

Dating is a Joint Venture:
The Vicarious Sunk Cost Effect in Romantic Relationships

by

Samantha Joel

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Psychology Department
University of Toronto

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Abstract

The present pair of studies tested the hypothesis that romantic investments are reciprocal, such that the investments made by one romantic partner motivate continued investment from the other partner. In Study 1, participants were presented with a hypothetical scenario involving a failing relationship, in which romantic investment was experimentally manipulated. High investments made by a romantic partner predicted continued relationship perseverance. In Study 2, participants in romantic relationships were randomly assigned to recall their own investments, their current partner's investments, or skip directly to the dependent measures (control). Participants who recalled their partners' investments reported higher intentions to continue to invest in their relationships. This effect was mediated by higher feelings of gratitude toward the partner and by increased feelings of trust in the romantic partner. The role of gratitude in particular suggests prosocial emotions and processes are an important factor in relationship decision making.

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1. Introduction

The influence of one's own irretrievable investments on subsequent decision making has been clearly established: people dislike seeing their own resources go to waste, such that people often allow their past investments (or sunk costs) to influence their subsequent investment choices. For example, people are more likely to continue to invest into a business venture if they have already invested a large sum of money into it previously (Garland, 1990). Recently, judgement and decision making (JDM) researchers have extended this finding to collective ventures: Guina, Sivanathan, and Galinsky (2009) found that the investments of one decision maker can motivate further investments by another decision maker. Put simply, the sunk cost effect can occur *vicariously*. Romantic relationships exemplify the notion of a joint venture: in typical dating relationships, both romantic partners have invested time, energy, and other resources into the relationship, all of which would be lost were the relationship to fail. Furthermore, as numerous relationship theorists have argued (e.g., Rusbult & Van Lange, 2008; Murray & Holmes, 2011), romantic relationships are characterized by high levels of interdependence, meaning that the behavior of one romantic partner affects the other in important ways. Investment behavior is no exception to this rule: one romantic partner cannot give up on the relationship without wasting the resources of the other partner in addition to his or her own. Therefore, the vicarious sunk cost effect should be readily applicable to dating relationship situations. However, researchers have yet to consider the potential impact of one person's investments on his or her partner's intentions to persevere in the relationship. In the present research, I tested the hypothesis that individuals in romantic relationships experience a vicarious sunk cost effect. Specifically, I examined how future investment intentions, as well as critical decisions to remain committed to or leave a romantic relationship are influenced by investments made by the romantic partner. I

expected that investment into romantic relationships could be predicted not only by one's own previous investments, but also by the investments that have been made by the romantic partner. It is predicted that this effect occurs through two simultaneous pathways: a prosocial pathway, in which feelings of gratitude invoked by the partner's investments motivate people to reciprocate in kind, as well as a security pathway, in which the partner's investments increase trust in the romantic partner, thereby providing reassurance that it is safe to increase dependence on the relationship.

1.1 Sunk Cost Effect

According to the judgment and decision making literature, people are motivated to avoid wasting their resources (e.g., Arkes & Blumer, 1985). As such, non-recoverable investments that have already been placed into a given project (sunk costs) often motivate people to continue to invest into that project. For example, many people will choose to sit through a bad movie in a theatre because they have already paid for the ticket. This escalation behavior, often referred to as "throwing good money after bad," is considered irrational from the perspective of traditional economic theory. If the costs that have yet to be incurred (e.g., two hours of leisure time) are greater than the rewards to be received (e.g., watching an unenjoyable film), then the endeavour should be abandoned, regardless of how many costs have already been incurred. However, researchers have repeatedly found that people are more willing to endure further costs if they have already made a number of investments into the endeavor, arguably because they wish to avoid wasting those previously invested resources.

The majority of the support for the sunk cost effect has been identified in the context of financial investment. For example, in a field study conducted by Arkes and Blumer (1985), people with season tickets to a theatre attended more plays if they had paid more for their tickets, compared

to if they were given discounted passes. Similarly, in one experiment conducted by Garland (1990), participants were asked how willing they would be to continue to invest in a research and development project. Participants' willingness to continue to invest in the project increased as a linear function of how much money had already been spent on the project. This effect was found even though past investment in no way influenced the participants' perceptions of how likely the project would be to succeed. These and many other studies have demonstrated that people are likely to chase after monetary investments with further investments, regardless of whether continued investment is likely to be profitable.

More recently, researchers have found that the sunk cost effect can also extend to behavioral, or effort-based investments (Cuhna & Caldieraro, 2009), as well as to time investments (Navarro & Fantimo, 2008). For example, in one experiment, Navarro and Fantimo asked participants to imagine a scenario in which they were in charge of a copper-mining team. In this scenario, the team identified the location of the copper, and estimated that it would take the team ten more days of mining to retrieve the copper. However, the equipment also indicated that the mine only contained ten pounds of copper, whereas typical mines contain over 500 pounds. Invested time was manipulated, and participants were asked to indicate whether or not they would choose to stay for another ten days to retrieve the copper. Participants told that they had already been mining for 50 days were more likely to choose to continue mining, compared to participants told that this was their first day on the mining site. Navarro and Fantimo replicated this effect with more realistic lab experiments; for example, participants were more willing to invest more time into puzzles if they had already been working on them for some time. Overall, it appears that the sunk cost effect applies not only to tangible, financial investments, but also to intangible investments such as time and effort.

1.2 Investment in Relationships

As the sunk cost effect has been supported through increasing evidence within the field of decision making, a similar pattern has been identified by romantic relationship researchers. Rusbult (1980, 1983) was the first to note that one's own past investments into a romantic relationship might act as an important motivator of relationship persistence: "Investments increase commitment and help to 'lock the individual into his or her relationship' by increasing the costs of ending it—to a greater or lesser degree, to abandon a relationship is to sacrifice invested resources" (Rusbult, 1983, p. 103). Notably, this argument for the importance of investment in romantic relationships directly parallels the role of sunk costs in decision making: both lines of research suggest that one's own past investments should motivate continued investment.

