

**Romantic relationship investment and commitment:
An expansion of the Investment Model conceptualization**
by

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Abstract

Objective: Rusbult (1980) postulated that the endowment of personal contributions to a romantic relationship increases relationship commitment. This two-study project developed and psychometrically tested a theoretically-informed, multifactorial measure of relationship investment and examined loss aversion and observed investment reward value as potential causal mechanisms of the investment-commitment link. **Method:** One hundred and forty-nine participants completed a pilot study on Mechanical Turk, which was composed of self-report items assessing investment, loss aversion, observed investment reward value, commitment, and associated constructs. Four hundred and ninety-nine participants completed a similarly designed follow up study to gather data for Structural Equation Modeling (SEM). **Results:** The pilot study revealed that relationship investment was comprised of four factors: acceptance of communal cost, resource non-portability, and intrinsic and extrinsic expected reward value. Further, analyses revealed that commitment was best measured as a global construct. The follow-up study echoed these findings and also demonstrated a pathway wherein investment led was associated with greater loss aversion, which in turn was related to enhanced commitment. Observed investment reward value, however, was associated with investment alone. **Conclusions:** Overall, the findings supported Rusbult's (1980) original theory that loss aversion drives the investment-commitment association. However, these studies supply additional information about the multifactorial nature of investment, the factor structure of commitment, and the measurement of loss aversion. Further, they highlight the relationship-building features of investment and suggest

that these resources may represent some of the most essential components of relationship endurance.

Keywords: romantic relationships, investment model, relationship investment, loss aversion, relationship commitment

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List of Abbreviations

CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CI	Confidence Interval
EFA	Exploratory Factor Analysis
IMS	Investment Model Scale
IMS—C	Investment Model Scale—Commitment Subscale
MCS	Moral Commitment Scale
MTURK	Mechanical Turk
PN-SMD	Positive Negative Semantic Differential
RCI	Relationship Commitment Inventory
RMSEA	Root Mean Square Error of Approximation
S1	Study 1
S2	Study 2
SEM	Structural Equation Modeling
SRMR	Standardized Root Mean Square Residual

TCS The Commitment Scale

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Healthy romantic relationships enhance life satisfaction and quality (Frisch, Cornell, Villanueva, & Retzlaff, 1992; Kwan, Bond, & Singelis, 1997). And yet, many couples will experience ebbs and flows in relationship satisfaction (e.g., Mitnick, Heyman, & Slep, 2009) and love (Sprecher, 1999) across time. Commitment promotes relationship stability by allowing couples to assess the value of continuing a relationship in a broader context. In particular, the Investment Model (Rusbult, 1980) utilizes behavioral economic principles to describe how a person's perceptions of his or her romantic relationship influence commitment to that relationship¹ and, subsequently, its stability over time (see Figure B1). Specifically, the model posits that the strength of an individual's global commitment to a relationship—that is, his or her desire to continue in it—is determined by the perceived favorability of the ratio between relationship-related rewards and costs (Rusbult, 1980; Rusbult, 1983).

In this context, *reward value* describes the total of the positive outcomes for the relationship (including love, status, services, goods, money, sex, and information; Cate, Lloyd, Henton, & Larson, 1982). Similarly, *cost value* describes the total of the negative outcomes for the relationship (e.g., loss of independence, freedom, self-esteem, identity, time, effort, privacy, and/or money; Sedikides, Oliver, & Campbell, 1994). The net reward-cost ratio is termed the *outcome value* of the relationship; and it can vary by both sign and magnitude² (Rusbult, Martz, & Agnew, 1998). Positive outcome values (i.e., greater overall rewards than costs) are

¹ Throughout the manuscript, the term *relationship* is used as a shorthand reference for romantic relationships. The proposed study does not seek to extend the Investment Model to other types of relationships.

² Mathematically, the definition of outcome value is expressed as $O = \sum w_i a_i$, where O = outcome value, w_i = importance of the resource, and a_i = magnitude of the resource.

hypothesized to produce increased commitment, as individuals are presumably motivated to maintain these rewards over time. In contrast, negative outcome values are thought to decrease commitment (Rusbult, 1980; Rusbult, 1983). Similarly, larger outcome values (i.e., greater differences between rewards and costs) are thought to have a stronger influence on commitment (Rusbult, 1980; Rusbult, 1983). Essentially, the outcome value provides a snapshot of the relationship - a global evaluative judgment helping individuals decide whether or not they are “getting a good deal”.

Notably, however, the interpretation of this outcome value by the individual is comparative and, thus, subjective (Rusbult, 1980; Rusbult, 1983). In other words, the same relationship outcome value could seem attractive or unattractive to different degrees, depending upon the *comparison level* or *frame* against which it is evaluated by a particular person (Chibucos, Leite, & Weis, 2005; Kahneman & Tversky, 1979; Kelley & Thibaut, 1978; Thibaut & Kelley, 1959). In fact, the investment model asserts that there are three determinants of commitment—relationship satisfaction, alternatives, and investment—with each specifying a comparison level that alters the perceived importance and meaning of the relationship’s outcome value (see Figure B2; Rusbult, 1980).

Relationship satisfaction describes the global positive and negative attributes of the relationship (i.e., the outcome value) relative to what one has come to expect in terms of relationship rewards and costs, based on past relationship experiences and observations of other romantic relationships (e.g., “[m]y relationship is much better than others’ relationships”; Fincham & Bradbury, 1987). In this case, then, the comparison level is the outcome value anticipated in a prototypical relationship (Rusbult et al., 1998). Commitment will be greater when the outcome value is more positive for the current relationship than for a prototypical

relationship— and the larger the discrepancy between these two outcome values, the stronger the impact is on commitment.

Similarly, *quality of alternatives* compares the outcome value of the present relationship to the expected outcome value in the best alternative relationship situation (e.g., “[t]he people other than my partner with whom I might become involved are very appealing”; Rusbult et al., 1998; Thibaut & Kelley, 1959). There are many types of alternative relationship statuses that can serve as a comparison, including partnering with a different individual, partnering with multiple individuals, or remaining single. When the outcome value of the current relationship is more favorable than that of the best alternative relationship status, commitment will be higher. Ultimately, both high satisfaction and low quality of alternatives will elicit greater commitment (e.g., “I am committed to maintaining my relationship with my partner”; Rusbult et al., 1998; Rusbult, 1980; Thibaut & Kelley, 1959).

Relationship Investment

In contrast to satisfaction and alternatives, the third determinant of commitment – *relationship investment* – is framed in terms of “input value” of the relationship. In particular, relationship investment compares the combined personal resources devoted to the current relationship against the value of resources left if the relationship dissolves (Rusbult, 1980; Rusbult, 1983)^{3,4}. Importantly, investments are also defined within the model as resources that

³ Mathematically, this definition is expressed as $I_x = \sum w_j r_j$, where I_x =investment size, w_j =resource importance, and r_j =resource size.

⁴ The Investment Model does not explicitly identify a comparison level for investments (Rusbult, 1980, 1983; Rusbult et al., 1986). However, we base this discussion of investment’s comparison level on Rusbult’s informal discussions of the mechanisms of the investment-commitment link (Rusbult, 1980; Rusbult, 1983).

have been irrevocably tied to the relationship. Behavioral economic studies have demonstrated that individuals will continue to invest in a project—even if it is a losing proposition—to avoid losing resources that cannot be withdrawn from that project (Garland, 1990; Thaler & Johnson, 1990). These past investments thus represent “sunk costs” that can inspire loss aversion (Brockner, 1992; Zeelenberg & van Dijk, 1997). The investment model proposes that loss aversion works similarly within romantic relationships, such that individuals will avoid “wasting” permanently dedicated resources by leaving the relationship (Arkes & Blumer, 1985). Therefore, the input value of an intact relationship will always be greater than that of a dissolved relationship (Rusbult, 1980), which also implies that investment should promote commitment.

Existing research gives provisional support for the loss aversion explanation of the investment-commitment association. For instance, individuals often identify potential relationship dissolution as a risk within their romantic relationships due to the losses that may incur as a result (Boon & Pasveer, 1999). Further, *constraint commitment* – factors (investment or otherwise) that makes relationship termination more costly or risky – tend to inhibit relationship dissolution (Adams & Jones, 1997; Johnson, 1982; Johnson, Caughlin, & Huston, 1999; Rhoades, Stanley, & Markman, 2010; Stanley & Markman, 1992). Thus, research suggests that the anticipation of a loss of valuable resources, among other constraining factors, contributes to relationship persistence.

The overall investment model has received strong empirical support for its hypothesized causal associations. It has also demonstrated consistent results among different populations, relationship types, and cultures (for a comprehensive review, see Agnew & Arriaga, 2011). Relationship investment, in particular, has been found to be uniquely predictive of commitment,

even beyond the influence of commitment's other determinants (Impett, Beals, & Peplau, 2001; Le & Agnew, 2003; Rusbult, 1980; Rusbult, Johnson, & Morrow, 1986). It appears possible that loss aversion contributes to the investment-commitment association, as individuals consider the value of already-dedicated resources when weighing the rewards and costs of continuing a romantic relationship.

Limitations of Extant Research

Despite the strong track record of empirical support, some of the implications of the model's underlying theory have yet to be fully explicated and empirically tested. In particular, the construct of relationship investment and its association with commitment remain, in part, unexplored in the sense that (a) the definition of investment is ambiguous, (b) investment model theory is not fully integrated into the explanation of the investment-commitment association, and (c) the factors of commitment have not been not considered separately within this association.

Vague definition of investment. The current theoretical definition of investment is very broad, specifying only that contributed resources are non-portable (Rusbult, 1980). This criterion applies solely to resources that are not time-bound (as discussed in Goodfriend & Agnew, 2008). For example, a car might be contributed to a relationship at one point and later removed from it; however, it would be impossible for an ephemeral resource—such as an hour of shared time or a conversation—to ever be removed from the relationship, once given. Further, the broadness of this definition also prevents the differentiation of investment from other relationship transactions, such as sacrifice (Kogan et al., 2010) or relationship maintenance behaviors (Dainton & Stafford, 1993; Stafford, 2011). Perhaps more crucially, though, the ambiguity of the conceptual scope of investment renders it impossible to develop a clear operational definition for investment's "input

value”, creating a situation in which investment is assessed by very different criteria across studies (Goodfriend & Agnew, 2008; Rusbult, 1980; Stafford, Dainton, & Haas, 2000). A more clearly delineated definition of investment is therefore needed; this definition must apply to all types of relationship resources, place investment within the broader nomological network of relationship exchanges, and lend itself to reliable and accurate measurement.

Incomplete exploration of causal mechanisms. Further, the loss aversion comparison level has been implied but not yet been formally defined—conceptually or operationally—within the investment model framework (Rusbult, 1980). The absence of an operational definition, in particular, has led to a lack of empirical research that directly tests the potential role of loss aversion in the investment-commitment association. Further, operational ambiguity has also contributed to an exclusive emphasis on stay-leave behaviors within the loss aversion comparison level (e.g., comparing resources available if the individual stays in the relationship vs. leaving it). This comparison level thus conflates one element of commitment—the intent to persist (Le, Dove, Agnew, Korn, & Mutso, 2010)—with an associated construct—relationship stability (which describes the actual persistence of a relationship across time; Le & Agnew, 2003; Rusbult et al., 1998; Simpson, 1987).

Further, the rough conceptual definition of loss aversion does not reflect all of the behavioral principles that underpin the investment model. For example, individuals are known to make investments in order to maintain or strengthen the health of the relationship; thus, investing is essentially a reward-seeking behavior (Canary, Stafford, House, & Wallace, 1993; Fitzsimons & Bargh, 2003; Knee, 1998; Rusbult et al., 1986). However, the current comparison level focuses only on the potential losses of relationship dissolution. It is possible that, at least under certain conditions, a reward-focused comparison level may also drive the evaluation of

investments. Given these limitations, an updated model of investment's comparison levels is needed and should include clear operational definitions that facilitate empirical examination; apply to the full continuum of commitment states; supply comparative lenses for both the rewards and costs of investment; and explore the conditions in which rewards or costs become influential.

Outmoded conceptualization of relationship commitment. Finally, the original investment model describes commitment as a unidimensional or global construct (Rusbult, 1980). However, more recent research suggests a multi-factorial definition of commitment involving conative, affective, and cognitive factors (Adams & Jones, 1997; Agnew, Van Lange, Rusbult, & Langston, 1998; Arriaga & Agnew, 2001; Johnson, 1973; Stanley, Rhoades, & Whitton, 2010). These components respectively describe (a) the motivation of an individual to choose to remain in the current relationship, (b) dependence on the relationship to meet social and emotional needs, (c) the belief in the relationship's future persistence (Adams & Jones, 1997; Agnew et al., 1998; Arriaga & Agnew, 2001; Johnson, 1973; Rusbult, 1980; Rusbult & Buunk, 1993; Rusbult & Van Lange, 2003; Stanley et al., 2010; Wieselquist, Rusbult, Foster, & Agnew, 1999). Clearly, each of these factors represents a distinctive element of commitment; an updated model of the investment-commitment association is needed in order to explore how investment may be differentially associated with each of these components.

Extending the Investment Model

The investment model provides a logically-convincing, empirically-supported theoretical framework for understanding the process that culminates in relationship commitment (Agnew & Arriaga, 2011). The proposed study seeks to clarify several features of the investment model that

pertain to relationship investment and the investment-commitment association. To this end, we first propose refined conceptual and operational definitions of investment and its comparison levels. In addition, we also specify a model of the investment-commitment association that treats commitment as a continuous and multi-factorial construct.

A Reward-Oriented Definition of Investment

The original investment model posits that investments are resources that increase commitment because they are non-portable and therefore inspire loss aversion (Rusbult, 1980; Rusbult & Buunk, 1993; Rusbult et al., 1986). However, investments have also been shown to result in later rewards, such as appreciation on the part of one's partner (Berger & Janoff-Bulman, 2006) or a sense of increased closeness with one's partner (Agnew & Arriaga, 2011). Thus, investment may additionally function as a method of increasing reward value for one's partner; which, in turn, would motivate the partner to re-invest in the relationship, ultimately leading to an increase in the actor's own reward value (see Figure B3; Berger & Janoff-Bulman, 2006). We therefore hypothesize that, in addition to non-portability, investment has two other features: a) the acceptance of communal costs, and b) the subsequent expectation of increased reward value.

This perspective suggests that individuals may view investments as *communal costs*, which are initially costly behaviors that “meet the needs of the other” member of the dyad (Berger & Janoff-Bulman, 2006; Clark & Grote, 1998). However, these contributions differ from other types of relationship exchanges, which may be made solely to maintain the relationship or as a sacrifice for one's partner. Instead, they may be tied to the *expectation of positive reward value*; or, in other words, the belief that the acceptance of up-front personal costs will lead to later rewards within the relationship. Any resource—whether it is time-limited or not—may be

linked with such later rewards. Taking this three-fold, functional view of relationship investment provides a clearer conceptual definition of investment, one that applies to resources regardless of whether they are constrained by time; delineates differences between investment and other relationship exchanges; and is specific enough to be operationalized and empirically tested.

A reward-oriented comparison level. A reward-oriented comparison level may serve as an appropriate theoretical compliment to the updated definition of investment. Specifically, an individual may compare his or her expectation of rewards to the actual rewards received when judging the value of investment (Kelley & Thibaut, 1978). This viewpoint is consistent with studies of behavioral economics and neuroeconomics, which find that satisfaction with a reward depends upon whether that reward meets, or exceeds, its predicted value (for example, see O’Doherty, 2004; Schultz, 2006). Thus, one potential comparison level is that of *observed investment reward value*, or the perceived rewards garnered through investment, as compared to the rewards expected when making an investment. This comparison level does not conflate commitment and relationship stability by focusing only on the stay-leave situation; rather, it applies to the full spectrum of commitment. Further, loss aversion and observed investment reward value, when considered together, offer comparative lenses that address both the potential rewards and costs of investment. Finally, the use of clearer definitions facilitates better operationalization and, subsequently, the examination of these comparison levels through empirical study.

