained from mediation analyses, using unstandardized estimates (*b* values). The direct effect of miss vs. hit on relationship satisfaction was examined while controlling for gratitude.



*Figure 3.* The sequential mediation model for the association between miss vs. hit and sacrificer's relationship satisfaction. "Miss vs. Hit" is coded with "1" being missed sacrifices, and "0" being accurately detected sacrifices. All reported values are unstandardized estimates (*b* values), with their standard errors reported between parentheses. Between brackets are the values for the total effect of miss vs. hit on sacrificer's relationship satisfaction.

*Note.* \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

## Auxiliary analyses

*Predictors of detection.* We additionally explored whether the prevalence of hits, misses, and false alarms would be affected by sacrifice costs (in both studies), and type of sacrifice (Study 2), and explored a potential role of communication of sacrifice (Study 2). However, aside from some types of sacrifice (active sacrifices and sacrifices related to support and recreation), the likelihood of accurately detecting partners' sacrifices seems largely independent from any of these factors (see *Supplemental Materials 3.1* for details on the methods, results, and discussion of these findings).

*Follow-up.* Furthermore, we explored whether the average occurrence of hits, misses, and false alarms during the daily experience study would predict gratitude one year (Study 1) or three months (Study 2) later, controlling for earlier gratitude assessed during the initial survey. In Study 1, hits were positively, but non-significantly related to gratitude one year later ( $p = .127$ ), but misses and false alarms were not ( $p = .850$  and  $p = .400$ , respectively). In Study 2, hits marginally predicted gratitude three months later:  $b = .34$ ,  $SE = .18$ , 95% CI =  $[-.03, .70]$ ,  $t(99.15) = 1.84$ ,  $p = .069$ , while misses ( $p = .451$ ) and false alarms ( $p = .371$ ) did not. Thus, although results for hits are positively trending, we do not observe evident support for either hits, misses, or false alarms to promote gratitude over time.

## General Discussion

While day-to-day sacrifices may be crucial for romantic partners to coordinate their lives together, they might be easily overlooked or misconstrued. In the current investigation, we aimed to answer a two-fold question: How accurately do people see their partners' sacrifices, and what are the consequences of (in)accurate detection? Two daily experience studies consistently showed that when partners reported a sacrifice, their sacrifices only had a 50% chance of being accurately detected, meaning half of the sacrifices partners reported were not recognized by the recipient of the sacrifice. At the same time, about half of the sacrifices that perceivers reported "seeing" were not actually declared by the partner. Thus, partners do not always share the realities in which they live (Fletcher & Kerr, 2010), either by not detecting partners' costly pro-social behaviors or by overclaiming them.

These inaccuracies in perceiving partners' sacrifices importantly affected perceivers' gratitude in response to them. Gratitude was boosted when people had "seen" a partner's

sacrifice, irrespective of whether their partner shared this reality. In stark contrast, missing a partner's sacrifices failed to evoke gratitude. "Seeing" a partner depart from their own self-interest to benefit the partner and relationship (Rusbult & Van Lange, 2003) signals the partner's benevolence and relationship dedication, and thus their worthiness of gratitude (Algoe, 2012). Hence, missing partners' sacrifices are missed opportunities for gratitude to emerge.

Moreover, consistent with previous research (Algoe et al., 2010; Gordon et al., 2011, 2012), our findings showed that a lack of gratitude in turn affected relationship satisfaction. More specifically, *when* a partner sacrificed, missing the sacrifice as compared to accurately detecting this act, undermined perceivers' relationship satisfaction through their missed opportunity to feel grateful. Importantly, missed sacrifices also affected the partner who sacrificed, as the lack of appreciation they perceived from their partner negatively colored their satisfaction with the relationship when they sacrificed but their costly act was missed. Note that the receivers' gratitude more strongly translated into the sacrificers' satisfaction through sacrificers' *feelings* of appreciation (Study 2), as compared to sacrificers' *perceptions* of receivers' appreciation (Study 1). Thus, feeling appreciated may affect relationship satisfaction more directly than merely perceiving the partner express appreciation.

### **Broader Considerations**

Why do people miss so many of their partner's sacrifices? Perhaps, sacrifices are sometimes construed as normative relationship behaviors, not necessarily a departure from self-interest. To explain how misses and false alarms arise, future research could disentangle different motivational processes that could clarify how sacrificers' behaviors and communication may affect distorted perceptions in the perceiver. There may be times when sacrificers are motivated to downplay their behavior (e.g., to cope with the costs they incurred), while at other times they are motivated to "play-up" the behavior (e.g., to induce reciprocity in the perceiver).

Given that sacrifices so often go unnoticed, and fail to elicit gratitude, should partners more clearly communicate their sacrifices to each other? Not necessarily so. There may be, at times, benefits to *not* seeing partners' sacrifices, as encountering conflicts of interests with one's partner can be stressful (Righetti et al., 2016). Also, sacrifices may "smooth" the interaction between partners, and at times, partners may

make sacrifices that perhaps are better held privately (e.g., when they avert getting involved with an attractive alternative partner). Moreover, to elicit gratitude, it may be especially important to communicate and detect sacrifices that seem free from self-interest (Visserman et al., 2018). Future research could explore how to increase accurate sacrifice detection through communication, and when communication would benefit couples or may potentially backfire.

### **Strengths and Limitations**

Although our findings are consistent with a causal sequence in which detecting partners' sacrifices boosts perceivers' gratitude from the previous day, the causal direction of the associations cannot be confirmed. Also, our findings regarding relationship satisfaction in response to missed sacrifices are based on a subset of the data (i.e., misses and hits). Future research could further validate these findings in a larger sample with more missed sacrifices from which to draw. A strength of this work is that it provides an ecologically valid account of perception of sacrifice in daily life, as well as replication of these findings across two Western cultures (United States, the Netherlands), increasing confidence in the generalizability of these findings.

### **Conclusion**

While sacrifices are often assumed to be important to close relationships, an act of sacrifice has only a 50% chance of being accurately detected. Sacrifices are just as likely to be missed, leaving an important opportunity for eliciting gratitude unutilized, and leaving the sacrificing partner dissatisfied. On the bright side, sacrifices can be "seen" and boost perceivers' gratitude even when partners do not declare them. These findings highlight the power that perception holds in construing reality within relationships, and the associated consequences in the daily lives of romantic couples.

### Footnotes

<sup>1</sup> In Study 1, gender interacted with perceived partner gratitude in predicting sacrificers' relationship satisfaction ( $b = -.11$ ,  $SE = .05$ , 95% CI =  $[-.20, -.01]$ ,  $t(197.1) = -2.25$ ,  $p = .026$ ). This association was significant among women ( $b = .12$ ,  $SE = .03$ , 95% CI =  $[.05, .19]$ ,  $t(197.4) = 3.50$ ,  $p = .001$ ), but not among men ( $p = .779$ ).

<sup>2</sup> In Study 1, perceivers' nor partners' relationship satisfaction was significantly predicted in the full detection model ( $ps > .115$ ). In Study 2, perceivers' relationship satisfaction was significantly predicted by hits ( $b = .30$ ,  $SE = .06$ , 95% CI =  $[.18, .42]$ ,  $t(1509.0) = 4.84$ ,  $p < .001$ ) and false alarms ( $b = .35$ ,  $SE = .07$ , 95% CI =  $[.21, .48]$ ,  $t(1428.3) = 5.02$ ,  $p < .001$ ), and marginally predicted by misses ( $b = .10$ ,  $SE = .06$ , 95% CI =  $[-.01, .22]$ ,  $t(1381.5) = 1.74$ ,  $p = .083$ ). Partners' relationship satisfaction was not significantly predicted by hits or false alarms ( $ps > .221$ ), but misses negatively predicted partners' satisfaction ( $b = -.12$ ,  $SE = .06$ , 95% CI =  $[-.24, -.003]$ ,  $t(1369.5) = -2.02$ ,  $p = .044$ ).

<sup>3</sup> Given that gratitude is generally linked with positive affect (e.g., Emmons & McCullough, 2003), we tested whether hits, misses, and false alarms uniquely predicted gratitude, controlling for positive mood (Study 1) and positive emotions (Study 2). In each study, results held when controlling for positive affect.

### Acknowledgments

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### **Supplemental Materials 3.1: Predictors of Sacrifice Detection**

In this Supplemental Material we discuss several potential predictors of sacrifice detection. First, for both studies, we address a potential role of the costs the sacrificer experienced as a predictor of whether perceivers detect sacrifices or miss them. Next, for Study 2 we address the role of the type of sacrifice that is reported or perceived, by first describing how sacrifice descriptions were coded and then by examining whether certain types of sacrifices are more likely to be accurately perceived, missed, or perceived in the absence of the partner reporting on them. Last, for Study 2 we briefly address the role of communication of sacrifice, by exploring whether sacrificers' perceptions of whether the perceiver wanted the sacrifice resulted in perceivers being more likely to accurately pick up on them.

#### **Sacrifice Costs**

In both studies, we explored whether sacrifice costs would predict whether the sacrifice is accurately detected (i.e., hit) or goes unnoticed (i.e., missed). It is plausible that sacrifices that are reported to be more costly by the partner may be more clearly expressed, and therefore may be more likely to be accurately detected by the perceiver.

#### **Study 1**

When partners reported a sacrifice we measured sacrifice costs ("About your sacrifice(s) today... How costly were they for you?"). We conducted a logistic multilevel regression model in which the sacrificer's reports of how costly the sacrifice was to them (i.e., when they reported to have sacrificed) was used as a predictor of whether participants were more likely to hit versus miss the partner's sacrifice (i.e., binary outcome). However, we did not find support for this effect ( $p = .663$ ).

#### **Study 2**

As in Study 1, we measured sacrificers' report of how costly the sacrifice was to them ("I put a lot of time and effort into making this sacrifice"). Again, we ran a logistic multilevel regression analysis to test whether sacrificers' reports of how costly the sacrifice was to them (i.e., when the partner reported on a sacrifice) predicted whether participants were more likely to hit versus miss the partner's sacrifice, but did not find such an effect ( $p = .654$ ).



## Conclusion

To conclude, we did not find support for greater sacrifice costs, as reported by the sacrificer, to result in a greater likelihood for sacrifices to be accurately detected, in either of our studies, suggesting that more costly, substantial sacrifices are not necessarily more visible and accurately detected. It is possible though that we were just not able to pick up on such effect, given that we examined daily sacrifices that are rather uniform in how costly they are (i.e., small, mundane, sacrifices). Plausibly, we could find an effect of sacrifice costs on detecting a sacrifice when comparing daily sacrifices to more major sacrifices (e.g., relocating to accommodate a partner's job opportunity), that is, partners may be more accurate to detect their partner's major sacrifices. However, in our diary data, we do not have many instances of major sacrifices to test this idea.

## Type of Sacrifice

In Study 2 we further investigated the prevalence of hits, misses, and false alarms by exploring whether certain types of sacrifices are more likely to be accurately perceived, missed, or wrongly inferred. We did not have clear a priori predictions, and thus used a data-driven approach to provide some initial insight into how accurately specific types of sacrifices are perceived. If anything, we expected that active sacrifices (i.e., doing something unpleasant) might be more visible than passive sacrifices (i.e., giving up something pleasant), because actively sacrificing requires the enactment of behavior, and therefore might be more likely to be accurately detected than missed.

## Method

**Procedure.** Each day of the diary procedure, if participants indicated that either they or their partner sacrificed, they were asked to provide a brief description of their sacrifice. Two independent coders coded these descriptions on predefined categories, inspired by previous research (Impett, Gable, & Peplau, 2005; Righetti, Gere, Hofmann, Visserman, Van Lange, 2016), and based on earlier exploration of the descriptions by the first author (who was blind to whether the sacrifices were accurately detected, missed, or wrongly inferred). The coders agreed upon most of their categorizations (overall  $K = .75$ ; perceived sacrifices:  $K = .77$ , partner reported sacrifices:  $K = .73$ ), and reached 100% agreement after they discussed the cases in which they disagreed. Note that some sacrifice descriptions were coded into multiple categories, for example when the description contained several prominent elements pertaining to different sacrifice domains. Moreover,

sometimes sacrifices were not described (i.e., left blank) or unidentifiable (two cases) and thus could not be coded. Because of these factors the number of sacrifices across all sacrifice domains do not exactly match the total of sacrifices that can be deduced from Table 2 of the manuscript.

**Description of sacrifice domains.** The two coders were provided with the sacrifice domains as described below, and were instructed to categorize each sacrifice description into one of these domains (or into multiple domains if they were rated to be equally prominent). Additionally, the coders were asked to categorize each sacrifice description into reflecting an “active” or “passive” sacrifice. The first author and the two coders went over these instructions and descriptions together to discuss any questions regarding these categorizations and the coding procedure in general.

***Other relationships.*** Sacrifices related to “other relationships” include giving up seeing one’s friends, family, or other relationships (such as members of the other sex that may feel threatening to the partner). These sacrifices can also be related to the partner’s relationships (e.g., spending time with one’s partner and his/her friends that you don’t really like), or giving up time with one’s partner to invest in other relationships.

***School/work/self-time.*** Sacrifices related to “school/work/self-time” regard investing or spending time on own concerns such as work, studies, hobbies, or other personal activities that place a dilemma on spending time with the partner at the expense of own goals or investing in own goals at the expense of spending time with the partner. *Note.* Sacrifices related to “other relationships” and “school/work/self-time” both indicate the dilemma of whether or not participants spend time and invest in the relationship with their partner versus spending time and investing in other relationships or other personal concerns.

***Coordination.*** Sacrifices related to “coordination” concern *how* to organize time together (i.e., the way to do it), such as when to be together (e.g., postpone dinner time), putting effort (or not) in seeing each other (e.g., driving a long time to see the partner), and how to spend time together (e.g., sleep at partner’s place although you prefer your own place). Also, more generally, these sacrifices may reflect issues regarding lifestyle (i.e., how to do things), how to interact and communicate, and can also concern errands and chores (e.g., cleaning up the house).

**Recreation.** Sacrifices related to “recreation” concern *what* to do when spending time together (i.e., content wise) (e.g., watching a movie versus staying in; which movie to watch). Such sacrifices can also concern what to consume (e.g., what to have for dinner; which restaurant in which they dine). *Note.* Sacrifices related to “coordination” and “recreation” indicate the dilemmas around how couples organize their lives together, that is how to do things and what to do.

**Support/help/favors.** Sacrifices related to “support/help/favors” concern helping and supporting the partner (e.g., staying up late to talk when the other feels down), and doing the partner a favor, such as going out of one’s way to benefit the other (e.g., driving a long way to drop him/her off). These are sacrifices that are not really ‘necessary’ to solve a situation of divergence of interest but are specifically directed at meeting the other’s needs. They can also include health issues (e.g., taking care of the other when sick), changing one’s own behavior (i.e., in favor of the partner), giving gifts or money to the partner, and intimate favors (e.g., pleasing the other when not in the mood). *Note.* Sacrifice related to “support/help/favors” indicate sacrifices that are focused on the other, mostly to please the other (e.g., make life easier or more enjoyable for him/her).

**Active versus passive sacrifices.** Active sacrifices are sacrifices that entail *forgoing* one’s own self-interest by actively “doing something unpleasant” that one does not like to do (e.g. going out with one’s partner’s very boring friends, going to a boring museum because one’s partner asks to do so, cleaning up after one’s partner). Passive sacrifices entail *giving up* one’s own self-interest by “not doing something pleasant” or not doing what one would actually like to do (e.g. not going out with one’s best friend, not watching football on tv, not eating one’s favorite dish). Sometimes sacrifices can be both active and passive, for example when partners want to watch different movies and one highly dislikes the partner’s preferred movie. Watching the partner’s preferred movie then entails both watching a movie one does not like and forgoing one’s own preferred movie. In this case, coders were instructed to categorize a sacrifice as both active and passive. However, they were asked to be selective and by choosing either active or passive if either the active or passive element seemed more prominent (e.g., one seems to especially dislike the partner’s preferred movie, or especially likes one’s own movie).

## Results

First, we separately explored the number of hits, misses, and false alarms within each sacrifice domain, for partner reported sacrifices (i.e., hits and misses; see Table S1) and perceived partner sacrifices (i.e., hits and false alarms; see Table S2). The most commonly reported type of sacrifice pertained to “support/help/favors”, which could be interpreted as sacrificing for the partner specifically. Next in prevalence were sacrifices pertaining to solving issues regarding “coordination”, which broadly speaking solve dilemmas of how to organize couples lives together. Less common were sacrifices pertaining to “recreation” (i.e., what to do together) and “school/work/self-time” (i.e., pitting investing time and effort in one’s own concerns against spending time with the partner). Least often reported were sacrifices pertaining to “other relationships” (i.e., pitting spending time and investing in one’s own relationships against spending time with the partner, or spending time with one’s partner’s family or friends). Regarding “active” and “passive” sacrifices, active sacrifices were almost twice as often reported as compared to passive sacrifices. Thus, most sacrifices entailed doing something unpleasant rather than giving up something pleasant.

Table S1.

*Numbers and percentages of partner reported sacrifices within each sacrifice domain.*

<b>Sacrifice Domain</b>	<b>Sample Item</b>	<b>Number</b>	<b>%</b>
Other Relationships	“Skipped hanging out with (female) friends”	38	9.2
School/Work/Self-Time	“I came home from work early to spend time with her.”	50	12.2
Coordination	“Waited for her for dinner and ate later than I liked”	97	23.6
Recreation	“I went and saw a movie that I particularly didn’t want to see”	50	12.2
Support/Help/Favors	“I gave my time and energy to comfort her in a time of need”	167	40.6
Active	“I started the dinner and washed the dishes when I didn’t want to”	246	59.9
Passive	“Stay inside and in bed and not go outside”	145	35.3

*Note.* Partner reported sacrifices are sacrifices that the partner reported to have made, and therefore reflect hits and misses. Note that the percentages do not add up to 100% because sacrifice descriptions could be categorized into multiple domains.

Table S2.

*Numbers and percentages of perceived partner sacrifices within each sacrifice domain.*

<b>Sacrifice Domain</b>	<b>Sample Item</b>	<b>Number</b>	<b>%</b>
Other Relationships	“He sacrificed a dinner with his parents to be with me.”	34	9.3
School/Work/Self-Time	“He sacrificed a lot of study time to hang out with me”	46	12.6
Coordination	“She woke up early to run an errand one of us would have to do”	83	22.8
Recreation	“He went to a store that I know he has no interest in”	38	10.4
Support/Help/Favors	“He prepared dinner for me in bed.”	170	46.7
Active	“She cleaned up my apartment while I was at work”	248	68.1
Passive	“She took a nap with me when she had to do work”	110	30.2

*Note.* Perceived partner sacrifices are sacrifices that the participant reported to have perceived, and therefore reflect hits and false alarms. Note that the percentages do not add up to 100% because sacrifice descriptions could be categorized into multiple domains.

Next, we examined the number of hits, misses, and false alarms per sacrifice domain. As shown in Table S3, active sacrifices and sacrifices related to “support/help/favors” were more likely to be hit than missed ( $Z$  difference = 2.04,  $p = .041$ ; and 2.24,  $p = .025$ , respectively), and sacrifices related to “recreation” were more likely to be hit than wrongly inferred ( $Z$  difference = 2.16,  $p = .031$ ). All other types of sacrifice were equally hits and misses or hits and false alarms. Thus, actively engaging in sacrificial behavior may increase the likelihood that perceivers detects the sacrifice. It may be more puzzling why sacrifices directed at partners’ well-being (i.e., “support/help/favors”) are more accurately detected. Perhaps these behaviors are more likely to be seen as a sacrifice, as there might be little self-interest perceived. Further, sacrifices related to recreational activities may be less likely to be wrongly inferred, as couples may explicitly discuss these issues; although misses should also be less common in that case, but hits and misses do not significantly differ in prevalence.

