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Commitment in Relationships: An Updated Meta-Analysis of the Investment Model

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Abstract

This paper provides a systematic review and updated meta-analysis of the extant literature on Rusbult's Investment Model of Commitment. The meta-analysis aimed to determine the strength of the associations between commitment and its antecedents, and to investigate potential moderators of these associations. The meta-analysis included 50,427 participants from 202 independent samples (collected between 1980 and early 2016) that had examined the intercorrelations between satisfaction, investment size, quality of alternatives and commitment. Across all studies, satisfaction had the largest aggregate association with commitment ($r = .65$), followed by investments ($r = .53$) and quality of alternatives ($r = -.43$). Several significant moderators of the relationships between the antecedents and commitment were also identified. Implications and future research directions are discussed.

Keywords: Commitment, satisfaction, investment, alternatives, meta-analysis

Commitment in Relationships: An Updated Meta-Analysis of the Investment Model

To date, Rusbult's (1980) Investment Model has been one of the most prominent and influential theories of commitment in relationships. The robustness of the model has been demonstrated in almost 40 years of research since its inception. Although the Investment Model was originally developed in the domain of close relationships (Rusbult, 1980) and extended to job commitment (e.g., Rusbult & Farrell, 1983), in recent years it has been applied to a wide variety of domains including website use (e.g., Li, Browne, & Chau, 2006), relationships with the natural environment (e.g., Davis, Le, & Coy, 2011), mentor-mentee relationships (e.g., Gettings & Wilson, 2014), loyalty to brands (Li & Petrick, 2008) and buyer-seller relationships (e.g., Moon & Bonney, 2007). The current paper aims to provide an up-to-date and comprehensive meta-analysis of research that has used the investment model to predict commitment to relationships across various domains.

Predicting Commitment to Interpersonal Relationships

The Investment Model by Rusbult (1980) drew on Thibaut and Kelley's (1959) interdependence theory to develop a model of the processes by which individuals are motivated to continue to remain in interpersonal relationships. Under the Investment Model, commitment is a concept characterised by an intention to remain in a relationship, a psychological attachment to a relationship partner, and a long-term orientation towards the relationship (Arriaga & Agnew, 2001; Le & Agnew, 2003; Rusbult & Buunk, 1993). According to the theory, commitment in a relationship increases as a) the amount of satisfaction derived from a relationship increases, and as b) the quality of possible alternatives to the relationship decreases. Rusbult further added another concept to the model, level of investment, suggesting that as individuals make greater investments in the relationship, commitment to the relationship should further increase.

Interdependence theory assumes that individuals seek to maximise rewards and minimise costs (Rusbult, 1980). As such, satisfaction with and attraction to a partnership is seen as a function of the discrepancy between the rewards and costs associated with the relationship. Rewards and/or outcomes can be material or psychological, and can include anything such as physical appearance of the relationship partner, intelligence, wealth, status, behaviours by the partner in the relationship, increased privileges as a result of being in the relationship and so forth. Outcomes of a relationship are compared with the individual's personal standard or expectations of the quality of relationships in general, known as the individual's comparison level (CL; Thibaut & Kelley, 1959). The individual's CL is the perception of the average relationship outcome value that the individual has come to expect from relationships, that is determined by both the quality of past experiences in relationships and by comparison to relationships of other people. And so, individuals evaluate their current relationships with regard to their CL to assess the degree of satisfaction with and attraction to the relationship; as outcomes exceed comparison levels, individuals feel more satisfied with the relationship, but if outcomes fall below the individual's comparison level, dissatisfaction with the relationship occurs. Satisfaction is thus a subjective experience of the relative positivity or negativity of a relationship.

Though satisfaction with a relationship is an important factor that influences relationship commitment, the intention for an individual to stay or leave a relationship is also influenced by other factors that may draw the individual away from the current relationship, such as the quality of available alternatives (Rusbult, 1980). Commitment in Rusbult's model is in part a function of satisfaction of the current relationship in relation to the perceived satisfaction that could be achieved (or opportunity cost associated with) the individual's available alternatives to the current relationship, whether it be an available alternate partner or having no partnership at all. Perceiving attractive alternative options available to the

individual can lead the individual away from the current relationship. If alternative options are not available, an individual may be more likely to be “stuck” in current relationships for lack of better options.

The Investment Model extends interdependence theory by asserting that dependence is affected by a third factor - investment size (Rusbult, 1980). Investment size refers to the concrete or intangible resources that are associated with the relationship that would be lost or diminished upon cessation of the relationship. Investments can be direct or intrinsic resources such as the amount of time and effort spent in the relationship, experienced emotions or disclosure of personal information. Investments can also be from originally extraneous sources such as personal identity, social networks, any children borne from the relationship, or material possessions that become attached to the relationship. And so, according to the Investment Model, commitment to the relationship increases as satisfaction increases, quality of alternatives decreases, and as there are greater investments made in the relationship.

Aims of the Present Research

The first meta-analysis of the Investment Model literature was published by Le and Agnew in 2003. Analyzing 52 independent samples and a total sample size of 11,582 participants, the authors found strong and robust relationships; satisfaction level and investment size were both positively associated with commitment across 48 studies ($r = .68$ and $.46$ respectively), whilst quality of alternatives was negatively associated with commitment ($r = -.48$). The three antecedents of commitment were found to collectively explain more than 60% of the variance in commitment. Furthermore, satisfaction level was found to be significantly more predictive of commitment than both quality of alternatives and investment size, which both predicted commitment to the same degree.

While Le and Agnew's (2003) meta-analysis made a landmark contribution by summarizing the extant evidence relating to the Investment Model as applied to romantic relationships (and a few other domains), the recent burgeoning of research in other non-romantic relationship domains is yet to be accounted for in meta-analytic research. In the past fifteen years since Le and Agnew's meta-analysis, the Investment Model has been used to examine concepts in the non-interpersonal domain, such as commitment to academic institutions (e.g. Human-Vogel & Rabe, 2015; Savage, 2008), the honor code (Dix, Emery & Le, 2014), the War on Terror (Agnew, Hoffman, Lehmiller & Duncan, 2007), the environment (e.g. Coy, Farrell, Gilson, Davis & Le, 2013; Davis et al., 2011), and service relationships (e.g. Boakye, Kwon, Blankson & Prybutok, 2012; Mitrega & Katrichis, 2010; Nysveen, Pedersen, & Thorbjørnsen, 2003). In the interpersonal domain, the model has also been extended to investigate commitment to friendships (e.g. Branje, Frijns, Finkenauer, Engels & Meeus, 2007; Vanderdrift, Lehmiller & Kelly, 2012), parasocial relationships (i.e. one-sided relationships between viewers and media figures; e.g. Eyal & Daley, 2012; Branch, Wilson & Agnew, 2012), relationships characterized by violence, abuse or aggression (e.g. Rhatigan, Moore & Stuart, 2005; Rhatigan, Shorey & Nathansson, 2011; Rhatigan & Street, 2005), and recently-dissolved relationships (e.g. Tan, Agnew, Vanderdrift & Harvey, 2015; Tassy & Winstead, 2014), just to name a few.

It has been argued that meta-analyses and systematic reviews should be updated if a considerable number of new studies have been conducted following previous reviews (e.g., Chalmers & Haynes, 1994; Clark, Donovan, & Schoettker, 2006; Richardson, & Rothstein, 2008). This is the primary reason that an updated meta-analysis of the Investment Model is appropriate. However, there are a number of other reasons for why an updated meta-analysis might be necessary. Due to the recent explosion of research, there are also a far greater number of studies available to allow for a more rigorous analysis of whether the associations

between commitment and its antecedents are moderated by any other variable. One of the limitations mentioned by Le and Agnew (2003) in their seminal article was that the relatively small sample sizes in some of their moderator analyses prohibited firm conclusions to be made. For example, in reviewing the difference between homosexual and heterosexual males on Investment Model associations, the authors noted that a sample of $N = 86$ for homosexual males cannot be considered as representative of the homosexual male population.

Furthermore, the popularity of the Investment Model in research provides for a new opportunity to determine whether or not publication biases may be present in the published literature. Publication bias, if present, can lead to inappropriate conclusions drawn about the relationships between psychological constructs, as the published literature may not be representative of all of the scientific research that has been conducted (e.g., Hunter & Schmidt, 2004). Whereas Le and Agnew were able to include samples from 13 unpublished data sources in their analysis, they did not provide an analysis of whether there was a difference between Investment Model associations in published versus unpublished literature.