The moderating role of satisfaction. The addition of a second comparison level also begs the question: what factor (or factors) influences an individual to consider rewards—versus costs—when evaluating his or her investment? Within relationship evaluations, individuals do vary in their tendency to consider positive or negative relationship attributes (Boon & Griffin,

1996). Further, there may be salient relationship factors that *frame* how strongly rewards and costs are weighted in evaluations (Tversky & Kahneman, 1981). One such factor is relationship satisfaction, which can create a *valence frame effect*, altering the relative cognitive accessibility of the positive (i.e., rewards) or negative (i.e., costs) attributes of the relationship (this phenomenon is also called *sentiment override*; Bizer, Larsen, & Petty, 2011; Brandstatter, 2001; Fincham, Garnier, Gano-Phillips, & Osborne, 1995; Levin, Schneider, & Gaeth, 1998). Such an effect may impact which investment comparison level provides the frame of reference due to increased cognitive accessibility—the observed reward value or loss aversion.

For instance, a highly satisfied individual may easily be able to recall positive aspects of the relationship, such as rewards, and these factors are then more strongly weighted in investment evaluations. Thus, expected versus observed investment reward value is likely to be used as a comparison level when relationship satisfaction is high. For those with low satisfaction, though, loss aversion may function as the primary investment comparison level, as costs become more salient and cognitively accessible (Arkes & Blumer, 1985). Put more simply, individuals in happy relationships may tend to think of rewards when judging investment and commitment, while individuals in less happy relationships may look to the costs of dissolution.

Factors of commitment. Finally, current theories of commitment in romantic relationships suggest that, rather than being a global construct, commitment is composed of conative, cognitive, and affective components. These factors may be differentially associated with reward- and cost-based comparison levels for investment. For example, many therapists hypothesize that emotional attachment to another individual will increase when his or her needs are met through that relationship (e.g., teaching partners responsiveness to interpersonal needs in Emotionally Focused Couple Therapy; Davila, 2003; Johnson & Whiffen, 1999). Therefore, we

posit that, for highly satisfied individuals, investment will be tied to affective commitment because of the positive evaluations of observed investment reward value.

On the other hand, we hypothesize that the non-portability of resources will translate into loss aversion when satisfaction is low, thereby increasing conative commitment. In this case, individuals may feel a desire to avoid losing resources tied to the relationship and therefore make a conscious decision to continue in that relationship despite their dissatisfaction (as is the case with constraint commitment; Rhoades, Stanley, & Markman, 2010). In sum, investment may impact either attachment or intent to persist, depending upon the comparison level and its associated satisfaction level.

Summary

The original investment model asserts that the impact of relationship investment on commitment is determined through loss aversion alone (Rusbult, 1980; Rusbult, 1983). We propose to update and extend this hypothesized causal association. First, we argue that investment has three primary components: expected investment reward value, communal cost, and non-portability of resources. Further, we posit that two comparison levels shape the investment-commitment association: loss aversion and observed investment reward value. We hypothesize that satisfaction impacts which comparison level is utilized; specifically, highly satisfied individuals will use observed investment reward value, while dissatisfied individuals will weight loss aversion. Additionally, each comparison level may be differentially associated with the factors of commitment. In particular, the fulfillment of relational needs through rewards may create a direct association between observed reward value and affective commitment, while the inhibiting effect of potential losses may directly shape conative commitment.

Aims of the Current Studies

The primary aim of the current project was to empirically examine the updated conceptual model of the investment-commitment link described above. Many of the constructs in this model were expanded or altered for the current project. Furthermore, some of the constructs have never been operationally defined in the context of the investment model. Thus, a two-fold approach was required. First, a pilot study was conducted to establish clear and psychometrically sound measures for each of the study constructs. Towards this end, several existing instruments were adapted from previous studies; other measures of novel study constructs were generated for this research project. Once the composition of each measure was established, the second study was then implemented to test the expected structural associations between constructs. Together, these studies demonstrate whether individual constructs could be successfully measured and conform to their expected factor structures, as well as assessing whether they were associated in the theoretically predicted ways.

General Method

Procedure

Participants were recruited through Mechanical Turk (MTurk), a website hosted by Amazon that provides the structure to recruit and compensate participants, as well as to administer a survey (Mason & Suri, 2012; Paolacci, Chandler, & Ipeirotis, 2010). Individuals were eligible for participation if they were at least of the age of majority in Alabama (i.e., 19 or older), living in the United States, fluent English speakers, and were in a current romantic relationship. A pre-qualification was also added into MTurk for the follow-up study, which prevented pilot study participants from participating in the follow-up study.

Interested participants were directed to Qualtrics, where they provided informed consent and affirmed that they met eligibility criteria. Participants then completed the survey online. The presentation of scales and items within scales was mostly randomized to protect against order effects; however, two scales were presented back-to-back for methodological reasons (described below). Survey content included measures that were intended to be included in the follow-up study. These scales assessed investment, comparison levels, relationship satisfaction, and commitment. In the pilot study, additional supplementary scales were included that assessed commitment (at a global and factor level), relationship satisfaction, and investment equity. Following completion of the study, participants were de-briefed in case they experienced any distress and were also compensated with a \$0.70 credit to Amazon.com.

Participants

One hundred and fifty-nine and 520 people consented to participate in the pilot study and the follow-up studies, respectively. Of these, 149 finished the pilot study, while 499 individuals completed⁵ its later counterpart. Among the 10 partial completers of the pilot study, 6 completed 70% or more of the survey, 3 completed between 50 and 69% of the items, and one completed less than 50% of the survey. Further, completers in the pilot study had significantly longer romantic relationships ($t = -3.42$, $df = 91.65$, $p = 0.001$) and higher non-portability ($t = -2.27$, $df = 152$, $p = 0.03$) than did partial completers.

Among the follow-up study's partial completers, 5 individuals completed more than 80% of the survey, 9 completed between 50% and 79% of the survey, and 7 completed less than 50% of the survey. Completers and partial completers generally did not vary significantly on the

⁵ An individual was considered to have completed the study if he or she filled out the entire study and reached the de-briefing page.

majority of the demographic variables or primary outcome variables. Additionally, completers were more likely to be cisgender than transgender ($\chi^2 = 16.24$, $df = 2$, $p < 0.01$) and also had higher income levels ($t = -2.82$, $df = 512$, $p < 0.01$) than partial completers.

Full demographics for both studies can be found in Tables B1 and B2. Overall, study participants were in middle adulthood (Study 1[S1] $M = 35.38$ years, $SD = 12.60$; Study 2[S2] $M = 33.34$ years, $SD = 10.37$) and tended to be White (S1 $n = 110$, 71.4%; S2 $n = 369$, 71.8%), Christian (S1 $n = 86$, 54%; S2 $n = 269$, 52.4%), and heterosexual (S1 $n = 139$, 87.5%; S2 $n = 444$, 86.4%). While participants in both samples were most often cisgender women (S1 $n = 95$, 59.7%; S2 $n = 370$, 72%), there were significantly more cisgender men in the pilot study (S1 $n = 60$, 37.7%; S2 $n = 139$, 27%; $\chi^2 = 8.63$, $df = 2$, $p < 0.01$). The modal education level was a Bachelors degree (S1 $n = 61$, 38.4%; S2 $n = 177$, 34.4%) and participants reported earning between \$20,000-\$29,999 annually. Partners in the follow-up study earned the same income as respondents, but partners in the pilot study earned significantly more on average (\$30,000-\$39,999 per year; $t = -5.58$, $df = 153$, $p < 0.01$). Respondent's income significantly and positively predicted partner income in both studies (S1 *Standardized B* = 0.21, $t = 2.63$; S2 *Standardized B* = 0.23, $t = 5.38$; p 's < 0.01).

The majority of respondents were in a serious, monogamous relationship (e.g., monogamous marriage, S1 $n = 55$, 34.6%; S2 $n = 188$, 36.6%). The average couple had been together for over six years (S1 $M = 6.5$, $SD = 8.5$; S2 $M = 7$, $SD = 8.42$) and most were currently cohabiting (S1 $n = 111$, 72.1%; S2 $n = 365$, 71%). A minority of individuals indicated that they had broken up and reunited with their current partner in the past (S1 $n = 35$, 22.7%; S2 $n = 159$, 31%). A slim majority of participants were childless (S1 $n = 87$, 56.5%; S2 $n = 278$, 54.1%). Parents typically had one or two children (S1 $M = 1.84$, $SD = 0.93$; S2 $M = 2.08$, $SD = 1.17$) who

were most likely to be minors (S1 $n = 41$, 61.2%; S2 $n = 165$, 70.2%). Notably, parents in the pilot study were more likely to have a mixture of minor and adult children in the home (29.9% of the pilot study participants vs. 10.2% of the follow-up study participants). Most commonly, the respondent's partner was a significant parenting figure (S1 $n = 37$, 56.1%; S2 $n = 172$, 72.9%). However, participants in the follow-up study were more likely to report that their partner was a co-parent to all of the respondents' children (S1 $n = 37$, 56.1%; S2 $n = 172$, 72.9%).

Data Preparation. First, individual items were reverse-scored, as needed, and then all items on a given scale or subscale were summed to create total scores. Next, an analysis was performed to identify outliers on relevant study variables. Cases found to represent univariate outliers were “brought to the fence” (i.e., Median +2IQR; Osborne & Overbay, 2004). Skew and kurtosis were next examined and a square root transformation was applied to one variable (Positive/Negative Semantic Differential—Disatisfaction) in order to correct for mild positive skew in the pilot study sample (*skew statistic* = 1.30, *SE* = 0.10; *kurtosis statistic* = 0.52; *SE* = 0.39).

Response processes. While researchers often assume that participants are optimizing responses, some individuals satisfice instead; that is, they take “short cuts” to give the most quick and convenient response (Krosnick & Alwin, 1987; Krosnick, 1991). Data obtained from participants that use a satisficing response style is likely to be low quality and not reflective of the constructs being measured (Barge & Gehlbach, 2012; Couper, 1997). Thus, satisficers were identified within the current studies by examining several metrics of response style. First, a variable was created to identify participants with extremely fast survey completion times, which have been related to satisficing response styles (Aust, Diedenhofen, Ullrich, & Musch, 2013). Completion times were examined in the context of attention and seriousness, which were

assessed using 2 overt (e.g., “*How seriously are you answering survey items?*”) and 2 covert (e.g., “*I have never brushed my teeth.*”)⁶ items. Responses on these four items were coded as attentive/serious or inattentive/not serious based on the direction and strength of the response. Finally, all five metrics of survey completion style were summed to create an omnibus index of signs of satisficing, where a higher score indicated more inattentive/non-serious responses on these critical measures. In particular, a score of 2 or higher was considered “poor performance” on this index.

Six (4.03% of S1 sample) and sixteen (3.21% of S2 sample) participants performed poorly on the satisficing index in the pilot and follow-up studies, respectively, suggesting that the studies overall yielded high quality data. The data of these 22 participants with possible satisficing styles were reviewed on a case-by-case basis. Two pilot study participants’ and four follow-up study participants’ data were removed for “straight lining” or, in other words, for providing the same response to every item on each scale (Kaminska, McCutcheon, & Billiet, 2010). Further, two cases in the follow-up study were removed because the participants endorsed paying little attention to the study, not taking the study seriously, and they completed the study in less than 6 minutes. The data of the other fourteen respondents data were retained, as there was no clear indication that their responses were invalid.

Measures

The pilot and follow-up studies both used the same core measures, which are displayed in full in Appendix A. These measures were reviewed for conceptual clarity, as well as tested

⁶ One additional overt item assessing attention (i.e., “Please indicate how much attention you paid to the current study.”) was not included because no participant endorsed not paying attention to the study.

empirically for evidence of internal consistency within the both samples. In the pilot study, the internal structure of each construct was also tested using Exploratory Factor Analysis (EFA), a technique that facilitates the identification of latent factors (Floyd & Widaman, 1995). Best practices for EFA were reviewed (Costello & Osborne, 2005) and maximum likelihood extraction and varimax or promax rotations were employed, depending upon the strength of the hypothesized correlations between factors.

Demographics. The demographic questionnaire included a number of items assessing individual-level and couple-level variables such as age, gender, ethnicity, religious affiliation, education, and income. Demographics that were used in validity analyses include parental status, respondent and partner income, relationship length, and cohabitation status.

Attention and effort. Four items indicative of low engagement or attention were included in the current study. These items have been shown to successfully discriminate between participants with different response styles (Aust, Diedenhofen, Ullrich, & Musch, 2013; Goodman, Cryder, & Cheema, 2013; Mason & Suri, 2012; Meade & Craig, 2012). Individual items were scored on a 1-4, 1-5, or 1-7 Likert-type scale (e.g., “*How seriously are you answering study items?*”, where 1 = “*Not at all seriously*” and 5 = “*Very seriously*”; Appendix A illustrates all scaling for study measures). Completion time, which has also successfully discriminated response styles in online surveys, was measured in seconds and was also used as an assessment of attention and effort (Malhotra, 2008; Oppenheimer, Meyvis, & Davidenko, 2009).

Investment. The three factors hypothesized to contribute to investment—expected investment reward value, communal cost, and non-portability—were assessed using EFA with a

promax rotation⁷. Surprisingly, four factors were retained, which together accounted for 70.00% of the response variability (Kaiser-Guttman rule; Guttman, 1954; see Table B3 for factor and indicator loadings). These factors were significantly and positively associated (r 's ranged from 0.13 to 0.61, all p 's < 0.05) and are described in more detail below.

Communal cost. One factor constituted by indicators of communal cost explained the largest portion of response variability among these indicators (35.57%; *eigenvalue* = 6.05). Indicators that assessed the perceived *magnitude* of communal costs (e.g., “*How costly have your relationship investments been to you?*”) were excluded due to low loading values. The retained 5-item scale, composed of items created for the current study, assessed one’s *willingness* to dedicate resources to benefit the relationship (e.g., “*It is worthwhile to put in my resources into my current relationship if it means our relationship will be strong*”). Responses were solicited on a 1-7 Likert style scale⁸ and the measure demonstrated evidence of good reliability (S1 α = 0.87; S2 α = 0.87).

Non-portability. The second factor assessed non-portability of investment, accounted for 15.88% of response variability (*eigenvalue* = 2.70), and generally conformed to the proposed scope of this construct. Retained indicators included two original items (e.g., “*It would be difficult to lose all that I’ve devoted to this relationship.*”) and two items from the Investment sub-scale of the Investment Model Scale (IMS; e.g., “*Many aspects of my life have become linked to my partner [recreational activities, etc.] and I would lose all of this if I were to break up.*”; Rusbult et al., 1998). These four items were assessed on a 0-8 Likert-style scale (where 0 =

⁷ During preliminary analyses, this EFA was also run with an orthogonal rotation, which yielded the same factor structure and very similar item content.

⁸ Response values ranged from 1 = “*No costs/not at all costly*” to 7 = “*Many costs/Extremely costly*” on items concerned with the magnitude of costs. Items measuring willingness to incur communal costs had responses ranging from 1 = “*Strongly disagree*” to 7 = “*Strongly agree*”.

“Do not agree at all” and 8 = “Completely agree”) and demonstrated good internal consistency (S1 $\alpha = 0.89$; S2 $\alpha = 0.84$).