Rusbult's Investment Model of relationship commitment (1980, 1983) was originally developed as a way to explain why some people remain committed to unsatisfying relationships. Rusbult asserted that some people remain highly committed to their relationships not because they feel particularly satisfied or fulfilled, but because they have already put a lot of investments into their relationship which they would lose if the relationship were to end. These investments may be tangible (e.g., money, possessions, or pets) or intangible (e.g., effort, time emotions, or self-disclosure). Rusbult's Investment Model of relationship commitment has been extensively validated, with investment consistently predicting relationship commitment, persistence, and stability for both dating and married couples (Le & Agnew, 2003). More recently, Goodfriend and Agnew (2008) delineated specific types of relationship investments that motivate people to persevere with their romantic relationships. As in the decision making literature, Goodfriend and Agnew concluded that both tangible investments (e.g., money, possessions, pets) and intangible

investments (e.g., effort, time, emotions, self-disclosure) are associated with relationship commitment and stability.

1.3 Joint Ventures

Taken together, research on judgment and decision-making and research on close relationships both suggest that one's *own* investment into a romantic relationship should predict continued effort and maintenance of that relationship. However, until recently, very little research had considered the possible importance of the *partner's* investment. The one exception to this gap in the literature is a package of studies conducted by Gunia, Sivanthan, and Galinsky (2009). Gunia et al. were interested in how the investments made by one decision maker could influence the subsequent investment choices made by another decision maker. They found that if two decision makers share a psychological connection, then the second decision maker can be vicariously motivated to honour sunk costs made by the first, in an effort to justify that individual's decision. For example, in Study 1, participants read that they were the new vice-presidents of a company with two divisions, and they needed to decide how to allocate investments between the divisions. They were told that the previous VP had invested heavily in one division over the other, but that this chosen division had been performing worse than the un-chosen division. Prior to reading this scenario, some participants were randomly assigned to engage in a perspective-taking exercise involving the previous VP. The participants who took the perspective of the previous decision maker invested more heavily in the worse-performing division compared to those who did not engage in perspective taking. Gunia replicate these results in another study in which participants who were told that they had shared attributes with the participant (e.g., age, birth month), and among those primed with the idea of interdependence. In each case, participants who felt a

psychological connection to someone continued to invest in failing ventures on behalf of that individual.

In the present package of studies, we sought to draw from the JDM literature, and Gunia et al.'s work in particular, to understand how the investments of one romantic partner might affect the investment choices made by the other romantic partner. Of course, there are a number of important differences between investments made in the romantic relationship context and the investment situations used in the above studies. For example, in Gunia et al.'s scenarios, the decision makers were not investing into the same venture concurrently, and the past decision maker's choices did not have a personal impact on the current decision maker. Furthermore, the nature of the relationship between romantic partners tends to be much more intimate than the relationship between business partners: romantic partners are often particularly sensitive to each other's feelings (e.g., through the caregiving system: Collins & Ford, 2010), and they tend to feel a particularly strong sense of interdependence (e.g., Kelley & Thibault, 1978; Agnew, Van Lange, Rusbult, & Langston, 1998) and closeness with one another (e.g., Aron, Aron, & Smollan, 1992). Therefore, we expect the reciprocal nature of investment to work through somewhat different mechanisms in the romantic context than it does in the business context. However, even given the impersonal nature of the scenarios used by Gunia et al., the effect still appeared to operate through prosocial mechanisms, meaning that it seemed to involve a sense of awareness of the previous decision maker's feelings. For example, Gunia et al.'s effect only emerged under conditions in which the participants were made to feel a sense of psychological connection with the previous decision maker (e.g., when they were primed with interdependence, or when they were asked to perspective-take with the decision maker). We expect prosocial emotions to play a crucial role in the vicarious sunk cost effect among romantic partners as well.

However, because of the close, intimate nature of romantic relationships, we expect the effect to be particularly robust on the romantic context. In other words, we do not expect to have to induce feelings of closeness in order for the effect to occur.

1.4 Gratitude as a Prosocial Mechanism

We propose that a romantic partner's investments are likely to elicit a prosocial response, whereby one feels compelled to reciprocate the investment behavior with further investments of one's own. In other words, we expect the vicarious sunk cost effect to be mediated by a morally-based emotion. But exactly which moral affect might be involved in the vicarious sunk cost effect, particularly as it pertains to romantic relationships? McCullough and colleagues (e.g., McCullough, Kilpatrick, Emmons, & Larson, 2001) have argued that moral affects can be classified by the types of situations that elicit them. Empathy and sympathy, McCullough et al. argue, are moral affects that are experienced in response to the perceived needs of others. For example, seeing a romantic partner in distress typically promotes feelings of empathy (e.g., Singer, Seymour, O'Doherty, Kaube, Dolan, & Frith, 2004). Guilt and shame, in contrast, are experienced in response to the perception that one has caused harm to someone else. For example, people often experience guilt when they attempt to break up with a romantic partner (Perilloux & Buss, 2008), or reject a would-be romantic partner (Baumeister, Wotman, & Stillwell, 1993). Finally, gratitude is experienced when another person engages in prosocial behaviour on one's behalf. Relationship investments can most readily be placed in this last category: they are resources (e.g., money, time, emotions, energy) that partners choose to give to the romantic relationship (Rusbult, 1980). Thus, I expect gratitude to be the most likely mediator of the vicarious sunk cost effect.

The quality that defines moral affects such as empathy, guilt, and gratitude is their ability to motivate prosocial behaviour. In the case of gratitude, the experience of receiving positive treatment motivates one to reciprocate by behaving prosocially oneself. This association between gratitude and prosocial behavior has been demonstrated using a range of situations and methodologies (e.g., DeSteno and Bartlett, 2006; DeSteno, Bartlett, Baumann, & Williams, 2010; Froh, Bono, & Emmons, 2010; McCullough, Emmons, & Tsang, 2002; Tsang, 2006). For example, DeSteno and Bartlett (2006) experimentally induced feelings of gratitude by staging a computer malfunction near the end of the participant's task, and then having a confederate (ostensibly another participant) fix the problem so that the participant did not have to complete the task again. Participants in this condition later spent significantly longer completing a tedious and cognitively taxing survey for the confederate. Furthermore, in two follow-up studies, the researchers demonstrated that the effect could not be deduced to simple reciprocity norms, but was instead due to the emotion of gratitude specifically. In a study with a similar design, DeSteno et al. (2010) found that gratitude also motivated participants to be more financially cooperative with a confederate in an economic game. Gratitude has been found to have meaningful effects longitudinally; for example, Froh et al. (2010) found that among a group of early adolescents, feelings of gratitude predicted higher social integration (a measure of general prosocial attitudes) at later points, controlling for social integration at baseline.