Table S3.

*Numbers and percentages of hits, misses, and false alarms within each sacrifice domain.*

Sacrifice Domain	Hit		Miss		False Alarm		Total	
	Number	%	Number	%	Number	%	Number	%
Other Relationships	20	36.4	18	32.7	17	30.9	55	100
School/Work/Self-Time	26	33.8	24	31.2	27	35.0	77	100
Coordination	46	32.9	51	36.4	43	30.7	140	100
Recreation	28 <sub>a</sub>	43.7	22	34.4	14 <sub>a</sub>	21.9	64	100
Support/Help/Favors	98 <sub>a</sub>	39.8	69 <sub>a</sub>	28.1	79	32.1	246	100
Active	139 <sub>a</sub>	38.4	107 <sub>a</sub>	29.6	116	32.0	362	100
Passive	66	37.9	62	35.6	46	26.5	174	100

*Note.* Subscripts (*a*) show whether within a specific sacrifice domain, a sacrifice is significantly ( $p < .05$ ) more or less likely to be hit, missed, or wrongly inferred, contrasted to another detection category. Note that the partner's sacrifice descriptions are used for the calculating the frequencies for hits.

## Conclusion

Our exploration of the types of sacrifices that partners reported to have made as well as perceived their partner to have made showed that sacrifices pertaining to providing support, help, and favors to the partner were most commonly reported, followed by solving issues regarding coordinating couples' lives together. Moreover, active sacrifices were almost twice as likely to occur than passive sacrifices. Related to sacrifice detection, most notably, results suggest that active sacrifices are more likely to be hit than to be missed, plausibly because active sacrifices entail doing something unpleasant (instead of not doing something pleasant) and thus might be more observable. Moreover, sacrifices related to support, help, and favors also seem more likely to be hit than missed, and sacrifices related to recreational activities (e.g., how to spend leisure time together) seem more likely to be accurately perceived than to be wrongly inferred.

## Communication of Sacrifice

It is plausible that sacrifices that are communicated better are more accurately perceived, that is, they are more likely to be detected and less likely to go unnoticed. For example, couples may have talked about the sacrifice or the divergence of interest issue more generally, and this may result in partners being more in tune to each other's needs and sacrificial acts, that result from addressing each other's needs and forgoing one's own

needs. Our data cannot directly address this question, but we have a more indirect measure in Study 2, in which we measured sacrificers' perception of whether their partner "really wanted or needed them to make the sacrifice". Although such measure could arguably also tap into perceived importance of the sacrifice, it could—to some extent—be a proxy for whether couples communicated about a sacrifice.

We conducted a logistic multilevel regression model in which sacrificers' perception of their partner wanting the sacrifice was used as a predictor of whether their partner (i.e., perceivers) were more likely to hit versus miss the sacrifice (i.e., binary outcome). This analysis showed a marginally significant trend, suggesting that the more sacrificers thought their partner wanted the sacrifice, the more likely the sacrifice was accurately detected instead of missed ( $b = .16$ ,  $SE = .10$ , 95% CI =  $[-.03, .35]$ ,  $t(457) = 1.69$ ,  $p = .091$ ).

This is the only lead we have so far on how communication of sacrifice may potentially benefit accurate sacrifice detection, and although promising, it mostly evokes more questions regarding sacrifice communication. Future research could benefit from a more direct approach in tackling this communication process, for example by asking both partners on whether they discussed the sacrifice, or the conflict of interest more generally, and explore more broadly what makes the perceiver think there was a sacrifice. This would not only be interesting as regards to accurate detection, but could also provide more insight into the emergence of false alarms (i.e., what drives perceivers to think that their partner sacrificed?).

## General Discussion

This is the first exploration, of which we are aware, into the role of sacrifice costs, type of sacrifice, and communication of sacrifice in predicting sacrifice detection. Except for some types of sacrifice (e.g., active sacrifices being more likely to be accurately detected than missed), our findings suggest that the (in)accuracy with which partners perceive each other's sacrificial acts seem largely independent from these factors. Future research is needed to replicate these findings to establish how general and robust the occurrence of hits, misses, and false alarms are, and the role of communication of sacrifice and conflicts of interests more generally. Furthermore, future research could also extend these questions to different types of couples (e.g., varying in relationship length, couples with children, older couples).

## CHAPTER 4

### It's the Motive that Counts: Perceived Sacrifice Motives and Gratitude in Romantic Relationships

This Chapter is based on Visserman, M. L., Righetti, F., Impett, E. A., Keltner, D., & Van Lange, P. A. M. (2018). It's the motive that counts: Perceived sacrifice motives and gratitude in romantic relationships. *Emotion*. Advanced online publication.





## Abstract

Gratitude is robustly linked to many positive outcomes for individuals and relationships (e.g., greater life- and relationship satisfaction). However, little is known about how romantic partners come to feel grateful for each other's pro-relational acts, such as when a partner makes a sacrifice. The present research examines how *perceptions* of partner sacrifice motives evoke gratitude. We distinguish between partner, relationship, and self-focused motives, and how they are guided by approach or avoidance orientations. We expected that perceiving a partner to sacrifice for partner-focused approach motives (i.e., to promote the partner's well-being) should evoke gratitude, as this type of motive may signal a genuine departure from self-interest. Moreover, we expected these motives to provoke greater perceptions of partner responsiveness, which should partially explain why they elicit gratitude. In contrast, perceiving a partner to sacrifice for relationship-focused motives (e.g., to promote the well-being of the relationship), or self-focused motives (e.g., to feel good about oneself), should not evoke gratitude—irrespective of an approach or avoidance orientation—as these motives may, to some extent, be perceived as tainted by self-interest. Two studies of romantic couples ( $N = 413$ ), employing diary methods (Studies 1 and 2) and having couples converse about a major sacrifice in the laboratory (Study 2) consistently showed that perceived partner-focused approach motives promote gratitude, and that this association is partly mediated by perceived partner responsiveness. In contrast, relationship and self-focused motives (approach and avoidance oriented) were not associated with gratitude. Implications regarding perceiving and displaying sacrifice motives are discussed.

*Keywords:* Romantic relationships, sacrifice, gratitude, responsiveness, pro-social emotions



*“Let us be grateful to people who make us happy; they are the charming gardeners who make our souls blossom.”*

—Marcel Proust

Gratitude has important implications for people’s individual well-being and their relationships. Feeling grateful from receiving benefits from another person fosters an abundance of positive outcomes for individual well-being, such as greater positive mood, life satisfaction, and physical health (e.g., Emmons & McCullough, 2003; McCullough, Emmons, & Tsang, 2002; Watkins, Woodward, Stone, & Kolts, 2003; Wood, Froh, & Geraghty, 2010). And we are not just grateful for the good deeds of strangers or acquaintances; gratitude is an essential emotion that promotes rewarding outcomes in romantic relationships, such as increased relationship satisfaction and commitment (e.g., Algoe, Gable, & Maisel, 2010; Gordon, Impett, Kogan, Oveis, & Keltner, 2012). While much research has focused on the positive outcomes derived from feeling grateful (e.g., Algoe et al., 2010; Emmons & McCullough, 2003), little is known about the factors that promote gratitude. In romantic relationships, when do we feel most grateful toward our romantic partner?

Clearly, gratitude often emerges when an individual receives benefits from another person. However, gratitude may be influenced not only by the concrete benefits that an individual receives, but also by the perceptions of *why* the benefactor has provided those benefits. For instance, romantic couples inevitably come across situations in which their preferences diverge, and one of the partners may sacrifice his or her preference to benefit the partner or the relationship (Van Lange et al., 1997). When receiving a partner’s sacrifice, the perceptions of the motives underlying the partner’s decision to sacrifice may shape the extent to which people experience gratitude, a notion that we examine in the present investigation.

## **Gratitude**

Gratitude is a positive emotion that people experience in response to an intentionally rendered benefit that is valuable to them, and costly to the benefactor (McCullough, Kilpatrick, Emmons, & Larson, 2001; Tesser, Gatewood, & Driver, 1968). The emotion of gratitude can be defined as a *self-transcendent* emotion—along with compassion, awe, inspiration, elevation, and love—and accordingly is elicited by appraisals of other people’s actions (Stellar et al., 2016). Experiencing gratitude not only promotes receivers’ health

and psychological well-being (for a review see Wood et al., 2010), it is an important social emotion that strengthens social ties—varying from those between strangers, to relationships between colleagues, friends, family members, and romantic partners (Algoe, Haidt, & Gable, 2008; Algoe et al., 2010; Tsang, 2006a). Further, the benefits of gratitude can even extend to third parties such as when people receive a gift or favor and decide to “pay it forward” (Bartlett & DeSteno, 2006; McCullough, Kimeldorf, & Cohen, 2008).

Gratitude is the “social glue” of interpersonal interactions, given the important social functions it fulfills, illustrated by the “find-remind-and-bind” theory of gratitude (Algoe, 2012). The emotional experience of gratitude in response to another’s altruistic act helps people to identify a responsive relationship partner (i.e., to find), to value an established relationship (i.e., to remind), and it functions to strengthen the relationship with this responsive other (i.e., to bind) (Algoe, 2012). Indeed, in the context of established romantic relationships, studies have shown that when people feel grateful toward their partner, they feel more connected, satisfied, and committed to their relationship (Algoe et al., 2010; Gordon, Arnette, & Smith, 2011; Gordon et al., 2012). Moreover, gratitude toward a partner is predictive of actual relationship longevity (Gordon et al., 2012), and fuels relationship maintenance behaviors such as trying to resolve conflict (Kubacka, Finkenauer, Rusbult, & Keijsers, 2011). These studies speak to the consequences of gratitude; little is known about the predictors of gratitude within romantic relationships, the focus of the present investigation.

Given the importance of gratitude for people’s well-being and their relationships, strikingly little is known about how gratitude is elicited. Most studies on gratitude have focused on the experience of gratitude in response to benefits received from unknown or fictional others (e.g., Tsang, 2006a, 2006b), and on gratitude as a general state, or disposition, in which people are appreciative of ‘what they have’ (e.g., McCullough et al., 2002; Watkins et al., 2003), and mostly focused on the outcomes of feeling grateful. Especially in romantic relationships, which are contexts characterized by high interdependence between partners (Rusbult & Van Lange, 2003), and in which the process of give and take is very frequent as partners coordinate a life together (Van Lange et al., 1997), it is of crucial importance to gain a better understanding of how romantic partners come to feel grateful for each other’s pro-relationship behaviors. To our knowledge, the only studies that have examined predictors of experiencing gratitude in romantic relationships have found that people feel more grateful toward their partner when they

perceive their partner to be responsive to their needs (Algoe et al., 2008, 2010; Kubacka et al., 2011), and when they perceive their partner to have invested a great deal in the relationship (Joel, Gordon, Impett, MacDonald, & Keltner, 2013). No prior research has investigated whether gratitude emerges not only in response to observing a partner's pro-relationship behaviors but also in response to the *reasons* why the partner is perceived to have engaged in those behaviors. In the present work, we argue that the perceived motives underlying a partner's sacrifice are one important elicitor of gratitude.

### **Perceived Sacrifice Motives**

Previous research that has examined the reasons why people choose to sacrifice for their romantic partner has distinguished between approach and avoidance motives (for a review, see Day & Impett, 2016). When people sacrifice for approach motives, they focus on trying to bring about positive outcomes in their relationships, such as making their partner happy or increasing intimacy in their relationship. In contrast, when people sacrifice for avoidance motives, they focus on averting negative outcomes, such as feeling guilty, disappointing their partner, or causing conflict in their relationship. Approach motives are associated with increased personal and relationship well-being, whereas avoidance motives are typically associated with lowered personal and relationship well-being (Elliot, Gable & Mapes, 2006; Gable, 2006; Gable & Impett, 2012).

Similarly, when making a relational sacrifice in pursuit of approach motives people typically experience a boost in positive emotions and an increase in relationship quality, whereas pursuing avoidance motives for sacrifice typically increases negative emotions and relationship conflict (Impett, Gable, Peplau, 2005; Impett, Gere, Kogan, Gordon, & Keltner, 2014; Impett et al., 2010). Moreover, people's perceptions of their partner's motives for sacrifice also matter: people typically experience increased well-being and relationship quality when they perceive their partner to sacrifice in pursuit of approach goals, but poorer well-being and relationship quality when they perceive their partner to sacrifice to avoid negative outcomes (Impett et al., 2005).

To investigate when people are most likely to feel grateful for a partner's sacrifice, we propose to go beyond the fundamental distinction between approach and avoidance motives by advancing a distinction based on the perceived focus of the sacrificer's motives. Specifically, we draw on recent research that stresses the importance of disentangling partners' goals and behaviors in reflecting a focus on either the partner, the relationship,

or the self (Fitzsimons, Finkel, & vanDellen, 2015; see also Kelley et al., 2003). We follow this distinction and we propose three types of perceived motives for sacrifice: whether the person who sacrifices is doing so to pursue *partner-focused*, *relationship-focused*, or *self-focused* motives. Crossed with approach and avoidance, we distinguish among six different types of motives: partner-focused approach, partner-focused avoidance, relationship-focused approach, relationship-focused avoidance, self-focused approach, and self-focused avoidance motives.

To illustrate the distinction between these six different kinds of motives, imagine a fictional couple John and Sara. Partner-focused approach motives occur when John perceives Sara to have sacrificed to benefit him (e.g., to make him happy), whereas partner-focused avoidance motives occur when John perceives Sara to have sacrificed to reduce any harm that John might experience (e.g., to prevent him from being upset). Relationship-focused approach motives occur when John perceives Sara to have sacrificed to promote the well-being of the relationship (e.g., to have a harmonious relationship with him), whereas relationship-focused avoidance motives occur when John perceives Sara to have sacrificed to avoid harming the relationship (e.g., to avoid conflict). Finally, self-focused approach motives occur when John perceives Sara to have sacrificed to feel good about herself (e.g., to feel good as a person or as a partner), whereas self-focused avoidance motives occur when John perceives Sara to have sacrificed to avoid feeling bad about herself (e.g., to avoid feeling guilty).

In relation to gratitude, we expected that when people perceive their partner's decision to sacrifice to be driven by partner-focused approach motives, they will feel grateful because their partner seems to want to benefit them specifically. In support of our hypothesis, previous research showed that people are most likely to feel grateful when they perceive the other—often a (newly) acquainted other—to be motivated by benevolent, sincere, and altruistic intentions (Tesser et al., 1968; Tsang, 2006b). People may feel most benefitted by their partner's sacrifice, and construe the sacrifice as a genuine departure from self-interest, when they perceive this prosocial act to be driven by a motivation to specifically benefit their well-being. Thus, they may especially value their partner's sacrifice, which is an important ingredient for the emotion of gratitude to occur (McCullough et al., 2001). Moreover, they may perceive their partner to have their best interest in mind by being responsive to their needs specifically (Algoe et al., 2008; Algoe, 2012; Reis, Clark, & Holmes, 2004), and this should turn on the “gratitude spotlight” as

they identify and remember how valuable their partner is to them, which should trigger a gratitude response (Algoe, 2012). However, partner-focused motives should not elicit gratitude when these motives are avoidance oriented. Even though partner-focused avoidance motives may reflect a concern about the partner's well-being, these motives may not signal direct benefits to the receiver, but instead signal indirect value through the absence of negative end states, which may not be strong enough to elicit gratitude. Furthermore, the avoidant nature of these motives, which is usually linked to negative outcomes, may undermine the positivity of partner-focused motives and, therefore, may not promote gratitude.

In contrast, self-focused motives (whether approach or avoidance oriented) may not be perceived as benevolent, sincere, and altruistic (Tesser et al., 1968; Tsang, 2006b), and therefore may not elicit gratitude. When people perceive their partner to sacrifice for self-focused motives, they may think that their partner's sacrifice is tainted by self-interest and therefore may not feel particularly grateful toward their partner. In fact, recent research showed that when people's costly prosocial acts—such as giving to charity—are perceived to be motivated by selfish intentions (e.g., to feel good about oneself or promote one's reputation), these acts are appreciated even less than when people do not behave charitably at all (Newman & Cain, 2014). Consistent with these findings, perceiving selfish motives when receiving benefits from an acquaintance or fictional other does not lead to gratitude (Tsang, 2006b). In short, perceiving self-focused motives to underlie a partner's decision to sacrifice should not elicit gratitude.

Given the sensitivity of emotional experiences such as gratitude to the intentions that people perceive to underlie others' behaviors (e.g., Tesser et al., 1968; Weiner, 1986), we suggest that even relationship-focused motives may not be strong enough to elicit gratitude. Partners in committed relationships are highly interdependent and form a highly intertwined system (Fitzsimons et al., 2015; Kelley et al., 2003; Rusbult & Van Lange, 2003) and may highly identify with the relationship, as they merge more closely together and become a "self-and-partner-collective" (Agnew, Van Lange, Rusbult, & Langston, 1998; Aron & Aron, 1986). Any investment in the relationship would benefit the sacrificing partner as well, either in the short term (e.g., being able to spend time together), but also in the long term, given the various benefits people derive from being in a well-functioning relationship. For example, when people are in a committed relationship, they typically experience high psychological well-being and happiness



(Kamp Dush & Amato, 2005; Kim & McKenry, 2002), good health and health habits (Holt-Lunstad, Smith, & Layton, 2010; Kiecolt-Glaser & Newton, 2001), and potential for personal growth (Feeney & Collins, 2015; Rusbult, Finkel, & Kumashiro, 2009). In short, relationship-focused motives may also—to some extent—be perceived as tainted by self-interest, as being focused on the relationship may fail to signal a “true” departure from self-interest, and therefore may not elicit gratitude (Tesser et al., 1968). In order to feel grateful, people may need to perceive partner motives that exceed this more general goal of promoting the well-being of the common good that is the relationship (which may be generally expected in communal relationships; Clark, Lemay, Graham, Pataki, & Finkel, 2010), and instead need to perceive the partner to be focused on their needs specifically. Thus, we propose that partner-focused motives are the best—and likely the only—candidate in eliciting gratitude.

### **Perceived Partner Responsiveness**

Perceiving a partner to react supportively to central, core defining features of the self makes people feel understood, valued, and cared for (Reis et al., 2004), and we propose that perceiving a partner as being responsive may help explain why perceived partner-focused approach motives may elicit gratitude. Perceiving a partner’s sacrifice motives to be partner-focused and approach-oriented (i.e., to make them happy) may signal that the partner genuinely cares about one’s well-being, and this may enhance the perception that the partner is responsive to one’s needs and interests (Reis et al., 2004). In turn, perceptions of partner responsiveness promote gratitude (Algoe et al., 2008; Kubacka et al., 2011). Thus, perceptions of partner responsiveness may be an important mechanism by which partner-focused sacrifice motives lead to gratitude. Furthermore, because previous research showed that only partners with high approach motives, as opposed to low avoidance motives, are perceived as responsive (Impett et al., 2010), we expect that only perceived partner-focused approach motives would elicit perceptions of partner responsiveness, and in turn, promote gratitude.

### **Research Overview**

In two studies, we investigated how perceptions of partner-focused, relationship-focused, and self-focused motives (both approach and avoidance) are related to the experience of gratitude for a partner’s sacrifice. We hypothesized that only partner-focused approach sacrifice motives would evoke gratitude, and that this process would be

in part explained by heightened perceptions of partner responsiveness<sup>1</sup>. We tested our hypotheses with two complementary methods.