The current meta-analysis therefore sought to: (1) update the meta-analysis conducted by Le and Agnew (2003), (2) investigate the associations between commitment and its antecedents across a range of new domains, (3) explore moderators that were not explored in the previous meta-analysis and (4) explore whether or not publication bias is likely to be present in the published literature. We conclude the paper by discussing some promising directions for future research.

Method

Literature Search

Two databases were used for the primary search of studies. Google Scholar and PsychINFO were searched using the keywords "Investment Model", "satisfaction AND

alternatives AND investments" and "Rusbult" entered into the search parameters. The date for studies collected ranged from 1980 to January 2016. A call was placed for relevant papers and unpublished data on two electronic forums, one for the International Association for Relationship Research, and another for the Society for Personality and Social Psychology (SPSP). The members or visitors to these forums were asked to provide any data from in-press/unpublished manuscripts that measured Investment Model constructs. All papers that were received in this method were considered for inclusion into the meta-analysis.

Furthermore, letters were sent to ten established researchers in the field, asking for additional data that could be included in the analysis. Data was received from four of these researchers and included in the meta-analysis. Le and Agnew, the authors of the seminal meta-analysis published in 2003, were also contacted and graciously provided additional data for use in the analysis.

Inclusion Criteria

To be included in the analysis, studies must have collected measures of all four Investment Model constructs (satisfaction, alternatives, investment and commitment). Furthermore, studies must have reported inter-correlations between all Investment Model constructs. Overall, 202 independent samples were obtained that fit the criteria, totalling 50,427 participants. The studies were from 95 published articles and 66 unpublished masters, doctoral dissertations or data sources. An additional 18 published studies were identified in which measures of all Investment Model constructs were collected, but all inter-correlations were not reported. Emails were sent to the first and second authors of each of these studies; however, a response did not arrive in time for these studies to be included in the analysis.

Coding Strategy

Sample independence. In articles in which more than one study was reported, each study was treated as a separate unit as long as the samples were independent of each other. If studies contained multiple non-independent samples, the average correlation weighted by sample size between the samples was calculated and the smallest sample size of the multiple samples was recorded as the value representing the overall sample size when determining the overall effect (Sheeran, Abraham & Orbell, 1999). If multiple results were reported from the same sample (e.g. when a published article and an unpublished doctoral dissertation was collected that drew upon the same sample), the results that provided the most information were used. For studies that reported identical analyses over multiple time points for a particular sample, only the results from the initial time point were chosen. This was to ensure that the possibility of practice effects was eliminated from the recorded result. In the event that identical samples provided responses for Investment Model constructs reflecting multiple domains (e.g., both commitment to a romantic relationship and commitment to a friendship), one domain was chosen at random to be included in the analysis. Again, this was done to ensure that there were no dependent samples collected in the meta-analysis.

Variables coded in each study. Wherever possible, the following variables were coded for each study: a) sample size, b) number of males and females, c) mean age of participants (in years), d) mean duration of relationship (in months), e) location of study, f) whether or not a student sample was used, and g) whether the studies examined interpersonal or non-interpersonal commitment. For interpersonal commitment, we coded the type of relationship (e.g., romantic, friendship, mentor/mentee relationship, or parasocial), and for romantic relationships, whether the relationship featured transgressions, infidelity, was recently dissolved, featured abuse or violence, or was otherwise ongoing. We also coded the sexual orientation of the participants, and whether the sample was predominantly pre- or non-marital, or if it was a cohabitating/engaged/married sample. For non-interpersonal

commitment, we coded the type of commitment (e.g. academic, environmental, job etc.). Finally, whether or not an article had been published in a peer-reviewed academic journal was also recorded. The Excel files for this project can be viewed on the Open Science Framework at the following link:

https://osf.io/pk6qh/?view_only=1bd01167d4f643ef9ed4bc38e708137c .

Analytic Strategy

The main effect size of interest was the weighted average correlation of all Investment Model constructs with each other. The statistical package Comprehensive Meta-Analysis (2014) was used to compute the Fisher's z scores for correlations from each study. These z-scores were weighted by the sample size for each study, and then the average weighted correlations across all studies were computed. Comprehensive Meta-Analysis also produced 95% confidence intervals around each correlation coefficient.

The standardized regression coefficients were calculated from commitment regressed simultaneously on satisfaction, quality of alternatives and investment for every independent sample using the Excel program by Braun and Oswald (2011). The variance accounted for by the three predictors (R^2) was also calculated for every independent sample. The Multiple R values for each of these samples were transformed into z-scores for comparative purposes. A 95% CI was also calculated for each R^2 . These data are presented in Table 1.

The Q-statistic was used to test the homogeneity of effect sizes for each antecedent's correlation with commitment across all studies. We used a random-effects model to calculate the overall effect sizes rather than the fixed-effects method. Fixed effects models assume that there is a true effect size that is shared by all the studies included in the meta-analysis, with differences between studies being due to sampling error (Borenstein, Hedges, Higgins & Rothstein, 2009). Random-effects models, however, assume that the effect size could vary

from study to study (depending on the presence of moderators), and so the combined effect size represents the mean of the distribution of true effects (Borenstein, Hedges & Rothstein, 2007). Following from Le and Agnew's (2003) meta-analysis detailing the influence of a number of moderators, it was decided that the random-effects model would be more appropriate for computing overall effect sizes.

We also investigated a number of possible moderators for the aforementioned correlations and regression analyses. We conducted meta-regression to analyse the relationship between moderators and the relationship between Investment Model antecedents with commitment. Regression coefficients and their associated 95% confidence intervals were produced in the analyses, with regression coefficients detailing the change in effect size (Fisher's Z) associated with a one-unit increase in a continuous moderator, or the difference in effect size between two levels of the categorical moderator. Random-effects models were again chosen based on the assumption that the true effect sizes to be estimated varies from study to study depending upon the presence of moderators (Borenstein, et al. 2007).

Insert Table 1 about here

Results

Table 2 presents the sample sizes, correlations between Investment Model antecedents and commitment, standardized regression coefficients of commitment regressed onto the three hypothesized antecedents, and the R^2 values computed across all studies and by each categorical moderator. Counting all 202 independent samples, satisfaction and investments were strongly positively correlated with commitment, and quality of alternatives was moderately negatively correlated with commitment (see Table 2). Satisfaction showed a stronger correlation with commitment than either investments ($Z = 29.4, p < .001$) or quality

of alternatives ($Z = 50.08, p < .001$) with commitment. Investments also showed a stronger correlation with commitment than quality of alternatives with commitment ($Z = 20.68, p < .001$). Satisfaction and investments were also negatively correlated with alternatives ($r = -.34$ and $-.26$ respectively) and positively correlated with each other ($r = .42$).

The standardized regression coefficients were computed for commitment regressed onto satisfaction, quality of alternatives and investments for each of the 202 independent samples. Satisfaction was the strongest predictor, followed by investments and then quality of alternatives (see Table 2). Together, the three predictors explained 54% of the variance in commitment (95% CI [.53, .55], $k = 202, N = 50,427$). The set of correlations were heterogeneous for all relationships with commitment, satisfaction, $Q_w(201) = 3115.41, p < .001$, quality of alternatives, $Q_w(201) = 2575.29, p < .001$, investments, $Q_w(201) = 3490.21, p < .001$, indicating that any differences in the strength of associations between studies could potentially be explained by moderators.

Insert Table 2 about here

Moderator Analyses

Moderators were examined for each of the correlations between commitment and the Investment Model variables¹. The results are shown in Table 3. Age of participants (in years), duration of the relationship (in months), and year of publication were treated as continuous moderators. The type of commitment (interpersonal or non-interpersonal) was coded as a categorical moderator with interpersonal relationships as the reference category. Subtypes of

¹ When there was significant moderation identified, the associations between the antecedent and commitment remained significant for all subgroups, with the exception of some of the moderators of the association between alternatives and commitment. The association between alternatives and commitment was not statistically significant for friendship, mentor/supervisor and service relationships, and for the studies based in Africa.

commitment was coded as a categorical moderator (with romantic relationships as the reference category) and included: Academic commitment; commitment to a community, commitment to a concept; customer loyalty; commitment to the environment; commitment to friendships; job commitment; commitment to a mentor or supervisor; parasocial commitment (e.g. commitment to a TV show character); commitment to a service; sport commitment; and commitment to websites. Aspects of the relationship such as the presence of violence, or whether or not the relationship has been recently dissolved were coded as categories to be compared with otherwise ongoing relationships. Marital status, gender, sexual orientation, location of the sample, and whether or not a student sample was used were also coded as categorical moderators, with the reference categories of non-married, female, heterosexual, USA and student samples used, as these were the most frequently occurring categories. Published studies as the reference category was compared to non-published studies to determine the possibility of differences in effect sizes for published versus non-published samples. Finally, inclusion in Le and Agnew's (2003) meta-analysis was coded as a categorical moderator with "included studies" as the reference category. In the analyses, we only included moderators that had at least two independent samples.