Expected investment reward value. Although expected investment reward value was conceptualized as a single construct, it was represented in the EFA by two factors, which accounted for 11.41% and 7.14% of the response variability, respectively (*eigenvalues* = 1.94 and 1.21). Several expected investment reward value indicators were excluded from the EFA model; these items measured global expected investment reward value (e.g., “How rewarding do you think your relationship investments should be to you?”; Rusbult, 1980). The retained indicators were mostly domain-specific items adapted from Foa & Foa (1974), although one item was retained from the global reward value scale developed by Rusbult (1980). The content of the factors was divided according to the type of reward; specifically, one factor assessed expectations about extrinsic (e.g., money and goods) rewards, while the other measured intrinsic (i.e., love and sexuality) investment rewards. Items were measured on a 1-7 Likert-type scale⁹. Chronbach’s alpha suggested adequate internal consistency for both the intrinsic (S1 $\alpha = 0.75$; S2 $\alpha = 0.61$) and extrinsic (S1 $\alpha = 0.84$; S2 $\alpha = 0.87$) expected investment reward value scales.

Comparison levels. The two constructs hypothesized to link investment and commitment—observed investment reward value and loss aversion—were also assessed.

Observed investment reward value. The initial pool of indicators for observed investment reward value included both global and domain-specific items. However, reliability analyses revealed that the global subscale had an inadequate reliability estimate (S1 $\alpha = 0.42$) and item

⁹ Items concerned with the magnitude of expected investment rewards was scored on a scale where 1 = “No rewards/Extremely unrewarding” and 7 = “Many rewards/Extremely rewarding”. Items assessing general expectation of rewards had a scale ranging from 1 = “Strongly disagree” to 7 = “Strongly agree”.

deletion would not improve internal consistency. Thus, only the domain-specific observed investment reward value indicators were included in an EFA. These items were adapted from Foa and Foa (1974) and utilized the same scaling as the measure of expected investment reward value; however, the wording of the directions was changed in order to instruct participants to focus on the investment rewards currently observed in the relationship (e.g., “*How rewarding do you think your relationship investments are to you?*”; Rusbult, 1980). The exploratory factor model, which retained all of the indicators, showed that a single factor accounted for 73.09% of variability in responses (*eigenvalue* = 5.12; see Table B4 for indicator loadings). This measure of observed investment reward value also demonstrated excellent internal consistency (S1 α = 0.94; S2 α = 0.93).

Loss aversion. According to an EFA, the loss aversion indicators generated for this study accounted for 67.93% of the response variability and retained 10 of the 12 proposed indicators (see Table B5 for loadings). The two resulting factors, which were negatively associated ($r = -0.44$, $p < 0.01$), assessed orientations towards the potential rewards and costs of leaving the relationship. For instance, *loss orientation* (*eigenvalue* = 1.90) measured the individual’s focus on losses that would be incurred through relationship dissolution (e.g., “*I’ve given too much to this relationship to walk away.*”). The other six items assessed *gain orientation* (*eigenvalue* = 4.89), which assessed the individual’s focus on rewards that could be gained after relationship dissolution (e.g., “*Rate how much you believe you would gain if you and your partner break*

up. "). Items were assessed on a 1-7 Likert-type scale¹⁰. Both the loss orientation (S1 $\alpha = 0.86$; S2 $\alpha = 0.87$) and gain orientation (S1 $\alpha = 0.87$; S2 $\alpha = 0.85$) scales had good internal consistency.

Relationship satisfaction. An EFA was conducted on the 5-item Relationship Satisfaction sub-scale of the IMS (e.g., "*I feel satisfied with our relationship.*"); Rusbult et al., 1998). A one-factor model was retained which included all proposed indicators and accounted for 80.67% of the response variability (*eigenvalue* = 4.03; see Table B6 for indicator loadings). Items were scored using a 0-8 Likert-type scale (where 0 = "*Do not agree at all*" and 8 = "*Agree completely*"). This sub-scale has demonstrated good internal consistency and adequate convergent, predictive, and discriminant validity in past studies, as well as strong internal consistency in the current study (S1 $\alpha = 0.94$; S2 $\alpha = 0.95$; Impett et al., 2001; Le & Agnew, 2003; Rusbult & Farrell, 1983; Rusbult et al., 1998).

Commitment. Data on commitment factors were collected using an unnamed measure developed by Arriaga and Agnew (2001), which will be referred to for convenience as The Commitment Scale (TCS). This measure contained 3 four-item sub-scales that assess intent to persist in the relationship (e.g., "*I wish to maintain our relationship.*"), long-term orientation towards the relationship (e.g., "*I am oriented toward the long-term future of my relationship.*"), and bondedness or attachment to the relationship (e.g., "*I feel very strongly attached to our relationship—very strongly linked to my partner.*"). Contrary to hypotheses, TCS conformed to a one-factor model that accounted for 67.88% of the response variability (*eigenvalue* = 6.79; see Table B7 for factor loadings). A clear "elbow" existed between the first and second factors in the scree plot (Cattell, 1966). Two indicators of attachment commitment were excluded due to low

¹⁰ Items concerned with attitudes towards loss and gain were measured on a scale which ranged from 1 = "*Strongly Disagree*" to 7 = "*Strongly Agree*". Items focused on perceived magnitude of loss and gain were assessed on a scale where 1 = "*Very little*" and 7 = "*A lot*".

communalities. The remaining 10 items were answered on a 0-8 Likert-type scale (where 0 = “Do not agree at all” and 8 = “Agree completely”) and demonstrated good internal consistency (S1 $\alpha = 0.94$; S2 $\alpha = 0.93$).

Study 1 Methods

Data Analytic Strategy

The pilot study data analysis was intended to establish the psychometric properties of relevant scales; multiple pieces of evidence for reliability and validity of the study scales were therefore examined (as per the recommendations of AERA, APA, NCME, 1999; also see Furr & Bacharach, 2008). These tests included the abovementioned evaluations of response processes, internal consistency, and internal structure validity (Chronbach, 1951). Patterns of correlations among relevant variables can further elucidate whether a target construct is associated with other constructs that are supposed to fall within its’ nomological network (i.e., convergent validity) and, similarly, reveal if the target construct is unrelated with theoretically disparate constructs (i.e., divergent validity; Chronbach & Meehl, 1955; Furr & Bacharach, 2008). Sets of associations were subsequently evaluated in order to examine the evidence for convergent and divergent validity (Furr & Bacharach, 2008). Towards this end, supplementary measures of associated relationship constructs were included in the pilot study. All analyses for this study were conducted with SPSS 22 (IBM, 2013).

Supplementary Measures

Commitment. Several scales of global and facet-level commitment were included as supplementary measures. The Investment Model Scale—Commitment Subscale (IMS—C; Rusbult et al., 1998) consisted of seven items that assessed global commitment to the

relationship (e.g., *“I am committed to maintaining my relationship with my partner.”*). The Revised Commitment Inventory (RCI; Owen, Rhoades, Stanley, & Markman, 2011) was a 25-item measure that assessed seven factors of commitment¹¹ (e.g., *“I could not bear the pain it would cause my partner to leave him/her even if I really wanted to.”*). Finally, the Moral Commitment Scale (MCS; Johnson, Caughlin, & Huston, 1999) was a 13-item inventory that assessed moral factors of commitment, including attitudes towards relationship dissolution (e.g., *“It’s all right to end your relationship if things are not working out”*), the view of a relationship as a social contract (e.g., *“Ending your relationship violates your religious beliefs”*), and valuing consistency (e.g., *“Even when things get hard, you should do the things you have promised to do”*). Responses to all scales were recorded on a 1-5 Likert-style scale (where 1 = *“Strongly disagree”* and 5 = *“Strongly agree”*). Each of these assessment instruments has been supported by reliability and validity evidence in past studies (Impett et al., 2001; Johnson, Caughlin, & Huston, 1999; Le & Agnew, 2003; Rusbult & Farrell, 1983; Rusbult et al., 1998).

Positive-Negative Semantic Differential. The Positive-Negative Semantic Differential (PN-SMD; Mattson, Rogge, Johnson, Davidson, & Fincham, 2013) was a 14-item inventory that independently assessed for relationship satisfaction (i.e., evaluative judgments about a relationship’s rewarding aspects; e.g., *“My relationship is enjoyable”*) and relationship dissatisfaction (i.e., evaluative judgments about the relationship’s costs; e.g., *“My relationship is boring”*). Both constructs have demonstrated adequate model fit in previous factor analytic studies (Mattson, Rogge, Johnson, Davidson, & Fincham, 2013), as well as incremental validity

¹¹ These factors include dedication to the relationship, structural investments, availability of attractive alternative partners, concern for one’s partner’s wellbeing, costs of relationship dissolution, financial factors, and social pressure to maintain the relationship.

over other validated measures of relationship satisfaction. The current study utilized a 1-8 Likert-style scale for this measure (where 1 = “*Not at all*” and 8 = “*Completely*”).

Investment Equity. This construct was measured at global and domain-specific levels. Global investment equity was assessed with a two-item measure¹² (Hatfield, Hatfield, & Berscheid, 1978; Sprecher, 1986), while domain-specific investment equity was assessed using a scale developed by Cate and colleagues (1982; e.g., “*How good of a deal do you think you get, relative to the deal your partner gets, in each of these aspects of your relationship?*”... “*Love,*” “*Money,*” “*Goods,*” etc.). This scale’s structure parallels that of the investment reward value scales that were described previously. Responses were recorded on a 1-7 Likert-style scale in the current study (where 1 = “*I am getting a much better deal than my partner*” and 7 = “*My partner is getting a much better deal than I am*”). This scale has demonstrated internal consistency and predictive validity across several other studies (Cate, Lloyd, & Henton, 1985; Cate et al., 1982; Lloyd, Cate, & Henton, 1984).

Study 1 Results

Associations between theoretically-linked measures. The primary measures chosen for this study were first compared to supplementary measures with overlapping theoretical content

¹² The first item in this scale reads “*Considering what you put into your relationship, compared to what you get out of it....and what your partner puts in compared to what he or she gets out of it, how does your relationship ‘stack up’?*” and is answered on a scale ranging from 1 = “*I am getting a much better deal than my partner*” to 7 = “*My partner is getting a much better deal than I am*”. The second item reads “*Considering what you put into your relationship, compared to what you get out of it....and what your partner puts in compared to what he or she gets out of it, how does your relationship ‘stack up’?*”, where a response of 1 = “*My partner is much more likely to be the one who contributes more*” to 7 = “*I am much more likely to be the one that contributes more*”.

(see Table B8 for a full summary). For example, the factors of investment were expected to be associated with the Structural Investment subscale of the RCI, which measured the perceived value of physical resources that are tied to a relationship. As anticipated, this scale was significantly and positively related to all three factors of investment (r 's ranged from 0.24 to 0.42, p 's < 0.01). Further, it was expected that intrinsic and extrinsic expected investment reward value would be differentially associated with dedication commitment; this association was supported by the data ($r_{extrinsic} = 0.11, ns; r_{intrinsic} = 0.65, p < 0.01$). In addition, it was hypothesized that observed investment reward value would be moderately associated with investment equity, a scale that also measured investment reward value, but did so relative to one's partner's reward value. In this case, as well, the expected association emerged between observed investment reward value and investment equity ($r = -0.27, p < 0.05$).

Further, the study's measure of global commitment (i.e., the one-factor version of the TCS) was expected to be highly associated with the IMS's measure of global commitment, as well as moderately-to-highly associated with factor-level assessments of commitment found on the RCI and MCS. Data largely confirmed these associations, wherein the TCS was strongly associated with the IMS—Commitment Subscale ($r = 0.94, p < 0.01$) and had moderate-to-strong associations with facet-level commitment measures (r 's ranged from 0.20-0.86, p 's < 0.05). However, the TCS was not associated with one commitment sub-scale, which assessed the financial factors that may inhibit relationship dissolution ($r = 0.16, ns$). Finally, the expected associations were found between the IMS's measure of global satisfaction and the PN-SMD's bi-dimensional assessment of the same construct ($r_{satisfaction} = 0.79, r_{dissatisfaction} = -0.72, p$'s < 0.01). Overall, then, the primary scales were associated in predicted ways with supplementary measures of conceptually-related constructs.

Correlations between study constructs. We next examined associations between study variables that were hypothesized to be related within the proposed structural model (see Table B9 for a summary). The expected convergent associations were generally observed; for example, non-portability and loss aversion were positively associated ($r_{lossorientation} = 0.64$, $r_{gainorientation} = -0.52$, p 's < 0.01), as were expected and observed investment reward value ($r_{extrinsic} = 0.33$, $r_{intrinsic} = 0.34$, p 's < 0.01). Further, loss aversion was associated, as anticipated, with both commitment ($r_{lossorientation} = 0.40$, $r_{gainorientation} = -0.64$, p 's < 0.01) and global relationship satisfaction ($r_{lossorientation} = 0.20$, $p < 0.05$; $r_{gainorientation} = -0.53$, $p < 0.01$). It was also predicted that the comparison levels would be unrelated; this finding was born out by the data (r 's were 0.02 and 0.17, both *ns*, for observed investment reward value with loss and gain orientations, respectively).

Departures from hypothesized associations. The general pattern of these associations provided evidence for convergent and divergent validity. However, the pattern of associations also suggested departures from the proposed model with regards to: a) communal cost, b) expected investment reward value, and c) observed investment reward value.

Associations with communal cost. Communal cost was anticipated to have a relatively narrow scope of associations, given that it was not modeled as a predictor of either comparison level or commitment. However, communal cost was unexpectedly associated with loss aversion ($r_{lossorientation} = 0.35$, $r_{gainorientation} = -0.37$, p 's < 0.01), relationship commitment ($r = 0.63$, $p < 0.01$), relationship satisfaction ($r = 0.26$, $p < 0.01$), and dedication to the relationship ($r = 0.59$, $p < 0.001$). This variable was also negatively related to ease of relationship termination ($r = 0.42$, $p < 0.001$), availability of alternatives ($r = 0.26$, $p < 0.001$), perceived gains of leaving the relationship ($r = -0.37$, $p < 0.001$), and dissatisfaction ($r = -0.31$, $p < 0.001$). And, as noted previously, this construct also explained a surprisingly large amount of variance in the investment EFA. Taken together,

these findings suggest that communal cost may be a more pivotal construct in the model than was previously hypothesized.

Associations with extrinsic and intrinsic expected investment reward value. These factors shared some similar associations, including with observed investment reward value ($r_{intrinsic} = 0.33$, $r_{extrinsic} = 0.34$, p 's < 0.01) and loss orientation ($r_{intrinsic} = 0.31$, $r_{extrinsic} = 0.34$, p 's < 0.01). However, they also showed a differential pattern of associations; for instance, intrinsic expected investment reward value demonstrated a moderate association with global commitment ($r = 0.61$, $p < 0.01$), while extrinsic expected investment reward had no significant association with this construct ($r = 0.08$, ns). Additionally, intrinsic expected investment reward value was more strongly tied to satisfaction ($r_{intrinsic} = 0.53$, $p < 0.01$; $r_{extrinsic} = 0.24$, $p < 0.05$) and gain orientation ($r_{intrinsic} = -0.44$, $p < 0.01$; $r_{extrinsic} = -0.12$, ns). These unique patterns of association provide reinforcing evidence that intrinsic and extrinsic expected investment reward value represent distinct constructs.

Associations with observed investment reward value. As noted above, observed investment reward value was associated as hypothesized with both intrinsic and extrinsic expected investment reward value. However, it was unassociated with relationship commitment and satisfaction, as measured by the IMS ($r_{commitment} = -0.08$, $r_{satisfaction} = -0.16$) and it was also unassociated with other, supplementary measures of commitment and its sub-factors ($r_{IMScommitment} = 0.03$, $p = 0.71$; r 's for sub-factors of Revised Commitment Inventory ranged from -0.01 to 0.16; r 's for moral commitment ranged from -0.02 to 0.08). Conversely, observed investment reward value was strongly associated with both positive ($r = 0.72$, $p < 0.001$) and negative ($r = -0.69$, $p < 0.001$) satisfaction as measured by the PN-SMD. These findings suggest that the role of observed investment reward value may differ from what was initially theorized.