First, in Studies 1 and 2, we used daily diary methods to provide an everyday account of behaviors, perceptions, and emotions relevant to the relationship. The use of experience sampling methods not only drastically reduces retrospective bias, but it also allows partners to provide reports of ongoing experiences within their natural environment (Bolger, Davis, & Rafaeli, 2003). Furthermore, such methods allow us to examine within-person variation in sacrifice motives as well as links with gratitude and partner responsiveness (Bolger et al., 2003). In particular, we expected that on days when participants perceived their romantic partner to sacrifice for partner-focused approach motives more than they typically do in their relationship, they will also report higher levels of gratitude and partner responsiveness.

Second, in Study 2 we complemented the diary procedure with a laboratory investigation of romantic couples who discussed a major sacrifice in their relationship. This method allowed us to test our hypotheses in a controlled environment, and enables generalization of findings regarding “every day” sacrifices to major sacrifices that partners have made over the course of their relationship.

### Study 4.1

In Study 1 we used a daily diary procedure to capture perceptions of sacrifice motives, partner responsiveness, and feelings of gratitude in a sample of romantic couples each day over an 8-day period. Specifically, we tested our prediction that perceptions of partner-focused approach motives would be positively associated with gratitude, and that this association would be mediated by perceptions of partner responsiveness.

### Method

**Participants.** Participants were 125 heterosexual couples (and one individual whose partner dropped out) and one lesbian couple ( $N = 253$ ) residing in The Netherlands. Participants' mean age was 23.3 years ( $SD = 3.7$ , range = 18 to 43 years), and 64% were university students. Almost all participants were Dutch (93%), and all participants spoke Dutch fluently. On average, couples were involved in their current romantic relationship for 2.8 years ( $SD = 29$  months, range = 4 months to 17 years), and 35% lived together. The data come from a larger project on romantic relationships (see Righetti, Balliet, Visserman, & Hofmann, 2015; Righetti, Gere, Hofmann, Visserman, & Van Lange, 2016;

Righetti et al., 2015, Study 4; Righetti & Visserman, in press; Visserman, Righetti, Kumashiro, & Van Lange, 2016). Originally, 130 couples participated in the study, but one couple broke up before completing the diary portion of the study, and five individuals did not follow the instructions properly.

**Measures and procedure.** In a laboratory intake session, participants were carefully instructed by the experimenter on how to recognize daily sacrifices in their relationship. Sacrifices were explained as forgoing your own preference by doing something that you find unpleasant and that you would not like to do (active sacrifice; e.g. going on a boring outing with your partner's friends), or by giving up something that you find pleasant or would like to do (passive sacrifice; e.g. not going out with your best friend), or a combination of the above (e.g., giving up spending time with your friends to go on a boring outing with your partner's friends). In addition, participants received a booklet with definitions and examples of sacrifice, as well as instructions for completing the diary.

The first Saturday after the laboratory session, participants started the diary procedure. They received a link to a short survey every evening on their mobile phone (using the SurveySignal application; Hofmann & Patel, 2015) for eight days (two blocks of four days with one rest day in between on Wednesday). In general, participants responded to 87.6% of the daily surveys ( $M = 7.35$  out of 8 days). On each day, they were asked whether they had encountered a situation of divergence of interest with their partner. Participants were then asked whether their partner had sacrificed his or her preference that day. On average, participants reported their partner to have sacrificed on 1.91 days ( $SD = 1.73$ , ranging from 0 to 7 days). Relevant to the current investigation, participants responded to questions regarding the motives underlying their partner's daily sacrifices, as well as their perception of their partner's responsiveness and how grateful they felt toward their partner, all measured on a 7-point scale (0 = *not at all* to 6 = *very much*). All diary measures were assessed with a single item in order to minimize participant fatigue and reduce attrition (Bolger et al., 2003).

To measure perceptions of a partner's *sacrifice motives*, participants were first asked, each day, whether their partner had made a sacrifice for them. If they replied that their partner sacrificed, they also answered a series of questions designed to assess their perceptions of their partner's motives for sacrifice. Participants indicated the extent to which each of the six different reasons motivated their partner's decision to sacrifice, including: "to make you happy" (partner-focused approach), "to avoid you being upset

(angry or sad)” (partner-focused avoidance), “to maintain an harmonious relationship with you” (relationship-focused approach), “to avoid damaging your relationship” (relationship-focused avoidance), “to feel good about him/herself” (self-focused approach), and “to not feel bad (e.g., guilty or ashamed)” (self-focused avoidance). Importantly, in accordance with the main goal of the present research, the above items were designed to distinguish between partner-focused, relationship-focused, and self-focused motives for sacrifice, as well as between approach and avoidance motives.

Each day, we assessed each participants’ perceptions of their partner’s responsiveness and their gratitude, irrespective of whether participants had perceived their partner to have sacrificed. To measure *responsiveness*, we asked participants to answer the question: “I feel that my partner supports me”; *gratitude* was assessed with the item: “I feel very grateful to my partner.” See Table 1 for means, standard deviations, and correlations among all variables. Given that gratitude is linked with positive emotions in general (e.g., Emmons & McCullough, 2003), we measured positive mood (“I’m in a positive mood”) to examine our effects above and beyond a general positive state.

Table 1.

*Means, standard deviations, and correlations among all variables in Study 1*

Variables	1	2	3	4	5	6	7	8
1. Gratitude	4.99 (.67)							
2. Responsiveness	.45***	4.92 (.70)						
3. Partner-focused approach	.11*	.17**	4.25 (.95)					
4. Partner-focused Avoidance	-.17**	-.14*	.15**	2.46 (1.20)				
5. Relationship-focused Approach	-.06	-.06	.16**	.25***	3.06 (1.17)			
6. Relationship-focused Avoidance	-.15**	-.18**	-.05	.44***	.33***	1.80 (1.02)		
7. Self-focused Approach	.02	.003	.009	.04	.20***	.15**	2.15 (.96)	
8. Self-focused Avoidance	-.15**	-.15**	-.03	.34***	.32***	.44***	.16**	1.94 (1.11)

*Note.* Correlations represent daily within-person correlations (i.e., correlated fluctuations within participants), and do not take the dyadic structure of the data (i.e., nesting within dyads) into account. Means and standard deviations (between parentheses) are displayed on the diagonal (scale range: 0-6), and are calculated based on within-person averages across the diary, thus the standard deviations reflect the within-person variability of each variable.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

## Results

Multilevel-modeling was used to take into account the occurrence of multiple measurement occasions within participants, and the nesting of participants within couples (Kenny, Kashy, & Cook, 2006), using SPSS v.22. We employed a 2-level cross model in which participants and the daily measurements within participants (i.e., time) were treated as crossed and nested within the dyad. Furthermore, intercepts were allowed to randomly vary, whereas slopes were treated as fixed effects. Dyads were treated as indistinguishable unless gender moderated the effects (Kenny et al., 2006)<sup>2</sup>, in which case we report the different effects for men and women in a footnote<sup>3</sup>.

To test for mediation, we used the Monte Carlo Method for Assessing Mediation (MCMAM), using unstandardized estimates. This simulation method shows 95% confidence intervals for the indirect effects using 20,000 simulations (Selig & Preacher, 2008). The confidence interval is significant at  $p < .05$  when it does not include the value of zero<sup>4</sup>.

In all analyses, predictors were within-person centered (Enders & Tofighi, 2007), such that all daily effects assessed whether day-to-day changes from a participant's own mean in perceived partner sacrifice motives were associated with corresponding changes in partner responsiveness and gratitude<sup>5</sup>. We tested models in which we entered all six sacrifice motives simultaneously as predictors of the daily outcomes so that we could examine unique effects of each motive controlling for the others.

As predicted, partner-focused approach motives were positively associated with gratitude (see Table 2). Furthermore, partner-focused avoidance motives were negatively associated with gratitude ( $b = -.07$ ,  $SE = .03$ , 95% CI =  $[-.14, -.01]$ ,  $t(284.35) = -2.30$ ,  $p = .022$ ). That is, on days when participants perceived their partner to have sacrificed to make them happy more than they typically did across the 8-day study, the more grateful they reported feeling on that day. Further, on days when participants perceived their partner to have sacrificed to prevent them from becoming upset, the less grateful they felt on that day. None of the other sacrifice motives were significantly associated with daily gratitude ( $ps$  ranged from .112 to .832). Note that these associations held when controlling for positive mood (e.g., the association between partner-focused approach motives and gratitude:  $b = .09$ ,  $SE = .04$ , 95% CI =  $[.02, .16]$ ,  $t(288,56) = 2.43$ ,  $p = .016$ ).

Table 2.

*Associations between perceived partner-focused approach motives and gratitude, mediated by perceived partner responsiveness*

<b>Study 1 Diary</b>	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Partner-focused approach:						
Responsiveness	.13	.04	.05, .21	288.80	3.30	.001
Gratitude <i>Total effect</i>	.08	.04	.01, .15	291.34	2.38	.018
<i>Direct effect</i>	.05	.03	-.02, .12	290.30	1.44	.152
<i>Indirect effect</i>			[.01, .06]			
<b>Study 2 Conversation</b>	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Partner-focused approach:						
Responsiveness	.24	.12	.01, .48	148.00	2.02	.046
Gratitude <i>Total effect</i>	.35	.13	.08, .62	145.05	2.60	.010
<i>Direct effect</i>	.17	.10	-.03, .36	143.80	1.72	.088
<i>Indirect effect</i>			[.01, .39]			
<b>Study 2 Diary</b>	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
Partner-focused approach:						
Responsiveness	.38	.08	.24, .53	290.01	5.11	.001
Gratitude <i>Total effect</i>	.38	.08	.22, .53	311.07	4.78	.001
<i>Direct effect</i>	.23	.08	.07, .39	301.26	2.86	.005
<i>Indirect effect</i>			[.08, .24]			

*Note.* Between brackets are 95% confidence intervals using the MCMAM to test the indirect effect of perceived partner-focused motives on gratitude mediated by perceived partner responsiveness.

Next, we examined the effects of the six sacrifice motives on partner responsiveness. Again, as expected, partner-focused approach motives were positively associated with partner responsiveness (see Table 2). Further, partner-focused avoidance motives were negatively associated with partner responsiveness ( $b = -.09$ ,  $SE = .04$ , 95% CI =  $[-.16, .01]$ ,  $t(290.09) = -2.31$ ,  $p = .022$ ). Thus, on days when participants perceived their partner to have sacrificed to make them happy, more so than they typically did, they perceived their partner to be more responsive. In addition, on days when participants perceived their partner to sacrifice to prevent them from becoming upset, they perceived their partner to be less responsive. None of the other sacrifice motives were significantly associated with partner responsiveness ( $ps$  ranged from .331 to .644).

Next, we tested our hypothesis that partner responsiveness would mediate the association between partner-focused motives and daily gratitude. Indeed, in a model in which we simultaneously entered all six sacrifice motives and partner responsiveness, partner responsiveness was positively associated with gratitude ( $b = .26$ ,  $SE = .05$ , 95% CI = [.18, .35],  $t(353.15) = 5.83$ ,  $p < .001$ ). That is, on days when participants perceived their partner to be responsive more so than they typically did, they felt more grateful for their partner. Moreover, partner responsiveness mediated the association between partner-focused approach motives and gratitude (see Table 2), and between partner-focused avoidance motives and gratitude (indirect effect: 95% CI = [-.05, -.004]; direct effect:  $b = -.05$ ,  $SE = .03$ , 95% CI = [-.11, .01],  $t(280.68) = -1.70$ ,  $p = .091$ ). So indeed, on days when participants perceived their partner to have sacrificed to make them happy more than they typically did, they felt more grateful, at least in part because they perceived their partner to be more responsive. In addition, when perceiving their partner to sacrifice to avoid them being upset, they perceived them to be less responsive, and in turn, felt less grateful.

## Discussion

Study 1 revealed that when people perceived their romantic partner make a daily sacrifice in pursuit of partner-focused approach motives (i.e., to promote their happiness), they experienced increased gratitude toward their partner. Moreover, participants perceived their partner to be more responsive when they perceived them to sacrifice in pursuit of partner-focused approach motives, and this, in turn, promoted gratitude<sup>6</sup>. In contrast, perceiving the partner to sacrifice for partner-focused avoidance motives (i.e., to prevent them from becoming upset) yielded opposite results, that is, participants perceived their partner to be less responsive and felt less grateful toward them. As expected, neither relationship-focused nor self-focused motives were associated with participants' daily gratitude toward their partner, suggesting that it is indeed only the partner-focused motives that elicit gratitude.

## Study 4.2

Study 2 extended Study 1 in several important respects. First, we sought to replicate Study 1's findings by conducting another daily diary study of sacrifice in romantic relationships. Second, in addition to providing a replication of the effects, we also sought to extend the results regarding naturally-occurring, daily sacrifices by inviting couples into the laboratory to participate in discussions about important, larger sacrifices that they have made for each other over the course of their relationship. A third extension of Study 2 was to examine the generalizability of the findings to a different western culture; while Study 1 was conducted in The Netherlands, Study 2 was conducted in the United States.

### Method

**Participants.** Participants were 75 heterosexual couples, four lesbian couples, and one gay male couple ( $N = 160$ ), recruited from the San Francisco Bay Area (California, US). Participants' mean age was 23.9 years ( $SD = 6.4$ , range = 18 to 60 years), and about half of the participants were university students. Participants were characterized by a diverse range of ethnic backgrounds: 53% were European or European American, 18% were Chinese or Chinese American, 8% were African or African American, 4% were Mexican or Mexican American, and 17% were of other ethnicities; all spoke English fluently. On average, couples were involved in their current romantic relationship for 1.3 years ( $SD = 44$  months, range = 6 months to 30 years), and 48% lived together. The data come from a larger project on romantic relationships (see Impett et al., 2010, 2012, 2014).

**Measures and procedure for the laboratory conversation.** First, participants attended a laboratory session in which romantic partners took turns discussing "the most important or meaningful sacrifice that you have made over the course of your relationship." The sacrifices that partners discussed varied across a large spectrum of issues representing conflicts of interest in their relationship, such as spending time alone, sacrificing interpersonal relationships, relocating to a new city, and turning down potential lucrative job offers in other geographical regions. The mean length of the discussions was 3 min, 28 s ( $SD = 1$  min, 23 sec; range = 1 min, 14 s to 5 min, 4 s). The speaking order for the conversations was randomly assigned through a coin flip. Immediately following each of the conversations, participants answered a series of questions, all on 7-point scales (1 = *not at all* to 7 = *a lot*).



Table 3.

Means, standard deviations, and correlations among all variables in Study 2's lab conversation (a) and daily diary (b)

Variables	1.a	1.b	2.a	2.b	3.a	3.b	4.a	4.b	5.a	5.b	6.a	6.b	7.a	7.b	8.a	8.b
1. Gratitude	5.09 (1.76)	3.96 (.72)														
2. Responsiveness	.74***	.50***	5.32 (1.60)	3.73 (.82)												
3. Partner-focused approach	.34***	.32***	.34***	.46***	5.42 (1.57)	3.54 (.70)										
4. Partner-focused avoidance	.09	-.03	.04	-.06	.59***	.31***	4.52 (1.90)	2.46 (.78)								
5. Relationship-focused approach	.30***	.24***	.40***	.43***	.63***	.39***	.34***	.10	4.88 (1.76)	2.28 (.69)						
6. Relationship-focused avoidance	.002	-.09	-.04	-.16**	.24**	.10†	.66***	.63***	.24**	.09	4.05 (2.06)	2.04 (.72)				
7. Self-focused approach	.27**	.06	.18*	.15*	.33***	.26***	.24**	.17**	.32***	.22***	.18*	.12†	3.34 (1.54)	2.26 (.49)		
8. Self-focused avoidance	.03	-.08	-.11	-.16*	.15†	.05	.46***	.50***	.07	-.03	.59***	.55***	.31***	.21***	3.09 (1.77)	1.87 (.58)

*Note.* Correlations do not take the dyadic structure of the data (i.e., nesting within dyads) into account. Means and standard deviations (between parentheses) for the laboratory conversation (scale range: 1-7) and the daily diary (scale range: 1-5) are displayed on the diagonal. In the daily diary, correlations represent daily within-person correlations (i.e., correlated fluctuations within participants), and means and standard deviations are calculated based on within-person averages across the diary, thus the standard deviations reflect the within-person variability of each variable.

† $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Perceptions of *sacrifice motives* were measured with 12 items in total, with two questions for each of the six subscales, including: “to make me happy” and “to make me feel loved” (partner-focused approach;  $\alpha = .78$ ); “to prevent me from feeling upset” and “to prevent me from feeling let down” (partner-focused avoidance;  $\alpha = .78$ ); “to increase intimacy in our relationship” and “to create more satisfaction in our relationship” (relationship-focused approach;  $\alpha = .82$ ); “to avoid conflict in our relationship” and “to avoid tension in our relationship” (relationship-focused avoidance;  $\alpha = .86$ ); “to feel good about him/herself” and “to feel like he/she is a caring person” (self-focused approach;  $\alpha = .50$ )<sup>7</sup>; and “to avoid feeling guilty” and “to avoid feeling selfish” (self-focused avoidance;  $\alpha = .68$ ). Perceptions of *partner responsiveness* were measured by having participants indicate the extent to which they felt “cared about/loved/connected” to their partner; and *gratitude* was measured by having participants indicate the extent to which they felt “grateful/appreciative/ thankful” after the discussion about their partner’s sacrifice (see also Algoe et al., 2010; Gordon et al., 2012). See Table 3 for means, standard deviations, and correlations among all variables.

**Measures and procedure for the daily diary.** After the laboratory session, participants began the 14-day diary procedure (through surveymonkey.com), in which they received a short survey at the end of each day. Each day, participants indicated whether their partner had made a sacrifice for them by actively “engaging in something they did not particularly want” or passively “giving up something they did want.” In general, participants responded to 83.6% of the daily surveys ( $M = 11.7$  out of 14 days), and reported partner sacrifices on 2.49 (out of 14) days on average ( $SD = 2.65$ , range = 0 to 12 days). Relevant to the current investigation, participants completed measures of perceptions of their partner’s sacrifice motives, daily perceived partner responsiveness, and daily gratitude, all measured on 5-point scales (1 = *not at all* to 5 = *a lot*).

Perceptions of *sacrifice motives* were measured with the same items as in the laboratory session, with the addition of one item to measure self-focused approach motives (“to gain my appreciation”)<sup>6</sup>. Because items were measured within participants over time, we calculated within-person reliability of the items representing each subscale (indicated by  $Rc$ ; Bolger & Laurenceau, 2013). Except for self-focused approach motives ( $Rc = .44$ ), the items reliably represented the other five

subscales: partner-focused approach ( $R_C = .71$ ), partner-focused avoidance ( $R_C = .74$ ), relationship-focused approach ( $R_C = .68$ ), relationship-focused avoidance ( $R_C = .84$ ), and self-focused avoidance ( $R_C = .77$ ). Each day, we measured participants' perceptions of their partner's responsiveness and their gratitude toward their partner, irrespective of whether participants had perceived their partner to have sacrificed. *Responsiveness* was measured with the same item as in the laboratory session (i.e., to which extent participants felt "cared about/loved/connected" to the partner), as was *gratitude* toward the partner (i.e., the extent to which they felt "grateful/appreciative/thankful" for their partner's sacrifice). See Table 3 for means, standard deviations, and correlations among all variables. Similar to Study 1, we measured positive emotions ("happy/pleased/joyful") in both the laboratory conversation and daily diary to be used in control analyses.