Satisfaction. The effect sizes for the relationship between satisfaction and commitment were influenced by two moderators. The relationship between satisfaction and commitment was attenuated if there was interpersonal violence present in the relationship, or if it had been recently dissolved in the past 6 months. The correlation between satisfaction and commitment was also weaker for Europeans than for American samples.

Quality of alternatives. The size of the correlation between quality of alternatives and commitment was influenced by eight different moderators. Quality of alternatives was associated with commitment for interpersonal relationships, but much less so for non-interpersonal relationships. At the subtype level, this correlation was lower for job

commitment, commitment to the environment, commitment to friendships, commitment to mentors/supervisors, and commitment to a service, than for commitment to romantic relationships. As the age and duration of the relationship increased, and for non-students versus student samples, the correlation between quality of alternatives and commitment becomes weaker. Alternatives exerted a lower influence on commitment to a relationship if the relationship had recently dissolved versus if they were otherwise ongoing, and also for samples from Africa versus US samples. The correlation between quality of alternatives and commitment was significantly weaker in the studies that were not included Le and Agnew's (2003) meta-analysis, than in the studies that were included in their analysis. Similarly, the correlation became weaker as the year of publication increased.

Investments. The size of the relationship between investments and commitment was influenced by seven moderators. The investments-commitment relationship was weaker for job commitment than for romantic relationship commitment. Investments was less associated with commitment for individuals in homosexual relationships than for individuals in heterosexual relationships. The investments-commitment relationship was also stronger for students than for non-students, for non-married versus married relationships, and as the duration of relationship and age of participant decreased. The relationship was also weaker as the year of publication increased.

Insert Table 3 about here

Discussion

The current study reviewed the Investment Model literature and identified 202 independent samples from 95 published articles and 66 unpublished studies that featured Investment Model constructs of commitment, satisfaction, quality of alternatives and

investments. We then used the latest meta-analytic techniques to examine the aggregate associations between the Investment Model constructs and explore various potential moderators. According to the Investment Model, the intention to persist with a relationship increases as satisfaction with and investments in the relationship increase, and as the quality of one's alternatives decreases. Across a total sample size of 50,427 participants, the aggregate level correlations between commitment and its proposed antecedents were strong and in the expected directions. In predicting commitment; satisfaction, alternatives and investments accounted for a total of 54% of the variance of commitment across all studies.

Satisfaction level was found to have the largest aggregate association with commitment ($r = .65$), as well as being the strongest predictor of commitment when investments and quality of alternatives were also included in the same model ($Std. ^2 = .47$). Investment size also showed a large aggregate association with commitment ($r = .53$) and was the second-strongest predictor of commitment in the Investment Model ($Std. ^2 = .32$). Quality of alternatives showed a moderate to large aggregate association with commitment ($r = -.43$) and was the weakest predictor of commitment ($Std. ^2 = -.19$) when included in the same model with satisfaction level and investment size. These findings are consistent with that of Le and Agnew's (2003) meta-analysis, showing the robustness of the associations between Investment Model constructs and commitment to relationships across a number of domains. The results also corroborate their finding that showed the primacy of satisfaction level in predicting commitment over quality of alternatives and investment size (Le & Agnew, 2003). This is consistent with the longstanding belief that satisfaction with a relationship is the single most important criterion to its persistence. Additionally, consistent with past research, our results also demonstrated the importance of considering the quality of alternatives and investment size, as these constructs consistently accounted for unique variance in predicting commitment, over and above satisfaction level alone.

The current meta-analysis also sought to provide a more rigorous analysis of potential moderators of the association between commitment and its Investment Model bases. To that end, the type of commitment (interpersonal/non-interpersonal, including subtypes), aspect of relationship, relationship status, sexual orientation, gender, duration of relationship, age, location of sample, student/non-student sample, publication bias, inclusion/exclusion in Le & Agnew (2003), and year of publication, were examined as potential moderators of the Investment Model associations. Of these 12 moderator concepts, eight were found to moderate at least one of the relationships in the model.

Overall, the association between satisfaction level and commitment was found to be the most stable, being influenced by a very few moderators (two out of 12 moderators). The association between satisfaction and commitment was found to be stronger for ongoing relationships than relationships that have recently dissolved or relationships that are characterised by violence. One explanation for this result could be due to ceiling and floor effects suppressing the associations in studies of relationships characterised by violence or dissolution. Participants in these studies tend to report very low levels of satisfaction (e.g. Rhatigan & Axsom, 2006; Rhatigan, et al., 2011; Rhatigan & Street, 2005). The low variation in satisfaction scores is likely to lead to satisfaction being less strongly associated with commitment levels. The only other moderating influence on the association between satisfaction and commitment was that the association was weaker for participants from European countries than for American countries. The association for European countries was nevertheless strong ($r = .54$).

The association between investment size and commitment was relatively less stable and influenced by seven out of 12 moderators. The association between investment size and commitment was found to be weaker for job and business relationships than for romantic relationships. This finding is consistent with Le and Agnew's (2003) meta-analysis results, in

which it was found that the model explained less of the variance in commitment in non-interpersonal domains such as job commitment. Factors specific to work contexts, as well as non-work influences (e.g. family or location) may be accounted for by satisfaction with the relationship, but not by investments (see also, Hulin, 1991).

The association between investment size and commitment was lower for homosexual relationships than for heterosexual relationships, a result also found by Le and Agnew (2003). It is possible that the type of investments made by individuals in homosexual relationships differ qualitatively from that made by individuals in heterosexual relationships, and this may require more investigation in future studies. For example, Lehmiller (2010) measured tangible and intangible investments separately and found that while intangible investments predicted commitment for both gay and heterosexual men, tangible investments were not a significant predictor for gay men (which the authors suggested may be due to differences in legal factors between these two kinds of relationship). Alternatively, there may be additional factors that play a role in non-heterosexual relationships that are not currently accounted for in the model, such as minority stressors (e.g., Greene, & Britton, 2015). Future research should further investigate the potential similarities and differences between heterosexual and non-heterosexual relationships.

Five other interconnected moderators were identified for the association between investment size and commitment. Specifically, the association between investment size and commitment was found to be weaker as participants increased in age; as relationship duration increased; for married as opposed to dating relationships; for non-students as opposed to student relationships; and as year of publication increased. Investments into relationships increase as the duration of the relationship increases, and so for relationships that have continued for a prolonged period of time, it could be expected that individuals' perceptions of investments would have reached a ceiling. This would mean that individuals' ratings of their

investment size would vary by a small amount, and so would contribute little to the prediction of relationship commitment. It can also be expected that as individuals become older, are married, and are non-students, they are likely to be in longer relationships, and thus investment size is less predictive of commitment for these relationships. It is not clear why the association between investments and commitment became weaker as year of publication increased; however, it is plausible that this is due to the greater variation in commitment targets in more recent research.

Quality of alternatives was also a relatively less stable predictor of commitment and was influenced by eight moderators. The association between quality of alternatives and commitment was weaker for non-interpersonal relationships than for interpersonal relationships. More specifically, it was weaker for service relationships and organisational relationships than for romantic relationships. It is possible that due to the transactional nature of these types of relationships, their continuation implies that a more attractive alternative relationship is simply not available; when alternatives are available and accessible, individuals are likely to forego the current relationship. Therefore, it can be expected that when participants are sampled and asked to provide an indication of the quality of their alternatives, they are likely to be in a situation where there is no current better alternative to their current job or service provider.