Gratitude has further been found to facilitate the development and maintenance of interpersonal relationships (Algoe, Haidt, & Gabe, 2008). Feelings of gratitude can increase relationship satisfaction for both the recipient and the benefactor; this effect has been found among newer couples (Algoe, Gable, & Maisel, 2010), as well as among long-term, married couples (Gordon, Arnette, & Smith, 2011). Gratitude appears to serve a prosocial function among close

relationships as it does in other contexts; for example, expressing gratitude to a close other increases feelings of communal strength toward that individual, or feelings of responsibility for that person's well-being (Lambert, Clark, Durtschi, Fincham, & Graham, 2010).

Altogether, I hypothesized that gratitude would play an important role in investment behavior in the context of romantic relationships. Because relationship investments tend to be prosocial in nature (e.g., sharing assets with one's partner, making sacrifices for one's partner), I hypothesized that a romantic partners' investments into a romantic relationship would elicit feelings of gratitude. Furthermore, because gratitude is a moral affect that motivates further prosocial behavior, I expected that gratitude would motivate people to invest in their relationships in return. Thus, I expected feelings of gratitude would be an important psychological mechanism of the hypothesized association between the partner's investments and one's own.

In the present paper, I also address two additional, alternative potential mediators for the vicarious sunk cost effect: empathy and indebtedness. As previously discussed, empathy is an important prosocial emotion that bears many similarities to gratitude (McCullough et al., 2001). However, the key difference between these emotions is that whereas gratitude promotes prosocial behaviors in an effort to repay another's kindness, empathy motivates prosocial behaviors specifically in an attempt to meet another's needs or alleviate another's distress. Romantic relationship investments should not typically involve high levels of distress for either member of the couple. Thus, I did not expect empathy to be a primary motive for reciprocating a romantic partner's investments into the relationship. I also did not expect feelings of indebtedness to help to explain the vicarious sunk cost effect. Indebtedness is similar to gratitude in that it motivates one to reciprocate another's kindness. However, indebtedness, which

involves feelings of obligation, is typically elicited by exchange, rather than communal relationships (e.g., Shen, Wan, & Wyer, 2010). One of the defining characteristics of close relationships is that they are associated more with communal norms, and less with exchange norms, compared to more casual relationships (e.g., Clark, Mills, & Corcoran, 1989). Therefore, I expected the vicarious sunk cost effect to operate through gratitude, rather than indebtedness.

1.5 Trust as an Additional Mechanism

Just as with investments made in JDM domains such as business and finance, romantic relationship investments can be risky. Dedicating time and energy to a romantic relationship is costly not only because of the resources that are being invested, but also because it leads to increased dependence on the relationship (Rusbult, 1983; Le & Agnew, 2003). Many relationship theorists have argued that a certain degree of assurance from the romantic partner is needed before one is willing to make oneself vulnerable to that person (see Murray & Holmes, 2009 for review). Trust in particular – a sense of confidence that the romantic partner will be available to meet one’s needs – can lower perceptions of emotional risk associated with the relationship (Murray, Pinkus, Holmes, Harris, Gomillion, Aloni, Derrick, & Leder, 2011), which subsequently allows people to feel safe escalating their dependence on the relationship (e.g., Murray, Holmes, & Collins, 2006). According to Murray and colleagues’ dependency regulation theory, trust in a romantic partner should increase one’s willingness to invest in the relationship by making one feel that it is emotionally safe to do so.

A romantic partner’s investments into the relationship may be an important indicator or signal of the extent to which that partner can be trusted. Specifically, when people perceive that their romantic partner has invested resources into the relationship, those investments may provide them with a sense of security that their partner will be available and responsive to their needs in

the future. Indeed, previous research has shown that pro-relationship behaviors such as accommodation and sacrifice lead to increases in a romantic partner's trust, which in turn leads the recipients of these behaviors to increase their feelings of dependence and commitment (Wieselquist, Rusbult, Foster, & Agnew, 1999). Drawing on the dependency regulation model and existing research on trust, I predicted that people's investments would motivate a romantic partner's investments not only because of increased gratitude, but also because of increased trust in the romantic partner.

1.6 Overview of the Current Studies

In the present research, I sought to better understand how the decision to persevere with a romantic relationship is affected not only by concern for one's own investments, but also by concern for the partner's investments. I hypothesized that when people perceive their romantic partners to have invested into their relationships, they are motivated to reciprocate in kind. In Study 1, I tested this prediction by presenting participants with a hypothetical relationship scenario in which I manipulated own versus partner's investment into the relationship. Next, I told the participants that the relationship was beginning to fail. I expected that past investments made by the hypothetical romantic partner would motivate continued relationship perseverance. In Study 2, I recruited participants who were in romantic relationships, and asked them to think about either their own or their partners' past relationship investments. I hypothesized that thinking about the partner's investments would increase people's intentions to continue to invest in the relationship themselves. Together, these studies were intended to show that romantic partners' investments motivate people to persevere with their relationships themselves, above and beyond perceptionsthe effects of one's own past investments. Furthermore, Study 2 was designed to test whether this effect occurs through two distinct motivational pathways. I

predicted that a romantic partner's investment would increase own investment through both increased gratitude for the partner, as well as through increased trust in the partner.

2. Study 1

2.1 Method

2.1.1 Participants and Procedure

Participants were recruited from the North American online community with advertisements on sites such as craigslist.org and kijiji.ca. They completed a ten minute questionnaire online through surveymonkey.com in exchange for entry into a draw for a \$50 gift card to Amazon.com. The sample consisted of 142 participants (102 women, 39 men) with an average age of 26 (range = 18 to 62). Seventeen participants were in romantic relationships at the time of participation, and 125 were single.