## Results

**Laboratory conversation.** Since both partners in the couple provided data, we analyzed the data using multilevel modeling to account for the fact that partners' responses are not independent (Kenny et al., 2006). We used a 2-level model where partners are nested within the dyad. Intercepts were allowed to randomly vary, and slopes were treated as fixed effects. Dyads were treated as indistinguishable, as gender did not moderate any of our findings (Kenny et al., 2006). As in Study 1, we used models in which we entered all six sacrifice motives simultaneously as predictors of the outcomes so that we could examine the unique effects of each motive controlling for the others. Furthermore, we used the MCMAM simulation method to assess mediation<sup>4</sup>.

As predicted, partner-focused approach motives were positively associated with gratitude (see Table 2). The more that participants thought that their partner sacrificed to make them happy, the more gratitude they reported feeling during the conversation in the laboratory. None of the other motives predicted gratitude ( $p$ s ranging from .223 to .842), except for a marginally significant positive association between the self-focused approach motives and gratitude ( $b = .19$ ,  $SE = .09$ , 95% CI = [-.004, .38],  $t(146.40) = 1.93$ ,  $p = .055$ )<sup>6</sup>. Note that these associations held when controlling for positive emotions (e.g., the association between partner-focused approach motives and gratitude:  $b = .22$ ,  $SE = .11$ , 95% CI = [.01, .42],  $t(134.74) = 2.04$ ,  $p = .043$ ).

Next we examined the effects of the six sacrifice motives on perceived partner responsiveness. Again, as expected, partner-focused approach motives were positively associated with partner responsiveness (see Table 2). In addition, relationship-focused approach motives were also significantly associated with partner responsiveness ( $b = .24$ ,  $SE = .09$ , 95% CI = [.06, .42],  $t(147.83) = 2.68$ ,  $p = .008$ ). Thus, the more participants perceived their partner to have sacrificed to make them happy, and the more they perceived them to sacrifice to promote the well-being of the relationship, the more they perceived them to be responsive during the conversation. None of the other motives were associated with partner responsiveness ( $p$ s ranging from .221 to .914).

Next, we tested the hypothesis that partner responsiveness mediates the association between partner-focused approach motives and gratitude. Indeed, in a model in which we simultaneously entered all six sacrifice motives and partner responsiveness, we found that partner responsiveness was positively associated with gratitude ( $b = .80$ ,  $SE = .07$ , 95% CI = [.67, .93],  $t(143.31) = 12.05$ ,  $p < .001$ ), and mediated the association between partner-focused approach motives and gratitude (see Table 2). Thus, when participants perceived their partner to sacrifice to make them happy, they felt more grateful during the conversation, at least in part because they perceived them to be more responsive.

**Diary.** As in Study 1, we analyzed the data with multilevel modeling, to account for the nesting of daily measurements within participants, and participants within dyads (Kenny et al., 2006). Predictors were within-person centered (Enders & Tofighi, 2007), and intercepts were allowed to vary randomly whereas slopes were treated as fixed effects. As in Study 1, dyads were treated as indistinguishable, unless the effects were moderated by gender. When effects were moderated by gender, we also report different effects for men and women in a footnote<sup>8</sup>. As in previous analyses, we used models in which we entered all six sacrifice motives to test unique effects of each motive controlling for the others. And, again, we used the MCMAM simulation method to assess mediation<sup>4</sup>.

As predicted, partner-focused approach motives were positively associated with gratitude (see Table 2). Thus, on days when participants perceived their partner to sacrifice to make them happy, more so than they typically did across the 14-day study, the more gratitude they reported feeling. None of the other motives significantly

predicted daily gratitude ( $ps$  ranging from .104 to .769). Note that these associations held when controlling for positive emotions (e.g., the association between partner-focused approach motives and gratitude:  $b = .22$ ,  $SE = .11$ , 95% CI = [.01, .42],  $t(134.74) = 2.04$ ,  $p = .043$ ).

Next, we examined the effects of the six sacrifice motives on partner responsiveness. As predicted, results showed that partner-focused approach motives were positively associated with partner responsiveness (see Table 2). Relationship-focused approach motives were also positively associated with partner responsiveness ( $b = .36$ ,  $SE = .08$ , 95% CI = [.21, .50],  $t(293.33) = 4.75$ ,  $p < .001$ ). Thus, on days when participants perceived their partner to have sacrificed to make them happy, and on days when they perceived their partner to have sacrificed to promote the well-being of the relationship, more than they usually did, they perceived their partner to be more responsive. None of the other motives significantly predicted daily partner responsiveness ( $ps$  ranging from .476 to .795), except for a marginally significant negative association between the relationship-focused avoidance motives and partner responsiveness ( $b = -.16$ ,  $SE = .08$ , 95% CI = [-.32, .01],  $t(306.26) = -1.85$ ,  $p = .065$ ).

Next, to examine whether partner responsiveness mediates the association between partner-focused approach motives and gratitude, all six sacrifice motives and partner responsiveness were simultaneously entered in a model to predict gratitude. Results showed that partner responsiveness was positively associated with gratitude ( $b = .39$ ,  $SE = .07$ , 95% CI = [.25, .53],  $t(305.31) = 5.36$ ,  $p < .001$ ), and mediated the association between partner-focused approach motives and gratitude (see Table 2). Thus, indeed, on days when participants perceived their partner to have sacrificed to make them happy more so than they typically did, they felt more grateful, at least in part because they perceived their partner to be more responsive.

## Discussion

Study 2 provided additional support for our prediction that perceived partner-focused approach motives elicit greater perceptions of partner responsiveness, which in turn, elicit gratitude. As in Study 1, results from a daily diary procedure and couples' conversations in the laboratory revealed that gratitude emerged when people perceived their partner to have sacrificed to promote their happiness (i.e., partner-

focused approach motives). However, relationship and self-focused motives were not significantly associated with gratitude. Although relationship-focused approach motives were positively associated with perceived partner responsiveness in both the daily diary procedure and laboratory conversations, they did not predict gratitude. These findings were replicated in a different sample (i.e., North American sample), and replicated in an additional daily diary procedure, as well as in a laboratory discussion about a partner's major sacrifice.

### **General Discussion**

The present research investigated how gratitude emerges when a romantic partner makes a sacrifice. In two daily diary studies regarding “minor” sacrifices (Studies 1 and 2), and couples' conversations regarding “major” sacrifices in the laboratory (Study 2), we examined the role of perceived partner sacrifice motives in shaping gratitude for a partner. In line with previous research showing the importance of intentions that signal genuine departures from self-interest (e.g., Tesser et al., 1968; Tsang, 2006b), our results revealed that gratitude was only reliably evoked when participants perceived their partner to have sacrificed for partner-focused approach motives. Perceiving their partner to be interested in promoting one's own well-being induced participants to perceive their partner as highly responsive to their needs and interests (Reis et al., 2004) and in turn to feel grateful.

However, in accordance with literature showing that avoidance motives undermine personal and relationship well-being (e.g., Elliot et al., 2006; Impett et al., 2005), and perceptions of responsiveness (Impett et al., 2010), perceiving the partner to be partner-focused to avoid negative end states did not promote perceptions of responsiveness and gratitude. Furthermore, and in line with recent findings showing that people do not appreciate prosocial behaviors that are tainted by self-interest (Newman & Cain, 2014), perceptions of self-focused motives (e.g., to feel good about oneself or not feel guilty) and even perceptions of relationship-focused motives (e.g., to promote the well-being of the relationship or prevent harming the relationship) did not elicit gratitude. Although we did observe positive associations between perceptions of relationship-focused motives and perceptions of partner responsiveness in Study 2,

this finding was not consistent across studies. Moreover, perceptions of self-focused motives were not related to perceived partner responsiveness in either of the studies.

The costly prosocial behavior of sacrifice has the potential to promote the well-being and maintenance of romantic relationships (Van Lange et al., 1997). Presumably, partners feel grateful for each other's relationship investments, and this is an important factor in promoting further pro-relationship behaviors (Gordon et al., 2012; Kubacka et al., 2011) and in promoting the well-being of relationships (e.g., Algoe et al., 2010; Gordon et al., 2011). However, sacrifices can be made for very different reasons, and our results show that people's perceptions of what motivates their partner to sacrifice impact how grateful they feel. Importantly, our findings show that the experience of gratitude is only promoted when people perceive their partner's sacrifices as being motivated to "serve them" (i.e., partner-focused), and not when they are perceived as being motivated to serve the relationship in general or themselves. Even when couples discussed a partner's major sacrifice (Study 2), participants did not feel more grateful when perceiving their partner to be motivated by a relationship- or self-focus, but only when perceiving a partner to be focused on them specifically.

Why may it be that perceptions of relationship-focused approach motives for sacrifice do not enhance gratitude? It may not be surprising that sacrifices that are perceived to be driven by self-focused motives do not elicit gratitude, as these motives are self-interested in nature (Newman & Cain, 2014). However, it may be less intuitive that relationship-focused motives also do not elicit gratitude. The motivation to benefit the relationship may be perceived as investing in the "self-and-partner-collective" and thereby also serving the sacrificing partner (i.e., because of the various short- and long term benefits one receives from the relationship; e.g., Kiecolt-Glaser & Newton, 2001). For this reason, relationship-focused motives may also—to some extent—seem tainted by self-interest. To enhance feelings of gratitude people may need to infer partner-focused motives, relatively free from self-interest (e.g., Tesser et al., 1968). Thus, it may take more than "just" perceiving a partner's pro-relationship dedication as this may not be sufficient to elicit gratitude.

## **Broader Implications**

Gratitude is the glue that allows us to find close others, bind us to them, and remind us of the value and importance of these relationships (Algoe, 2012), and accordingly, has important implications for the well-being of those who feel grateful, as well as for the well-being of their relationship (e.g., Algoe et al., 2010). Perceiving a partner to be motivated to benefit one's well-being, to have one's best interests in mind and be responsive to one's needs triggers gratitude, as these perceptions importantly identify the partner as a responsive partner and serve as reminder of how valuable they are (Algoe, 2012).

Given that gratitude serves social functions in various types of relationships, ranging from strangers, co-workers, to close others (e.g., Algoe et al., 2008; Tsang, 2006a), we believe that perceiving a benefactor to behave prosocially by specifically having one's best interests in mind should trigger gratitude in any type of relationship. However, there may be factors distinguishing the threshold for gratitude to emerge. Our findings suggest that people may need to perceive their partner to exceed the general goal of promoting the relationship, which may generally be expected in communal relationships (Clark et al., 2010). Future research could examine the role of communal versus exchange orientations (Clark & Mills, 1979), and hence the expectations that people hold about the sacrifices their partners make (e.g., how often, for what reasons), and whether these expectations match their observations of their partner's motives and behaviors. Such research could reveal whether relationship-focused approach motives can elicit gratitude under certain circumstances. For example, in relationships that are characterized by an exchange orientation or low levels of closeness (e.g., in a business context), people may more easily come to feel grateful for others' prosocial behaviors when they perceive the other person to be focused on 'the common good' (i.e., relationship-focused motives), as in these relationship contexts the norm to behave in a prosocial manner may be less strong; expectations may be more easily exceeded and prosocial behaviors may be more easily appreciated.

What about the actual motives that drove the partner to sacrifice? In the present research we examined the perceptions that people have regarding their partner's motives, which may not necessarily reflect the partner's actual motives for sacrifice<sup>9</sup>. Individuals may be biased in their perception of a partner's motives, and thus may



overestimate or underestimate their partner's benevolent intentions (e.g., Fletcher & Kerr, 2010). Future research could examine who is especially likely to feel grateful and who may be at risk for not feeling grateful. For example, romantic partners usually have a more pronounced positive bias in their perceptions of each other in the early stages of the relationship (e.g., Fletcher & Kerr, 2010), and may be prone to infer partner-focused motives even when they are not really there ("love is blind"). On the contrary, people may be less inclined to infer such motives when they do not have sufficient trust or self-esteem to believe that a partner is making these sacrifices for them (e.g., Collings & Feeney, 2004; Murray, Holmes, MacDonald, & Ellsworth, 1998). As such, perceived motives for sacrifice in relationships is a topic that sheds light on the importance of partners' display of their motives and the attributions partners make about each other's motives. This communication process could importantly impact partners' emotional experiences—and eventually may help explain why some relationships grow and become more vital, while others decline.

The current findings imply that gratitude emerges only selectively, that is only when perceiving a partner to sacrifice to promote one's happiness. Thus, not to lose the opportunity to feel grateful, it would be adaptive if people would perceive these motives. This would require the perceiving partner to be *attentive* to these motives, and, for the partner to *express* these motives in order for the perceiving partner to pick up on them. In turn, the perceiving partner, feeling grateful for the partner's sacrifice, could express his or her gratitude, thereby fueling further pro-relationship processes (Kubacka et al., 2011). In contrast, failing to feel grateful and not expressing feelings of gratitude may disrupt this process, and the glue that could strengthen the relationship might be unutilized. For example, the sacrificing partner may not feel acknowledged for making a (costly) relationship investment; he or she may feel disappointed, and may feel less motivated to do so again. Future research could explore whether failing to acknowledge and express gratitude for a partner's prosocial behaviors could detract from relationship well-being, especially when these behaviors are specifically intended to benefit the other's well-being.

The present research is one of the first in the literature on close relationships to examine perceptions of the motives underlying prosocial behavior. In particular, Interdependence Theory (Kelley & Thibaut, 1978; Rusbult & Van Lange, 2003) has touched upon this topic, describing sacrifice as a typical example of a prosocial act that

requires *transformation of motivation*, that is, going beyond short term self-interest (Van Lange et al., 1997). In this literature, a partner-focus would be characterized as maximizing a partner's outcomes, and relatedly, is described as a pro-partner transformation of motivation. A relationship-focus is characterized by maximizing joint outcomes (the relationship), and a self-focus is characterized by maximizing own outcomes. The present findings contribute to this literature by providing initial evidence that perceived transformations—pro-partner versus pro-relationship or pro-self—may shape important psychological processes that are relevant to future interaction. In particular, attributing pro-partner motives for a partner's sacrifice is crucial to the experience of gratitude, which may be important to strengthening trust and commitment in the relationship (e.g., Wieselquist, Rusbult, Foster, & Agnew, 1999).

### **Strengths and Limitations**

Before closing, we address some strengths and limitations of the present research, as well as directions for future research. A major strength of the current work is that we employed daily experience studies which allowed us to examine sacrifices in the daily lives of romantic couples. This research method helped us to provide insight into the everyday, naturally-occurring experiences of romantic partners and how they are associated with perceptions of each other's motivations in these sacrifice situations. Another major strength of the present research is the replication of our findings across studies: findings were replicated in similar settings (both studies used daily diary procedures), as well as across different research settings (in a laboratory conversation about a partner's major sacrifice). Furthermore, in Study 2, we extended the findings to the context of major sacrifices that partners had made over the course of their relationship (e.g., when one partner decides to relocate to a different city for the other to take a new job). Finally, our findings provide some evidence for generalizability across two different western cultures (The Netherlands, USA).

A limitation of the present research is that the findings are correlational, and definitive causal conclusions cannot be drawn. Although we find daily variation in perceptions of a partner's sacrifice motives to be associated with daily changes in perceived partner responsiveness and gratitude, future research could employ

experimental procedures (e.g., manipulate perceptions of partners' sacrifice motives) to draw firm causal conclusions. Future research could also disentangle experiences of gratitude as a result of perceiving a partner's sacrifice—and the partner's motives—as compared to when a partner has not sacrificed at all. In the present research we examined perceptions of a partner's sacrifice motives in the presence of conflicts of interest. Yet sometimes, pro-partner motives are displayed in a spontaneous manner, in the absence of conflicting interests—for example, when a partner spontaneously brings home some flowers as a present. One intriguing question for future research is how feelings of gratitude come into being when there is no conflict of interest, above and beyond how much gratitude people typically experience for their partner.

### **Concluding Remarks**

Close relationship partners inevitably encounter situations in which their preferences diverge, thereby challenging their willingness to sacrifice. The results of this research suggest that people are most likely to feel grateful for their partner's sacrifices—whether they are “minor” or relatively more “major”—when they perceive their partner to be guided by partner-serving motives (i.e., to make them happy), rather than self-serving or relationship-serving motives. The present findings add credence to the claim that it may not be the sacrificial act per se that matters. Even in the context of close relationships, partners seem to operate as intuitive psychologists, seeking to understand behavior in terms of interpersonal motives. And such attributions, however implicit, have a profound impact on the experience of gratitude. Stated differently, it is not so much the act that counts: It is the social motive that counts.

## Footnotes

<sup>1</sup> For brevity, in the remaining part of the manuscript we will use the labels “partner motives” and “responsiveness” when referring to the perception of these constructs.

<sup>2</sup> When gender moderations occurred, we only reported the separate effects for men and women in a footnote, because gender did not consistently moderate our key findings across studies, and therefore cannot be reliably interpreted.

<sup>3</sup> Three out of 12 possible gender interactions were significant. Gender interacted with self-focused avoidance motives in predicting gratitude ( $b = .16$ ,  $SE = .07$ , 95% CI [.02, .30],  $t(287.79) = 2.26$ ,  $p = .025$ ), with this association being significant among women ( $b = -.14$ ,  $SE = .05$ , 95% CI [-.29, .01],  $t(153.20) = -2.79$ ,  $p = .006$ ), but not among men ( $p = .854$ ). Gender also interacted with the partner-focused approach motives in predicting responsiveness ( $b = -.18$ ,  $SE = .08$ , 95% CI [-.34, -.02],  $t(282.54) = -2.19$ ,  $p = .029$ ), with this association being significant among women ( $b = .21$ ,  $SE = .06$ , 95% CI [.09, .32],  $t(153.06) = 3.63$ ,  $p < .001$ ), but not among men ( $p = .646$ ). Further, gender interacted with the partner-focused avoidance motives in predicting responsiveness ( $b = -.15$ ,  $SE = .07$ , 95% CI [-.30, -.01],  $t(284.32) = -2.07$ ,  $p = .039$ ), with this association being significant among men ( $b = -.19$ ,  $SE = .06$ , 95% CI [-.30, -.07],  $t(142.83) = -3.25$ ,  $p = .001$ ), but not among women ( $p = .504$ ).

<sup>4</sup> While indirect effects stemming from the other motives were not hypothesized nor of core interest, upon the request of a reviewer we explored indirect effects other than reported in the main text. In Study 1, none of the other indirect effects were significant. In Study 2, relationship-focused approach motives showed a significant indirect effect on gratitude (conversation: MCMAM 95% CI = [.05, .34], direct effect:  $b = -.10$ ,  $SE = .07$ , 95% CI = [-.24, .05],  $t(145.40) = -1.31$ ,  $p = .193$ ; diary: MCMAM 95% CI = [.07, .22], direct effect:  $b = -.02$ ,  $SE = .08$ , 95% CI = [-.17, .14],  $t(310.61) = -0.19$ ,  $p = .851$ ). Thus, these motives might indirectly relate to gratitude, to the extent that they produce greater perceptions of partner responsiveness. Note that this results was not consistent across studies.

<sup>5</sup> When we include the within-person means of perceived motives as predictors in the model, the results are consistent with those reported in the paper.