Study 1 Discussion

The investment model has consistently received theoretical and empirical support; expanding its theoretical basis and measurement creates opportunities to better understand how commitment develops and is maintained. Overall, this preliminary study suggests that it is viable to empirically test the updated conceptual model of investment and the investment-commitment association. First, an analysis of response processes suggested that the data was generally of good quality and that a satisficing index could be utilized to identify lower quality data. In addition, most scales demonstrated evidence of good internal consistency and sound internal structure. Through the examination of Cronbach alphas and EFAs, one unreliable scale and extraneous individual indicators were removed from the set of measures; thus, analyses in the follow-up study will be conducted with an even more accurate pool of items.

Further, EFAs also suggested that indicator content was reflective of latent factors. For example, results supported the inclusion of non-portability, communal costs, and expected investment reward value as factors of investment. Further, findings suggested that loss aversion was bi-dimensional and observed investment reward value unidimensional. Taken together, the sum of the evidence suggests that the constructs described above can be successfully operationalized and that they largely conform to their proposed measurement models.

Revisions to the Updated Investment Model

However, study results also suggested that some aspects of the original investment model should be re-incorporated into the updated model. For example, we found support for a one-factor model of commitment; this finding mirrors the conceptualization of global commitment laid out in the original investment model (Rusbult, 1980). As compared to the current study, the

study that identified three factors (Arriaga & Agnew, 2001) was longitudinal; its participants were younger (i.e., average age of 19 vs. 35); and their romantic relationships were relatively short (i.e., one year vs. 6.5 years). In addition, Arriaga and Agnew (2001) sampled daters, who may have been less committed overall than individuals in the current study. Thus, it seems possible that the factors of commitment become less separable when individuals are in the middle adulthood life stage, in a long-term relationship, and expressing higher levels of commitment. However, it is possible that this finding is also anomalous to the current sample; therefore, both the one and three factor models of commitment will be tested in the follow up study.

In addition, loss aversion—but not observed investment reward value—was associated with commitment. This finding supports the use of a sole comparison level. With this in mind, relationship satisfaction is more likely a direct predictor of commitment, rather than a moderator of comparison levels (Rusbult, 1980). Finally, each of the factors of investment was associated with loss aversion and these associations did not vary much in their overall magnitude. Thus, investment itself—rather than any of its underlying factors—may be linked with loss aversion. Overall, these findings map out a more parsimonious pathway from the higher order construct of investment, through loss aversion, to global commitment. Notably, this is the same pathway identified in the original investment model (Rusbult, 1980).

Additions to the Updated Investment Model

Where some findings connected back to the original investment model, others suggested additional changes to the updated model. For instance, study findings confirmed that communal costs and expected investment reward value were both likely factors of investment. Furthermore,

communal costs in particular appeared to serve a central role—this factor accounted for a great deal of variance within the EFA, as well as being associated with multiple constructs. These findings reflect an emergent body of literature that suggests a link between communal costs and commitment (Berger & Janoff-Bulman, 2006; Clark & Grote, 1998). Thus, it is essential to further study the role of this lower order factor within the investment model.

Additionally, expected investment reward value conformed a two-factor model, with factors describing expectations about investment rewards both within the relational context (e.g., sexual exchange) and outside of it (e.g., improvement in social status). These factors echo the original investment model framework, in the sense that Rusbult (1980) describes two types of investments: a) *extrinsic*, or initially external to the relationship and b) *intrinsic*, or bounded by the relationship (Rusbult, 1980). However, this finding extends the concept of intrinsic and extrinsic investments to their respective rewards, suggesting that individuals separately evaluate investment rewards that are internal and external to the relationship, and that these evaluative judgments demonstrate only a small correlation.

Finally, observed investment reward value was associated with expected investment reward values, but unassociated with relationship length or commitment. Interestingly, these findings suggest that expectations about investment rewards may be more broadly influential than the actual rewards received by the individual. In fact, observed investment reward value's primary role in this model may be to influence the individual's expectations about future rewards.

A Revised Investment Model

Overall, findings suggested a revision of the investment model, which combines updates to the definitions of investment and loss aversion with a streamlined path from investment, to

loss aversion, to commitment (see Figure B6 for a depiction). In particular, we posit that investment is composed of four factors: non-portability, communal cost, and extrinsic and intrinsic expected investment reward values. We further hypothesize that the higher-order construct of investment is directly linked to loss aversion, as defined through the factors of gain and loss orientation. Loss aversion, in turn, is hypothesized to predict global commitment levels. In this revised model, relationship satisfaction also serves as a direct predictor of commitment, while observed investment reward value is associated with both forms of expected investment reward value. Thus, the next study will empirically examine a model of the investment-commitment association that elegantly blends aspects of the original and updated investment model conceptualizations.

Study 2

Data Analytic Strategy

The follow-up study sought to empirically test the newly revised model of investment and the investment-commitment association. First, preliminary analyses were conducted to identify any differences between pilot and follow-up study samples, as well as to note demographic characteristics that may be associated with study variables. Then, Confirmatory Factor Analyses (CFA; Brown, 2006) were completed to test the four-factor structure of investment and to compare one- and three-factor models of commitment. In addition, a set of CFAs was performed to identify any areas of weak fit among the other constructs included in the model—loss aversion, relationship satisfaction, and observed investment reward value. Next, a

structural model was tested from investment, through loss aversion¹³, to commitment (i.e., Structural Equation Modeling [SEM]; Kline, 2011). Within this model, relationship satisfaction was included as a predictor of commitment, while observed investment reward value was included as a correlate of the expected investment reward value factors (see Figure B6 for a depiction of the model).

MPLUS and full information maximum likelihood estimation were used for all analyses (Muthén & Muthén, 2011). The overall fit of each model was assessed by examining the values of chi-square, Root Mean Square Error of the Approximation (RMSEA), RMSEA confidence interval (CI), Comparative Fit Index (CFI), and Standardized Root Mean Square Residual (SRMR; Brown, 2006). Cut-off values were utilized; in particular, RMSEA near or below 0.06, RMSEA CI lower bound below 0.05, SRMR near or below 0.08, and CFI near or above 0.95 were considered evidence of good or close fit (Brown, 2006; Kline, 2011). Conversely, an RMSEA CI upper bound above 0.10 was considered evidence of poor fit (Brown, 2006; Kline, 2011). Further, χ^2 p-values were not closely considered within these models, as χ^2 is susceptible to increased Type II error when used with large sample sizes (Hoe, 2008). Instead, a χ^2 to *df* ratio of 3:1 or lower was considered an indicator of good fit (Hoe, 2008). Fit indices were considered as a whole so that the relative strengths and weaknesses of each approach might be balanced out (Brown, 2006). Finally, the potential to improve the accuracy of each model was evaluated through a review of residuals and modification indices (e.g., adding a correlation between two indicators or a demographic control variable; Kline, 2011).

¹³Loss aversion is modeled through the constructs of loss and gain orientation. A higher order factor was not created, as the lower order factors would have then been constrained to equality. By modeling them as separate but correlated factors, the influence of each can be estimated (Brown, 2006, pgs. 205-206).

Results

Patterns of Associations

Before beginning the modeling, the means and standard deviations for total scores of each scale or subscale were compared for the pilot and follow-up studies (see Table B10). Relative to participants in the pilot study, participants in the follow-up study endorsed higher observed investment reward value ($t = -11.80$, $df = 626.51$, $p < 0.01$), lower loss orientation ($t = 11.75$, $df = 196.12$, $p < 0.01$), and higher commitment ($t = -3.26$, $df = 190.15$, $p < 0.01$). In general, however, scores were comparable across studies. Thus, it is improbable that differences in model fit or composition between studies are attributable to sample characteristics.

In addition, associations between demographic characteristics and primary study constructs were examined to identify potential control variables (see Table C1 for a summary and Appendix C for details regarding post-hoc analyses). Sexual orientation and education were unassociated with study constructs. On the other hand, multiracial people reported higher non-portability than many other racial groups ($F[5, 506] = 3.77$, $p < 0.01$). Further, Christians and non-religious individuals endorsed greater extrinsic expected investment reward value ($F[4, 493] = 2.68$, $p < 0.05$), while Christians also reported higher loss orientation than those of other faiths ($F[4, 487] = 4.36$, $p < 0.01$). Finally, older individuals reported greater intrinsic expected investment reward value ($r = 0.10$, $p < 0.05$), higher commitment ($r = 0.14$, $p < 0.01$), and lower gain orientation ($r = -0.16$, $p < 0.05$).

Three individual-level demographic variables—gender, participant income, and partner income—demonstrated a broader association with key study variables. In the case of gender alone, cisgender people reported higher communal costs ($F[2, 494] = 2.55$, $p < 0.05$) and higher

satisfaction ($F[2, 510] = 6.32, p < 0.01$) than transgender people; cisgender women endorsed greater intrinsic expected investment reward value ($F[2, 496] = 3.63, p < 0.05$) and commitment ($F[2, 507] = 3.85, p < 0.05$) than did cisgender men; and cisgender men had greater observed investment reward value than any other gender identity ($F[2, 495] = 7.25, p < 0.01$). Similarly, current relationship length, relationship status, parenthood, age of children, and relationship cycling were associated with a range of variables, such as commitment, willingness to accept communal costs, and loss orientation (see Appendix C). These variables were subsequently considered for inclusion in the SEM model as control variables where appropriate.

Preliminary CFAs

Investment. When the four-factor model of investment was subjected to a CFA, the overall fit was adequate ($\chi^2 = 286.80, df = 111, \chi^2/df = 2.58; RMSEA = 0.06, 90\% C.I. [0.05, 0.06]; CFI = 0.96; SRMR = 0.05$). However, modification indices suggested that fit could be improved by cross-loading an item concerning expected rewards related to information on both of the expected investment reward value factors. Fit was good once this modification was made ($\chi^2 = 252.30, df = 110, \chi^2/df = 2.29; RMSEA = 0.05, 90\% C.I. [0.04, 0.06]; CFI = 0.97; SRMR = 0.05$). Further, all retained indicators demonstrated significant loadings onto their factors, most of which were moderate-to-strong in magnitude (estimates ranged from 0.31 to 0.88; see Table B3 for a full summary). However, intrinsic expected investment reward value indicators had lower loading values overall (ranging from 0.31 to 0.64). Similarly, all of the lower-order factors loaded significantly onto the higher-order investment factor, but extrinsic expected investment reward value's loading ($estimate = 0.24$) was noticeably smaller than that of the other three factors (estimates ranged from 0.66 to 0.78).

Commitment. When comparative CFAs were run for commitment, the overall fit was good for both the one ($\chi^2 = 94.55$, $df = 32$, $\chi^2/df = 2.95$; $RMSEA = 0.06$, 90% *C.I.* [0.05, 0.08]; $CFI = 0.99$; $SRMR = 0.02$) and three ($\chi^2 = 130.25$, $df = 49$, $\chi^2/df = 2.66$; $RMSEA = 0.06$, 90% *C.I.* [0.05, 0.07]; $CFI = 0.99$; $SRMR = 0.02$) factor models. However, a chi-square difference test (Brown, 2006) suggested that the fit was significantly worse for the three-factor model, as compared to the one factor model ($\chi^2 \text{ diff} = 35.70$, $df \text{ diff} = 17$, *critical value* [$p = 0.05$] = 8.67). Further, an examination of the three-factor model revealed that the factors were highly associated with each other (r 's = 0.93, 0.97, and 0.97), adding further evidence that they should be collapsed.

Within the retained one-factor model, all of the indicators loaded significantly onto the latent factor (estimates ranged from 0.39 to 0.95; see Table B7 for a summary). One indicator had a smaller loading than the others (*estimate* = 0.39; e.g., “*I find it difficult to imagine myself with my partner in the future.*”); this was also the only reverse-scored indicator retained in the CFA, suggesting that methodological issues may have influenced the strength of its loading.

Additional preparatory CFAs. The other constructs were next subjected to individual CFAs in order to identify any areas of poor fit within a given measurement model that might negatively impact the overall SEM model fit. The one-factor model of satisfaction demonstrated superior fit ($\chi^2 = 6.46$, $df = 3$, $\chi^2/df = 2.15$; $RMSEA = 0.05$, 90% *C.I.* [0.00, 0.10]; $CFI = 0.99$; $SRMR = 0.01$), with all indicators loading significantly (estimates ranged from 0.75 to 0.95; see Table B6). Similarly, observed investment reward value's one-factor model also demonstrated excellent fit ($\chi^2 = 16.34$, $df = 12$, $\chi^2/df = 1.36$; $RMSEA = 0.03$, 90% *C.I.* [0.00, 0.06]; $CFI = 0.99$; $SRMR = 0.01$) and all indicators loaded significantly (estimates ranged from 0.63 to 0.89; see Table B4).

Notably, all of the preceding CFA models had good-to-excellent fit without including any demographic characteristics as control variables. Conversely, the loss aversion model had poor fit when specified as originally conceived ($\chi^2 = 153.58$, $df = 29$, $\chi^2/df = 5.30$; $RMSEA = 0.09$, $90\% C.I. [0.08, 0.11]$; $CFI = 0.95$; $SRMR = 0.08$). Loss aversion is theoretically associated with relationship length because it is likely that individuals are averse to “wasting” this crucial, unrecoverable resource (Arkes & Blumer, 1985). When relationship length was added as a control variable, the resulting model demonstrated adequate fit ($\chi^2 = 111.20$, $df = 37$, $\chi^2/df = 3.00$; $RMSEA = 0.06$, $90\% C.I. [0.05, 0.08]$; $CFI = 0.97$; $SRMR = 0.06$).

All of the indicators loaded significantly onto their respective factors (estimates ranged from 0.53 to 0.90; see Table B5) and the factors had a significant negative association with each other ($estimate = -0.37$, $p < 0.01$). Further, relationship length had significant associations with both factors ($estimate_{lossorientation} = 0.18$, $estimate_{gainorientation} = -0.21$, p 's < 0.01); the direction of these associations supports the hypothesis that loss aversion increases alongside relationship length.

Structural Equation Model

Overall model fit. The combined structural model (depicted in Figure B7) demonstrated good overall fit ($\chi^2 = 2592.97$, $df = 1142$, $\chi^2/df = 2.27$; $RMSEA = 0.05$, $90\% C.I. [0.05, 0.05]$; $CFI = 0.93$; $SRMR = 0.08$). When modification indices were examined, it appeared that one item from the expected investment reward value scale cross-loaded onto the relationship satisfaction scale. Since that indicator's content overlapped with relationship satisfaction conceptually, this modification was made to the model. In addition, the loadings of gain orientation indicators changed somewhat from the CFA to the SEM model (see Table B5). This finding may suggest

that the composition of gain orientation changes dependent on the empirical context (Witte, 2012). This may mean that the gain orientation indicators are influenced by the indicators and fit present by the broader model; when the broader model is changed, gain orientation's fit also may be altered.

With this in mind, the standardized residuals for covariances between gain orientation and other indicators were examined for areas of under- or over-prediction in the current model. These findings revealed that relationship length was over-predicted for all but one of the gain orientation indicators. Thus, this control variable was removed from the model, resulting in modest changes on some overall model fit statistics ($\chi^2 = 2555.57$, $df = 1095$, $\chi^2/df = 2.33$; $RMSEA = 0.05$, $90\% C.I. [0.05, 0.05]$; $CFI = 0.93$; $SRMR = 0.07$). Aside from gain orientation, the indicator and factor loadings for each latent construct were very similar in the CFA and SEM models, suggesting that the measurement model fit was both good and stable.