The association between quality of alternatives and commitment was also weaker for commitment to the environment, for commitment to friendships and for mentor or supervisor relationships than for romantic relationships. It is likely that with regards to these types of relationships, any consideration of alternatives is essentially moot: in terms of friendships, a new friendship can be gained without necessarily sacrificing or dissolving an existing one (e.g. Branje, et al., 2007); and in terms of commitment to the environment or mentors and supervisors, there is often no obvious choice of an alternative (e.g. Gettings & Wilson, 2014).

As such, it can be expected that in these sorts of relationships, individuals do not usually consider the quality of their alternatives. Indeed, the regression coefficients for quality of alternatives predicting commitment were very low for these relationship types.

The association between quality of alternatives and commitment was weaker for relationships that have been recently dissolved than for otherwise ongoing relationships. Research has shown that individuals tend to perceive a lack of alternatives in the short term after a relationship has dissolved, especially if they did not initiate the dissolution (e.g. Dutton & Winstead, 2006). This temporary lowering of perceived quality of alternatives for recently dissolved relationships could have led to the lower association between quality of alternatives and commitment, as seen in the results.

Similar to investment size, the association between quality of alternatives and commitment was also found to be weaker as the age of participants increased, as the duration of relationship increased, and for non-students as opposed to student samples. Research has shown that individuals' perceptions of their own dating 'market value' declines with age, which limits their perceived quality of alternatives in the dating pool (e.g. Pawlowski & Dunbar, 1999). This is likely to reduce the variation in perceptions of quality of alternatives for older participants and thus decrease the predictive value of alternatives on commitment. It is possible that duration of relationship and being a non-student approximate the effect of age and thus leads to similar findings, although this may need to be tested in future studies.

The association between quality of alternatives and commitment was also weaker for African samples than for US samples. This result was likely an artefact of the small sample of studies featuring African participants. Only seven separate independent samples of African participants were included in the meta-analyses, all of which were in the non-interpersonal domain of commitment, in which it has been previously shown that the association between quality of alternatives and commitment was weaker than for interpersonal commitment

domains (Le & Agnew, 2003). Further research involving African samples is required before any conclusions can be drawn about whether location moderates the relationship between the Investment Model constructs.

Finally, the association between quality of alternatives and commitment was weaker in the studies not included in Le and Agnew's (2003) meta-analysis compared to the studies that were included in the analysis (and was also moderated by year of publication). This is likely due to the greater variability in domains in which the model has been applied in recent years and could therefore be accounted for by the more specific moderators discussed in the previous paragraphs. However, in a subsequent analysis that restricted the dataset to the domain of romantic relationships ($n = 141$), inclusion in Le and Agnew (2003) ($0.16, SE = .04, Z = 4.03, p < .001$) and year of publication ($0.01, SE = .002, Z = 3.21, p = .001$) were still significant moderators of the alternatives-commitment relationship. Therefore, it is possible that this finding indicates a declining trend in the strength of the association between quality of alternatives and commitment over time.

The meta-analysis also interrogated the possibility of publication bias, whereby published studies may over-estimate true associations between Investment Model constructs. Including a large sample of unpublished studies in the meta-analysis, no significant differences were found between these and published articles in the size of Investment Model associations. This indicates the robustness of the Investment Model and suggests that publication bias, if present, likely exerts a very minimal influence on Investment Model associations.

Limitations and Future Directions

Although this meta-analysis included a very large number of independent samples, the major shortcoming of this investigation is that for many of the moderators, there were only a

small number of articles reviewed. For example, there were only two independent samples of participants for the domain of commitment to the environment. Although it was found to be a significant moderator of the association between alternatives and commitment, for such a relatively small sample size ($N = 386$), it may be wise to include a greater sample of studies and participants before any firm conclusions can be made.

As pointed out by an anonymous reviewer, it is important to consider whether the investment model predictors retain the same meaning when extended across domains. The process of adapting and modifying the investment model measures for a new domain such as commitment to the environment, may produce measures that are no longer directly comparable with the original context of interpersonal relationships. For example, in regard to the quality of alternatives measure in the context of commitment to the environment, there are fewer opportunities for objectively measuring the availability of alternatives. However, most studies included in this paper measured subjective beliefs about quality of alternatives; therefore, we considered it appropriate to include these domains in the meta-analysis. Although it is not possible to determine whether the weaker associations identified in domains such as commitment to the environment were due to a true effect or differences in how the construct was measured, we propose that it is still useful to have a meta-analysis that shows that there is such a difference.

In recent years, researchers have not only been applying the investment model to new domains but have also been exploring potential new variables and constructs that may help to explain additional variance in relationship commitment (i.e., going beyond the standard three antecedents of satisfaction, quality of alternatives and investment). For example, recent studies have investigated additional proximal predictors on commitment and alternative versions of the investment model predictors, such as perceptions of one's partner's investments (e.g., Joel, Gordon, Impett, MacDonald & Keltner 2013), the counterfactual

potency of forgone alternatives (e.g., Petrocelli, Kammrath, Brinton, Uy & Cowens, 2015), forecasted future relationship satisfaction (Lemay Jr, 2016) and future plans as another form of investment (Tan & Agnew, 2016), and subjective norms (Etcheverry, & Agnew, 2004). Research has also investigated the role of more distal predictors of commitment, such as anxious and avoidant attachment orientations, (Etcheverry, Le, Wu & Wei, 201) and unmet ideal expectations (Vannier & O'Sullivan, 2017), which influence commitment indirectly via the three investment model antecedents. Recent research has also gone beyond focusing on demographic moderators to investigate potential psychological moderators of the relationships in the model, such as one's self-determined relationship motivation (Hadden, Knee, DiBello, & Rodriguez, 2015). As these areas of research develop, there is likely to be a refining of the conceptualisation of the constructs and scales currently employed in the investment model, which can then be compared with existing research in future meta-analyses.

Given that there appeared to have been several studies that had measured subjective norms, we explored whether it would be possible to include subjective norms in the meta-analysis as an additional predictor. However, we found that previous research had conceptualised subjective norms in numerous different ways that did not facilitate inclusion in a meta-analysis (e.g. measured concepts included "subjective norms", "sanctions", "normative beliefs", "motivation to comply", "social constraints", "injunctive norms", "descriptive norms", "cultural norms", "perceived marginalization" and "approval or disapproval of friend's romantic relationship"). There were also not enough samples that had included "future plans" or "expectations" as additional predictors. Therefore, we decided not to include these predictors in the current analyses. In future research, it would be useful for researchers to utilise common measures of subjective norms and other newer predictors, in order to allow for inclusion in a meta-analysis.

Future research should also investigate the reasons for the degree of intercorrelations between the predictors of commitment themselves. There seems to have been very little research that has examined how the predictors of commitment potentially influence or interact with each other. For example, as an anonymous reviewer suggested, there may be a motivated devaluing of alternatives when satisfaction is high, which could contribute to a high correlation between these measures. In the original model, these concepts are conceptualised as independent. For example, in the paper by Rusbult et al. (1998), the inter-factor correlations between SAT, ALT and INV ranged from .21 to .55 and the authors concluded that “the analyses revealed only moderate collinearity among the three Investment Model bases of dependence” (p. 372). Le and Agnew (2003) also found that across all studies, “Satisfaction, alternatives, and investments were also found to be significantly correlated with one another (satisfaction-alternatives $r = .44$; satisfaction-investments $r = .42$; alternatives-investments $r = .25$)” (p. 50). The current findings are broadly consistent with this past research. However, the potential interactions between the antecedents in the investment model is an area that requires further investigation.

Conclusion

The current meta-analysis sought to extend previous research by demonstrating the robustness of the Investment Model in explaining commitment across a number of relationship domains, and by highlighting the role of several moderators of the model. Although the current investigation has shown that the Investment Model may be more appropriate for interpersonal than non-interpersonal commitment domains, there does appear to be value in extending the model to non-interpersonal contexts. Additionally, we identified that the relationship between quality of alternatives and commitment is weaker in the research conducted since the previous meta-analysis by Le and Agnew (2003). Future research should consider including additional factors that may have an impact in non-

interpersonal commitment domains (e.g. geographical or family factors in relation to job commitment, or health factors in relation to sport commitment), and integrating new constructs that have been recently developed in this area. These factors, if found to be significant, could also provide greater insight into the sources of commitment in relationships.

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Table 1

Sample Sizes, Bivariate Correlations with Commitment and Standardized Regression Coefficients for Investment Model Variables.