2.1.2 Materials

Scenario. Participants were asked to read and imagine a scenario about the development of a new romantic relationship (see Appendix A). The gender of the hypothetical partner was tailored to each participant's gender preference. The scenario began with the relationship developing smoothly. Partway through the scenario, participants were randomly assigned to imagine that either they or their partner received an attractive job offer in another city. Next, they read that the job offer was either retracted by the company due to funding (low investment) or turned down for the sake of the relationship (high investment). This created a 2 (person: self vs. partner) by 2 (investment: low vs. high) experimental design. Further on in the scenario, the hypothetical relationship started to go downhill: participants were told that they were fighting with their partners more than usual, and that they did not appear to have the same values. They were then

told that they have started to consider the possibility that this individual may not be the right person for them.

Decision. Participants were next asked to indicate what they would do if they found themselves in this situation. They completed the following five items measuring how willing they would be to continue to maintain the relationship rather than dissolve it: “I would probably start planning how to end things” (reverse scored), “I would probably stay in the relationship, at least for the time being- let’s see if we could find a way to make it work”, “I think that it would be worth it for me to keep trying”, “I would want to get out of the relationship as quickly as possible” (reverse scored), and “Given this situation, when would you be most likely to end the relationship?” Responses to the first four questions were given on a 5-point scale ranging from 1 = “*Strongly disagree*” to 5 = “*Strongly agree*,” and the fifth question had five separate options (1 = *Immediately*, 2 = *Soon*, 3 = *After a while*, 4 = *Eventually*, and 5 = *Never*) (Cronbach’s $\alpha = .87$).

Plans for continued investment. I next measured participants’ willingness to continue to invest in the failing relationship. Participants were asked to indicate, at this point in the relationship, how willing they would be to do the following: “Agree to go on a romantic getaway that your partner has planned for you,” “Confide in your partner about something that is troubling you,” “Have sex with your partner,” “Try a new class or hobby with your partner,” “Help your partner with a personal problem,” “Borrow something valuable from your partner,” “Accept your partner’s offer for help with something that’s been stressing you out,” “Reassure your partner that you care about him or her,” “Talk about the future with your partner,” “Celebrate a major accomplishment with your partner,” and “Spend lots of time with your partner”. Responses were given on a 5-point scale ranging from 1 = “*Not at all willing*” to 5 = “*Very willing*” (Cronbach’s $\alpha = .86$).

2.2 Results and Discussion

The first goal was to test whether participants' relationship stay/leave decisions would be influenced by the level of investment made by themselves versus their partners. I ran a 2x2 factorial analysis of variance analysis to test the effects of both the person making the investment (self versus partner) and degree of investment (high versus low) on the participants' decisions to continue versus dissolve the relationship. There was no main effect of either person or degree of investment, $F(1,138) < 1$. However, there was a significant between person by degree of investment, $F(1,138) = 4.49, p = .04$. This interaction is depicted in Figure 1. Subsequent simple effects analyses supported our hypotheses. Among participants who read that their partner received a job offer, there was a significant difference between the low investment and high investment conditions: participants were more willing to stay in the relationship if the hypothetical partner had sacrificed the job offer for the relationship compared to if the job offer had simply been retracted, $t(138) = 1.95, p = .05$. However, the same was not true for participants who read that *they* had received the job offer: participants were not significantly more or less willing to stay in their relationships if they had sacrificed a job offer for their partner, compared to if their job offer had been retracted, $t(138) = -1.06, p = .29$. I next compared the self and partner conditions with one another. There was a marginally significant difference between the self versus partner high investment conditions, meaning that participants were more willing to stay in the relationship if their partner had sacrificed a job offer compared to if they had sacrificed their own job offers, $t(138) = 1.70, p = .09$. However, there was no difference between the self versus partner low investment conditions, meaning that participants were not significantly more or less willing to stay in the relationship if their partner's job offer

had been retracted compared to if their own job offer had been retracted, $t(138) = -1.35, p = .19$. Overall, these results suggest that participants were more willing to stay in a relationship when their partner had made an important relationship investment for them, but their own investments had no such effect.

I next conducted another 2x2 ANOVA to examine the effects of our manipulations on participants' plans for future investment into the hypothetical relationship. Again I did not find significant main effects for either person or investment, $F(1,138) < 1$, but I did find a significant interaction between person and degree of investment, $F(1,138) = 6.34, p = .01$. This interaction is shown in Figure 2. As with the decision to stay in the relationship, participants were also more willing to continue to invest into the relationship when their partner had sacrificed their job offer compared to when the partner's job offer had been retracted, $t(138) = 2.05, p = .04$. However, participants were not significantly more or less willing to continue to invest if they had sacrificed their own job offer compared to if their own job offer had been retracted, $t(138) = -1.51, p = .13$. I next compared the simple effects among participants in the high versus low investment conditions. There was again a marginal difference between the high investment conditions, such that participants were more willing to continue to invest in the relationship if their partner had sacrificed a job offer for them, compared to if they had sacrificed their own job offer, $t(138) = 1.65, p = .10$. Finally, there was also a marginal effect for person in the low investment conditions, such that participants were more willing to invest in the relationship if it was their own job offer that had been retracted compared to if their partner's job offer had been retracted, $t(138) = -1.89, p = .06$.

Overall, our hypotheses for Study 1 were confirmed. When participants were told that their hypothetical dating partner had made a major investment into the relationship (sacrificing an

attractive job offer in another city), participants were more willing to stay in the relationship and were more willing to make continued investments in the relationship, compared to when their hypothetical partner had not made this investment into the relationship. Furthermore, I found evidence for a vicarious sunk cost effect even though I told participants that the romantic relationship was not going particularly well and that this partner was unlikely to ultimately be the right person for them. Unexpectedly, I did not find any effects of own investment on continued relationship perseverance. If anything, participants were *less* motivated to continue to invest in the hypothetical relationship when they had sacrificed a job offer for the sake of the relationship earlier in the story. It may be that although one's own past investments motivated commitment to a relationship (Le & Agnew, 2003), they do not motivate further investment. Another possibility is that this effect was the result of something specific about the present scenario; for example, perhaps own investment does not motivate continued investment in the case where the relationship is clearly not working out, or in the case where the investment was a major sacrifice. In any event, this result (which was only marginally significant) should be interpreted cautiously.