Structural model fit. The fit of the pathways between model constructs were next examined and, in general, the observed causal associations matched hypotheses. For example, relationship satisfaction positively predicted commitment ($estimate = 0.49$, $p < 0.01$). Further, loss and gain orientations served as a bridge between investment and commitment. Specifically, investment negatively predicted gain orientation ($estimate = -0.82$, $p < 0.01$), which in turn negatively predicted commitment ($estimate = -0.36$, $p < 0.01$). Loss orientation demonstrated the converse of this relationship; it was positively predicted by investment ($estimate = 0.60$, $p < 0.01$), and itself positively associated with commitment ($estimate = 0.17$, $p < 0.01$). Surprisingly, however, gain and loss orientations were positively associated with each other in the model ($estimate = 0.28$, $p < 0.01$). Finally, observed investment reward value showed the anticipated

positive association with extrinsic expected investment reward value ($estimate = 0.54, p < 0.01$). It was, however, unrelated to intrinsic expected investment reward value ($estimate = -0.15, ns$).

Study 2 Discussion

An individual will continually assess and reassess his or her commitment to a romantic relationship throughout its ups and downs (Impett, Beals, & Peplau, 2001). Investment can ground these decisions in the costs and rewards of past contributions to the relationship, facilitating decisions based upon experience. These studies utilized CFA and SEM to explore a revised model of investment and its role in shaping relationship commitment. Preliminary analyses showed that the two study samples were largely comparable to each other, facilitating generalization from the EFAs conducted in the pilot study to the CFAs tested in the current study. While multiple demographic characteristics were associated with the total scores of examined scales, they did not play a substantive role in the CFAs or SEM model. And in general, the fit of these models proved to be good to excellent without major modifications, adding further evidence that the investment model possesses strong psychometric properties and significant explanatory power for relationship commitment and its determinants. Thus, this study produced high quality empirical results that can be interpreted with minimal ambiguity. These findings suggest exciting possibilities for the investment model, including that (a) investment can be functionally measured in the context of social exchange theory; (b) commitment converges into a global construct within highly committed relationships; and (c) loss aversion not only binds together investment and commitment, but may also influence other parts of the investment model.

Investment

First, this study and the pilot study frame investment and the investment-commitment association in reference to the simple but powerful concepts of rewards and costs – the bedrock of social exchange theory (Blau, 1968; Emerson, 1976; Homans, 1958; Thibaut & Kelley, 1959). Within the investment model, relationship satisfaction and quality of alternatives were always assessed with reference to their outcome values, or the rewards to costs ratio present in their respective relationship domains (Rusbult, 1980; Rusbult, 1983; Rusbult & Buunk, 1993; Rusbult, Martz, & Agnew, 1998; Simpson, 1987). For example, relationship satisfaction is judged within this framework by the positive and negative qualities of the relationship, rather than the individual exchanges that contributed to the development of those qualities (e.g., “*Our relationship makes me very happy.*”; Rusbult, Martz, & Agnew, 1998).

Investment, on the other hand, was traditionally viewed in terms of input values, with an emphasis on the size and magnitude of resources contributed to the relationship (e.g., “*Compared to other people I know, I have invested a great deal in my relationship with my partner.*”; Rusbult, Martz, & Agnew, 1998). The new model of investment instead suggests that individuals are willing to accept the up-front costs of permanently dedicating resources in the hopes of garnering later rewards. Notably, the results demonstrated that intrinsic investment rewards—those that are internal to the relationship—appear to be more closely linked to investment than their extrinsic counterparts. Overall, then, the adoption of this multi-factorial view of investment connects this construct back much more closely to social exchange theory, giving it greater conceptual weight and explanatory power.

Commitment

This study also provides insights into the composition of commitment. Many recent conceptualizations of commitment have divided it into multiple factors (Adams & Jones, 1997; Arriaga & Agnew, 2001; Johnson, Caughlin, & Huston, 1999; Owen, Rhoades, Stanley, & Markman, 2011). In both of the current studies, however, commitment was best described by the data as a global construct. As discussed previously, these findings may be specific to their respective samples. However, it is also possible that, in longer-term relationships like those in these studies, the components of commitment eventually synchronize and become indistinguishable. Over time, for example, commitment appears to increase conceptualizations of self-in-relationship, fostering greater and greater interdependence (Agnew, Van Lange, Rusbult, & Langston, 1998; Rusbult, Drigotas, & Verette, 1994; Rusbult & Van Lange, 1996). It is possible that increasing interdependence changes the way that individuals perceive commitment, such that they begin to view commitment to the relationship as an aspect of their personal identities. In this case, commitment may seem less like a decision-making process and more like a stable, singular attribute. Taken together, the available data are consistent with the notion that the factor structure composing the attitude of commitment may have its own developmental course across relationship stages.

Loss Aversion and the Investment-Commitment Pathway

The findings for loss aversion also have interesting implications for the revised investment model and, in particular, for quality of alternatives. First, the positive loss orientation-investment association suggests that individuals are heavily weighting the potential losses of dissolution in their commitment decisions. We also found that gain orientation was strongly and negatively associated with investment, meaning that individuals are likely to discount or dismiss the potential gains of relationship dissolution as investment increases. In this

case, then, investment inspires a specific case of risk aversion—or a desire to maintain the status quo due to the uncertainty associated with change (i.e., maintaining or increasing commitment; Kahneman & Tversky, 1979). It is therefore unsurprising that loss aversion was linked to commitment, which is itself an expression of relational stability.

Interestingly, gain and loss orientation shared a positive association in this model. This finding may suggest that certain individuals are more actively engaged in weighing both the potential benefits (i.e., gain orientation) and risks (i.e., loss orientation) of relationship dissolution. This portion of the sample may represent the individuals for whom investment has the most impact on commitment, as they are motivated to consider the value of past investments and their related expectations about the future.

Although not the focus of these studies, our findings also have potential implications for quality of alternatives. Past research shows that individuals are less attentive to relational alternatives when they wish to maintain stability (Johnson & Rusbult, 1989; Miller, 1997). It is possible that relationship investment may, in part, contribute to inattention to attractive alternatives. Thus, investment may have an additional indirect effect on commitment through its potential influence on perspectives on alternatives.

General Conclusions

When taken together, these two studies provide essential information about the meaning of relationship investment, relationship commitment, and the investment model as a whole. First, it provides psychometric evidence for measures of each construct in the model, including novel measures such as the assessment of loss aversion. Second, the model identifies core definitional features of investment that tie it causally to commitment. Further, these studies demonstrated the

pivotal role that loss aversion plays in mediating this association. Finally, relationship satisfaction and observed investment reward value were able to be placed more accurately within the model.

Perhaps more importantly, these studies demonstrate the durability and parsimony of the investment model and the concepts that underlie it. Many of the retained additions within the updated model were not really alterations at all; rather, they strove to more closely represent the theory driving the investment model. Further, a parsimonious pathway—connecting global investment and commitment through a single comparison level—was retained, providing an elegant solution based on the simple, yet powerful, laws of behavior.

Limitations and Future Directions

Recruitment of participants via Mechanical Turk is one potentially limiting aspect of these studies. In particular, our findings may be particularly reflective of the Mechanical Turk population, which is known to vary somewhat from the general population (i.e., they tend to be more female, highly educated, lower income, and younger than the general population; Goodman, Cryder, & Cheema, 2013; Paolucci & Chandler, 2014). Furthermore, the make-up of the Mechanical Turk population itself is changing rapidly, such that these samples may represent this population accurately for only a short period of time (Ross, Irani, Silberman, Zaldivar, & Tomlinson, 2010). Notably, Mechanical Turkers' motivations for joining the crowdsourcing site may also have impacted their responses (Kaufman, Schulze, & Veit, 2011). Thus, as with any sample, the findings may be shaped in a specific way by the characteristics and motivations of the participants. Future studies may seek to assess these constructs by comparing different

samples, such as short-term and long-term relationships; older and younger individuals; or same gender and mixed gender couples.

In addition, both studies were cross-sectional and cannot directly affirm causal relationships between constructs (Kazdin, 2003). This methodological feature may be especially pertinent to the current studies, as the factor structure of commitment was found to differ from that of another longitudinal study (Arriaga & Agnew, 2001). Further, several factors of commitment (i.e., gain orientation, communal costs) had a distinctive time component and may interact significantly with time. Thus, it is possible that the cross-sectional design captured only one view of a changing, time-dependent construct. Future longitudinal research is needed to explore these possibilities.

Further, these studies focused on the respondent's own relationship investment, loss aversion, and commitment. However, partner relationship characteristics often influence the respondent's own relationship health (Kenny, Kashy, & Cook, 2006). Thus, it is likely that respondents' evaluations were shaped, in part, by their partners' outlooks on their relationships—variables which are not accounted for in the current studies. Thus, additional research, conducted at the dyadic level, may clarify the potential interplay between partners' investment and commitment. For instance, such a study may reveal whether both partner and respondent investment influence commitment; or conversely, if only the actor's own investments impact his or her commitment level.

Finally, this study adapted and created several measures. Although psychometric properties of these measures were examined, they were examined in the context of only two studies with a similar survey design. Thus, these psychometric evaluations fall short of gold

standard practices, such as testing the measure repeatedly and utilizing mixed methods to test the validity and generalizability of constructs (Furr & Bacharach, 2008). Future psychometric work may seek to extend the evidence for these constructs' reliability and validity.

Implications

Despite their limitations, these studies have significant implications for the advancement of investment model research, as well as for clinical practice. For example, people who have experienced partner violence are less likely to leave the relationship when the magnitude of investments is high (Rusbult & Martz, 1995). By employing this updated conceptualization of investment, the therapist could explore with the client the role of both the size of investments, as well as the individual's *attitudes* towards investment, in relationship persistence. Conversely, clinicians could also identify investment as an area of strength for a couple, by focusing on how shared contributions foster healthy interdependence (Rusbult & Buunk, 1993). In general, discussions of investment in therapy hold the potential to enrich the therapeutic process by calling attention to behaviors that form the basis of the couples' bond.

In terms of research, this project illustrates that the spirit of the behavioral economic model—and not just its technical aspects—can be applied to romantic relationships. For example, the components of relationship investments have often been conceptualized as a literal parallel to economic investments; thus, the magnitude and surface level distinctions of investment types have been utilized to denote its salient features. However, this study emphasizes the theoretical meaning of “investment” within behavioral economics; this focus then allows us to examine the components of investment at a more fundamental, conceptual level. Once the more conceptual stance is incorporated, these results suggest that we can empirically measure the components of

relationship investment, as well as the causal mechanism that drives its association with commitment. As a more in-depth empirical model is developed, researchers will be able to cultivate a more nuanced understanding of the processes involved in the development of commitment across time and couples. Thus, this project shows that behavioral economics can be fully translated into the relationship framework, rather than fitting relationships into a literal economic framework.

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Appendix A

Please note that some proposed indicators and factors were excluded following reliability analyses or EFA. These indicators and factors are italicized in this appendix. In addition, the response options given for each Likert-style scale are listed below that scale's directions.

Demographic Questionnaire¹⁴

1. What is your current age? _____
2. What is your gender?
 - Female
 - Male
 - Intersex
 - Transgender Male-to-Female
 - Transgender Female-to-Male
 - Transgender do not identify as exclusively male or female
 - Genderqueer
 - Another gender identity, specify: _____
3. What educational degrees do you hold?
 - None
 - GED
 - High School Diploma
 - Associate
 - Bachelor
 - Master
 - Law (J.D.)
 - Doctorate

¹⁴ Items from this scale were generated for the current study.

4. Please indicate your racial identity:

- African American
- Asian American
- American Indian
- Latino/a
- Middle Eastern
- White
- Another racial identity. Specify: _____

5. Please indicate your religious affiliation:

- Catholicism
- Protestant
- Eastern Orthodox
- Hindu
- Islam
- Judaism
- None
- Another religious affiliation. Specify: _____

6. Not including your partner's income, what was your income last year, before taxes?

- \$0-\$9,999
- \$10,000-\$19,999
- \$20,000-\$29,999
- \$30,000-\$39,999
- \$40,000-\$49,999
- \$50,000 or above

7. Not including your income, what was your partner's income last year, before taxes?

- \$0-\$9,999
- \$10,000-\$19,999
- \$20,000-\$29,999
- \$30,000-\$39,999
- \$40,000-\$49,999
- \$50,000 or above
- Unknown

8. Are you currently:

- In a non-exclusive dating relationship
- In an exclusive casual dating relationship
- In an exclusive serious dating relationship
- Engaged to be married
- In a monogamous committed partnership or marriage
- In a non-monogamous committed partnership or marriage
- Another relationship status? Specify: _____

9. How long have you and your partner been dating (enter years, months): _____

10. Do you consider yourself to be:

- Heterosexual or straight
- Gay or lesbian
- Bisexual
- Questioning or unsure
- Pansexual
- Asexual
- Another sexual orientation? Specify: _____

11. Have you and your current partner ever lived together?

- Yes
- No

12. Are you and your partner currently living together?

- Yes. We have lived together for (years, months): _____
- No

13. Is this a relationship where you and your partner have broken up and gotten back together at least once?

- Yes. How many times have you broken up and gotten back together with this partner? (enter response in box) _____
- No

Response Effort Item and Instructional Manipulation Check¹⁵

1. How seriously are you answering survey items?

1. Not at all seriously
2. A little bit seriously
3. Somewhat seriously
4. Pretty seriously
5. Very seriously

2. Research in decision making shows that people, when making decisions and answering questions, prefer not to pay attention and minimize their effort as much as possible. Some studies show that over 50% of people don't carefully read questions. If you are reading this question and have read all the other questions, please select the box marked "other" and type "Decision Making" in the box below. Do not select "predictions of your own behavior."

Thank you for participating and taking time to read through the questions carefully!

1. Predictions of your own behavior
2. Predictions of your friends' behavior
3. Political preferences
4. Other. Specify: _____

3. I am using a computer currently.

1	2	3	4	5	6	7
Strongly disagree			Neutral	Strongly agree		

4. I have never brushed my teeth.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

¹⁵ Item 1 is adapted from Aust, Diedenhofen, Ullrich, and Musch (2013), item 2 is adapted from Goodman, Cryder, and Cheema (2013), and items 3 and 4 are adapted from Meade and Craig (2012).

Strongly disagree

Neutral

Strongly agree

Investment: Communal Costs

Subscale 1: Magnitude of Communal Costs¹⁶

Instructions: Sometimes in a relationship, we do things to improve the relationship or make our partner happy, at a personal cost for ourselves. For example, we might give up personal time or spend money we could use for something else on the relationship. Please rate the extent to which you've invested in your relationship at a personal cost to you.

Response Options:

1	2	3	4	5	6	7
<i>No costs/</i>			<i>Many costs/</i>			
<i>Not at all costly</i>			<i>Extremely costly</i>			

Items:

- 1. How costly have your relationship investments been to you?*
- 2. In terms of costs, how do your investments in this relationship compare to the investments you'd expect to make in your ideal relationship?*

Subscale 2: Attitudes towards Communal Costs¹⁷

Instructions: Please rate how much you agree with the following items.

Response options:

1	2	3	4	5	6	7
<i>Strongly disagree</i>			<i>Neutral</i>	<i>Strongly agree</i>		

Items:

- 1. I am willing to dedicate my resources (e.g., time, effort, or money) to our relationship at a personal expense, if it means that our relationship is healthy and happy.*

¹⁶ These items are drawn from experimental questions used in Rusbult, 1980.

¹⁷ These items are adapted from a measure utilized in Cate et al., 1982 and Foa & Foa, 1974.

2. I give of myself to my relationship for the betterment of the relationship.
3. I have put resources into my relationship at the expense of my personal needs or desires, so that my relationship can thrive.
4. It is worthwhile to put in my resources to our relationship if it means the relationship will be strong.
5. Giving up things for my partner's sake makes our relationship better.