Study	Domain ^d	N	Correlation with Commitment			Standardized regression ²			
			S	A	I	S	A	I	R ²
Agnew & Loving (Females) (1995)	Females	36	.66	-.37	.55	.52	-.04	.17	.45
	Males	36	.70	-.42	.40	.64	-.06	.06	.50
Agnew, Hoffman, Lehmiller & Duncan (2007)		110	.77	-.39	.57	.63	-.06	.19	.62
Agnew, Loving & Goodfriend (1999)	Females	101	.64	-.61	.63	.33	-.31	.30	.59
	Males	107	.76	-.57	.61	.53	-.22	.20	.66
Agnew, Rusbult & Martz (1996)	Females	172	.82	-.65	.64	.56	-.25	.26	.79
	Males	167	.81	-.59	.71	.54	-.21	.30	.78

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Agnew, Van Lange, Rusbult & Langston (Study 1; 1998)	Females	118	.60	-.37	.55	.44	-.09	.36	.50
	Males	74	.69	-.45	.55	.48	-.19	.25	.56
Agnew, Van Lange, Rusbult & Langston (Study 2; 1998)	Friendships	39	.62	-.38	.33	.61	-.38	.08	.55
	Romantic relationships	37	.90	-.80	.41	.69	-.26	.04	.84
Allen, Babin & McEwan (2012)		179	.61	.00	.50	.48	-.02	.27	.43
Arriaga (1995)		49	.65	-.59	.81	.13	-.28	.60	.74
Arriaga (2002)	Non-violent	62	.71	-.41	.67	.50	-.29	.29	.67
	Violent	32	.61	-.58	.54	.30	-.40	.32	.59
Augaitis (2003)		144	.42	-.60	.51	.19	-.46	.36	.54
Bayer (2009)		267	.63	-.20	.51	.48	-.11	.30	.47
Bevan (2008)		158	.82	-.67	.69	.53	-.27	.25	.79
Boakye (2013)	Ghana sample	222	.87	.17	.40	.85	.03	.03	.76

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	US sample	174	.88	-.07	.31	.87	-.06	.04	.78
Boakye, Kwon, Blankson & Prybutok (2012)		86	.65	-.18	.11	.69	-.11	.25	.50
Boakye, Prybutok & Blankson (2015)		218	.87	.35	.42	.85	.02	.04	.77
Bolkan, Goodboy& Bachman (2011)		234	.29	-.58	.64	.27	-.38	.47	.60
Branch, Wilson & Agnew (Study 1; 2013)		259	.51	-.41	.52	.27	-.24	.33	.41
Branch, Wilson & Agnew (Study 2; 2013)	Fictional	106	.47	-.46	.46	.19	-.35	.35	.41
	Non-fictional	90	.62	-.32	.46	.49	-.12	.20	.43
Branje, Frijns, Finkenauer, Engels & Meeus (2007) ^a		995	.70	-.16	.66	.46	-.08	.33	.55
Buunk & Bakker (1997)	Females	171	.67	-.72	.63	.41	-.43	.20	.72
	Males	63	.79	-.74	.54	.53	-.31	.16	.79
Campbell (2000)		101	.78	-.73	.67	.48	-.29	.27	.77
Carpenter & Coleman (1998)		78	.43	-.21	.24	.38	-.08	.15	.21

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Casper, Gray & Stellino (2007)		537	.72	-.21	.67	.50	-.09	.43	.66
Choice & Lamke (1999)		126	.72	-.61	.38	.52	-.26	.11	.58
Chopik, Wardecker & Edelstein (2014)		144	.79	-.24	.59	.69	.01	.15	.64
Chow & Tan (2013)		113	.66	-.16	.68	.40	-.08	.42	.56
Cohen (2007)		462	.63	-.08	.02	.63	-.06	.01	.40
Cox Wexler Rusbult & Gaines (1997)		173	.57	-.55	.43	.36	-.34	.31	.53
Coy, Farrell, Gilson, Davis & Le (2013)		145	.66	-.24	.67	.49	.01	.51	.66
Dam (2005)		953	.48	-.15	.17	.46	-.13	.05	.25
Dardis (2015)		1,156	.49	-.26	.63	.30	-.15	.49	.50
Davis, Le & Coy (2011)		248	.52	-.19	.60	.36	.00	.48	.47
Dedekorkut (2015)		505	.52	-.29	.47	.39	-.20	.31	.41
Derlega, Winstead, Pearson, Janda & Lewis (2011)	Disengagers	71	.39	-.34	.58	.26	-.26	.51	.49
	Rejected partners	82	-.01	-.28	.16	-.09	-.27	.17	.10

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Dillow, Afifi & Matsunaga (2012)		605	.80	-.62	.73	.47	-.23	.31	.75
Dillow, Malachowski, Brann & Weber (2011)		215	.75	-.60	.75	.34	-.27	.42	.73
Dix, Emery & Le (2014)		276	.61	-.44	.67	.33	-.09	.46	.55
Drigotas, Safstrom & Gentilla (1999)		74	.77	-.39	.49	.67	-.07	.15	.62
Edwards (2011)		282	.72	-.56	.64	.48	-.25	.36	.72
Edwards (2007)	No abuse	235	.60	-.45	.42	.48	-.19	.31	.50
	Sexual abuse	70	.56	-.62	.58	.26	-.34	.40	.59
Emmers-Sommer, Warber & Halford (2010)	Females	195	.60	-.63	.71	.26	-.29	.47	.67
	Males	100	.71	-.47	.70	.39	-.25	.35	.64
Etcheverry & Le (2005a)		212	.69	-.50	.64	.44	-.22	.37	.65
Etcheverry & Le (2005b)		321	.68	-.52	.60	.45	-.29	.31	.64
Etcheverry, Le & Hoffman (2012)		1,274	.63	.06	.70	.36	-.09	.51	.58
Etcheverry, Le, Wu & Wei (Study 1; 2013)		334	.88	-.32	.78	.63	-.12	.38	.89

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Etcheverry, Le, Wu & Wei (Study 2; 2013)		205	.79	-.48	.61	.60	-.24	.21	.72
Etcheverry, Le, Wu & Wei (Study 3; 2013)		395	.48	-.57	.40	.33	-.44	.16	.48
Eyal & Daley (2012) ^c	Friendships	490	.50	-.33	.51	.33	-.21	.28	.37
Farrell & Rusbult (1981)		163	.67	-.21	.27	.63	-.16	.22	.52
Foster (2008)		144	.64	-.58	.48	.44	-.34	.26	.60
Foster et al. (Study 1; 2014)		88	.82	-.65	.68	.54	-.26	.23	.77
Foster et al. (Study 2; 2014)		138	.79	-.56	.57	.59	-.16	.21	.68
Foster et al. (Study 3; 2014)		219	.79	-.38	.70	.57	-.16	.32	.73
Fraley, Heffernan, Vicary & Brumbaugh (2011)	Dating females	215	.62	-.68	.52	.32	-.42	.24	.61
	Dating males	108	.66	-.52	.57	.45	-.23	.31	.59
	Married couples	64	.61	-.20	.31	.56	-.06	.10	.39
Fricker & Moore (2006)		291	.73	-.40	.35	.64	-.22	.09	.58
Gable & Hunting (2001)		86	.37	-.10	.37	.30	-.03	.31	.23

META-ANALYSIS OF THE INVESTMENT MODEL

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Gartner & Foshee (1999)		722	.70	-.33	.51	.57	-.09	.19	.52
Gephart (1997)	Females	65	.65	-.64	.67	.31	-.32	.39	.67
	Males	65	.51	-.57	.50	.29	-.39	.31	.53
Gere, MacDonald, Joel, Spielmann & Impett (Study 1; 2013)		537	.65	-.49	.46	.50	-.31	.22	.58
Gere, MacDonald, Joel, Spielmann & Impett (Study 2; 2013)		866	.74	-.28	.66	.53	-.08	.37	.66
Gettings & Wilson (2014)		145	.55	-.23	.65	.27	-.10	.48	.64
Geyer (1985)		308	.61	-.28	.43	.49	-.17	.24	.45
Gillen (2012)		90	.53	-.35	.47	.36	-.05	.23	.32
Gordon (2009)		267	.63	-.20	.51	.48	-.11	.30	.47
Greene & Britton (2013)		232	.47	-.18	.42	.36	-.01	.28	.29
Hall (2013)		74	.52	-.55	.79	.18	-.20	.59	.66