3. Study 2

Whereas Study 1 was hypothetical in nature, Study 2 was designed to test our hypotheses in a more realistic context. Specifically, I recruited participants who were in romantic relationships, and randomly assigned them to either recall investments that their partner had made into their relationship, recall investments that they had made into the relationship themselves, or skip this portion of the experiment (control). Relative to the control condition, I hypothesized that participants who were asked to think about their partners' investments would report greater intentions to continue to invest themselves. I expected this effect to occur through two simultaneous pathways. Specifically, I expected that thinking about the partner's investments would make participants feel more appreciative of their partners (the prosocial pathway), and I also expected the partner's investments to make participants feel more trusting of their partners (the security pathway). I expected that increased feelings of both gratitude and security would provide important mechanisms by which one person's investments into the relationship would motivate the other partner's continued investment. Furthermore, I tested two previously-discussed alternative potential mechanisms for the vicarious sunk cost effect – empathy and indebtedness. I predicted that neither of these potential mechanisms would help to account for the effect.

3.1 Method

3.1.1. Participants

Participants in romantic relationships were recruited through Amazon.com Mechanical Turk. A total of 178 individuals agreed to participate (76 men, 100 women, two preferred not to indicate their gender). Thirty-four participants were excluded because they did not complete the questionnaire, two participants were excluded because they were not currently involved in romantic relationships, and another six participants were excluded because they did not follow the instructions for the study. The final sample consisted of 136 participants (52 men, 83 women, one preferred not to indicate his or her gender), with an average age of 27 (range = 18 to 59). Participants had been in their relationships for an average of four years (range = 1 month to 39 years, median = 28 months). The majority of participants ($N = 70$) stated that their relationship status was “exclusively dating.” Three participants described themselves as casually dating, eight were in an open relationship, 14 were engaged, five were common-law, and 36 were married. Six participants were from Canada, five were from the UK, and the rest were from the United States.

3.1.2. Procedure and Materials

Participants were randomly assigned to one of three conditions: own investment, partner investment, or control. Participants in the “partner investment” condition were asked to think about the various ways in which their current romantic partner had invested in the relationship, and to list those investments as they thought of them. Next, participants were asked to think of an investment their partner had made that was particularly important or meaningful to the partner, and to describe why it was a significant investment for them to make. Participants in the “own investment” condition were given the same instructions, except that they were asked to think about their own investments rather than their partner’s. Participants in the control condition

skipped this portion of the experiment. Next, all participants were given a series of questionnaires about their relationship.

Gratitude. Three items were selected from Gordon and Chen's (2010) scale to capture participants' current feelings of appreciation for their romantic partners: "I feel very lucky to have my partner in my life," "I feel appreciative of my partner," and "I am struck with a sense of awe and wonder that my partner is in my life" (Cronbach's $\alpha = .79$).

Trust. Three items were selected from Rempel, Holmes, and Zanna's (1985) scale to capture participants' current feelings of trust toward their romantic partners: "I can count on my partner to be concerned about my welfare," "I can rely on my partner to keep the promises he/she makes to me," and "I usually know how my partner is going to act. He/she can be counted on" (Cronbach's $\alpha = .90$).

Empathy. We designed the following three items to capture feelings of empathy or concern toward the romantic partner: "I feel compassionate toward my partner," "I feel sympathetic for my partner's feelings," and "I feel concerned for my partner's welfare" (Cronbach's $\alpha = .75$).

Indebtedness. Three items were adapted from Shen, Wan, & Wyer (2010, Experiment 5) to capture participants' current feelings of indebtedness toward their romantic partners: "I feel indebted to my partner for everything he/she does for me," "I feel obligated toward my partner to persevere with this relationship," and "I feel that I owe it to my partner to give this relationship my best shot" (Cronbach's $\alpha = .81$).

Intentions for future investment. I modified Rusbult's Investment Model scale to capture participants' intentions to continue to invest into their relationship in the future. Specifically, I

adapted and combined items from Rusbult's two initial investment subscales (Rusbult, Martz, & Agnew, 1998) to create a final subscale composed of the following five items: "I plan to put a great deal of time into this relationship in the future," "I plan to disclose my personal secrets to my partner," "I plan to continue to merge many aspects of my own life with my partner's," "I plan to work on the mutual friendships and social connections that my partner and I share together," and "I plan to stay involved in this relationship" (Cronbach's $\alpha = .90$).

Upon completion, participants were probed for suspicion regarding the hypotheses of the experimental study, and then debriefed.

3.2 Results and Discussion

I first conducted a one-way ANOVA test to examine the effect of the recall manipulation on investment motivation. As hypothesized, the recall manipulation had a significant overall effect on motivation to continue to invest in the relationship, $F(2,133) = 7.24, p = .001$. In order to examine these differences among experimental groups, I conducted least significant difference post-hoc tests. The results of these tests are shown in Table 1. Compared to those in the control condition, participants who recalled their partners' investments were more motivated to continue to invest in their relationships ($p = .04$), they were more grateful toward their partners ($p = .03$), they felt more trusting of their partners ($p = .02$), and they felt more empathic toward their partners ($p = .04$). In contrast, in comparison to those in the control group, participants who recalled their own investments were marginally *less* motivated to invest in their relationships ($p = .08$) and they reported their partners' views of themselves as marginally less positive ($p = .10$). However, the own investment condition did not differ from the control condition on any of the

other measures. Overall, these results replicate the finding from Study 1 that the partner's investments motivate one's own continued investment, and they suggest a number of potential mechanisms through which this effect might occur. Surprisingly, as with Study 1, these results also suggest that own investment does not motivate subsequent investment. I will explore the implications of this in the general discussion.

3.1.2. Mechanisms

I next conducted a series of one-way ANOVA tests to examine the effect of our recall manipulation on our proposed mediators. The recall manipulation significantly affected gratitude ($p = .01$), empathy ($p = .02$), and trust ($p = .008$). However, the recall condition had no effect on feelings of indebtedness toward the partner ($p = .37$). Given that thinking about the partner's investments did not increase feelings of indebtedness, this variable could not possibly mediate the present effects, and so it will not be discussed it further.

