ORIGINAL ARTICLE

The mediating effects of network overlap and network uncertainty in the investment model

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Abstract

The investment model is a widely used theoretical framework in the study of close relationships. The model asserts that commitment is the outcome of relationship satisfaction, perceived investments, and perceived quality of alternatives. The current study sought to expand the scope of the investment model by including social network-based variables (specifically, network overlap and network uncertainty) as potential mediating entities. Results indicated that, when controlling for satisfaction, investment, and quality of alternatives, both network overlap and network uncertainty significantly and negatively relate to commitment. Tests of mediation revealed that both network uncertainty and network overlap partially mediated the associations shared by relationship satisfaction and investment with commitment, such that the positive relationships were significantly weakened. Results are discussed in theoretical and heuristic contexts.

1 | INTRODUCTION

The Investment Model (Rusbult, 1980) argues that relational commitment is influenced by three factors: satisfaction level (i.e., the extent to which a person positively perceives a relationship) quality of alternatives (i.e., the degree to which a person's relational needs can be fulfilled by extradyadic members), and investment size (i.e., the magnitude of resources that a person has attached to a particular relationship). Since its inception, researchers have expanded the model's utility from only studying the romantic couple (e.g., Rhatigan & Axsom, 2006; Rusbult et al., 1998) to considering the role of social network members (i.e., friends, family, and peers) surrounding that romantic relationship (see Agnew et al., 2001; Arriaga). Related, Parks and Adelman (1983) displayed that social network members can determine relational fate with 95% accuracy. In other words, dyadic commitment is highly influenced by a couple's individual and shared social network (Rusbult et al., 2011). Few studies, however, have explored how network structure and relational factors simultaneously alter the investment model's proposed associations. To address this gap in research, the present

study explores how shared network ties (i.e., network overlap) and doubts about network members (i.e., network uncertainty) impact commitment. In the following sections, we present literature articulating these contextual expansions followed by survey results and discussion of these findings.

2 | THE INVESTMENT MODEL

The investment model argues that investment (+), relationship satisfaction (+), and quality of alternatives (−) predict commitment (see Figure 1; Rusbult et al., 1998). Commitment is documented as a major factor in relationship persistence (see Rusbult & Buunk, 1993), and is strongly associated to an abundance of relational factors, such as forgiving behaviors (Finkel et al., 2002), infidelity (Mattingly et al., 2011), and breakup patterns (Le & Agnew, 2003). Thus, the factors that increase and decrease commitment are the crux of the investment model's suppositions. Relational scholars have explored two implications for the link between social networks and commitment: (1) relational perceptions from network members and (2) the couple's motivations to follow those perceptions (Fishbein & Ajzen, 1975). Because of this facet of human networks, the longevity of romantic relationships might be explained by additional network features.
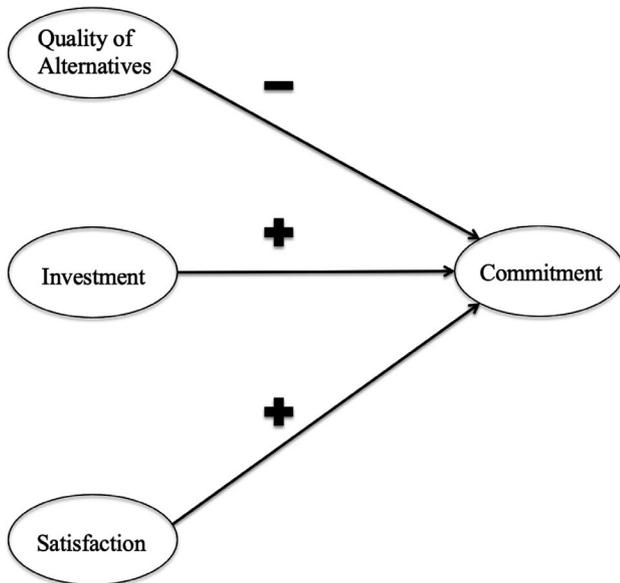
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FIGURE 1 Relationships between variables in the investment model (Rusbult et al., 1998)

3 | THE SOCIAL NETWORK AS AN INDICATOR OF COMMITMENT

Network members play an important role in close relationships. Knobloch and Donovan-Kicken's (2006) reported that network members can both help and hinder relationship development. Past research also documents that social network members intentionally interfere with relationships of which they disapprove (Sprecher, 2011). Moreover, partners' duocentric network (i.e., shared network members) grows steadily over time (Kennedy et al., 2015).

These findings led us to consider two important factors that bind social network perceptions and the investment model: network overlap (the extent to which two people share the same network; Surra, 1988) and network uncertainty (the degree of confidence in which partners believe their networks accept and facilitate their relationship's growth, Stein et al., 2019). Both classical and contemporary publications offer perspective on the role that these variables play in relationship development, discussed below.

First, network overlap appears to be an integral part of relationship development. Agnew and colleagues (2001) illustrated that a couple's shared friendships positively related to commitment levels. Moreover, sharing common network ties and liking a partner's network facilitates intimacy and closeness within the dyad, which ultimately predicts relational success (Sprecher & Felmlee, 2000). Relationship-focused support from network members (shared or otherwise) strongly and positively predicts relational well-being (Blair & Holmberg, 2008). Similarly, perceptions of network helpfulness positively contribute to intimacy levels in couples (Knobloch & Donovan-Kicken, 2006). Lastly, increased online support from Facebook friends is positively linked to both relationship stability and satisfaction in long distance relationships (Billedo et al., 2020).

Together, these works suggest that a couple's overlapping network provide numerous relational benefits.