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Hatcher, Kryter, Prus & Fitzgerald (1992)		174	.25	-.30	.37	-.02	-.17	.30	.16
Hertlein, Emmers-Sommer & Kennedy (2014)		846	.26	-.57	.67	.07	-.35	.52	.57
Hoffman, Agnew & Lehmler (2009) ^c	NATO sample	110	.55	-.17	.35	.53	-.22	.11	.38
Horan & Booth-Butterfield (2010)		72	.72	-.55	.51	.51	-.26	.20	.61
Human-Vogel & Dippenaar (2013)	Females	341	.72	-.45	.54	.54	-.18	.18	.72
	Males	73	.66	-.38	.47	.53	-.20	.14	.49
Human-Vogel & Rabe (2015)		259	.52	-.18	.27	.53	.04	-.01	.27
Impett, Beals & Peplau (2001)	Males (w. follow up)	979	.37	-.17	.11	.34	-.10	.06	.15
	Males (w/o follow up)	2,648	.38	-.22	.14	.34	-.14	.07	.17
	Females (w. follow up)	979	.48	-.19	.10	.46	-.10	.05	.24
	Females (w/o follow up)	2,648	.45	-.25	.17	.40	-.16	.09	.24
Jerstad (2004)		80	.49	.11	.58	.26	.03	.45	.39
Jolly (2008)		350	.51	-.19	.54	.38	-.17	.41	.45

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Jolly (2010) ^a		119	.71	-.50	.65	.44	-.20	.37	.66
Katz, Kuffel & Brown (2006)		177	.63	-.56	.72	.30	-.15	.51	.64
Kurdek (2007a)		392	.69	-.53	.60	.47	-.23	.26	.60
Kurdek (2007b)		351	.61	-.35	.29	.53	-.18	.13	.42
Kurdek (2007c)		225	.75	-.54	.61	.52	-.22	.28	.68
Kurdek (2008a)		304	.63	-.36	.28	.55	-.17	.09	.43
Kurdek (2008b) ^b		646	.74	-.65	.57	.44	-.26	.25	.64
Le (1998)	Females	262	.72	-.60	.51	.50	-.26	.19	.61
	Males	144	.77	-.50	.72	.49	-.14	.40	.73
LeBeau & Buckingham (2008)		421	.72	-.38	.25	.72	-.17	-.12	.55
Lehmiller (2010)	Gay males	68	.74	-.32	.22	.72	-.28	.03	.63
	Heterosexual males	86	.67	-.53	.46	.47	-.29	.24	.58
Lehmiller & Agnew (2007) ^a		215	.70	-.42	.31	.62	-.22	.16	.58

META-ANALYSIS OF THE INVESTMENT MODEL

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Lehmiller & Konkel (2013)		69	.77	-.44	.73	.54	-.25	.27	.72
Levine, Kim & Ferrara (2010)		170	.26	.03	.24	.20	-.03	.16	.09
Li (2002)		284	.71	-.56	.54	.54	-.14	.39	.67
Li (2006)		554	.77	-.49	.70	.57	-.17	.40	.80
Li, Browne & Wetherbe (2006)		239	.72	-.61	.58	.51	-.15	.35	.66
Li, Browne & Wetherbe (2007)		299	.77	-.59	.61	.58	-.09	.38	.73
Loving (1997)	Females	98	.74	-.63	.65	.47	-.27	.28	.70
Loving (1997)	Males	114	.79	-.52	.71	.52	-.20	.28	.72
Lund (2014)		150	.58	-.19	.50	.43	-.08	.35	.44
Ma & Harton (2016)	Students	102	.55	-.45	.51	.41	-.29	.32	.52
	M-Turk sample	98	.56	-.55	.56	.33	-.33	.25	.51
Macher (Study 1; 2013) ^b		77	.61	-.26	.61	.39	-.15	.38	.51
Macher (Study 2; 2013) ^b		162	.65	-.47	.40	.50	-.24	.18	.51

META-ANALYSIS OF THE INVESTMENT MODEL			42						
Madlock & Dillow (2012)		244	.85	-.30	.61	.73	-.08	.19	.75
Majeres (2010)		93	.19	-.06	.52	.24	-.15	.55	.34
Mattingly, Wilson, Clark, Bequette & Weidler (2010)		100	.58	-.29	.69	.37	.09	.54	.56
McAlister, Pachana & Jackson (2005)		120	.60	-.39	.40	.53	-.23	.18	.48
McCreery (2010)		247	.61	-.27	.47	.66	-.29	-.69	.81
McDowell (2004)		132	.63	-.37	.44	.63	-.22	-.12	.42
Mikkelson & Pauley (2013)		275	.70	-.52	.68	.42	-.18	.40	.66
Mitrega & Katrichis (2010)		208	.49	-.13	.35	.44	.06	.20	.28
Morrow & Lata (1993)		48	.75	-.42	.46	.69	-.14	.00	.58
Morrow (1996)	Females	147	.80	-.58	.52	.63	-.14	.21	.68
Morrow (1996)	Males	70	.82	-.63	.50	.66	-.22	.07	.71
Mosko (2009)		399	.69	-.56	.50	.48	-.27	.26	.62

META-ANALYSIS OF THE INVESTMENT MODEL

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Muise (2011)	Females	44	.64	-.30	.43	.56	-.08	.08	.42
	Males	44	.70	-.55	.44	.50	-.28	.15	.57
Myers Zeigler-Hill & Barry (2013)	Positive writing condition	91	.54	-.24	.50	.39	.00	.31	.37
	Negative writing condition	61	.67	-.42	.59	.46	-.11	.32	.55
Nysveen, Pedersen & Thorbjørnsen (2003)	Big Brother	374	.47	-.51	.71	.01	-.18	.61	.53
	Drop	226	.45	-.31	.66	.11	.02	.60	.44
	Finn	368	.29	-.12	.53	-.03	-.06	.54	.28
Oliver (1990)		121	.46	-.44	.60	.23	-.21	.47	.48
Panayiotou (2005)		110	.66	-.27	.31	.61	-.16	.07	.47
Pautsch (1999)		68	.29	-.21	.40	.25	-.14	.39	.26
Peleg-Oren, Macgowan & Even-Zahav (2007)		178	.62	-.07	.22	.61	-.01	.05	.39
Petrocelli et al. (Study 1; 2015)		88	.60	-.42	.62	.45	-.14	.47	.62

META-ANALYSIS OF THE INVESTMENT MODEL

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Petrocelli et al. (Study 2; 2015)	Adults	104	.81	-.54	.61	.58	-.25	.22	.74
	Students	97	.66	-.56	.41	.48	-.37	.16	.59
Petrocelli et al. (Study 3; 2015)	Adults	154	.66	-.48	.74	.34	-.15	.53	.69
	Students	100	.67	-.46	.57	.47	-.37	.22	.61
Pistole, Clark & Tubbs (1995)		239	.70	-.59	.68	.40	-.21	.37	.66
Pistole, Roberts & Mosko (2010)		138	.59	-.45	.39	.45	-.23	.26	.47
Pollack, Coy, Green & Davis (2013)		279	.68	-.74	.38	.28	-.49	.25	.65
Poteat (2012)		360	.69	.07	.66	.49	.10	.44	.63
Raedeke, Granzyk & Warren (2002)		295	.52	-.34	.51	.41	-.13	.44	.48
Raedeke, Warren & Granzyk (2002)		469	.52	-.34	.51	.41	-.13	.44	.48
Rhatigan & Street (2005)		309	.69	-.61	.55	.44	-.35	.28	.67
Rhatigan, Moore & Stuart (2005)		60	.62	-.22	.53	.47	-.20	.31	.50
Rhatigan, Shorey & Nathansson (2011)		213	.51	-.36	.56	.33	-.22	.38	.46