I next used a bootstrapping procedure (Preacher & Hayes, 2008) to simultaneously test the three remaining potential mechanisms for the vicarious sunk cost effect. Because I was only interested in the relative differences between the partner investment recall condition and the control condition, I dropped the own investment condition from these analyses. Experimental condition (partner investment recall versus control) was entered as the independent variable. Gratitude and trust (our two hypothesized mechanisms), as well as empathy (an alternative potential mechanism) were entered as simultaneous mediators. Finally, intentions for future investment were entered as the dependent variable.

The results of these mediational analyses are shown in Table 2. Consistent with our predictions, gratitude significantly mediated the effect of the romantic partner's investments on people's own

intentions to invest in the relationship in the future, $B = .27, p = .03$. As predicted, thinking about the romantic partner's investments increased feelings of gratitude, which in turn motivated continued investment. In addition and also in line with our predictions, increased feelings of trust in the romantic partner simultaneously mediated the effect, $B = .15, p = .04$. In other words, thinking about the romantic partner's investment also increased feelings of trust in the partner, which further motivated continued relationship investment. However, empathy did not emerge as a significant mediator, $B = .03, p = .41$. As hypothesized, intentions to invest into the relationship could not be accounted for by feelings of empathy toward the romantic partner. Finally, there was a strong overall association between condition and investment intentions, $B = .53, p = .01$. However, the direct association between condition and investment intentions (i.e., controlling for gratitude, trust, and empathy) was not significant, $B = .07, p = .59$. The direct association still was not significant when empathy was removed from the model, $B = .08, p = .54$. This suggests that together, gratitude and trust fully accounted for the association between recalling the partner's investments and intending to continue to invest oneself.

Altogether, the results of Study 2 demonstrate that when people are asked to think about a romantic partner's past investments into the relationship, they become more motivated to continue to invest in the relationship themselves. Furthermore, I identified two important mechanisms of the vicarious sunk costs effect. Replicating past findings (Weiselquist et al., 1999), participants who thought about their partners' investments felt more trusting of their partners, which predicted a higher motivation to invest in the relationship themselves. In addition, as would be expected from past research on prosocial emotions and behavior, thinking about the romantic partner's investments also increased participants' feelings of gratitude for

their partners, which led to further investment motivation. Moreover, this study successfully ruled out indebtedness and empathy as two alternative explanations for the effect.

4. General Discussion

Together, these studies provide compelling support for the vicarious sunk cost effect in romantic relationships. That is, decisions to persevere in romantic relationships can be motivated by the past investments made by the romantic partner. In Study 1, participants were more motivated to continue working at a hypothetical failing relationship if their partner had made a sacrifice earlier in the story. In Study 2, participants who were asked to think about their partners' investments subsequently reported higher intentions to continue to invest in those relationships. This effect occurred through two distinct motivational pathways. Participants' higher motivation to continue to invest in the relationship could be accounted for by higher levels of trust in their romantic partners (i.e., reduced threat associated with investing), and as a result of increased gratitude for the romantic partner (i.e., prosocial desires to reciprocate the investment).

There are notable methodological strengths to each of the present studies. Study 1 provides evidence for the vicarious sunk cost effect within the context of a failing relationship. In this study, even though participants explicitly read that the relationship was not doing well and was unlikely to work out in the long run, the partner's investments still motivated continued relationship perseverance. Thus, this study demonstrates that a romantic relationship does not have to be succeeding in order for the partners' sunk costs to be honored. In Study 2, using an entirely different experimental method, I demonstrated that the effect extends beyond hypothetical contexts to actual romantic relationships, and I also identified two distinct mechanisms through which the effect occurs. Furthermore, the fact that one of the mediators of the vicarious sunk cost effect was a moral emotion – gratitude – provides evidence that the

behavior is at least partially prosocially motivated. Study 2 also showed that any prosocial motivation for the vicarious sunk cost effect could not be accounted for by the related feelings of empathy or indebtedness, but were instead specific to gratitude.

These studies also have some limitations that should be addressed in future research. First, both of these studies relied on self-report as opposed to actual investment behavior. One way to remedy this limitation would be to conduct a longitudinal study, and test whether the partner's investment leads to a subsequent increase in one's own investment. An additional limitation to the present studies is that the prosocial element of gratitude – the idea that gratitude motivates continued investments out of a desire to reciprocate the partner's investments – was not directly tested, but was instead implied based on previous research. I intend to address this problem in follow-up studies as well, by directly measuring the extent to which participants' motivation to invest is due to a desire to reciprocate the partner's past investments.

The present findings have important implications for the applicability of judgment and decision making research to the domain of romantic relationships, and vice versa. Gunia et al. (2009) identified a vicarious sunk cost effect in the traditional JDM context of financial investments. In our research, I found that this effect extends to the relational domain, in that romantic partners are motivated to honor one another's relational sunk costs. In both situations, the effect seems to occur at least partially through a prosocial mechanism. However, in our research, I found an additional, security-based mechanism through which the partner's investments motivate one's own investment. Trust is unlikely to be an explanation for the vicarious sunk cost effect in the scenarios used by Gunia et al., in which the second decision maker is in no way reliant on the previous decision maker. However, trust may be relevant for financial ventures in which two decision makers are investing concurrently, as it is for other cooperative financial situations

(referred to as “trust games”, e.g., Stirrat & Perrett, 2010). Future research should examine situations in which two or more individuals are investing into the same financial project. It would be interesting to determine if one decision maker’s investments would motivate the other’s due to increased feelings of trust in the investment partner, as I have found to be the case in the context of interpersonal relationships.

The current studies also have interesting implications for the role of one’s own investment in relationship perseverance decisions. In both Studies 1 and 2, whereas the partner’s investment motivated continued relationship perseverance, own investments did not. In fact, if anything, own investment into the relationship led to a *decreased* motivation to continue to invest in the relationship across both studies. These results were unexpected, given that there is already a large body of research demonstrating that past investments made by the self *do* predict future relationship commitment and stability (Le & Agnew, 2003). One possible reason for this discrepancy is that there may be a difference between the influence of investment in the short-term versus the long-term. It is possible that although investment promotes continued relationship maintenance in the long-term (Le & Agnew, 2003), reciprocity norms may motivate people to hold back on further investment in the short-term, so as not to end up being under-benefited. This may be one way in which romantic relationships differ from other ventures that are typically studied by judgment and decision making researchers. Another possibility is that own past relationship investments do motivate future investments, but not in ways that could be captured with our present experimental designs. For example, perhaps own investment only motivates continued investment into relatively successful relationships, and the effect does not extend to failing relationships (Study 1). Similarly, perhaps people are already quite cognizant of their own relationship investments, and so being reminded of those investments does not increase

what future investment intentions they already have (Study 2). These hypotheses will be more directly tested in our planned follow-up studies.