<sup>6</sup> To gain a better understanding of the direction of our findings, we tested whether perceived partner motives predicted gratitude above and beyond previous day

gratitude (and gratitude before the laboratory conversation). In Study 2's diary and laboratory conversation we do observe a change in gratitude due to perceiving partner-focused approach motives for sacrifice (diary:  $b = .33$ ,  $SE = .10$ , 95% CI = [.14, .52],  $t(198.78) = 3.46$ ,  $p = .001$ ; conversation:  $b = .32$ ,  $SE = .11$ , 95% CI = [.10, .54],  $t(138.14) = 2.88$ ,  $p = .005$ ). This effect was in the same direction but not significant in Study 1 ( $p = .190$ ). Moreover, we tested whether within-person average perceptions of partner motives during the diary studies would predict gratitude a year (Study 1) or three months (Study 2) later. However, we did not observe such an effect in either Study 1 ( $ps$  ranged from .132 to .982), or in Study 2 ( $ps$  ranging from .193 to .983). Furthermore, we explored the directionality of the mediation through responsiveness by testing reverse mediation models, in which gratitude served as the mediator and responsiveness as the outcome. Also, in the laboratory conversation, we ran a lagged mediation model by controlling for gratitude reported before the start of the conversation. These analyses showed that (a) the original mediation model seems stronger than the reversed mediation model (Study 1: % mediation: original = 41.65%, reversed = 20.90%; Study 2: % mediation: original = 38.94%, reversed = 32.52%; except for Study 2's conversation: % mediation: original = 51.80%, reversed = 83.91%), and (b) the proposed mediation model held in the lagged analysis when controlling for gratitude levels measured before the sacrifice conversation.

<sup>7</sup> To increase reliability in the daily diary, a third item for measuring self-focused approach motives was added to the two items used in the laboratory, however, this three-item measure had poor reliability. As such, we conducted an additional set of analyses using the original two-item measure and it yielded the same pattern of results as those reported under the results for the daily diary in Study 2. We also conducted our analyses using only the most 'face valid' item, similar to Study 1 ("to feel good about him/herself"), and again these analyses yielded the same results with one exception: the marginally significant association between self-focused approach motives and gratitude in the laboratory conversation was reduced to non-significance ( $p = .309$ ).

<sup>8</sup> Three out of 12 possible gender interactions were significant. Gender interacted with partner-focused approach motives in predicting gratitude ( $b = .21$ ,  $SE = .08$ , 95% CI = [.06, .37],  $t(307.27) = 2.66$ ,  $p = .008$ ), with this association being significant among

women ( $b = .51$ ,  $SE = .12$ , 95% CI = [.28, .74],  $t(334.27) = 4.40$ ,  $p < .001$ ), but not among women ( $p = .383$ ). Also, gender interacted with the relationship-focused avoidance motives in predicting gratitude ( $b = .31$ ,  $SE = .09$ , 95% CI [.13, .49],  $t(289.22) = 3.36$ ,  $p = .001$ ). Specifically, this association was significantly negative among men ( $b = -.47$ ,  $SE = .17$ , 95% CI = [-.81, -.14],  $t(273.36) = -2.76$ ,  $p = .006$ ), but not among women ( $p = .437$ ). Furthermore, gender interacted with the relationship-focused avoidance motives in predicting responsiveness ( $b = .36$ ,  $SE = .09$ , 95% CI [.19, .53],  $t(226.31) = 4.15$ ,  $p < .001$ ), with this association being significantly negative among men ( $b = -.63$ ,  $SE = .17$ , 95% CI = [-.97, -.29],  $t(246.82) = -3.68$ ,  $p < .001$ ), but not among women ( $p = .903$ ).

<sup>9</sup> For exploratory purposes, we ran all analyses controlling for actual partner reported motives for sacrifice, yielding the same results as reported in both studies. Furthermore, perceived partner motives and actual partner reported motives did not significantly correlate or were only moderately correlated ( $r$ s ranging from .01 to .32). These results indicate that it is especially people's perceptions of their partner's motives, rather than the actual motives, that elicit gratitude.

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## CHAPTER 5

### Taking Stock of Reality: Biased Perceptions of Romantic Partners' Costs for Sacrifice

This Chapter is based on Visserman, M. L., Righetti, F., Impett, E. A., Muise, A., Joel, S., & Van Lange, P. A. M. (2018). Taking stock of reality: Biased perceptions of romantic partners' costs for sacrifice. *Manuscript under review*.





## Abstract

Romantic partners inevitably encounter situations in which their preferences diverge and one partner may sacrifice their self-interest to resolve this issue. When people see their partner's sacrifice, how do they perceive the costs that this sacrifice entails? We set out competing hypotheses examining whether people *underperceive* or *overperceive* partners' sacrifice costs. In Study 1, romantic couples' ( $N = 125$ ) ratings of their own and their partner's costs were sampled bi-hourly, daily, and after a conversation about a sacrifice, and were analyzed using Truth and Bias modeling. In Study 2, a preregistered experiment, individuals ( $N = 441$ ) were randomly assigned to imagine themselves or their partner sacrifice and rated the associated costs and benefits. Results consistently showed that, while people perceived their partner's sacrifice costs somewhat accurately, they also *overperceived* the costs while underestimating the benefits. These findings illustrate romantic partners' biased construction of their "own realities" in their lives together.

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



*“Whilst part of what we perceive comes through our senses from the object before us, another part (and it may be the larger part) always comes out of our own mind.”*

—William James, *The Principles of Psychology*

Imagine two partners, Sara and David, who want to spend an upcoming Sunday afternoon together. Sara would like to visit her family who she has not seen in a while, whereas David would prefer to spend some time with 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 not uncommon, as research has shown that they are part of couples’ everyday interactions (Righetti, Gere, Hofmann, Visserman, & Van Lange, 2016; Visserman et al, 2018). And although an act of sacrifice can bring several benefits to the relationship, it also involves some costs for the person who decides to sacrifice (Righetti & Impett, 2017; Van Lange et al., 1997). Given that sacrifices may bring both positive and negative outcomes, there may be ambiguity about the extent to which a sacrifice is beneficial or costly for the person who decides to sacrifice. Therefore, it may not be easy for the recipient of the sacrifice to interpret how their partner feels about the costs and benefits of making the sacrifice. Hence, when people perceive that their romantic partner has made a sacrifice, do they accurately see their partner’s costs of this action, and is there a general tendency to interpret these acts as more or less costly than the sacrificer actually experiences them to be?

If David sacrifices his desire to see their friends and joins Sara to visit her family, how accurately would Sara perceive David’s costs for doing so? And, beyond her level of accuracy—and central to the current work—would Sara perceive David’s costs in a biased manner, by either *under-* or *overestimating* these costs? We investigated these novel—and to some extent—exploratory questions in the area of accuracy and bias in perceiving a romantic partner’s costs for sacrifices.

### **Perceptual Accuracy and Bias**

Romantic relationships are characterized by high interdependence (Rusbult & Van Lange, 2003), rooted in the desire to maintain the relationship (e.g., Rusbult & Buunk, 1993) and partners’ attachment to each other (Hazan & Shaver, 1987). This dependence may drive partners to be especially motivated to accurately perceive each other’s behaviors and experiences, and they have many opportunities to get to know

each other well. Indeed, romantic partners are generally fairly accurate in observing each other's experiences and behaviors (Nater & Zell, 2015). However, at the same time, 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 we see and think (Tversky & Kahneman, 1974). Cognitive biases are usually driven by motives to arrive at certain conclusions (Kunda, 1990), and biases such as overly positive views of the self, one's sense of control, and one's future are usually adaptive in that they yield positive outcomes for the individual (e.g., psychological health, success, social bonding; Taylor & Brown, 1988). Especially when trying to "read" one's romantic partner, people can be prone to various biased perceptions (Fletcher, 2015; Fletcher & Kerr, 2010; Gagné & Lydon, 2004), such as wearing rose-colored glasses and seeing one's partner in ways they wish to see them (Fletcher & Kerr, 2010; Murray, Holmes, & Griffin, 1996; Rusbult, Van Lange, Wildschut, Yovetich, & Verette, 2000). For example, people tend to overperceive the positive qualities of their partner and think that their relationship is better than most others (Murray et al., 1996; Rusbult et al., 2000; Van Lange, Rusbult, Semin-Goossens, Görts, & Stalpers, 1999).

Thus, romantic partners are likely to hold biased perceptions of each other that may, at times, distort their interpretation of each other's experiences and behaviors. With some exceptions, most research on perceptual biases in close relationships has explored positive biases (Fletcher & Kerr, 2010)—such as the above-mentioned tendency of partners to see each other in an overly positive light (Murray et al., 1996; Rusbult et al., 2000). It is less clear how people may interpret situations that involve some negative outcomes for their partner, such as when they incur costs for a relational sacrifice. Costs of sacrifices may be especially hard to perceive accurately because they may be experienced rather privately (e.g., by forgoing one's own self-interest), and thus may not be clearly visible to the witnessing partner.

### **Perceiving Partner Sacrifice**

Recently, researchers have investigated how well people detect their partner's relational sacrifices in daily life. In two studies, both partners reported daily on whether they had sacrificed, and whether they perceived their partner to have sacrificed. Both partners' reports were directly mapped onto each other to assess whether partners agreed on the occurrence of a sacrifice (e.g., one person reporting to

have sacrificed and their partner reporting to have received a sacrifice). Results revealed that people missed about half of their partners' daily sacrifices (Visserman et al., 2018). Intriguingly, while sacrifices may often be unrecognized, people also tend to “see” partners' sacrifices when the partner did not actually report engaging in such acts. These findings illustrate that romantic partners tend to hold distorted perceptions of each other's sacrifices, by either not seeing them or overclaiming them (Visserman et al., 2018).

Moving past the detection of the occurrence of sacrifices, the current research focuses on—*when* a sacrifice is accurately detected—how accurate or biased people's perceptions are of the costs their partner incurs by making the sacrifice. Based on existing research showing moderate levels of accuracy when observing partners' feelings and behaviors (Nater & Zell, 2015), we expect that partners can “read” each other's costs for sacrifice fairly accurately. That is—to some extent—people should be able to track when their partner experiences a sacrifice as more rather than less costly. At the same time, even when perceptions may be quite accurate (West & Kenny, 2010), there can be various reasons why people hold biased perceptions by generally estimating their partner's costs to be higher, or lower, than their partner experiences them to be. As the current work is the first to investigate romantic partners' perceptions of each other's experience of the costly act of sacrifice, we set out to examine competing hypotheses as to whether people underperceive or overperceive their partners' costs for sacrifice.

### **The Underperception Hypothesis**

People may *underperceive* the costs that their partner incurs when sacrificing their own needs and interests for the relationship because they may be motivated not to see the partner's costs. One reason for this may be that people want to maintain a positive image of their relationship, as this helps them to maintain satisfaction in their relationship (Miller, Niehuis & Huston, 2006; Murray et al., 1996). However, perceiving a partner to incur costs for the relationship may threaten people's perception of the quality and superiority of their relationship (e.g., Murray et al., 1996; Rusbult et al., 2000) because it indicates the presence of a substantial conflict of interests in the relationship. In this conflict, partners' preferences did not match and in fact were so different that it was necessary for one of them to make a costly sacrifice. This realization may threaten people's (overly) positive view of their relationship.

In this situation, perceivers may hold two dissonant cognitions: on the one hand they hold the belief that their relationship is a “good” relationship (and even better than other people’s relationships), and on the other hand they see this large divergence of interest that signals that their partner’s preferences do not match their own and thus shows a substantial imperfection in the relationship. The psychological discomfort resulting from these dissonant beliefs and perceptions may create a motivation to reduce this dissonance (Elliot, & Devine, 1994; Festinger, 1957). To maintain a rosy view of the relationship, and to maintain their satisfaction with the relationship, people may be motivated to downplay the costs that the partner incurred, in order to downplay how different their preferences were in the first place. This motivation to protect one’s rosy view of the relationship is illustrated by research showing that while romantic partners overestimate positive attributes of their partner and their relationship, they downplay dissatisfying incidents in the relationship and construe them as “perfectly normal” (Van Lange et al., 1999). Similarly, people may also undermine the costliness of their partner’s sacrifice, and thus underperceive the magnitude of what their partner had to give up.

Another reason why people may be motivated to not see their partner’s costs is that they may feel bad or guilty that their partner had to sacrifice something important for them (Righetti & Impett, 2017). Indeed, when perceiving one’s partner to commit to the relationship—more so than oneself—by making such relationship investment, this may induce negative emotions such as feeling guilty for their partner incurring these costs instead of oneself (Drigotas, Rusbult, & Verette, 1999). Relatedly, seeing one’s partner sacrifice can induce feelings of indebtedness (Algoe, Gable, & Maisel, 2010; McCullough, Kilpatrick, Emmons, & Larson, 2001), which may not only induce negative affect, but may also burden the perceiver with pressure to return the favor and sacrifice in the future (McCullough et al., 2001; Righetti & Impett, 2017). Thus, to reduce these feelings of unpleasantness, guilt, and indebtedness, perceivers may be motivated to downplay their partner’s costs, and perhaps “play-up” the benefits that the partner may receive from making the sacrifice. As a consequence, people “see” their partner’s sacrifices as less costly than their partner actually experienced them. Overall, there are several plausible reasons to hypothesize that people may underperceive their partner’s costs for sacrifice.

## **The Overperception Hypothesis**

At the same time, there are also various reasons to expect that people may *overperceive* the costs their partner incurs when sacrificing. First, people may be motivated to “err” on the side that brings the best opportunities to capitalize on their partner’s sacrifice. In committed relationships, people are generally driven by a strong motive to maintain and invest in the relationship (Rusbult, 1980; Rusbult & Buunk, 1993). Moreover, people strongly value their partners’ investments, and when observing costly sacrifices, partners may feel especially grateful and reassured about their partner’s commitment to the relationship (Algoe, 2012; Gordon, Impett, Kogan, Oveis, & Keltner, 2012; Joel, Gordon, Impett, MacDonald, & Keltner, 2013; Visserman et al., 2018). Thus, there may be benefits of overperceiving partners’ costly investments, rather than underperceiving these costs.

Especially in light of research showing that half of partners’ daily sacrifices are missed and underappreciated (Visserman et al., 2018), when people *do* see their partner’s sacrifice, it may be functional to acknowledge the importance of what their partner did for them, even at the “risk” of overperceiving the costs. Such tendency would be consistent with an Error Management Theory perspective (Haselton & Buss, 2000; Haselton & Galperin, 2013), which predicts that, from an evolutionary perspective, people err on the side that brings the lowest costs and/or greatest benefits for survival and reproductive success. Although this strategy can result in judgments that are less accurate, it should also result in errors that are less costly and thus maximize positive relational outcomes overall. In fact, many perceptual biases in relationships seem to be adaptive for achieving positive relationship outcomes (Fletcher, 2015). For example, positive illusions, such as seeing one’s partner in idealized ways, are generally adaptive for maintaining satisfaction (Miller et al., 2006; Murray et al., 1996). Furthermore, transgressors tend to underestimate their partner’s forgiveness (Friesen, Fletcher, & Overall, 2005), presumably to make sure not to miss their partner’s feelings of hurt, and therefore create the motivation to make amends and repair the relationship. Similarly, overperceiving partners’ costs for sacrifice may be the adaptive way to err, in order to capitalize on the partner’s costly investment.



Another reason why people may overperceive partners' costs for sacrifice may originate from the partner who sacrificed. When making a sacrifice, partners may—with or without intending to do so—exaggerate how costly the sacrifice is for them and perhaps fail to express the potential benefits that this sacrifice may yield for them. Sacrificers may want to make sure that their partner actually sees their behavior as a sacrifice, for example to ensure that their partner appreciates their action, or will return the favor later, or maybe to show that they are a good partner for investing in the relationship. This may result in people perceiving their partner's sacrifice as more costly, and perhaps as less beneficial to the sacrificer, than it actually is. Relatedly, sacrificers' decision to sacrifice may have been the result of weighing the costs against the benefits of this action. Thus, sacrificers are likely to have envisioned benefits of their sacrifice, for their relationship but also for themselves. For example, partners may sacrifice to improve satisfaction in their relationship and have a more harmonious relationship with their partner in the long run (e.g., Impett, Gable, & Peplau, 2005). Even though such envisioned benefits may have driven their decision to sacrifice, they may not be clearly visible to the perceiver, as they may be more vague and long-term oriented, and not as concrete and direct as the costs. As a result, perceivers may not only overestimate partners' costs for sacrifice, but may also underestimate the benefits this sacrifice may yield for the person making the sacrifice. Altogether, there are several substantial reasons to hypothesize that people may overperceive the costs of a partner's sacrifice.

## **Research Overview**

In the current work, we investigated, for the first time, how accurately and biased—and the direction of this bias—people are when perceiving the costs of a romantic partner's sacrifice. We examined these questions with novel methodologies and analyses techniques to provide a comprehensive and accurate account of perceptions of partner sacrifice in couples' daily lives. In Study 1 we studied the perception of partners' costs for a sacrifice from a dyadic perspective (i.e., both partners reported on their own and their partners' sacrifice at the same time) and sampled couples' experiences and perceptions close in time to when they occurred. Using experience sampling, we assessed the perception of partner sacrifice while minimizing retrospective biases (Bolger, Davis, & Rafaeli, 2003; Bolger & Laurenceau,

2013). Furthermore, having both partners' reports on partner sacrifice enabled us to use Truth and Bias modeling (West & Kenny, 2011) to examine—at the same time—the extent to which perceivers' reports corroborated with their partners' actual reports of their sacrifice costs, as well as whether and how perceivers are biased in seeing these costs.

Specifically, in Study 1, we tested our hypotheses in three parts of the study using different methods. First, in a controlled laboratory session, couples held a conversation about a topic in which their preferences differed. We asked both partners to rate their own and their partner costs if they had to sacrifice. After that, couples went through an 8-day extensive experience sampling procedure in which they reported on sacrifices in their relationship every two hours and every day at the end of each day in a daily diary. They reported on their own sacrifice costs as well as on their perception of their partner's costs for sacrifice.

After obtaining initial evidence for the level of accuracy and bias in perceiving partner sacrifice, we conducted a preregistered study (Study 2) designed to replicate findings of Study 1 in an experimentally controlled setting. In a between-subjects design, participants were presented with several sacrifice scenarios and were either asked to imagine that they made the sacrifice or to imagine that their romantic partner made the same sacrifice. In addition to reporting how costly these sacrifices would be to make (for either themselves or their partner), participants in each condition also reported on the perceived benefits for the person making the sacrifice.

### **Study 5.1**

In Study 1 we sought to examine whether people are biased in the perception of the costs that their romantic partner incurs when they observe their partner make a sacrifice. First, in a controlled laboratory setting, romantic couples explicitly conversed about a potential relational sacrifice, and these sacrifices varied in terms of how substantial they were—from where to spend the holidays, to whether to start a family together. Participants rated the costs of these sacrifices for themselves and their partners. Second, couples reported on their own and partner's sacrifices in a bi-hourly experience sampling procedure and an 8-day daily diary, and also rated the costs of these sacrifices. Using these experience sampling methods, we captured couples' momentary and daily experiences and perceptions in their natural

environment. Using Truth and Bias modeling (West & Kenny, 2011), we simultaneously modeled the extent to which participants accurately perceived their partners' sacrifice costs, and the extent to which they showed a perceptual bias by either over- or underperceiving these costs.

## **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 64% were university students. On average, couples reported being involved in their current relationship for 2.8 years ( $SD = 29$  months), and 35% lived together. The data come from a larger project on sacrifice in romantic relationships (e.g., Righetti et al., 2016; Righetti & Visserman, 2017; Visserman, Righetti, Impett, Keltner, & Van Lange, 2018). Originally, 130 couples participated in the study, but one couple broke up before completing the daily diary, and three couples did not follow the instructions properly.