Non-Portability¹⁸

Instructions: Please indicate how well each of the following statements describes your current romantic relationship.

Response options:

0	1	2	3	4	5	6	7	8
Do not				Agree				Agree
Agree				Somewhat				Completely
At all								

Items¹⁹:

1. I have put a great deal into the current relationship that I would lose if our relationship were to end (please circle a number).
2. Many aspects of my life have become linked to my partner (recreational activities, etc.) and I would lose all of this if I were to break up.
3. *My relationships with friends and family members would be complicated if my partner and I were to break up (e.g., partner is friends with people I care about).*
4. If we broke up, I would have to give up a great deal of important things that I dedicated to this relationship.
5. It would be difficult to lose all that I've devoted to this relationship.

¹⁸ Items 1-3 are drawn from the Investment Model Scale's Investment Subscale (Rusbult et al., 1998). Items 4 and 5 were generated for the current study.

¹⁹ Item 5 from the communal costs scale was also modeled as part of non-portability, as it cross-loaded with this factor in an EFA.

Intrinsic and Extrinsic Expected Investment Reward Value

Subscale 1: Global Expected Investment Reward Value²⁰

Instructions (Items 1-2): Please rate how much you think you **should** get out of your current relationship, given what you're investing into it.

Response options (Items 1-2):

1	2	3	4	5	6	7
No rewards/ Extremely unrewarding			Many rewards/ Extremely rewarding			

Items:

1. *How rewarding do you think your relationship investments should be to you?*
2. In terms of rewards, how do you think your investments in this relationship should compare to the investments you'd expect to make in your ideal relationship?

Instructions (Items 3-4): Please rate how much you agree or disagree with the following statements about your relationship investments.

Response options (Items 3-4):

1	2	3	4	5	6	7
<i>Strongly Disagree</i>			<i>Strongly Agree</i>			

Items:

3. *I expect to give about as much to this relationship as I have to other, past romantic relationships.*

²⁰ These items are adapted from experimental questions utilized in Rusbult, 1980. In an EFA, item 2 was retained as an indicator of intrinsic expected investment reward value.

4. *I feel that it's reasonable to expect to contribute a similar amount to this relationship as I have in other relationships.*

Subscale 2: Domain-Specific Expected Investment Reward Value²¹

Instructions: To what extent do you believe that your relationship investments should result in rewarding experiences in the following areas?

Response Options:

1	2	3	4	5	6	7
No resulting rewards/ Extremely unrewarding				Many resulting rewards/ Extremely rewarding		

Items:

1. Love
2. Money
3. Goods
4. Status
5. Information
6. Services
7. Sexuality

²¹ These items are adapted from a measure utilized in Cate et al., 1982 and Foa & Foa, 1974. In an EFA, items 1 and 7 were retained as indicators of intrinsic expected investment reward value, while items 2, 3, 4, and 6 were retained as indicators of extrinsic expected investment reward value.

Observed Investment Reward Value

Subscale 1: Global Observed Investment Reward Value²²

Instructions: Please rate the extent to which your past relationship investments have resulted in relationship rewards.

Response Options:

1	2	3	4	5	6	7
<i>No rewards/</i>			<i>Many rewards/</i>			
<i>Extremely unrewarding</i>			<i>Extremely rewarding</i>			

Items:

- 1. How rewarding have your previous relationship investments been to you so far?*
- 2. In terms of rewards, how do you think your previous investments in this relationship compare to the investments you expected to make in your ideal relationship?*
- 3. I tend to give more to this relationship than I have to ones in the past.*
- 4. I am giving more to this relationship than I expected to [or than I feel I should] based on past relationships.*

Subscale 2: Domain-Specific Observed Investment Reward Value²³

Instructions: To what extent do you believe that your previous relationship investments resulted in rewarding experiences in the following areas?

Response Options:

1	2	3	4	5	6	7
---	---	---	---	---	---	---

²² These items are adapted from a measure utilized in Rusbult, 1980.

²³ These items are adapted from a measure utilized in Cate et al., 1982 & Foa & Foa, 1974.

No resulting rewards/

Extremely unrewarding

Many resulting rewards/

Extremely rewarding

Items:

1. Love
2. Money
3. Goods
4. Status
5. Information
6. Services
7. Sexuality

Loss Aversion²⁴

Instructions: Please rate the extent to which you agree or disagree with the following statements about your relationship.

Response Options (Items 1-4 and 7-10):

1	2	3	4	5	6	7
Strongly disagree			Neutral	Strongly agree		

Response Options (Items 11-12):

1	2	3	4	5	6	7
Very little		A good amount			A lot	

Subscale 1: Loss Orientation

1. I cannot leave this relationship because I've invested too much in it.
2. I will do anything to make sure that I don't lose what I've put into this relationship.
3. I've given too much to this relationship to walk away.
4. It would be a waste to break up after putting in so much time, energy, and effort to make things work.
5. *Rate how much you have invested (in time, energy, effort, and/or physical resources) into this relationship, at a personal cost to you, in the hopes of building your relationship.*

1	2	3	4	5	6	7
<i>Very few</i>		<i>A good amount</i>			<i>Almost all</i>	
<i>of my resources</i>		<i>of my resources</i>			<i>of my resources</i>	

²⁴ The items on these scales were generated for the current study.

6. Given your response on the previous question, rate how much of your investment in the relationship you would lose if the relationship ended.

1	2	3	4	5	6	7
<i>Very little</i>			<i>A good amount</i>			<i>Almost all</i>
<i>of what I've invested</i>			<i>of what I've invested</i>			<i>of what I've invested</i>

Subscale 2: Gain Orientation

7. Leaving would be worthwhile if things would get better.
8. I will break up with my partner if it means I'll be happier afterward.
9. I would give up what we have to build a better future for myself.
10. Going our separate ways could lead to good things for me.
11. Rate how much you believe you would gain if you and your partner broke up.
12. How much do you think you would benefit if your relationship ended?

Relationship Satisfaction²⁵

Instructions: Please indicate how well each of the following statements describes your current romantic relationship.

Response Options:

0	1	2	3	4	5	6	7	8
Do not				Agree				Agree
Agree				Somewhat				Completely
At all								

Items:

1. I feel satisfied with our relationship (please circle a number).
2. My relationship is much better than other's relationships.
3. My relationship is close to ideal.
4. Our relationship makes me very happy.
5. Our relationship does a good job fulfilling my needs for intimacy, companionship, etc.

²⁵ This scale is taken from the Investment Model Scale (IMS; Rusbult et al., 1998).

Three Factor Commitment Scale²⁶

Instructions: Please indicate how well each of the following statements describes your current romantic relationship.

Response Options:

0	1	2	3	4	5	6	7	8
Do not				Agree				Agree
Agree				Somewhat				Completely
At all								

Subscale 1: Intent to Persist

1. I intend to stay in this relationship.
2. I want to maintain our relationship.
3. I feel inclined to keep our relationship going.
4. My gut feeling is to continue this relationship.

Subscale 2: Long-term Orientation

5. I am oriented toward the long-term future of my relationship.
6. My partner and I joke about what things will be like when we are old.
7. I find it difficult to imagine myself with my partner in the distant future.
8. When I make plans about future events in my life, I think about the impact of my decisions on our relationship.

Subscale 3: Attachment or Bondedness

9. I feel very strongly attached to our relationship—very strongly linked to my partner.
10. It pains me to see my partner suffer.

²⁶ These subscales compose the measure developed by Arriaga & Agnew (2001).

11. I am very affected when things are not going well in my relationship.

12. In all honesty, my family and friends are more important to me than this relationship.

Appendix B

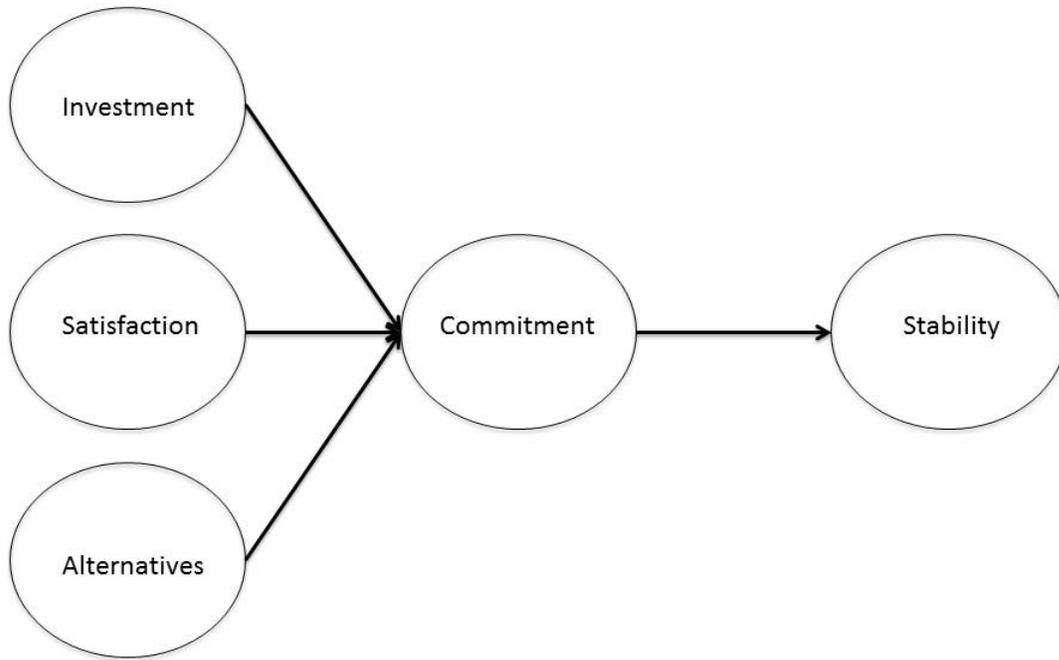


Figure B1. The conceptual model of relationship commitment as outlined in Rubult (1980).

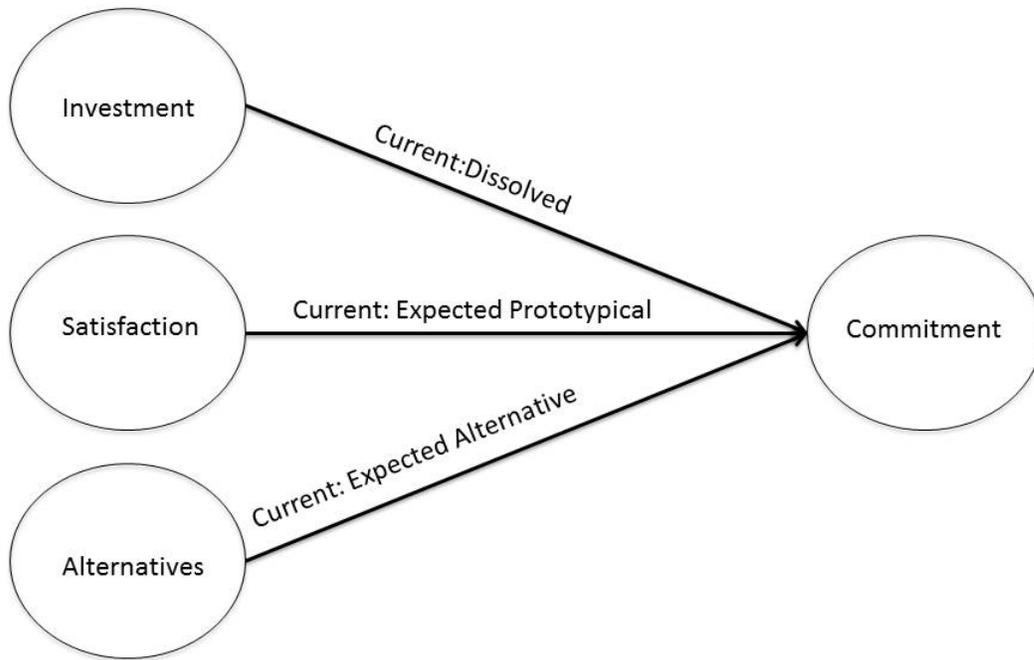


Figure B2. The conceptual model of comparison levels as described in the Investment Model (Rusbult, 1980).

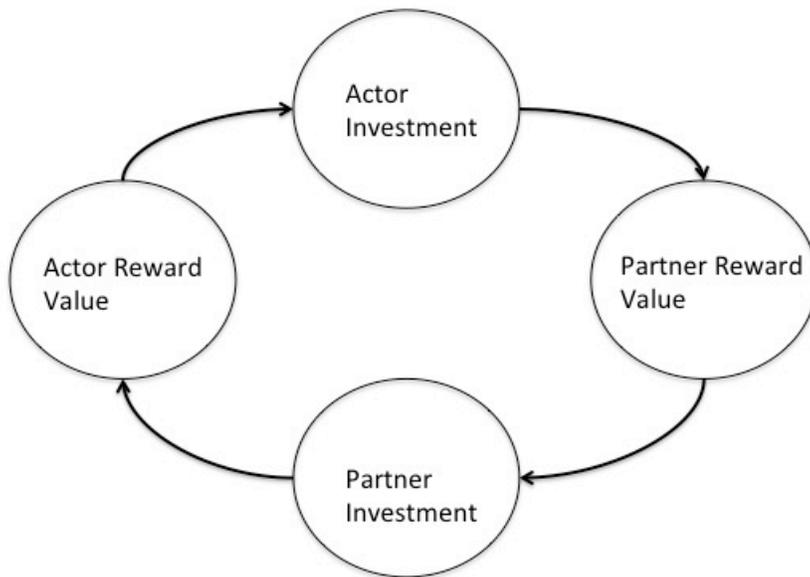


Figure B3. A conceptual model of the positive feedback loop between actor and partner investment and reward value.

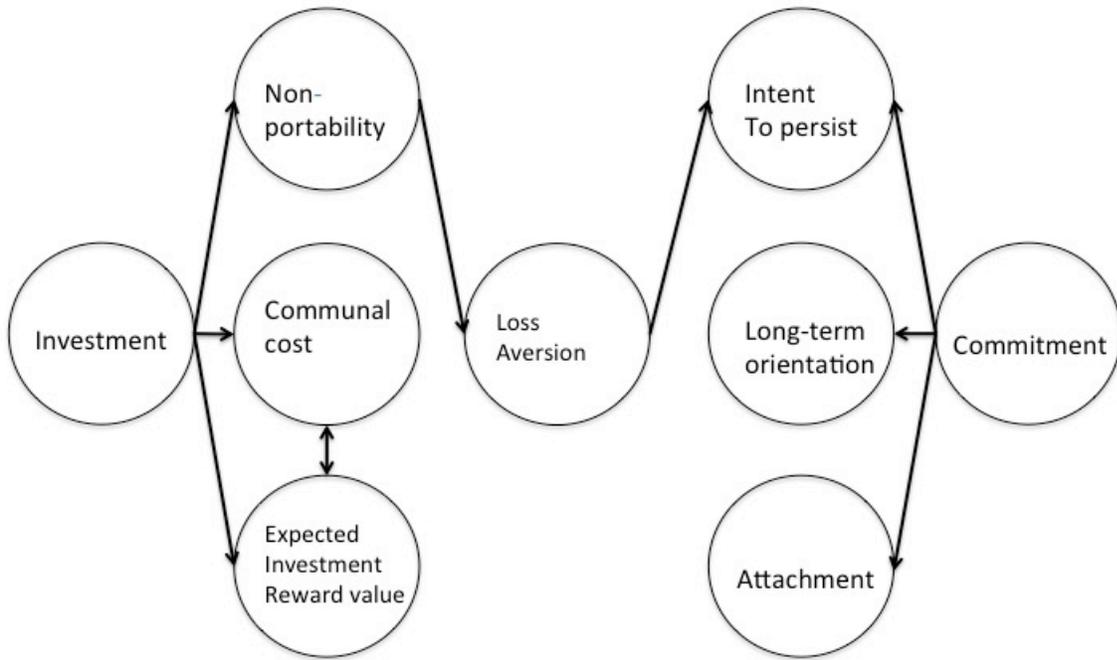


Figure B4. A conceptual model of the association between relationship investment and commitment when satisfaction is low.