META-ANALYSIS OF THE INVESTMENT MODEL

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Riela (2011)		55	.83	-.59	.65	.60	-.20	.24	.78
Riggio & Weiser (2008)	Exclusive dating females	201	.72	-.57	.59	.50	-.31	.29	.71
	Exclusive dating males	99	.82	-.58	.75	.54	-.20	.34	.81
	Married	93	.80	-.40	.56	.67	-.06	.27	.71
	Non-exclusive sample	52	.64	-.55	.79	.34	-.16	.53	.72
Riggio et al. (Study 2; 2013)		120	.74	-.40	.53	.62	-.03	.26	.61
Riggio et al. (Study 3; 2013)		130	.69	-.48	.73	.44	-.14	.45	.70
Rodrigues & Lopes (2013)		228	.71	-.40	.25	.63	-.21	.12	.56
Ruddock (2006)		89	.64	-.64	.22	.51	-.43	.19	.64
Rusbult, Martz & Agnew (Study 1; 1998)		415	.33	-.44	.38	.06	-.35	.29	.28
Rusbult, Martz & Agnew (Study 2; 1998)		313	.65	-.56	.57	.41	-.29	.23	.56
Rusbult, Martz & Agnew (Study 3; 1998)		186	.69	-.58	.63	.43	-.27	.27	.63
Sanderson & Kurdek (1993a)	Dating females	95	.79	-.66	.68	.50	-.23	.24	.72

META-ANALYSIS OF THE INVESTMENT MODEL

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	Dating males	95	.71	-.62	.75	.45	-.09	.50	.75
Sanderson & Kurdek (1993b)	Gay males	61	.80	-.54	.03	.74	-.11	-.04	.65
	Lesbian females	42	.84	-.73	.14	.65	-.28	.06	.76
	Married females	90	.83	-.67	.17	.77	-.08	.16	.72
	Married males	90	.73	-.73	.20	.45	-.44	.03	.66
Savage (2008)		125	.65	-.63	.46	.33	-.42	.22	.57
Schug (2016)		87	.73	-.13	.41	.69	.03	.10	.54
Segal & Fraley (2015)		382	.79	-.64	.60	.55	-.23	.21	.71
Shorey, Tirone, Nathanson, Handsel & Rhatigan (2013)		84	.70	-.14	.34	.67	-.08	.28	.58
Smith (2009)		295	.66	-.51	.45	.49	-.27	.20	.55
Sprecher (1988)		394	.57	-.60	.26	.34	-.41	.10	.47
Tan, Agnew, VanderDrift & Harvey (2015)		143	.47	-.44	.71	.21	-.19	.56	.58

META-ANALYSIS OF THE INVESTMENT MODEL

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Tassy & Winstead (2014)		242	.41	-.24	.55	.19	-.12	.45	.35
Tennant (2013)		475	.69	-.55	.58	.48	-.20	.27	.60
Toplu-Demirtas, Hatipoglu-Sumer & White (2013)		390	.76	-.58	.60	.54	-.26	.29	.74
Truman-Schram, Cann, Calhoun & Vanwallendael (2000)		76	.31	-.37	.46	.20	-.23	.34	.30
Vallade & Dillow (2014) ^a		133	.77	-.51	.65	.54	-.23	.29	.72
Van Lange, Agnew, Harinck & Steemers (1997)		336	.74	-.50	.47	.59	-.28	.13	.64
Vanderdrift, Agnew & Wilson (2014)	Chile sample	354	.62	-.53	.33	.46	-.33	.19	.53
	US sample	353	.65	-.47	.60	.42	-.26	.37	.62
Vanderdrift, Lehmler & Kelly (2012) ^c		246	.63	-.07	.81	.23	-.10	.67	.69
VanYepren (1998)		392	.36	-.45	.18	.18	-.36	.01	.23
Viljoen (2015)		27	.83	.08	.67	.61	.18	.43	.80

META-ANALYSIS OF THE INVESTMENT MODEL

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Vogel & Human-Vogel (2016)		127	.67	-.36	.32	.69	-.05	-.08	.46
Weiss, Weiss & Amorose (2010)		304	.79	-.74	.30	.50	-.33	.17	.69
Whitton & Kuryluk (2012)	Females	358	.65	-.45	.51	.50	-.18	.30	.56
	Males	126	.74	-.52	.71	.42	-.16	.40	.67
Wieselquist (2009)		129	.52	-.49	.50	.38	-.36	.28	.51
Wilson et al. (2004)		205	.49	-.25	.67	.20	-.06	.56	.49
Woodin & O'Leary (2010)		50	.46	-.54	.42	.21	-.39	.30	.43
Young & Furman (2013)		148	.65	-.52	.55	.46	-.27	.28	.59
Zeigler-Hill, Fulton & McLemore (2011)		364	.87	-.30	.78	.67	.04	.29	.80

Note S = satisfaction; A = quality of alternatives; and I = investments

^aThese studies featured data taken at two different times, and the time 1 correlations were chosen

^bThese studies featured couples within a dyad, and so the combined couple level statistics were computed

^cThese studies featured more than one domain of commitment, and so one domain was chosen at random

^dThis column is only filled in for citations that included separate samples from specific demographic groups.

Table 2.

Correlations and Standardized Regression Coefficients Predicting Commitment by Selected Moderators.

Moderator		Average correlation with commitment			Regression Standardized ²				
		S	A	I	S	A	I	R ²	R ² 95% CI
All studies included									
	(<i>k</i> = 202, <i>N</i> = 50,427)	.65	-.43	.53	.47	-.19	.28	.54	[.53, .55]
Target of commitment									
Interpersonal relationships	(<i>k</i> = 156, <i>N</i> = 39,059)	.66	-.46	.54	.47	-.21	.28	.56	[.55, .57]
	Romantic relationship	.67	-.48	.54	.48	-.22	.27	.57	[.56, .58]
	(<i>k</i> = 141, <i>N</i> = 34,148)								
	Friendship	.64	-.14	.61	.41	-.11	.39	.52	[.50, .54]
	(<i>k</i> = 8, <i>N</i> = 3,423)								
	Mentor/Supervisor	.62	-.07	.54	.48	.00	.32	.47	[.42, .52]

	<i>(k = 3, N = 683)</i>								
	Parasocial	.54	-.40	.48	.32	-.23	.29	.41	[.34, .48]
	<i>(k = 3, N = 455)</i>								
Non-interpersonal relationships	<i>(k = 46, N = 11,368)</i>	.63	-.33	.50	.48	-.13	.29	.49	[.48, .50]
	Job	.59	-.25	.38	.49	-.14	.22	.41	[.38, .44]
	<i>(k = 10, N = 3,263)</i>								
	Academic	.59	-.33	.41	.50	-.07	.12	.37	[.31, .43]
	<i>(k = 5, N = 712)</i>								
	Community	.71	-.53	.54	.42	-.32	.31	.68	[.64, .72]
	<i>(k = 4, N = 762)</i>								
	Concept	.62	-.32	.61	.40	-.09	.40	.51	[.46, .56]
	<i>(k = 4, N = 741)</i>								

META-ANALYSIS OF THE INVESTMENT MODEL				51					
Aspects of relationship	Customer	.58	-.54	.67	.44	-.28	.45	.71	[.68, .74]
	(<i>k</i> = 2, <i>N</i> = 788)								
	Environment	.59	-.21	.64	.43	.00	.49	.56	[.50, .62]
	(<i>k</i> = 2, <i>N</i> = 393)								
	Service	.68	-.11	.46	.60	.03	.22	.50	[.47, .53]
	(<i>k</i> = 8, <i>N</i> = 1,876)								
	Sport/Club	.58	-.45	.53	.39	-.22	.38	.53	[.50, .56]
	(<i>k</i> = 7, <i>N</i> = 1,901)								
	Website	.74	-.59	.58	.54	-.13	.37	.69	[.65, .73]
	(<i>k</i> = 3, <i>N</i> = 822)								
	Ongoing	.69	-.50	.54	.50	-.22	.25	.59	[.58, .60]
	(<i>k</i> = 115, <i>N</i> = 28,755)								

Relationship status	Violence	.60	-.45	.50	.44	-.25	.31	.53	[.50, .56]
	(<i>k</i> = 15, <i>N</i> = 2,077)								
	Dissolution	.38	-.27	.50	.19	-.17	.40	.32	[.28, .36]
	(<i>k</i> = 7, <i>N</i> = 1,954)								
	Non-married	.66	-.47	.57	.45	-.22	.32	.58	[.57, .59]
	(<i>k</i> = 37, <i>N</i> = 9,420)								
Sexual Orientation	Married	.61	-.40	.34	.49	-.20	.15	.42	[.41, .43]
	(<i>k</i> = 21, <i>N</i> = 9,881)								
	Heterosexual	.69	-.51	.55	.49	-.22	.26	.59	[.58, .59]
	(<i>k</i> = 67, <i>N</i> = 17,703)								
	Homosexual	.60	-.39	.28	.50	-.22	.12	.42	[.38, .46]