**Measures and procedure for the laboratory conversation.** First, couples came to the laboratory and were instructed to discuss a situation of divergent interests that they were currently experiencing in their relationship. Couples were told that the topic of this conversation could be any situation in their relationship in which they have different preferences, and were provided with various examples that varied in terms of costliness, such as “. . . on Saturday you would like to go to visit your family while s/he prefers to spend time with common friends; you would like to go on a trip to USA while your partner wants to go to Thailand; you would like to move to another country while your partner would like to stay in the Netherlands; you would like to have children while your partner would prefer not to; you would like to meet with a friend while your partner feels uncomfortable if you do so etc.” Couples were seated together in a private room, and the experimenter timed the conversation to last for seven minutes. After this time, the experimenter came back into the room and asked the couple to end their conversation.

Each partner went to a separate room to reply to some questions regarding the conversation they just had. Relevant to the current investigation, they were asked to indicate how costly their sacrifice would be (i.e., the magnitude of their sacrifice) if they would sacrifice their own preference to resolve the conflict of interest (“If you had

to sacrifice your preference, how big would the sacrifice be?”). Also, they were asked how costly their partner’s sacrifice would be if their partner would sacrifice their own preference (“If your partner had to sacrifice his/her preference, how big would the sacrifice be?”). Both questions were assessed on a 7-point scale (1 = *not at all* to 7 = *extremely*).

**Measures and procedure for the experience sampling.** At the end of the laboratory session, couples were carefully instructed by the experimenter on the experience sampling and daily diary procedures, and on how to recognize daily sacrifices in their relationship. Sacrifices were explained as forgoing your own preference by doing something that you find unpleasant and that you would not like to do (active sacrifice; e.g. going on a boring outing with your partner’s friends), or by giving up something that you find pleasant or would like to do (passive sacrifice; e.g. not going out with your best friend), or a combination of the above (e.g., giving up spending time with your friends to go on a boring outing with your partner’s friends) for your partner or relationship (see Van Lange et al., 1997). We explained to participants that sacrifices can be very small, such as forgoing one’s own first preference for a meal and instead having the partner’s preferred meal, as long as it involves some experience of personal cost (e.g., unpleasantness). Afterward, participants received a booklet with definitions and examples of sacrifice, as well as instructions for completing the experience sampling and daily diary phase of the study.

The first Saturday after the laboratory session, participants started the experience sampling and daily diary procedures. Six times a day (bi-hourly), participants received a link to a short survey on their mobile phone (using the SurveySignal application; Hofmann & Patel, 2015) for eight days (two blocks of four days with one rest day in between on Wednesday). Each experience sampling signal expired after one hour to ensure that we sampled participants’ momentary experiences. Both partners received the link at the exact same time in order to match their replies as closely as possible. Participants showed a high response rate, as they on average responded to 86.6% of the bi-hourly experience sampling signals.

At each bi-hourly signal, both partners were asked whether they and their partner encountered a situation of divergence of interest in the past hour. If so, they were asked whether they had sacrificed their own preference, whether their partner had sacrificed their preference, or whether they had compromised, meaning they themselves had sacrificed and they perceived their partner to have sacrificed as well. Participants reported to have sacrificed on 1.97 signals on average ( $SD = 1.94$ , ranging from 0 to 10 signals), and reported their partner to have sacrificed on 1.63 signals on average ( $SD = 1.64$ , ranging from 0 to 7 signals). Each time they reported having made a sacrifice, they were asked to report how costly their sacrifice was to them (“About your sacrifice, how costly was it?”), and each time they reported that their partner had made a sacrifice, reported on how costly they perceived their partner’s sacrifice was for their partner (“About your partner’s sacrifice, how costly was it?”). Each question was assessed on a 7-point scale (0 = *not at all* to 6 = *very much*) with a single item in order to minimize participant fatigue and reduce attrition (Bolger et al., 2003).

**Measures for the daily diary.** At the end of each day at 9:30pm, participants received the daily diary survey on their mobile phone, similar to the experience sampling signals. The link to the diary survey expired after midnight to give participants ample time to reply to summary questions regarding the entire day. Similar to the experience sampling procedure, participants showed a high response rate, as they responded on average to 87.6% of the daily surveys. Relevant to the current investigation, both partners were asked at the end of each day whether they had sacrificed—which could be more than once per day—(i.e., “Have you sacrificed today for your partner/relationship”), and whether their partner had sacrificed (i.e., “Has your partner sacrificed today for you or your relationship”). On average, participants reported to have sacrificed on 1.89 days ( $SD = 1.70$ , ranging from 0 to 8 days), and participants reported their partner to have sacrificed on 1.91 days ( $SD = 1.73$ , ranging from 0 to 7 days).

When participants reported to have sacrificed they were asked to report how costly their sacrifices were to them (“About your sacrifice(s) today, how costly were they for you?”), and when they had perceived their partner to have sacrificed, how costly their partner’s sacrifices were to their partner (“About your partner’s sacrifice(s) today, how costly were they for him/her?”). As in the experience sampling procedure, these questions were assessed on a 7-point scale (0 = *not at all* to 6 = *very much*).

**Analysis strategy.** Multilevel-modeling, using SPSS v.22, was used to account for non-independence in the data (Kenny, Kashy, & Cook, 2006). For the experience sampling and daily diary, we employed a 2-level cross model in which participants and the daily measurements within participants (i.e., time) were treated as crossed and nested within the dyad. Furthermore, intercepts were allowed to randomly vary, whereas slopes were treated as fixed effects. Dyads were treated as indistinguishable because gender did not moderate effects and because of the presence of one non-heterosexual couple (Kenny et al., 2006) (the data and syntax are available on the Open Science Framework: <https://osf.io/dhmca/>).

We used the Truth and Bias model of Judgment (West & Kenny, 2011) to simultaneously examine accuracy and bias in perceivers' judgment of their partners' sacrifice costs. Following steps specified by West and Kenny (2011), we first centered the perceiver's judgment of their partner's sacrifice costs on the partner's reported sacrifice costs by subtracting the grand mean of partners' sacrifice costs (i.e., the mean across dyads) from the perceiver's judgment of their partner's sacrifice costs at each time point (i.e., only one time point in the conversation, and each time point of the experience sampling and daily diary) (see also Muise, Stanton, Kim, & Impett, 2016; Overall, Fletcher, & Kenny, 2012). This centering strategy ensures that the intercept represents the difference between the average of the partners' sacrifice costs and the average of the perceivers' judgments of their partner's sacrifice costs. Thus, the intercept in this model tests whether, on average, perceivers' judgments of their partners' costs differed from their partners' reported costs (across the time points of the experience sampling and daily diary) and the direction of this bias, referred to as *directional bias* (West & Kenny, 2011). When the intercept is negative, this means that perceivers underestimated (i.e. *underperceived*) their partners' sacrifice costs, whereas a positive intercept means they overestimated (i.e., *overperceived*) these costs.

Next, to examine the extent to which perceivers accurately drew from their partners' actual sacrifice costs in estimating their partners' costs, we entered the partners' actual sacrifice costs as a predictor of perceived partner sacrifice costs. The partner's actual sacrifice costs were grand-mean centered across dyads (and across time points for the experience sampling and diary), and its coefficient indicates *tracking accuracy* (West & Kenny, 2011), that is, the degree to which perceivers

accurately tracked assessed their partner's costs. A positive coefficient indicates that perceivers—to some extent—accurately perceived their partners' costs, and more specifically the degree to which they accurately tracked their partners' sacrifice costs across time points (in the experience sampling and diary).

Last, the third component in the Truth and Bias model is *assumed similarity* (West & Kenny, 2011), that is the extent to which perceivers draw from their own sacrifice costs in estimating their partners' costs. In romantic relationships, partners are likely to project their own experiences onto their partner (e.g., Lemay, Clark, & Feeney, 2007), and thus their perception of partners' costs could—to some extent—be a result of the costs they would experience for their own sacrifice. In the experience sampling and daily diary we do not have consistent reports of perceivers' own sacrifice costs when they report on their partners' costs, as this would require perceivers to have sacrificed at the same time point (i.e., in the past hour, or on the same day) as their partner. However, in the laboratory conversation both partners reported on their own and their partner's costs for sacrifice at the same time, which allowed us to additionally test the influence of assumed similarity on perceivers' estimation of their partners' costs, and thus control for this influence in the effects for tracking accuracy and directional bias. Perceivers' own sacrifice costs were grand-mean centered across dyads and entered as a second predictor in our model. A positive coefficient indicates that—to some extent—perceivers project their own sacrifice costs onto their partner when estimating their partners' sacrifice costs.

## Results

Table 1 displays the results for directional bias and tracking accuracy in all three parts of the study, as well as the results for assumed similarity in the laboratory conversation. In all three data portions, we found that while perceivers showed significant tracking accuracy (i.e., their partners' reported sacrifice costs predicted perceptions of partners' costs), at the same time they *overperceived* these costs, indicated by the significant and positive intercepts. Additionally, in the laboratory conversation, the accuracy and directional bias effects remained significant even after accounting for assumed similarity.

Table 1

*Directional bias and accuracy in judgments of the partner's sacrifice costs in the laboratory conversation and across the experience sampling and daily diary in Study 1.*

	<i>b</i>	<i>SE</i>	95% CI	<i>df</i>	<i>t</i>	<i>p</i>
<b>Conversation</b>						
Directional bias	.26	.08	.10, .42	124.0	3.16	.002
Tracking accuracy	.21	.06	.09, .32	243.3	3.59	<.001
Assumed similarity	.23	.06	.12, .35	243.3	3.94	<.001
<b>Experience sampling</b>						
Directional bias	.30	.13	.04, .57	42.0	2.29	.027
Tracking accuracy	.32	.08	.16, .49	106.7	3.90	<.001
<b>Daily diary</b>						
Directional bias	.22	.09	.04, .39	143.5	2.48	.014
Tracking accuracy	.35	.06	.22, .46	211.9	6.27	<.001

## Discussion

Results from Study 1 consistently showed that while romantic partners tended to somewhat accurately track whether their partner's sacrifice is relatively more or less costly, they did so while at the same time *over*perceiving these costs—thus they perceived these costs as higher than their partner reported them to be. This perceptual bias was consistently observed in a controlled laboratory conversation about partners' potentially major sacrifices, and in couples' momentary and daily life experiences. Thus, while we set out competing hypotheses as to whether people would *over*- or *under*perceive their partners' sacrifice costs, these findings strongly suggest an *over*perception bias.

### Study 5.2

Given that our hypotheses for Study 1 were exploratory, we conducted a second, preregistered study designed to replicate our initial findings. Moreover, findings from Study 1—although highly ecologically valid—are correlational in nature. In Study 2, we conducted an experiment with several sacrifice scenarios in which participants were asked to imagine themselves sacrificing their own self-interest (own sacrifice condition) or their partner sacrificing their own self-interest (partner sacrifice



condition). This method allowed to directly compare participants' experience of sacrifice costs for themselves with participants' perception of the costs that their partner would incur when making exactly the same sacrifices. Furthermore, in Study 2 we complemented Study 1 by also examining the perceived benefits that are derived by making a sacrifice. In fact, sacrifices do not only involve costs but also benefits (Righetti & Impett, 2017). If people are indeed biased in overperceiving their partners' costs for sacrifice, this may be accompanied by also underperceiving the benefits they envision. In other words, there may be a tendency for people to overestimate their partner's costs, and to some extent, neglect the benefits that their partner may experience from their sacrifice. We pre-registered our hypotheses for this study before data collection. This pre-registration, and the data and syntax for this study can be found on the Open Science Framework: (<https://osf.io/dhmca/>).

## Methods

**Participants.** The sample consisted of 441 individuals, with 129 (29.3%) men and 312 (70.7%) women. Participants' mean age was 34.0 years ( $SD = 9.7$ ), ranging from 18 to 71 years. On average, participants reported being in their current romantic relationship for 9.8 years ( $SD = 8.3$  years), ranging from 5 months to 50 years. About half of the participants (51.9%) were married, 11.8% were engaged, 35.6% were exclusively dating, and 0.7% were in an open relationship. Most participants lived together with their partner (84.4%), and more than half of the participants reported having children (56.2%). The sample size was determined by a power calculation (using G\*Power), showing that detecting a small to medium effect ( $d = .25$ ), with .80 power, would require at least 199 participants per condition, for a total of 400 participants. Originally, 545 participants began the survey, but 26 did not complete the study, two participants identified themselves as single, four participants admitted not to having replied honestly to all questions, one participant failed the attention check, 28 participants failed the manipulation check (i.e., they either did not remember which condition they were in, or they identified the wrong condition), and 43 participants were removed because of duplicated IP addresses. Out of the remaining 441 participants, 227 were in the own sacrifice condition, and 214 were in the partner sacrifice condition.

**Measures and procedures.** Participants were recruited through the online platform Prolific Academic (Palan & Schitter, 2017; Peer, Brandimarte, Samat, & Acquisti, 2017). After a few demographic questions (e.g., age, sex), participants were presented with three different sacrifice scenarios, in a randomized order and a minimum display time of 25 seconds. They were randomly assigned to either the own sacrifice or the partner sacrifice condition. In the own sacrifice condition, participants were asked to imagine that they made each of the sacrifices, while in the partner sacrifice condition, participants were asked to imagine, for the exact same sacrifice scenarios, that their partner made the sacrifice. The sacrifice scenarios concerned situations of divergence of interests that partners may likely encounter in their daily lives together, such as making plans as a couple for Saturday night, spending time with their family (in law), or coordinating household tasks (see *Supplemental Materials 5.1*). These scenarios were inspired by previous research on situations of divergence of interests and sacrifice behaviors in romantic relationships (Righetti et al., 2016; Visserman et al., 2018).

After reading each sacrifice scenario, participants were asked how costly the sacrifice would be for them (own sacrifice condition), or for their partner (partner sacrifice condition), using three items (“How costly would the sacrifice be for [you/your partner]?”; “How big would the sacrifice be for [you/your partner]?”; “How hard would [you/your partner] find it to make this sacrifice?”). These three items, across the three scenarios (i.e., nine items in total), reliably fit together in one composite score for perceived sacrifice costs ( $\alpha = .84$ , and  $\alpha = .85$ , in the own sacrifice and partner sacrifice condition respectively). Next, participants were asked about the benefits they would experience when they would make the sacrifice (own sacrifice condition), or the benefits their partner would experience when their partner would make the sacrifice (partner sacrifice condition), using three items (“How beneficial would the sacrifice be for [you/your partner]?”; “How positively would [you/your partner] feel about this sacrifice?”; “How beneficial would [you/your partner] feel this sacrifice would be for your relationship?”). These three items, across the three scenarios (i.e., nine items in total), reliably fit together in one composite score for perceived sacrifice benefits ( $\alpha = .80$ , and  $\alpha = .81$ , in the own sacrifice and partner sacrifice condition respectively). All items were assessed on a 7-point scale (e.g., 1 = *not at all costly* to 7 = *very costly*).

After participants had imagined and rated each scenario, a manipulation check was administered to determine whether participants had adhered to their condition: participants indicated whether they had to imagine that they made the sacrifices, their partner made the sacrifices, or alternatively, they could indicate that they did not remember. Also, an attention check was administered, by asking participants to confirm that they were paying attention by choosing reply option “3” out of four possible replies (1, 2, 3, and 4). Last, participants were asked to confirm whether they replied truthfully to all questions, and whether they are indeed romantically involved, while stressing that their answers would not affect their payment. After participants were debriefed about the goal of the study, they were financially compensated for their participations (£1,0).

## Results

Analysis of Variance (ANOVA), using SPSS v.23, was used to analyze the difference between the own sacrifice and the partner sacrifice condition in perceived sacrifice costs and perceived sacrifice benefits. Participants rated the sacrifices as significantly more costly in the partner sacrifice condition ( $M = 4.05$ ,  $SD = 1.28$ ) as compared to the own sacrifice condition ( $M = 3.26$ ,  $SD = 1.24$ ),  $F(1, 440) = 43.50$ ,  $p < .001$ ,  $\eta^2 = .09$ ,  $d = .63$ . In contrast, the perceived sacrifice benefits were rated as lower in the partner sacrifice condition ( $M = 4.46$ ,  $SD = 1.00$ ) as compared to the own sacrifice condition ( $M = 4.72$ ,  $SD = 1.03$ ),  $F(1, 440) = 7.35$ ,  $p = .007$ ,  $\eta^2 = .02$ ,  $d = .26$ . See Table 2 for an overview of the means and standard deviations in each condition.

Table 2

*Means and standard deviations for the perceived costs and perceived benefits in the own sacrifice and the partner sacrifice condition.*

Condition	Perceived Costs		Perceived Benefits	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Own sacrifice	3.26 <sup>a</sup>	1.24	4.72 <sup>a</sup>	1.03
Partner sacrifice	4.05 <sup>b</sup>	1.28	4.46 <sup>b</sup>	1.00

*Note.* Means within one column (i.e., perceived costs or perceived benefits) with different subscripts are significantly different.

## **Discussion**

Findings of Study 2 conceptually replicated findings of Study 1. People perceived the costs that their romantic partner incurred when making a sacrifice to be higher than the costs they perceived for themselves when they imagined making the exact same sacrifice. In addition, people also perceived the benefits of sacrifice for their partner to be lower than they perceived these benefits to be for themselves. Thus, these findings imply that romantic partners display a perceptual bias in how they perceive their partner's experience of sacrifice, by overperceiving the costs and underperceiving the benefits their partner experiences when sacrificing their own self-interest.

### **General Discussion**

In the current work, we uncovered a new phenomenon in the literature on perceptual biases in romantic relationships. When a partner sacrifices their needs and interests to benefit their partner or the relationship, this prosocial act is not without its costs (Righetti & Impett, 2017). Findings from extensive dyadic experience sampling, couples' conversation about a partner's potentially major sacrifice, and an experimental study all point to the same twofold conclusion: (a) people perceive their partner's costs to be higher than sacrificers themselves report these costs to be, and (b) people may underestimate the benefits that the sacrificer receives from making this sacrifice (Study 2).

Closing one's eyes to the costs that the partner incurs might help people to maintain a rosy view of their relationship and maintain a sense of satisfaction in their relationship (Miller et al., 2006; Murray et al., 1996). However, our findings consistently showed that people err on the side of overperceiving these costs, possibly to make sure to capitalize on the partner's costly relationship investment. In accordance with previous research on perceptual accuracy in romantic relationships (Nater & Zell, 2015), findings from Study 1 showed that partners somewhat accurately "read" each other's costs for sacrifice. At the same time, people overperceived their partner's sacrifice costs, above and beyond the level of accuracy with which they tracked these costs.

## **Broader Considerations**

Oftentimes, sacrificial acts are not even seen by the partner (Visserman et al., 2018), but when a sacrifice is perceived, people seem motivated to see the importance of their partner's action, which may give them the chance to acknowledge and appreciate their partner's costly pro-relationship behavior (Algoe, 2012; Visserman et al., 2018). Gratitude is a fundamental emotion that promotes receivers' well-being (Emmons & McCullough, 2003; Wood, Froh, & Geraghty, 2010) as well as the quality and stability of the relationship (Algoe et al., 2010; Gordon, Arnette, & Smith, 2011; Gordon et al., 2012), and failure to acknowledge the partner's sacrifices has the potential to compromise the relationship (Visserman et al., 2018). Given that many sacrifices are not acknowledged simply because they are not seen, it may be functional to overestimate the costs of the sacrifices that are seen, so that partners can feel and express gratitude.