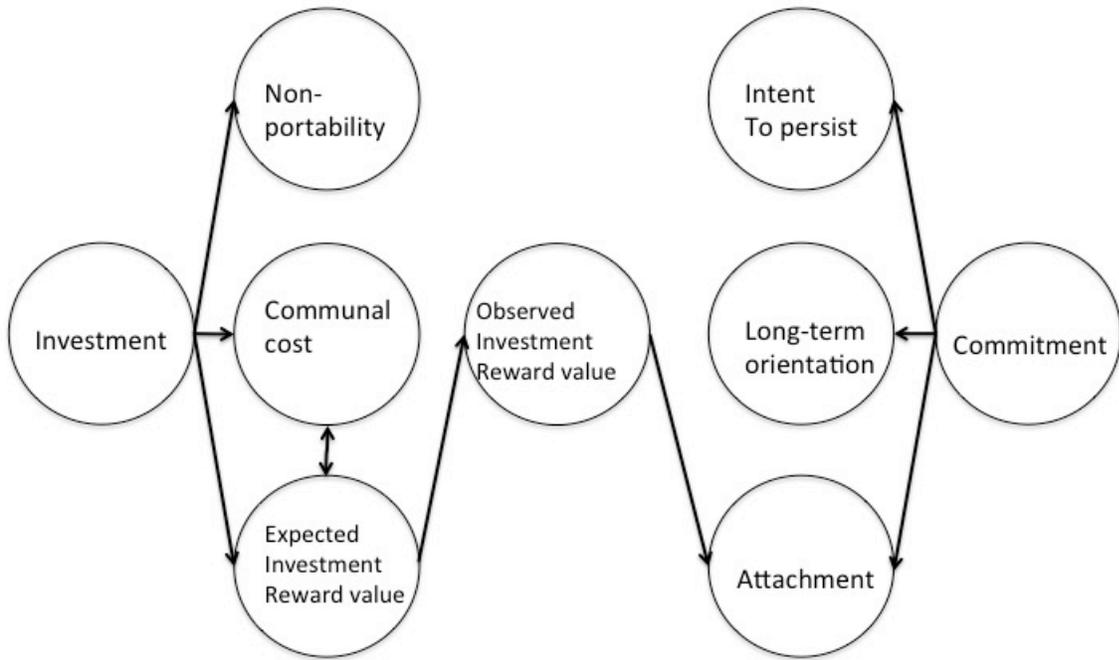


Figure B5. A conceptual model of the association between relationship investment and commitment when satisfaction is high.

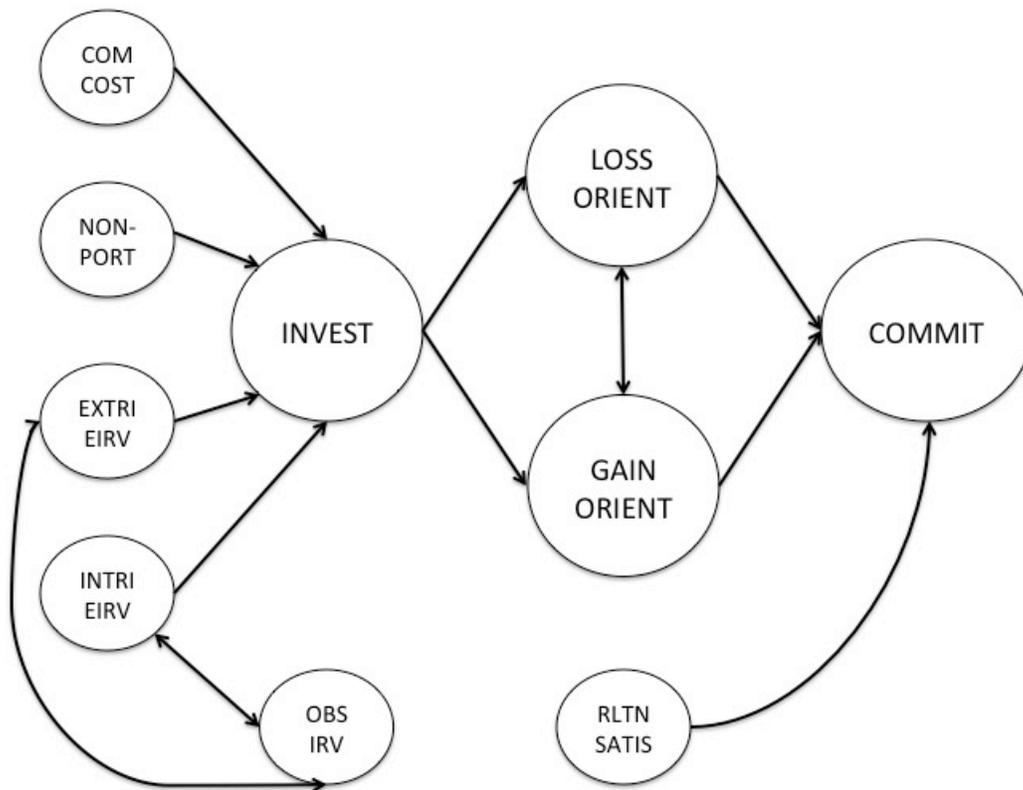


Figure B6. Revised model of investment and the investment-commitment association.

Disturbances and indicators not pictured. Abbreviations are as follows: Com cost = communal costs; non-port = non-portability; extra eirv = extrinsic expected investment reward value; intri eirv = intrinsic expected investment reward value; inv = investment; obs irv = observed investment reward value; loss orient = loss orientation; gain orient = gain orientation; rltm satis = relationship satisfaction; and commit = commitment.

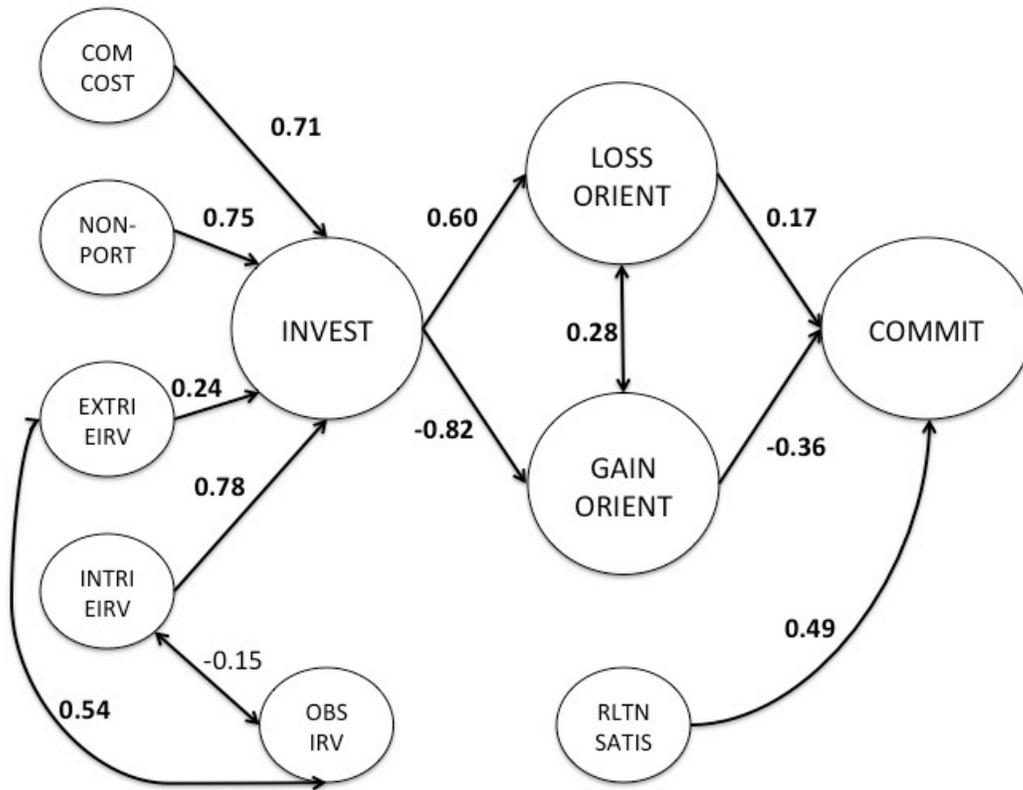


Figure B7. Final SEM model of investment and the investment-commitment association. Disturbances and indicators not pictured. Bolded figures are significant at $p < 0.01$. Non-bolded figures are non-significant. Abbreviations are as follows: Com cost = communal costs; non-port = non-portability; extra eirv = extrinsic expected investment reward value; intri eirv = intrinsic expected investment reward value; inv = investment; obs irv = observed investment reward value; loss orient = loss orientation; gain orient = gain orientation; rltm satis = relationship satisfaction; and commit = commitment.

Table B1

Descriptive Statistics and Difference Tests for Individual Demographics

Demographic Characteristic	Sample 1		Sample 2		Difference Test
	M	SD	M	SD	
Age (in Years)	35.06	12.54	33.34	10.37	1.84(218.87)
Respondent Income (In Dollars)	20,000-29,999	20,000	20,000-29,999	20,000	1.56(5)
Partner Income (In Dollars)	30,000-39,999	20,000	20,000-29,999	20,000	9.84(6)
	Frequency	%	Frequency	%	
Gender					8.63(2)**
Cisgender Male	60	37.7	139	27	
Cisgender Female	95	59.7	370	72	
Transgender People	4	2.6	5	1	
Race					6.16(6)
White	110	71.4	369	71.8	
Black	12	7.8	47	9.1	
Multiracial	11	7.1	46	8.9	
Asian	9	5.8	25	4.9	
Latino/a	7	4.5	18	3.5	
Native American	1	0.6	6	1.2	
Other	4	2.6	3	0.6	
Religion					1.16(4)
Christian	86	54	269	52.4	
Another Faith	15	9.5	35	6.8	
Secular	52	32.9	164	32	
Spiritual	3	1.8	14	2.7	
No Identification	3	1.8	31	6	
Sexual Orientation					5.12(5)
Heterosexual	139	87.4	444	86.4	
Gay or Lesbian	8	5	18	3.5	
Bisexual	8	5	30	5.8	
Other	4	2.5	22	4.3	
Education Level					6.46(6)
No Degree	1	0.6	11	2.1	
GED or HS Diploma	46	28.9	167	32.5	
Associates	24	15.1	98	19.1	
Bachelors	61	38.4	177	34.4	
Masters, JD, or Doctorate	27	17	61	11.9	

Note. *Denotes $p < 0.05$, ** denotes $p < 0.01$. All other findings are not significant. The difference test displays either the t - or χ^2 value, with degrees of freedom in parentheses.

Table B2

Descriptive Statistics and Difference Tests for Relationship and Family Demographics

Demographic Characteristic	Sample 1		Sample 2		Difference Test
	M	SD	M	SD	
Relationship Length (In Years)	6.5	8.5	7	8.42	-0.54(657)
Number of Children	1.84	0.93	2.08	1.17	-1.57 (301)
	Frequency	%	Frequency	%	
Relationship Status					7.21 (8)
Monogamous Marriage	55	34.6	188	36.6	
Monogamous Committed Partnership	22	13.8	56	10.9	
Non-Monogamous Marriage or Partnership	3	1.9	21	4	
Engaged to Marry	12	7.5	46	8.9	
Exclusive Serious Dating	44	27.7	146	28.4	
Casual Dating (Exclusive or Non-Exclusive)	22	13.8	48	9.3	
Another Status	1	0.6	9	1.8	
Cohabitation					0.10 (1)
Yes, Currently	111	72.1	365	71	
Yes, In the Past	7	5.9	20	3.9	
No, Never Cohabitated	36	23.4	129	25.1	
History of Relationship Cycling					3.92 (1)
Yes	35	22.7	159	31	
No	119	77.3	354	69	
Parent					0.28 (1)
Yes	67	43.5	236	45.9	
No	87	56.5	278	54.1	
Children's Ages					16.80 (2)**
All Minors	41	61.2	165	70.2	
Minors and Adults	20	29.9	24	10.2	
All Adults	6	8.9	46	19.6	
Partner Co-parenting					9.95 (2)**
Yes, For All Children	37	56.1	172	72.9	
Yes, For Shared Biological Children	9	13.6	31	13.1	
No	20	30.3	33	14	

Note. *Denotes $p < 0.05$, **denotes $p < 0.01$. All other findings are not significant. The difference test displays either the t - or χ^2 value, with degrees of freedom in parentheses.

Table B3

Relationship Investment Factor Structure and Indicator Loadings

Factor	Indicators	EFA Eigenvalue or Loading	CFA Indicator or Factor Loading	SEM Indicator or Factor Loading
Communal Costs		6.05	0.77	0.71
	I am willing to dedicate my resources (e.g., time, effort, or money) to our relationship at a personal expense, if it means that our relationship is healthy and happy.	0.92	0.87	0.87
	I give of myself to my relationship for the betterment of the relationship.	0.79	0.87	0.87
	I have put resources into my relationship at the expense of my personal needs or desires, so that my relationship can thrive.	0.70	0.62	0.62
	It is worthwhile to put in my resources to our relationship if it means the relationship will be strong.	0.85	0.88	0.87
	Giving up things for my partner's sake makes our relationship better. <i>(also cross-loaded on non-portability factor on EFA)</i>	0.50	0.71	0.72
Non-portability		2.70	0.66	0.75
	I have put a great deal into the current relationship that I would lose if our relationship were to end.	0.84	0.83	0.82
	Many aspects of my life have become linked to my partner (recreational activities, etc.) and I would lose all of this if I were to break up.	0.81	0.64	0.64
	If we broke up, I would have to give up a great deal of important things that I dedicated to this relationship.	0.85	0.79	0.78
	It would be difficult to lose all that I've devoted to this relationship.	0.79	0.79	0.81
Expected Extrinsic Investment Reward Value		1.94	0.24	0.24

	Expected Money	0.83	0.80	0.80
	Expected Goods	0.84	0.84	0.85
	Expected Status	0.71	0.72	0.72
	Expected Services	0.66	0.84	0.83
	Expected Information	0.35	0.53	0.60
Expected Intrinsic Investment Reward Value		1.21	0.78	0.54
	Expected Love	0.89	0.57	0.78
	Expected Sexuality	0.69	0.51	0.58
	Expected Information	--	0.31	0.35
	How do the rewards you might get in the future for investing in this relationship compare to the rewards you'd expect to get for investing in your ideal relationship? (<i>This item was scored from "Much less rewarding than my ideal relationship" to "Just as rewarding as my ideal relationship".</i>)	0.56	0.64	0.22

Note. The prompt for the expected rewards items read "To what extent do you believe that your relationship investments **should** result in rewarding experiences in the following areas?" STDYX loading values are displayed in the CFA and SEM results. All results are significant at $p < 0.01$.

Table B4

Observed Investment Reward Value Indicator Loadings

Indicators	EFA Loading	CFA Loading	SEM Loading
Love	0.78	0.70	0.69
Money	0.88	0.86	0.86
Goods	0.87	0.87	0.87
Status	0.86	0.84	0.85
Information	0.82	0.82	0.82
Services	0.89	0.89	0.90
Sexuality	0.69	0.63	0.63

Note. The prompt for these items read “*To what extent do you believe that your previous relationship investments resulted in rewarding experiences in the following areas?*” STDYX loading values are displayed in the CFA and SEM results. All results are significant at $p < 0.01$.