		(k = 8, N = 1,211)							
Gender									
	Females	.66	-.52	.51	.44	-.24	.34	.60	[.59, .61]
		(k = 33, N = 8,412)							
	Males	.68	-.48	.50	.47	-.19	.31	.58	[.56, .60]
		(k = 24, N = 5,746)							
Duration of relationship									
	<18 months	.71	-.53	.61	.47	-.22	.29	.63	[.62, .64]
		(k = 35, N = 7,186)							
	≥ 18 months	.67	-.46	.51	.49	-.22	.25	.56	[.55, .57]
		(k = 65, N = 12,543)							
Age									
	<25 years old	.67	-.48	.58	.45	-.21	.31	.58	[.57, .59]

META-ANALYSIS OF THE INVESTMENT MODEL				54					
Location of sample	(<i>k</i> = 102, <i>N</i> = 22,257)								
	e25 years old	.65	-.39	.50	.49	-.18	.27	.52	[.51, .53]
	(<i>k</i> = 48, <i>N</i> = 10,691)								
	Africa	.76	-.12	.44	.77	.07	.03	.61	[.58, .64]
	(<i>k</i> = 7, <i>N</i> = 1,267)								
	Canada	.56	-.44	.53	.33	-.25	.33	.47	[.40, .54]
	(<i>k</i> = 4, <i>N</i> = 437)								
	Europe	.54	-.40	.53	.33	-.17	.32	.42	[.53, .55]
	(<i>k</i> = 12, <i>N</i> = 3,235)								
	Middle-East	.65	-.32	.42	.55	-.18	.20	.49	[.39, .44]
	(<i>k</i> = 4, <i>N</i> = 1,183)								
	Oceania	.67	-.40	.37	.59	-.23	.14	.54	[.47, .61]

		<i>(k = 2, N = 354)</i>							
	USA	.66	-.44	.54	.47	-.20	.29	.55	[.54, .56]
		<i>(k = 154, N = 39,217)</i>							
Student vs. non-student sample									
	Non-student	.64	-.36	.46	.51	-.16	.24	.50	[.49, .51]
		<i>(k = 51, N = 19,720)</i>							
	Student	.65	-.43	.56	.45	-.19	.31	.55	[.54, .56]
		<i>(k = 74, N = 18,302)</i>							
Publication status									
	Published	.65	-.42	.53	.47	-.20	.29	.54	[.53, .55]
		<i>(k = 136, N = 37,967)</i>							
	Non-published	.67	-.44	.53	.49	-.19	.27	.56	[.55, .57]
		<i>(k = 66, N = 12,460)</i>							

META-ANALYSIS OF THE INVESTMENT MODEL		56								
Inclusion in Le and Agnew (2003)	Included	.68	-.53	.51	.48	-.23	.23	.57	[.55, .59]	
	(<i>k</i> = 46, <i>N</i> = 7,119)									
	Not included	.65	-.39	.54	.47	-.18	.30	.54	[.53, .55]	
	(<i>k</i> = 156, <i>N</i> = 43,388)									

Note S = satisfaction; A = quality of alternatives; and I = investment size

Table 3.

Meta-Analysis Results.

Investment Model Predictor	Moderator	Coefficient	<i>SE</i>	Z-value	<i>P</i>
Satisfaction					
	Type of commitment (Interpersonal)	-.06	.04	-1.36	.18
	Subtype (Romantic)				
	Academic	-.13	.12	-1.04	.30
	Community	.07	.14	.54	.59
	Concept	-.08	.13	-.63	.53
	Customer	-.14	.18	-.78	.43
	Environment	-.13	.19	-.69	.49
	Friendship	-.06	.10	-.59	.55

Job/Business	-.13	.09	-1.53	.13
Mentor/Supervisor	-.08	.15	-.51	.61
Parasocial	-.21	.16	-1.37	.17
Service	.02	.10	.19	.85
Sport	-.14	.10	-1.41	.16
Website	.13	.15	.86	.39
Aspects of relationship (On-going)				
Dissolution	-.46	.10	-4.62	<.001***
Violence	-.15	.07	-2.17	.03*
Marital status (Non-married)	-.08	.06	-1.48	.14
Sexual orientation (Heterosexual)	-.16	.11	-1.43	.15
Gender (Female)	.04	.08	.59	.55
Duration of relationship	.00	.00	-1.45	.15

Age	.00	.00	-1.26	.21
Location of sample (USA)				
Africa	.20	.10	1.91	.06
Canada	-.15	.14	-1.11	.27
Europe	-.18	.08	-2.27	.02*
Middle East	-.02	.13	-.12	.90
Oceania	.03	.19	.15	.88
Current study status (Student)	-.02	.04	-.36	.72
Publication status (Published)	.04	.04	1.14	.25
Inclusion in Le and Agnew (2003) (Included)	-.06	.04	-1.32	.19
Year of publication	.001	.00	.21	.84
Alternatives				
Type of commitment (Interpersonal)	.15	.04	3.55	<.001***

Subtype (Romantic)

Academic	.19	.10	1.85	.06
Community	-.07	.11	-.63	.53
Concept	.19	.11	1.78	.07
Customer	-.08	.15	-.52	.60
Environment	.31	.15	2.05	.04*
Friendship	.39	.08	4.99	<.001***
Job/Business	.27	.07	4.03	<.001***
Mentor/Supervisor	.45	.12	3.70	<.001***
Parasocial	.10	.13	.80	.42
Service	.42	.08	5.48	<.001***
Sport	.04	.08	.49	.63
Website	-.15	.12	-1.24	.22

Aspects of relationship (On-going)					
	Dissolution	.27	.08	3.29	<.01**
	Violence	.05	.06	.90	.37
Marital status (Non-married)					
		.10	.05	1.91	.06
Sexual orientation (Heterosexual)					
		.15	.09	1.65	.10
Gender (Female)					
		.06	.07	.86	.39
Duration of relationship					
		.00	.00	3.50	<.001***
Age					
		.01	.00	2.29	.02*
Location of sample (USA)					
	Africa	.35	.10	3.62	<.001***
	Canada	.01	.13	.07	.94
	Europe	.06	.07	.78	.43
	Middle East	.15	.12	1.18	.24

	Oceania	.06	.18	.34	.74
	Current study status (Student)	.08	.04	1.97	.05*
	Publication status (Published)	-.02	.04	-.40	.69
	Inclusion in Le and Agnew (2003) (Included)	.18	.04	4.30	<.001***
	Year of publication	.01	.00	3.33	<.001***
Investments					
	Type of commitment (Interpersonal)	-.06	.05	-1.34	.18
	Subtype (Romantic)				
	Academic	-.17	.12	-1.36	.17
	Community	.00	.13	.01	.99
	Concept	.11	.13	.80	.42
	Customer	.21	.18	1.17	.24
	Environment	.15	.19	.81	.42

Friendship	.10	.10	1.09	.28
Job/Business	-.20	.08	-2.39	.02*
Mentor/Supervisor	.00	.15	-.01	.99
Parasocial	-.08	.15	-.49	.63
Service	-.10	.09	-1.07	.28
Sport	-.01	.10	-.14	.89
Website	.06	.15	.38	.70
Aspects of relationship (On-going)				
Dissolution	-.06	.11	-.51	.61
Violence	-.06	.08	-.74	.46
Marital status (Non-married)	-.30	.05	-5.64	<.001***
Sexual orientation (Heterosexual)	-.33	.12	-2.80	<.01**
Gender (Female)	-.01	.08	-.12	.90

Duration of relationship	.00	.00	-3.64	<.001***
Age	-.01	.00	-2.88	<.01**
Location of sample (USA)				
Africa	-.13	.11	-1.22	.22
Canada	-.01	.15	-.10	.92
Europe	-.02	.08	-.20	.84
Middle East	-.16	.14	-1.15	.25
Oceania	-.21	.20	-1.06	.29
Current study status (Student)	-.14	.04	-3.24	<.01**
Publication status (Published)	-.01	.04	-.16	.87
Inclusion in Le and Agnew (2003) (Included)	.04	.05	.86	.39
Year of publication	.01	.00	2.32	.02*

Note: *significant at the .05 level; **significant at the .01 level; ***significant at the .001 level

Reference groups for each moderator are listed in round parentheses.