Furthermore, partners may be motivated to see each other's costly investments because it signals their partner's commitment to the relationship (Rusbult, 1980), and people may want to feel worthy and valued and therefore see their partner's sacrifices as especially costly. Moreover, possibly, perceiving partners' sacrifices as costly may also induce feelings of security and trust in the relationship (Wieselquist, Rusbult, Foster, & Agnew, 1999). Altogether, the overperception bias for the costs of partners' sacrifices may originate from motivations such as wanting to see the partner's commitment, show appreciation for their costly investments, and wanting to feel security and trust in the relationship. And these processes are likely to promote a mutual cyclical growth process in which partners find themselves in an upward cycle of relationship investments, appreciation, trust, commitment, and further relationship dedication (Joel et al., 2013; Wieselquist et al., 1999).

Alongside the possibility that overperceiving costs is driven by a motive to see the partner's commitment and capitalize on their costly relationship investments, overperception may also—perhaps additionally—be explained by perceivers' limited access to their partners' inner states. In fact, it may be especially challenging to see the benefits that the partner envisioned when deciding to sacrifice because these benefits may be more long-term oriented (e.g., investing in the future of the relationship) and not as concrete and immediate as the costs that the partner incurred (e.g., not watching their favorite movie, spending time with the partner's friends that

one does not like, or relocating to accommodate the other partner's job opportunities). Thus, when a partner makes a sacrifice, and the costs seem to stand out more clearly than the benefits, perceivers may see these costs as especially impactful. At the same time, the partner making the sacrifice may also be biased in overestimating the benefits that their sacrifice will generate (i.e., affective forecasting; Wilson & Gilbert, 2005). This may occur because when people decide to sacrifice they may be motivated to reduce cognitive dissonance (Festinger, 1957) by reasoning that the sacrifice must be worthwhile. In doing so, they may overestimate the benefits that the decision to give up their needs and interests will bring.

Thus, perceivers may not be aware of the inner experiences and considerations that impacted their partner's decision to sacrifice, which may not only make them overperceive the costs, but also underestimate the more long-term oriented and less visible benefits that their partner's sacrifice may yield for their partner. In contrast, the partner making the sacrifice may be especially aware of these benefits because these benefits may have driven their decision to sacrifice in the first place, or they may be especially salient post-decision as a way to justify their actions. All in all, this discrepancy between partners' perspectives may leave perceivers seeing the sacrifices as more costly and less beneficial than their partner does.

In the current research we uncovered a general tendency for romantic partners to overestimate each other's costs for sacrifice. Future research could examine possible individual differences that might make this overperception bias more or less pronounced. For example, some people may be more likely to make sure that their partner actually sees their behavior as a sacrifice, such as partners who are exchange oriented (Clark & Mills, 1979) or narcissistic (Brunell & Campbell, 2011), who may perhaps strategically express their costs in order to gain similar (or bigger) favors from their partner in the future. Such strategy could make perceivers especially prone to overperceive the costs that the sacrificer experiences. Also, research on attachment insecurity suggests that avoidantly attached individuals may be biased in overestimating the magnitude of their partner's negative emotions (Overall, Fletcher, Simpson, & Fillo, 2015), and might just as well overperceive the costs that their partner incurs for sacrifice.

Moreover, there may also be situational factors that may attenuate perceivers' likelihood to overperceive partners' costs for sacrifice, such as the motives that are perceived to drive a partner's decision to sacrifice. Sacrificing for avoidance motives (i.e., to avert negative outcomes such as conflict in the relationship) is negatively associated with both sacrificers' and perceivers' personal and relationship well-being (Impett et al., 2005; Impett, Gere, Kogan, Gordon, & Keltner, 2014). Perceivers may pick up on their partner's tension and perhaps reluctance as they try to avoid a negative outcome, and may interpret their avoidance as a sign that the sacrifice is especially costly. In contrast, sacrificing for approach motivates (i.e., to bring out positive outcomes in the relationship such as increasing intimacy) typically promotes both partners' personal and relationship well-being (Impett et al., 2005, 2014). This positivity might color perceivers' interpretation and they may see the sacrifice as less costly, even though the actual costs for the sacrificer may be independent from the sacrificer's motive for sacrifice.

### **Strengths and Limitations**

An important element of the current work to consider is that we treated partners' reports as the "truth", as this is conventional in the Truth and Bias model of judgment (West & Kenny, 2011). Interestingly, and in accordance with some of the ideas discussed in the present work, there may not be one truth, as both partners may hold their own truth, and our work shows that their "truths" do not align. In as far as there would be one truth, perceivers might just as well be "right" in their perception, while sacrificers might underperceive or downplay their costs for sacrifice.

A limitation of the current work is that we did not have measures of benefits in Study 1, and therefore could not use Truth and Bias modeling to examine whether perceivers are biased in seeing the benefits of their partner's sacrifices in daily life. Our findings from Study 2 obtained in an experimental setting demonstrated that people perceive their partner's sacrifices as both more costly and less beneficial than if they would make the same sacrifice themselves. Thus, these findings suggest that both costs and benefits are perceived in a biased manner.

A strength of the current work is that our findings are ecologically valid, as they were obtained from couples' actual interactions in their everyday lives, in their natural environment, and close in time to when they occurred. Furthermore, we replicated these findings in different settings and using different methodologies. For example, in Study 1, findings were replicated and generalized to costs perceptions of partners' major sacrifices that couples discussed in a controlled laboratory setting. And in Study 2, our findings were replicated in a pre-registered experimentally controlled study in which we manipulated who sacrificed (self vs. partner). Also, our findings generalized across two different Western cultures (i.e., romantic couples recruited in The Netherlands and predominantly North American participants recruited online).

## **Conclusion**

Our findings show that although people are able to somewhat accurately assess their partner's costs for sacrifice, they do so while perceiving these costs to be higher than the sacrificers themselves report them to be. In addition, people may underestimate the benefits that the partner receives from making a sacrifice. Thus, people are more likely to "see" the costly experience of their partner's sacrifice while being less aware of the—perhaps less immediate (and more privately considered)—benefits that the sacrifice brings. This consistent tendency to err on the side of overperceiving the partner's costs for sacrifice may potentially bring important opportunities to capitalize on the partner's costly relationship investment. Thus, taking stock of the reality of experiences and perceptions in romantic couple's daily lives, we conclude that romantic couples may—to some extent—live their lives together while both perceiving their own reality.



### Footnotes

<sup>1</sup> In Study 2 we explored whether participants' gender would moderate the effect of condition on perceived sacrifice costs and benefits. Gender did not moderate the effect of condition on perceived sacrifice costs ( $p = .186$ ), but gender did moderate the effect of condition on perceived sacrifice benefits,  $b = .11$ ,  $SE = .05$ ,  $t(440) = 2.06$ ,  $p = .040$ . Men rated the perceived sacrifice benefits as lower in the partner sacrifice condition ( $M = 4.24$ ,  $SD = 0.99$ ) as compared to the self-sacrifice condition ( $M = 4.82$ ,  $SD = 0.95$ ),  $F(1, 128) = 11.39$ ,  $p = .001$ ,  $\eta^2 = .08$ . Women's perceived sacrifice benefits did not significantly differ between the partner sacrifice condition ( $M = 4.54$ ,  $SD = 1.00$ ) and the self-sacrifice condition ( $M = 4.68$ ,  $SD = 1.07$ ),  $F(1, 311) = 1.41$ ,  $p = .236$ ,  $\eta^2 = .01$ , although the effect for women was in the proposed direction.

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## Supplemental Materials 5.1: Sacrifice Scenarios

### Scenario 1

#### *Partner sacrifice condition*

“You and your partner are making plans for this Saturday night. You would really like to go to the movies with your partner and watch a new movie that you have been looking forward to seeing, and that has a special premier this Saturday night. Your partner has a different preference for this Saturday night. S/he really wants to go out with his/her best friends, as they are all available that night. (S)he hasn’t seen them for a long time and was looking forward to finally catching up with them again.

Eventually your partner decides not to go out with his/her friends to go instead to the movies with you.”

#### *Own sacrifice condition*

“You and your partner are making plans for this Saturday night. Your partner would really like to go to the movies with you and watch a new movie that (s)he has been looking forward to seeing, and that has a special premier this Saturday night. You have a different preference for this Saturday night. You really want to go out with your best friends, as they are all available that night. You haven’t seen them for a long time and were looking forward to finally catching up with them again.

Eventually you decide not to go out with your friends to go instead to the movies with your partner.”

### Scenario 2

#### *Partner sacrifice condition*

“Imagine that your family has organized a family brunch on Sunday late in the morning. You are very much looking forward to seeing your family again, and you express to your partner how much you would love for him/her to be there too. However, your partner isn’t in the mood to spend time with your family, and would much rather stay home and have some time for him/herself, as (s)he would finally have some time to watch his/her favorite tv series or read a book.

After some consideration your partner decides to not stay home and instead give in to your wish to join the family gathering.”

### ***Own sacrifice condition***

“Imagine that your partner’s family has organized a family brunch on Sunday late in the morning. Your partner is very much looking forward to seeing his/her family again, and expresses to you how much (s)he would love for you to be there too. However, you aren’t in the mood to spend time with your partner’s family, and would much rather stay home and have some time for yourself, as you would finally have some time to watch your favorite tv series or reading a book.

After some consideration you decide to not stay home and instead give in to your partner’s wish to join the family gathering.”

### **Scenario 3**

#### ***Partner sacrifice condition***

“Imagine that you and your partner live together, and you are behind on household tasks, such as vacuum cleaning, doing the dishes, laundry, and doing groceries. Although you both like a clean and tidy house, neither of you likes to actually do these household task. It’s Saturday morning, you have had a busy week, you want to sleep in and rest, and really don’t feel like cleaning today. However, today would be the only day that you and your partner would have time for cleaning.

Imagine that your partner decides to take on all these household tasks by him/herself today, and lets you sleep in and rest.”

#### ***Own sacrifice condition***

“Imagine that you and your partner live together, and you are behind on household tasks, such as vacuum cleaning, doing the dishes, laundry, and doing groceries. Although you both like a clean and tidy house, neither of you likes to actually do these household task. It’s Saturday morning, your partner has had a busy week, (s)he wants to sleep in and rest, and really doesn’t feel like cleaning today. However, today would be the only day that you and your partner would have time for cleaning.

Imagine that you decide to take on all these household tasks by yourself today, and let your partner sleep in and rest.”

## **CHAPTER 6**

### General Discussion



Romantic couples inevitably encounter situations in which their preferences diverge. This may be as mundane as what to have for dinner tonight, or what movie to watch, or as substantial as relocating to a different city or country to accommodate a partner's job opportunities. Sacrifices provide solutions to these conflicts of interests, but they may also threaten the relationship because one person needs to give up their own needs and preferences for their partner. In the present dissertation we focused on three—largely unexplored—key themes related to sacrifice: (a) how couples navigate dilemmas about pursuing personal vs. relational concerns, (b) how partners perceive and appraise each other's sacrifices, and (c) how sacrifices elicit (or fail to elicit) gratitude. We addressed these questions by taking a dyadic approach and assessed both partners' experiences and behaviors in their daily lives. Below we will summarize the contributions that each empirical chapter provides to these themes.

## **Overview of the Empirical Findings**

### **Me or Us? Controlling the Balance**

Chapter 2 focused on how couples navigate the inevitable dilemmas they face between the pursuit of their own self-interest and the pursuit of the best interest of their relationship. We investigated partners' ability to sustain an optimal balance in attending to the goals and needs they have for themselves, and the goals and needs they have for the relationship. Although people have a strong motivation to attend to both their personal and relationship needs (Aron & Aron, 1986; Baumeister & Leary, 1995; Deci & Ryan, 2000), this is not an easy feat (Kumashiro, Rusbult, & Finkel, 2008). Indeed, our findings show that being able to balance those needs requires self-control. Results from two studies of romantic couples, using questionnaires in the laboratory and daily experience sampling, consistently showed that people high in self-control were more likely to experience an optimal balance between their pursuit of personal and relational concerns. Moreover, results partly supported the idea that self-control prevents people from overdedicating to either personal or relational concerns.

Thus, self-control is not merely recruited to invest in one's personal goals, nor to invest in one's relationship. Instead, self-control is key in promoting and maintaining a healthy balance in the pursuit of both these concerns, which are both important for

the pursuit of a happy and well-adjusted life. In fact, self-control helps people to achieve high levels of individual and relationship well-being through the ability to optimally navigate the challenge of pursuing both personal and relationship interests. Self-control thus could be seen as romantic partners' tool to successfully handle the self-other dilemmas that they inevitably face through their lives together.

### **“Seeing” Partners’ Sacrifices**

In Chapters 3 and 5 we examined perceptual accuracy and bias in seeing partners' sacrifices. When partners decide to give up their self-interest for the relationship, this act of sacrifice may not be well perceived, and may not even be seen at all. In fact, findings from Chapter 3 using a quasi-signal detection paradigm in two dyadic daily experience studies, revealed that partners only recognized each other's sacrifices 50% of the times, meaning that their sacrifices were just as likely to be missed. Interestingly, almost just as often, people “see” a partner's sacrifice, even though their partner reports not having sacrificed that day. Thus, oftentimes sacrifices are either missed or overclaimed, rather than accurately detected.

When a sacrifice is detected, this perception not only makes people aware of their partner's prosocial act, but also of the costs that the partner has incurred by forgoing his or her own self-interest. In Chapter 5 we set out two competing predictions as to whether people *under-* or *over*perceive their partner's costs for sacrifice. In a study of romantic couples, using bi-hourly and daily experience sampling, and having couples converse about a major sacrifice in the laboratory, we uncovered a new perceptual bias in romantic relationship: while people somewhat accurately perceive the costs that their partner incurs for sacrifice, they consistently *over*perceive these costs. These findings collected from couples' daily lives were replicated in an experimental study, in which we assessed people's appraisals of the costs and benefits of their own or of their partner's sacrifices. Additionally, this second study showed that people also *under*estimate the benefits that the partner receives from making a sacrifice.

Altogether, these findings reveal considerable inaccuracies in perceiving sacrifices: people miss many of their partner's sacrifices and are “only” somewhat accurate in perceiving their partner's costs for sacrifice. And biases are also likely to occur: not only do people “see” sacrifices that are not there, they also “see” the costly experience of partners' sacrifices while being less aware of the benefits that these

sacrifice bring. These findings illustrate romantic partners' biased construction of their "own realities" in their lives together. Ultimately, such biased "realities" might positively serve the relationship by creating opportunities to capitalize on partners' costly relationship investments, such as by being appreciative of them.

### **The Emergence of Gratitude: It's the Thought that Counts**

In Chapters 3 and 4 we addressed the emergence of gratitude. Gratitude has an abundance of positive outcomes for individuals themselves and their relationships. But how do people come to feel grateful in the first place? In Chapter 3, results from the two dyadic daily experience studies demonstrated that it is crucial that sacrifices are "seen" to elicit gratitude, regardless of whether or not the partner actually sacrificed. However, when partners sacrifice but their costly investments are missed, these instances constitute missed opportunities for perceivers to feel grateful and consequently also fail to cultivate greater relationship satisfaction. Importantly, from the sacrificer's perspective, this lack of gratitude leaves them feeling underappreciated for what they have done, and consequently detracts from their satisfaction with the relationship.

Findings from Chapter 4 demonstrated that *when* people perceive their partner to have sacrificed, the emergence of gratitude greatly depends on how genuine and selfless their partner's intentions are perceived to be. In two dyadic daily experience studies and a couple's conversation about a major sacrifice in the laboratory, we distinguished the unique contributions of perceived partner-, relationship-, and self-focused motives, and how they are guided by approach or avoidance orientations. Results consistently showed that only perceived partner-focused motives elicited gratitude in the perceiver, and only when these motives were guided by an approach orientation (i.e., to promote the partner's well-being). Such intentions may clearly signal a genuine departure from self-interest, and elicit gratitude in part because people perceive their partner to be responsive to their needs.

Thus, gratitude emerges under two conditions: (a) when people believe their partner to have sacrificed, and (b) when they attribute altruistic intentions to guide their partner's decision to sacrifice. In contrast, missing partners' sacrifices altogether not only fails to boost gratitude in the perceiver, but also leaves the partner who incurred the costs for sacrifice feeling underappreciated and dissatisfied as their



sacrifice is not welcomed with the gratitude they may have hoped for. Thus, failing to see partners' costly investments ultimately fails to cultivate a high quality relationship. Together, these findings illustrate the power that perception holds in romantic couples' daily lives.

## **Implications and Future Directions**

### **“Advancing” the Balancing Act**

Balancing one's dedication to both personal and relational concerns is not an easy feat. We identified an important individual factor (i.e., self-control) that provides people with the ability to balance those concerns, thereby enjoying high levels of individual well-being while also being happy in their relationships. As of yet, it is unclear though *how* self-control enables people to achieve and maintain such balance. One reason may be that people high in trait self-control tend to form healthy habits that help them achieve their long-term goals, without effortful exertion of self-control (Galla & Duckworth, 2015; Gillebaart & De Ridder, 2015). Forming such beneficial habits may help people to habitually—and effortlessly—balance their dedication to both personal and relationship concerns. A promising avenue for future research would then be to examine interventions that help people in forming such beneficial habits, while breaking bad habits or tendencies that they—perhaps without realizing—got immersed into. Instead, beneficial habits, once formed, may not require self-regulatory strength to be implemented. For example, someone may schedule their days in such a way to devote time and effort to their career during the week, to make time for one's partner in the weekend, and perhaps schedule a specific day of the week to spend time with one's own friends, go to the gym, or devote to the hobby they love to engage in. With such a habitual schedule, people may experience chronic high levels of personal and relational balance.

Another reason for why self-control helps successfully regulating people's dedication to personal and relationship needs may be that self-control brings the ability to monitor one's actions, and redirect one's behaviors by inhibiting undesired responses and promoting behaviors that are in line with one's standards (Baumeister, Vohs, & Tice, 2007; Hofmann, Schmeichel, & Baddeley, 2012). When people find themselves overdedicating to one domain over another, they may use their self-

regulatory strength to stop investing in the overinvested domain and instead redirect time and effort to the neglected domain. If this is the case, interventions should help people monitor their dedication to personal and relational goals, for example by keeping a diary. Keeping track of one's personal-relational balance could help people assess the state of the balance and intervene by inhibiting too much immersion into one domain and instead redirect one's time and efforts to the neglected domain. Such interventions may provide people with tools to design their lives in ways that help them successfully balance their need dedication and regain balance when it is lost, and importantly, they could be easily implemented in couples therapy.

The balancing act may become especially challenging when couples move onto new stages in their relationship, such as living together and starting a family. The challenge of managing personal and relationship concerns may become especially difficult and effortful when partners' lives become more interdependent. In fact, previous research has shown that the more partners are together, the more they lose sight of their personal goals and the more they may need to rely on their self-control to redirect their behaviors toward their personal goals (Kammrath et al., 2015). After their 30s, partners may not only need to juggle between their personal and relationship goals, but may also find themselves bounded (and motivated) to care for children, and perhaps for the extended family, and time pressure may be more of an issue. Thus, at such challenging phases in relationships, it can be even more important to optimally balance all these concerns, and self-control may especially come in handy in these moments.