Table B5

Loss Aversion Factor Structure and Indicator Loadings

Factor	Indicators	EFA Eigenvalue or Loading	CFA Loading	SEM Loading
Loss Orientation		1.90		
	I cannot leave this relationship because I've invested too much in it.	0.85	0.80	0.80
	I will do anything to make sure that I don't lose what I've put into this relationship.	0.68	0.70	0.71
	I've given too much to this relationship to walk away.	0.81	0.90	0.89
	It would be a waste to break up after putting in so much time, energy, and effort to make things work.	0.76	0.75	0.75
Gain Orientation		4.48		
	Leaving would be worthwhile if things would get better.	0.62	0.69	0.61
	I will break up with my partner if it means I'll be happier afterward.	0.47	0.67	0.55
	I would give up what we have to build a better future for myself.	0.61	0.79	0.73
	Going our separate ways could lead to good things for me.	0.80	0.64	0.75
	Rate how much you believe you would gain if you and your partner broke up.	0.77	0.53	0.61
	How much do you think you would benefit if your relationship ended?	0.86	0.57	0.68

Note. STDYX loading values are displayed in the CFA and SEM results. All results are significant at $p < 0.01$.

Table B6

Relationship Satisfaction Indicator Loadings

Indicators	EFA Loading	CFA Loading	SEM Loading
I feel satisfied with our relationship.	0.95	0.95	0.93
My relationship is much better than others' relationships.	0.75	0.75	0.76
My relationship is close to ideal.	0.89	0.86	0.86
Our relationship makes me very happy.	0.83	0.94	0.94
Our relationship does a good job of fulfilling my needs for intimacy, companionship, etc.	0.91	0.94	0.93
How do the rewards you might get in the future for investing in this relationship compare to the rewards you'd expect to get for investing in your ideal relationship? (<i>This item was scored from "Much less rewarding than my ideal relationship" to "Just as rewarding as my ideal relationship".</i>)	--	--	0.44

Note. STDYX loading values are displayed in the CFA and SEM results. All results are significant at $p < 0.01$.

Table B7

Commitment Indicator Loadings

Indicators	EFA Loading	CFA Loading	SEM Loading
I intend to stay in this relationship.	0.92	0.95	0.95
I want to maintain our relationship.	0.90	0.93	0.93
I feel inclined to keep our relationship going.	0.80	0.80	0.79
My gut feeling is to continue this relationship.	0.90	0.87	0.87
I am oriented toward the long-term future of my relationship.	0.88	0.93	0.93
My partner and I joke about what things will be like when we are old.	0.61	0.63	0.64
I find it difficult to imagine myself with my partner in the distant future.	0.74	0.39	0.39
When I make plans about future events in my life, I think about the impact of my decisions on our relationship.	0.76	0.87	0.87
I feel very strongly attached to our relationship—very strongly linked to my partner.	0.79	0.87	0.87
It pains me to see my partner suffer.	0.68	0.71	0.7

Note. STDYX loading values are displayed in the CFA and SEM results. All results are significant at $p < 0.01$.

Table B8

Correlations between Study Constructs and Theoretically-Associated Relationship Constructs in Pilot Study

	Communal costs	Non-portability	Extrinsic Expected Investment Reward Value	Intrinsic Expected Investment Reward Value	Observed Investment Reward Value	Loss Orientation	Gain Orientation	Relationship Satisfaction	Global Commitment
Investment Model Scale—Commitment Subscale	0.56**	0.54**	0.08	0.63**	-0.03	0.28**	-0.58**	0.68**	0.94**
Revised Commitment Inventory									
Concern for Partner Welfare	0.19*	0.49**	0.20*	0.07	-0.03	0.43**	-0.48**	0.21**	0.31**
Dedication Commitment	0.59**	0.65**	0.16	0.58**	-0.06	0.44**	-0.74**	0.62**	0.86**
Financial Concerns	0.12	0.37**	0.19*	0.06	-0.05	0.37**	-0.25**	-0.10	0.16
Difficulty of Termination	0.42**	0.63**	0.12	0.44**	-0.09	0.55**	-0.44**	0.30**	0.54**
Social Pressure	0.28**	0.45**	0.30**	0.30**	0.16	0.44**	-0.48**	0.51**	0.51**
Structural Investment	0.39**	0.42**	0.26**	0.23**	0.06	0.33**	-0.27**	0.19*	0.38**
Availability of Alternative Partners	0.26**	0.30**	0.16	0.15	-0.01	0.30**	-0.35**	0.17*	0.20*

Moral									
Commitment									
Social Norms	0.15	0.40**	0.30**	0.11	0.08	0.56**	-0.36**	0.15	0.25**
Moral Beliefs	0.24**	0.50**	0.22**	0.19*	0.02	0.61**	-0.46**	0.33**	0.40**
Cultural Values	0.38**	0.32**	0.17*	0.41**	-0.09	0.37**	-0.30**	0.29**	0.50**
Positive									
Negative									
Semantic									
Differential									
Satisfaction	0.39**	0.36**	0.22**	0.63**	0.72**	0.28**	-0.58**	0.79**	0.66**
Dissatisfaction	-0.31**	-0.18*	-0.09	-0.56**	-0.69**	-0.18*	0.49**	-0.72**	-0.55**
Investment									
Equity									
Global	0.11	-0.11	0.10	-0.17*	-0.18	-0.08	0.31**	-0.28**	-0.14
Domain-Specific	-0.10	-0.11	0.17*	-0.31**	-0.27**	-0.08	0.39**	-0.26**	-0.27**

Note. “*” denotes $p < 0.05$ and “**” denotes $p < 0.001$. All other findings are not significant.

Table B9

Correlations between Study Constructs in Pilot Study

	1	2	3	4	5	6	7	8	9
1 Communal Costs	1								
2 Non-portability	0.55**	1							
3 Extrinsic Expected Investment Reward Value	0.17*	0.28*	1						
4 Intrinsic Expected Investment Reward Value	0.51**	0.36**	0.30**	1					
5 Observed Investment Reward Value	-0.14	-0.09	0.28**	0.34**	1				
6 Loss Orientation	0.35**	0.64**	0.34**	0.24**	0.02	1			
7 Gain Orientation	-0.37**	-0.52**	-0.12	-0.44**	0.17	-0.47**	1		
8 Commitment	0.63**	0.61**	0.08	0.61**	-0.08	0.40**	-0.64**	1	
9 Relationship Satisfaction	0.26**	0.35**	0.24**	0.53**	0.16	0.20*	-0.53**	0.62**	1

Note. "*" denotes $p < 0.05$ and "**" denotes $p < 0.01$. All other findings are not significant.

Table B10

Descriptive Statistics and Difference Tests for Study Variables by Sample

Construct or Factor	Sample 1		Sample 2		t-value
	M	SD	M	SD	
Investment					
Communal Costs	29.46	4.91	29.64	4.81	-0.41(644)
Non-Portability	28.16	7.25	28.02	7.17	0.22(665)
Extrinsic Expected Investment Reward Value	23.56	5.95	23.98	6.45	-0.72(647)
Intrinsic Expected Investment Reward Value	17.67	3.24	18.19	2.62	-1.79(210.84)
Observed Investment Reward Value	20.54	4.12	27.66	11.21	- 11.80(626.51)**
Loss Aversion					
Loss Orientation	27.75	8.2	19.04	6.37	11.75(196.12)**
Gain Orientation	18.43	8.9	18.01	8.46	0.49(224)
Relationship Satisfaction	5.9	0.87	5.91	0.82	-0.18(665)
Commitment	75.37	14.18	79.63	11.49	-3.26(190.15)**

Note. *Denotes $p < 0.05$, ** denotes $p < 0.01$. All other findings are not significant. The difference test displays the t-test value, with degrees of freedom in parentheses.

Appendix C

Table C1

Associations between Study Constructs and Selected Demographic Variables in Follow-Up Study

Construct or Factor	Gender	ANOVA (<i>F</i> Statistic)					Correlation (<i>r</i> or <i>r_{pb}</i> statistic)			
		Participant Income	Partner Income	Relationship Status	Co-Parenting	Relationship Length	Cohabitation	History of Cycling	Parent Status	Number of Children
Investment	3.55	0.77 (5, 491)	2.32 (6, 490)*	9.78 (8, 488)**	6.93 (2, 228)**	0.17**	-0.10	0.00	0.14**	-0.06
Communal Costs	2.84 (2, 494)*	2.91 (5, 507)*	6.13(6, 506)**	16.84 (8, 504)**	13.66 (2, 233)**	0.27**	-0.11*	-0.05	0.16**	0.12
Non-Portability	1.46 (2, 510)	2.73 (5, 493)*	1.50 (6, 492)	1.91 (8, 490)	0.69 (2, 229)	0.06	-0.03	0.03	0.10*	0.11
Extrinsic Expected Investment Reward Value	3.63 (2, 496)*	1.04 (5, 493)	1.30 (6, 492)	6.23 (8, 490)**	2.18 (2, 229)	0.05	-0.11*	-0.07	0.09*	0.03
Intrinsic Expected Investment Reward Value	7.25 (2, 495)**	2.68 (5, 492)*	1.60 (6, 491)	1.02 (8, 489)	0.72 (2, 229)	-0.02	-0.02	-0.01	0.01	0.05
Observed Investment Reward Value Loss										

Aversion										
Loss	0.55	2.63 (5,	2.23	8.26 (8,	12.66 (2,	0.17*	-0.04	0.06	0.19**	0.02
Orientation	(2,	487)*	(6,	484)**	227)**					
	490)		486)*							
Gain	2.71	2.50 (5,	4.86	9.15 (8,	4.20 (2,	-0.16**	0.05	0.20**	-0.11*	-0.01
Orientation	(2,	486)*	(6,	483)**	227)*					
	489)		485)**							
Relationship	6.32	0.43 (5,	2.62	6.64 (8,	2.17 (2,	-0.07	-0.23**	-0.24**	0.03	-0.04
Satisfaction	(2,	507)	(6,	504)**	232)					
	510)**		506)*							
Commitment	3.85	1.10 (5,	3.84	17.81 (8,	5.42 (2,	0.16**	-0.22**	-0.16**	0.20**	0.01
	(2,	504)	(6,	501)**	232)**					
	507)*		503)**							

Note. “*” denotes $p < 0.05$ and “**” denotes $p < 0.01$. All other findings are not significant. The “Number of Children” analyses only included parents.

Post-hoc Analyses

Post-hoc analyses were first conducted for individual-level demographics. Race was associated with non-portability such that multiracial people reported higher non-portability than people of most other ethnicities (Mean diff.'s ranged from -0.80 to 6.44, SEs ranged from 1.11 to 4.21, most p 's < 0.05) and White people reported higher non-portability than Black people (*Mean diff.* = 3.81, *SE* = 1.09, p < 0.01). In addition, Christians (*Mean diff.* = 1.39, *SE* = 0.63, p < 0.05) and those without a religious identification (*Mean diff.* = 4.20, *SE* = 1.59, p < 0.01) reported greater extrinsic expected investment reward value than those of other faiths. Further, Christians reported greater loss orientation than those of other faiths (*Mean diff.* = 2.32, *SE* = 0.62, p < 0.01) and individuals identifying as spiritual but not religious (*Mean diff.* = 3.49, *SE* = 1.73, p < 0.05). In addition, older individuals reported higher intrinsic expected investment reward value ($r = 0.10$, p < 0.05) and commitment ($r = 0.14$, p < 0.01), as well as lower gain orientation ($r = -0.16$, p < 0.05).

With regards to gender, cisgender women reported higher commitment (*Mean diff.* = 2.75, *SE* = 1.14, p < 0.05) and intrinsic expected investment reward value (*Mean diff.* = 0.68, *SE* = 0.26, p < 0.05) than cisgender men. Further, cisgender people reported higher satisfaction (cisgender men *Mean diff.* = 1.24, *SE* = 0.37, p < 0.01; cisgender women *Mean diff.* = 1.29, *SE* = 0.36, p < 0.01) and communal costs (cisgender men *Mean diff.* = 5.60, *SE* = 2.43, p < 0.01; cisgender women *Mean diff.* = 6.07, *SE* = 2.40, p < 0.01) than transgender people. Finally, cisgender men endorsed greater observed investment reward value than either cisgender women (*Mean diff.* = 3.49, *SE* = 1.11, p < 0.05) or transgender people (*Mean diff.* = 14.54, *SE* = 5.61, p < 0.05).

With regards to actor income, there were several significant ANOVAs; however, post-hoc tests did not reveal a consistent pattern of differences across income brackets for most of the study constructs. One pattern was observed; specifically, individuals in the lowest income bracket had lower expected extrinsic investment reward value than individuals in most other income brackets (Mean diff.'s ranged from -0.96 to -2.88, SE's ranged from 0.87 to 1.05, most p 's < 0.05). Partner income, on the other hand, showed a distinctive pattern in the post-hoc tests, wherein individuals who did not know their partner's income also reported lower non-portability (Mean diff.'s ranged from -5.22 to -8.16, SE's ranged from 1.38 to 1.60, all p 's < 0.01), communal cost (Mean diff.'s ranged from -2.61 to -3.19, SE's ranged from 1.00 to 1.10, p 's < 0.01), loss orientation (Mean diff.'s ranged from -4.09 to -4.63, SE's ranged from 1.33 to 1.52, p 's < 0.01), commitment (Mean diff.'s ranged from -6.14 to -9.91, SE's ranged from 2.31 to 2.59, p 's < 0.05), and satisfaction (Mean diff.'s ranged from -0.42 to -0.62, SE's ranged from 0.17 to 0.19, p 's < 0.05), as well as higher gain orientation (Mean diff.'s ranged from 3.61 to 721, SE's ranged from 1.73 to 1.90, p 's < 0.05).

Relationship- and family-level demographic variables were also examined for associations with study constructs. Relationship length was associated with greater non-portability ($r = 0.27, p < 0.01$), communal cost ($r = 0.17, p < 0.01$), and commitment ($r = 0.16, p < 0.01$), as well as greater loss aversion ($r_{lossorientation} = 0.17, r_{gainorientation} = -0.16, p$'s < 0.01). When the ANOVA for relationship status was examined, it was clear that casual daters tended to vary significantly from the other groups. Therefore, a dichotomous variable was created to distinguish casual daters from more committed relationships and point-biserial correlations were run. These analyses revealed that more committed partnerships were associated with greater relationship satisfaction ($r = 0.29, p < 0.01$), communal cost ($r = 0.26, p < 0.01$), intrinsic expected investment reward value ($r = 0.29, p < 0.01$), loss aversion ($r_{lossorientation} = 0.22, r_{gainorientation} = -0.26,$

p 's<0.01), commitment ($r = 0.42, p<0.01$), and non-portability ($r = 0.36, p<0.01$), as well as lower observed investment reward value ($r = -0.09, p<0.05$). Individuals who endorsed a history of cycling through a relationship (i.e., breaking up and then reuniting) reported higher gain orientation ($r = 0.20, p<0.01$), as well as lower relationship satisfaction ($r = -0.24, p<0.01$) and commitment ($r = -0.16, p<0.01$). Parents, relative to non-parents, showed a similar pattern of associations—however, these associations tended to be smaller in magnitude ($r_{communalcost} = 0.14, r_{lossorientation} = 0.19, r_{commitment} = 0.20, r_{non-portability} = 0.16, p$'s<0.01; $r_{intrinsicexpectedreward} = 0.09, r_{extrinsicexpectedreward} = 0.10, r_{gainorientation} = -0.11, p$'s<0.05). Parents also showed differential loss orientation based on their children's ages; in particular, parents of all minor children had higher loss orientation than did parents of only adult children ($Mean\ diff. = -2.83, SE = 1.04, p<0.01$). However, the number of children in a household had no impact on any of the study variables (see Table C1).