In conclusion, our research strongly supports our hypothesis that investments made by the romantic partner can motivate one to continue to invest in the relationship oneself. This occurs in part because the partner's investments elicit trust ("It is now safe for me to invest as well"), and also because they elicit gratitude ("I feel thankful for my partner's thoughtful behavior"). More generally, this research suggests the usefulness of integrating the relationship and JDM literatures. Future research will continue to examine the mechanisms, extensions, and parameters of this relationship phenomenon.

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Table 1: Post-hoc tests for one-way analysis of variance between own investment recall condition, partner investment recall condition, and control condition on relationship variables of interest.

	Control Condition Means	Own Inv. Condition Means	Partner Inv. Condition Means	Control vs. Own Inv. p-values	Control vs. Partner Inv. p- values	Own vs. Partner Inv. p-values
Motivation to Invest	5.88	5.46	6.41	0.08	0.04	< .001
Gratitude	5.88	5.50	6.36	0.47	0.03	0.005
Trust	5.69	5.50	6.31	0.46	0.02	0.003
Empathy	6.10	5.99	6.52	0.57	0.04	0.009
Indebtedness	4.92	5.31	5.31	0.22	0.23	0.998

Table 2: Simultaneous mediation effects of gratitude and trust on the association between condition (partner investment recall versus control) and intentions to continue to invest.

	Point Estimate of Indirect Effect	SE	BCa 95% CI	
			Lower	Upper
Gratitude	.2712	.1216	.0700	.6267
Trust	.1527	.0746	.0236	.4547
Empathy	.0347	.0422	-.0720	.1985
Total	.4585	.1727	.1419	.8522

Note: BCa, bias corrected and accelerated, 5000 bootstrap samples. Confidence intervals containing zero are interpreted as not significant.

Figure 1. 2x2 Factorial ANOVA interaction predicting willingness to stay with hypothetical partner in Study 1 (N = 142).

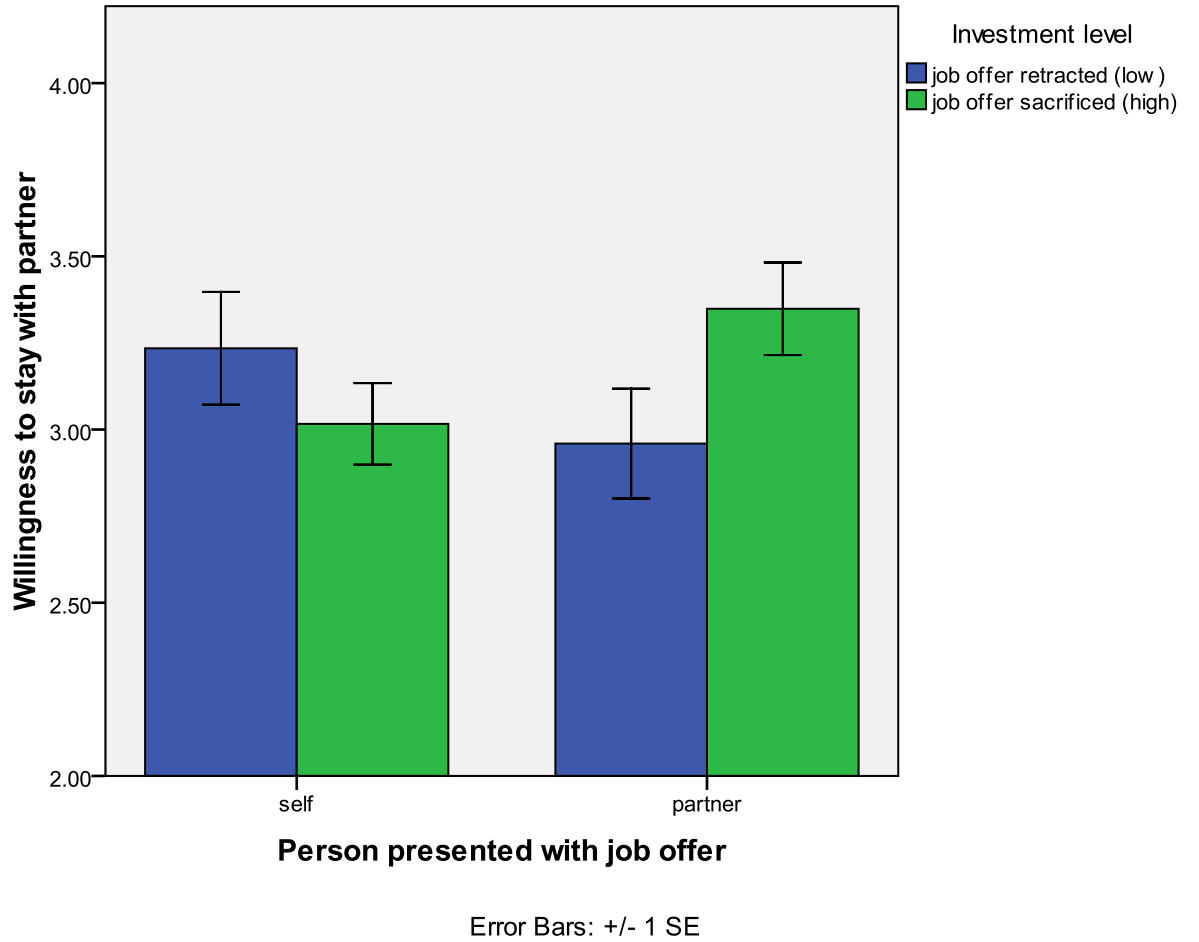
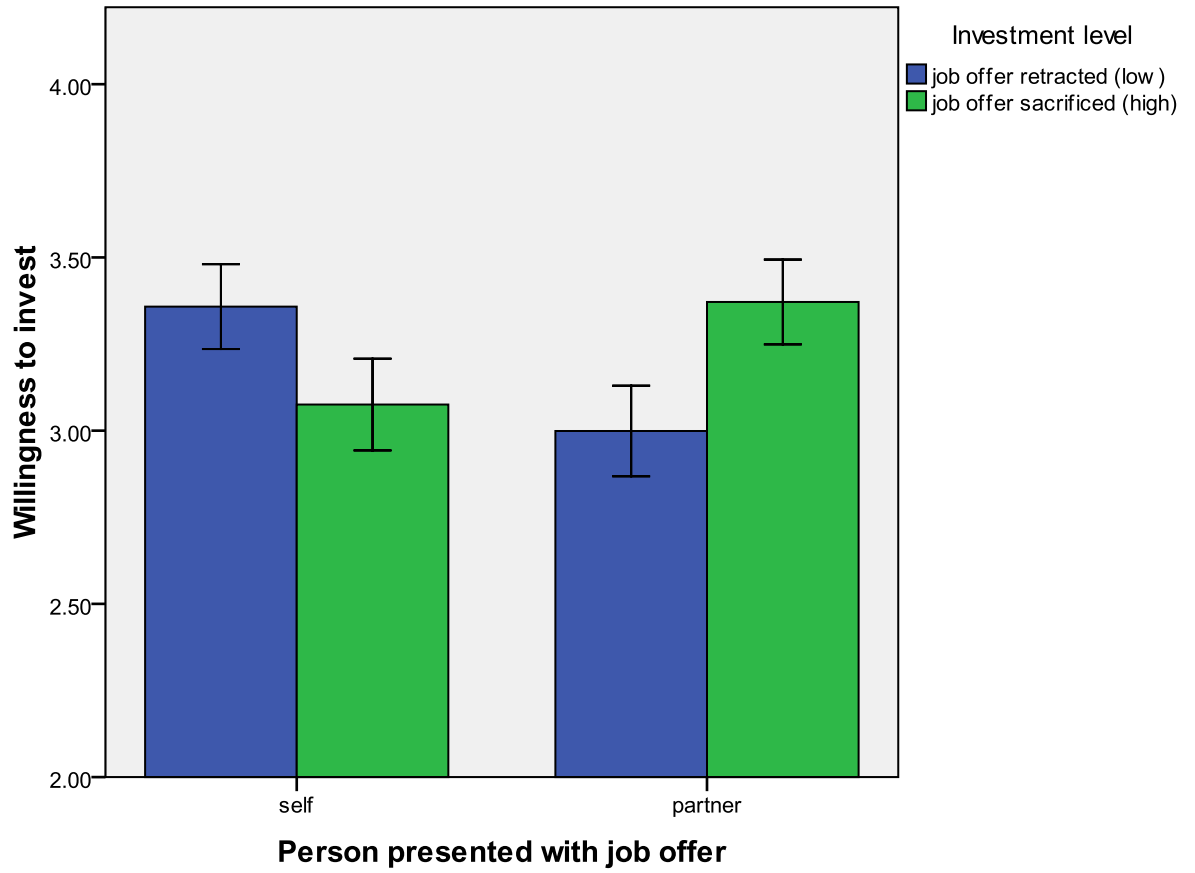