### **To See or not to See?**

The present dissertation unraveled various inaccuracies and biases in perceiving partners' sacrifices. Of the relationship behaviors studied so far, such as positive and negative partner behaviors (e.g., Gable, Reis, & Downey, 2003), partners' sacrifices seem especially likely to be missed. This is intriguing, as sacrifices may often concern concrete behaviors. At the same time, the costs are often experienced privately, such as when visiting one's partner's family while missing out on precious time with one's own family. Without explicitly communicating the loss that the individual incurs by not spending time with one's own family, such sacrifice may be easily missed by the partner. There may be individual characteristics that determine how likely partners

are to misperceive or misconstrue each other's sacrifices. Possibly, individuals with narcissistic tendencies (Brunell & Campbell, 2011) may be more likely to overclaim partners' sacrifices and may perceive them as especially costly. They may feel entitled to their partner's costly investments, and their feelings of grandiosity may be upheld by believing that they are worth sacrificing for. Such individuals, along with individuals who are exchange oriented in relationships (Clark & Mills, 1979), may also be more likely to express their own sacrifices and the importance of what they did. They may do so to ensure that their contributions to the relationship are seen and that their partner will return the favor at the next possible occasion.

Given the profound inaccuracies and biases in perceiving partners' sacrifices, an important question concerns whether we would recommend partners to communicate their sacrifices. On the surface, our results from Chapters 3 and 4 on the emergence of gratitude may imply that making one's sacrifices clearly visible to one's partner may be beneficial, given that "seeing" their sacrifices, and "seeing" their genuine intentions are key to eliciting gratitude for what they have done. Clearly, these perceptions are invaluable for gratitude to emerge. Also, making one's sacrifices explicit may be beneficial for the individual making the sacrifice, as this allows them to express the emotions they feel when making the sacrifice. In contrast, suppressing how they feel about the sacrifice may not only leave them with the costs they incurred but also with the burden of suppressing their emotions, impairing their well-being (Impett et al., 2012). From this perspective, it may be beneficial to communicate the sacrifices one makes.

However, taking on a more nuanced perspective, we may not necessarily advise partners to communicate their sacrifices more explicitly and perceivers to "read" them with greater accuracy. Yes, it is likely that explicit communication will enhance the chances of sacrifices being recognized. But there may also be benefits derived from *not* seeing a partner's sacrifice. First, if partners see a sacrifice this is because they recognize that there was a conflict of interests in the relationship in the first place, which is a stressful experience (Righetti, Gere, Hofmann, Visserman, Van Lange, 2016). Also, at times, acts of sacrifice—especially day-to-day sacrifices—may simply serve to "smooth" the interaction between partners. As long as both partners contribute by making such "invisible" sacrifices, they can both benefit from each other's sacrifices, while not being "too" aware of the conflicts of interests that evoked

these sacrifices (Righetti et al., 2016). Last, when partners sacrifice to avert negative outcomes, their acts may be better left unseen as this induces negative affect and leaves perceivers feeling dissatisfied with the relationship (Impett, Gere, Kogan, Gordon, & Keltner, 2014).

### **Expanding the Experience of Gratitude**

Gratitude may be viewed as the social “glue” that helps identify worthy relationship partners, binds us to them, and serves as a reminder of how valuable our partners are to us (Algoe, 2012). It is no surprise then that gratitude is essential for the well-being of individuals and their relationships (e.g., Algoe, Maisel, & Gable, 2010). Our findings show that perceiving one’s partner to have sacrificed, and having done so while having the receiver’s best interest in mind, is key to feeling grateful. This is an important finding in light of how central gratitude is to relationships. Alongside the opportunity to feel thankful for partners’ costly investments, perceiving sacrifices may also give rise to other emotional experiences. It may be uncomfortable to see one’s partner experiencing these costs for the relationship, which may induce feelings of guilt and indebtedness (Algoe et al., 2010), and pressure to sacrifice in return. Sacrifices may also be welcomed with excitement, such as when perceivers are happy to see that their partner finds them worthy of a sacrifice, and when they appraise their partner’s investment as a sign of their commitment (Joel, Gordon, Impett, MacDonald, & Keltner, 2013).

Future research could investigate these other emotional experiences that can be simultaneously elicited when perceiving partners’ sacrifices, and how such emotions— together with gratitude—affect the perceiver’s experiences and motivations, and ultimately the quality of the relationship (e.g., Joel et al. 2013; Wieselquist, Rusbult, Foster, & Agnew, 1999). For example, when gratitude is simultaneously experienced with feelings of indebtedness it might not result in the positive consequences that gratitude may otherwise yield. On the other hand, when the experience of gratitude is mixed with other positive emotions and appraisals such as excitement and contentment, gratitude can be amplified and elicit even higher levels of individual and relationship well-being.

## Beyond Romantic Relationships

The complexity of perceptions, motives, and emotions that surround the phenomenon of sacrifice in relationships make the study of sacrifice challenging, but also incredibly intriguing. To expand research on sacrifice and pro-social giving, we may go beyond the realm of romantic relationships and investigate other types of relationships as well. Generally speaking, romantic relationships are highly communal (Clark & Mills, 1979), as partners are strongly guided by intentions to care for each other and maintain their relationship together. Often, this goes together with a general communal *norm* that costly giving in relationships can be expected. Expectations and perceptions may differ when, instead of a romantic partner, it is a colleague who sacrifices. In relationships of this sort, people may be driven by less communal and more exchange oriented norms, and thus may be likely to keep track of each other's good deeds. Also, in relationships such as those between colleagues, people may have lower standards for what constitutes a good deed. In some ways then, colleagues might actually be better able to pick up on each other's pro-social acts, as they may be more likely to keep track of these pro-social exchanges. And gratitude might be provoked more easily when the standard for what counts as costly and altruistic giving is lower and more easily exceeded.

It would also be interesting to consider relationships that are hierarchical in nature, such as those between supervisors and subordinates. How well aware and appreciative are people of others' pro-social acts in these contexts? The power dynamic that characterizes such relationships may greatly affect people's expectations and responses to prosocial acts: someone who works a late night to please their boss may not receive much recognition and acknowledgement for what they have done, but one's boss buying them a birthday present may be much more noticeable and received with appreciation. Another typical hierarchical relationship would be the one between parents and their children, in which the parent holds the power, but at the same time is also driven by strong goals and needs to care for the child. While children may not always be aware of their parents' costly efforts in caring for them, parents may feel delighted with gratitude when their child goes to great lengths to do something nice for them.

## Strengths and Limitations

There are some limitations across our empirical chapters that we would like to acknowledge. First, most of the work is correlational, therefore we should be cautious in drawing firm causal conclusions. In some studies, we have examined long-term effects through lagged analyses, and in others we have examined within-person fluctuations. Still, although such analyses provide information about changes over time or within-person fluctuations, they do not provide conclusive causal evidence. Future research could test these ideas in an experimental setting. In an experiment, we could for example present participants with sacrifice scenarios in which we manipulate whether the partner's sacrifice is guided by altruistic or self-focused intentions, and we could examine people's gratitude in response to these manipulations.

One other limitation is that our results may be especially relevant for relatively young relationships. Although we aimed to target community samples of romantic couples, in most of our studies partners were relatively young and relationships were at relatively early stages. As discussed earlier, balancing personal and relationship concerns may become even more of an issue when relationships mature. Also, it would be interesting to uncover how well partners "see" each other's sacrifices when their lives are highly interdependent. Partners may become better at "reading" each other as they get to know each very well, and their rose-colored glasses may wear off as their romantic passion is replaced by deep commitment. Although there is some evidence that partners do not "read" each other with greater accuracy over time, perceptual biases indeed are likely to wane as relationships mature (Fletcher, 2015), and so too may the overperception bias of partners' sacrifice costs.

There are also several important strengths of our empirical work that we would like to recognize. First, we took a dyadic approach in studying sacrifice, and by including both partners in our investigation we could examine perceptual phenomena that rest on the comparison between both partners' reports. Also, we employed advanced statistical techniques to analyze these partners' reports. Second, we studied partners' behaviors, perceptions, and experiences using experience sampling in couples' daily lives. This method provides unique insights into couples' natural environment, and minimizes retrospective biases, as behaviors, perceptions, and experiences are assessed close in time to when they occurred (Bolger, Davis, & Rafaeli,

2003). Finally, a strength of the present work is that in each empirical chapter we replicated our finding across studies, and in most of our work the findings replicated in different research setting, such as in a laboratory conversation about a partner's major sacrifice or in an experimentally controlled setting. Also, all findings replicated across different Western cultures (i.e., The Netherlands, USA). These replications provide greater confidence in the robustness of our findings, and provide some evidence for generalizability across these cultures.

### **Closing Remarks: The Art of Sacrifice**

To conclude, there may be an art to sacrifice. First of all, romantic partners need to make sure to sacrifice for the 'right' reasons, by (a) being attentive to the state of their personal-relational balance, and (b) having the partner's best interest in mind—and importantly, communicate such pro-partner intentions. Second, there is an art to "seeing" one's partner's sacrifices, that is to detect them and to appraise the importance of what they gave up, and being attentive to their benevolent intentions. Thus, there is an art to perceiving partners' sacrifices in such a way to capitalize on their costly investments with gratitude, and thereby making the best from a situation that started as a conflict of interests. Clearly, such situations may not be ideal at first, but the way people deal with these diagnostic situations may be crucial for the individual and their relationships.

While research on sacrifice is young, with the present dissertation we hope to have provided comprehensive insights into the phenomenon of relational sacrifice, by taking a dyadic perspective in investigating self-other dilemmas, perceptions, and implications of sacrifice in couples' daily lives. Ultimately, with these insights into how couples can optimally deal with the inevitable conflicts of interests that they encounter in their daily lives, we aim to have contributed to a greater understanding of individual and relational happiness and well-being.

## Summary

Romantic relationships are one of the most important sources of people's well-being, which is no surprise given that romantic partners' lives become highly intertwined. This interdependence comes with a strong motivation to maintain and invest in the relationship, but also brings inevitable dilemmas between pursuing one's own self-interest and benefitting one's partner and the relationship. Couples are regularly confronted with situations in which partners' preferences diverge, and these situations may call for one of the partners (or both) to sacrifice their own self-interests and invest in the relationship instead (Van Lange et al., 1997). Sacrifices can be substantial but rare, such as moving to a new city with your partner to meet their career ambitions, or small and common, such as spending time with your partner's friends rather than your own. The way couples navigate these inevitable conflicts of interests and the related sacrifices may be key to well-functioning and thriving relationships, but has received surprisingly little empirical attention.

The present dissertation aimed to uncover (a) how couples navigate these self-other dilemmas, (b) how partners perceive and appraise each other's sacrifices, and (c) how sacrifices affect gratitude. In Chapter 2 we investigated the role of self-control in balancing partners' dedication to both their personal and relationship concerns. In Chapter 3 we examined how well partners detect each other's sacrifices, and how this detection affects gratitude. In Chapter 4 we investigated perceivers' gratitude in response to the specific sacrifice motives they perceive their partner to pursue. Last, in Chapter 5 we examined how accurately and biased people perceive their partner's costs for sacrifice. We addressed these questions by assessing both partners' experiences and behaviors in their daily lives.

Chapter 2 focused on the inevitable challenge romantic couples face in attending to both their personal and relational needs, and challenged the idea that greater dedication to the relationship unequivocally benefits partners and their relationships. We investigated partners' ability to sustain an optimal balance in attending to the goals and needs they have for themselves, and the goals and needs they have for the relationship. Although people have a strong motivation to attend to both their personal and relational needs (Baumeister & Leary, 1995; Deci & Ryan, 2000), this is not an easy feat (Kumashiro, Rusbult, & Finkel, 2008). We examined self-control, the ability to direct thoughts, motivations, and behaviors in a goal-directed manner



(Baumeister, Heatherton, & Tice, 1994), as a key factor in sustaining a healthy personal-relational balance. We hypothesized that self-control should promote romantic partners' experience of personal-relational balance, and prevent imbalance, and in doing so should ultimately promote the well-being of individuals and their relationships.

Results from two studies, using daily experience sampling and laboratory assessments, consistently showed that people high in self-control were more likely to experience an optimal balance between their pursuit of personal and relational concerns. Moreover, results partly supported the idea that self-control prevents people from overdedicating to either personal or relational concerns. Thus, self-control is not merely recruited to invest in one's personal goals, nor to invest in one's relationship. Instead, self-control is key in promoting and maintaining a healthy balance in the pursuit of both these concerns, which are both important for the pursuit of a happy and well-adjusted life.

In Chapter 3 we examined the detection of one's romantic partner's sacrificial acts, and the consequences for gratitude to emerge. *When* people decide to give up their own self-interests and sacrifice for the relationship, their partner may or may not be aware of their costly relationship investments. Thus, opportunities to trigger feelings of gratitude—which are essential to the well-being and stability of relationships (Algoe, 2012)—may or may not be utilized, and may or may not strengthen couples' relationship satisfaction. Just as intriguingly, people may “see” a partner's sacrifice when the partner declares none, but gratitude may be triggered nevertheless.

In two daily experience studies, we used a quasi-signal detection paradigm to directly map both partners' reports of each other's sacrifices onto each other, revealing when people accurately see their partner's sacrifices (i.e., hit), miss them (i.e., miss), or overclaim such acts (i.e., false alarm). Results across both studies consistently showed that partners only recognized each other's sacrifices 50% of the times, meaning that their sacrifices were just as likely to be missed. Interestingly, almost just as often, people “see” a partner's sacrifice, even though their partner reports not having sacrificed that day. Furthermore, findings consistently showed that sacrifices need to be “seen” to elicit gratitude, regardless of whether or not the partner actually sacrificed. However, when partners' sacrifices are missed, these instances constitute

missed opportunities for perceivers to feel grateful and consequently also fail to cultivate greater relationship satisfaction. Importantly, from the sacrificer's perspective, this lack of gratitude leaves them feeling underappreciated for what they have done, and consequently detracts from their satisfaction with the relationship.

In Chapter 4 we investigated more closely how gratitude emerges in response to perceiving a romantic partner's sacrifice, by focusing on people's perceptions of *why* their partner sacrificed. Given the importance of genuine and altruistic intentions in eliciting gratitude, we distinguished between partner-, relationship-, and self-focused motives, and how they are guided by approach or avoidance orientations. We hypothesized that partner-focused motives, that are approach oriented (i.e., to promote the partner's well-being), should reflect sacrificers' intentions as most free from self-interest and thus should be the prime candidate for eliciting gratitude, as these motives signal that the partner is responsive to one's needs.

Results from two daily experience studies and a couple's conversation about a major sacrifice in the laboratory, consistently showed that only perceived partner-focused motives elicited gratitude in the perceiver, and only when these motives were guided by an approach orientation (e.g., to make the partner happy). Such intentions may clearly signal a genuine departure from self-interest, and elicit gratitude in part because people perceive their partner to be responsive to their needs. Thus, *when* people perceive their partner to have sacrificed, the emergence of gratitude greatly depends on how genuine and selfless their partner's intentions are perceived to be.

Finally, in Chapter 5, we investigated romantic partners' perceptions of the inherent costs that their partner incurs when they give up their own self-interest. As there is often ambiguity about the extent to which a sacrifice is beneficial or costly for the individual who sacrifices, and the costs for sacrifice are often experienced privately, there can be considerable room for perceivers to evaluate partners' costs in a biased manner. We set out to examine competing hypotheses as to whether people *underperceive* partners' costs for sacrifice (e.g., to reduce cognitive dissonance arising from seeing these costs and to maintain a rosy image of the relationship), or *overperceive* these costs (e.g., driven by the motivation to capitalize on partners' investments in the relationship rather than missing the importance of what they did).

We conducted a multimethod dyadic study using bi-hourly and daily experience sampling and a couple's conversation about a major sacrifice in the laboratory, and

replicated findings with an pre-registered experimental study. Using Truth and Bias modeling, we disentangled the extent which people accurately track their partner's costs, and at the same, whether they do so in a biased manner by either under- or overperceiving these costs. Results consistently showed that, while people perceived partners' sacrifice costs somewhat accurately, they also *overperceived* them while underestimating the benefits. Thus, we uncovered a new perceptual bias in romantic relationships: partners exhibit a general tendency to *overperceive* the costs that their partner incurs for sacrifice.

All in all, we may conclude that there may be an art to sacrifice, as illustrated by the following three insights. First, our findings demonstrated the importance of optimally balancing one's dedication to both personal and relationship concerns, and importantly, the role of self-control in providing the ability to successfully deal with this inevitable challenge. These insights may provide tools for couples therapy, as couples could be helped in how to monitor and regulate their personal-relational balance in less effortful ways. Second, our findings suggest that there may be an art to "seeing" partners' sacrifices. People miss many of their partner's sacrifices and are only "somewhat" accurate in perceiving their partner's costs for sacrifice. Moreover, people "see" sacrifices that are not there, and overestimate the costly experience of partners' sacrifices. These findings illustrate romantic partners' biased construction of their "own realities" in their lives together. Ultimately, such biased "realities" might positively serve the relationship by creating opportunities to capitalize on partners' costly relationship investments, such as by being appreciative of them. Third, our findings showed that the essential experience of gratitude emerges under two conditions: (a) when people—accurately or inaccurately—believe their partner to have sacrificed, and (b) when they attribute altruistic intentions to guide their partner's decision to sacrifice. However, failing to see partners' costly investments fails to elicit gratitude, and ultimately fails to cultivate a high quality relationship. Together, these findings illustrate the power that perception holds in romantic couples' daily lives.

While research on sacrifice is still young, with the present dissertation we hope to have provided comprehensive insights into how couples can optimally deal with the inevitable conflicts of interests in their daily lives. Ultimately, with these insights, we aim to have contributed to a greater understanding of individuals' happiness and the well-being and thriving of relationships.

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*Liefs, Mariko*

## Curriculum Vitae



Mariko Visserman was born on November 14<sup>th</sup> 1987 in Stramproy, the Netherlands. She obtained her Undergraduate's and Master's degree in Psychology at the Radboud University Nijmegen. During her Master's she was introduced to the study of romantic relationships, and since then she is devoted to studying relationships. She received her PhD training at the Vrije Universiteit Amsterdam, under supervision of Dr. Francesca Righetti and Prof. dr. Paul van Lange. Currently, she continues following her passion for relationship research as a postdoctoral researcher at the University of Toronto Mississauga, and York University Toronto, Canada, where she is delighted to work with Dr. Emily Impett and Dr. Amy Muise.

### Research Interests

During her Master's she started studying social cognitive processes in romantically involved individuals, such as how people protect their relationship from attractive alternative dating partners (e.g., by evaluating and remembering their behaviors in an overly negative light). During her PhD she studied the phenomenon of sacrifice in relationships, taking a dyadic approach by including both partners, and approaching this topic from various angles and through advanced methods and statistical procedures to gain a well-balanced and thorough understanding of costly giving in relationship. She currently continues to study the process of sacrifice, including the challenges (and opportunities) coming from major sacrifices (e.g., relocating to a different city or country to accommodate a partner's career). She is also passionately continuing her study of gratitude in relationships, aiming to bring a greater understanding of the experience of gratitude (e.g., in concert with indebtedness), and predictors and consequences of this essential emotion in relationships. Ultimately, she aims to gain a better understanding of individual and relationship well-being, for people to live a happy life and be in a fulfilling and thriving relationship.

## Publications

- Visserman, M. L.** (in press). Sacrifice in intimate relationships. In J. J. Ponzetti (Eds.), *Encyclopedia of Intimate Relationships and Families*.
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*Invited Revisions & Under Review*

Thomson, R., Yuki, M., Talhelm, T., Schug, J., Kito, M., Becker, M. ..., **Visserman, M. L.** (2018). Relational mobility predicts social behaviors in 39 countries and is tied to historical farming and threat. *Manuscript under revision*.

**Visserman, M. L., Righetti, F., Impett, E. A., Muise, A., Joel, S., & Van Lange, P. A. M.** (2018). Taking stock of reality: Biased perceptions of romantic partners' costs for sacrifice. *Manuscript under review*.



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