Figure 2. 2x2 Factorial ANOVA interaction predicting willingness to invest in Study 1 (N = 142).



Error Bars: +/- 1 SE

Appendices

Appendix A: Hypothetical relationship scenario

It's autumn and you are taking a walk through your neighbourhood park. As you go to take a seat, you notice someone you find attractive sitting a few benches over, and so you decide to introduce yourself. You end up exchanging numbers, and agree to go out for dinner the following week.

As you get to know this person, you discover that he/she is clever, funny, and easy to talk to, and you thoroughly enjoy spending time together. After several weeks of dating, you find that you have developed strong, romantic feelings for this person, and you're quite sure that the feeling is mutual.

Everything continues to progress smoothly between you and your new partner, and before you know it, summer has arrived. A couple that you know invites the two of you to spend the weekend at their cottage. You both have such an excellent time that on your way back, your partner mentions how great it would be to rent a place like this of your own for a week or two. You agree wholeheartedly, and you make some plans together.

(Own Investment Version)

Some time later, you decide that you have outgrown your current place of work, and so you're in the market for a new job. You send out some resumes and get a number of offers. The most exciting offer is from a company that you have been hoping to work with for a while: the position is perfect for someone with your skills and experience, and the pay is terrific. Unfortunately, the company doesn't have this job opening at its office closest to you, so you would have to relocate to their other office, which is a five hour drive away. You wrestle with the decision for some time. However, in the end, [it turns out that the choice is made for you: the company loses funding for the position and is forced to retract the offer/you decide to not to take the offer: you wouldn't want to put that kind of strain on the relationship.]

(Partner Investment Version)

Some time later, your partner decides that he/she has outgrown his/her current place of work, and so he/she is in the market for a new job. He/she sends out some resumes and gets a number of offers. The most exciting offer is from a company that he/she has been hoping to work with for a while: the position is perfect for someone with your partner's skills and experience, and the pay is terrific. Unfortunately, the company doesn't have this job opening at its office closest to where your partner lives, so he/she would have to relocate to their other office, which is a five hour drive away. Your partner wrestles with the decision for some time. However, in the end, [it turns out that the choice is made for him/her: the company loses funding for the position and is forced to retract the offer/your partner decides to not to take the offer: he/she wouldn't want to put that kind of strain on the relationship.]

Over the next few months, you and your partner continue to become more and more comfortable with each other. You develop the same group of friends, and you spend an increasing amount of time at each other's places. Unfortunately, that's when things between you start to go downhill. As you get used to each other's company, you find that you aren't having as much fun together as you were before, and you feel like you're arguing a lot more than usual. More importantly, with all this time you're spending together, you begin to notice some pretty disappointing incompatibilities between you and your partner. You just don't seem to agree on important values, and you don't really share the same priorities in life. Even worse, your goals for the future don't line up at all. You still like them as a person, but you start to think that the likelihood of this person ultimately being the one is slim.