Conversely, network uncertainty negatively associates with relationship satisfaction (Stein & Davidson, 2019) and can lead to doubts concerning relational communication (Stein, 2021). This extant work compliments existing literature, which exemplifies that network members can serve as substantial sources of relational concern (Parks & Adelman, 1983) that, in turn, negatively affect relational outcomes (Parks et al., 1983; Sprecher, 2011). Combined, the data point to network uncertainty as a negative indicator of relational outcomes.

Parks and colleagues (1983) suggested that network-based variables may both influence lasting relational perceptions and also alter existing relationships between dyadic perceptions. This belief is supported by recent tests of mediation in the investment model. For example, Katz et al. (2006) found that investment moderates the relationship between sexual coercion and commitment. Givertz et al. (2016) explained that interdependence mediates the relationship between commitment and satisfaction. As such there is justification to explore the mediating effects of network variables on the associations proposed within the investment model.

Importantly, most network–dyad interaction research considers the network as a distal predictor of relationship outcomes, through dyadic perceptions. The investment model may be a unique exception to this rule. For example, shared network members are an example of extrinsic investments (Rusbult et al., 1998). Concerns about that investment (i.e., network uncertainty) and the manifestation of that investment (i.e., network overlap) are likely assessed after the investment is made and/or acknowledged. Similarly, the extent to which couples integrate their networks is likely a product of relational progression (see Agnew et al., 2001), indicating that satisfied couples may be more likely to share network members. Related, Felmlee (2001) indicated that dyadic relations (such as that between satisfaction and commitment) are likely altered by network-based perceptions. With these results in mind, it stands to reason that perceptions of both network overlap and uncertainty alter the association between quality of alternatives and commitment, given that network members are often considered a potential quality alternative (Rusbult, 1980). These assumptions inform our hypotheses.

Hypothesis 1a *Network uncertainty will partially mediate the relationship between relationship satisfaction and commitment, such that strength of relationship is weakened.*

Hypothesis 1b *Network uncertainty will partially mediate the relationship between investment and commitment, such that strength of relationship is weakened.*

RQ1: Does network uncertainty at all alter the relationship between quality of alternatives and commitment?

Hypothesis 2a *Network overlap will partially mediate the relationship between relationship satisfaction and commitment, such that strength of relationship is heightened.*

Hypothesis 2b *Network overlap will partially mediate the relationship between investment and commitment, such that strength of relationship is heightened.*

RQ2: Does network overlap at all alter the relationship between quality of alternatives and commitment?

4 | METHODS

4.1 | Participants and procedure

Data were collected from 391 adult students (119 men) enrolled in undergraduate classes at a two large Southern Universities. To participate, individuals must have been in a romantic/sexual relationship at the time of data collection (average length = 23.82 months, $SD = 37.47$). Relationship types included exclusive romantic relationships ($n = 301$) and friends with benefits relationships ($n = 90$).[1] Participants were primarily Caucasian ($n = 261$); however, LatinX ($n = 82$), African American ($n = 53$), mixed race ($n = 22$), Asian ($n = 12$), and "other" ($n = 6$) individuals also reported. Average age was 20.55 years ($SD = 3.54$). Respondents received extra credit for completing a Qualtrics survey.

4.2 | Measures

Several Likert-style questions (ranging from 1 to 7) gauged the variables measured in this study: Rusbult et al.'s measures of commitment ($M = 5.32$, $SD = 1.83$, $\alpha = 0.95$), investment ($M = 4.34$, $SD = 1.60$, $\alpha = 0.86$), quality of alternatives ($M = 3.64$, $SD = 1.63$, $\alpha = 0.87$), and relationship satisfaction ($M = 5.14$, $SD = 1.73$, $\alpha = 0.96$) measured investment model variables. Stein et al. and's (2019) network uncertainty measure ($M = 2.89$, $SD = 1.34$, $\alpha = 0.94$) was used. Finally, Aron and Aron's (1992) measure of inclusiveness gauged network overlap[2] ($M = 3.43$, $SD = 1.82$). All of these measures employed a Likert-scale ranging from one to seven. See Table 1 for means, standard deviations, and alphas for all measured variables used in this study.

5 | RESULTS

Structural equation modeling was used to answer both hypotheses. A single hierarchical model was created using SPSS and AMOS.[3] Multiple fit indices were assessed: the χ^2/df, with values under 3.0

TABLE 1 Means and standard deviations for all measured variables used in this study

Variable	M	SD	α
Perceived investments	4.34	1.60	0.86
Relationship satisfaction	5.14	1.73	0.96
Quality of alternatives	3.64	1.63	0.87
Commitment	5.32	1.83	0.95
Network uncertainty	2.89	1.34	0.94
Network overlap	3.43	1.82	–

indicating excellent fit (Schumacker & Lomax, 2004); the comparative fit index (CFI) with values at or above 0.95 indicating excellent fit (Hu & Bentler, 1999); the Root Mean Square Error of Approximation (RMSEA) with values under 0.06 indicating excellent fit (Browne & Cudek, 1993); and the Standardized Root Mean Residual (SRMR), with values under 0.06 indicated excellent fit (Hu & Bentler, 1999).[1] To test for mediation, Preacher and Hayes' (2008) bootstrapping method was performed.

The measurement model displayed excellent fit, $\chi^2(795) = 1,517.39$; $\chi^2/df = 1.91$; CFI = 0.95; RMSEA = 0.048; SRMR = 0.052, indicating that it was appropriate to proceed with substantive analyses. The hierarchical model displayed excellent fit, $\chi^2(913) = 1,726.95$; $\chi^2/df = 1.89$; CFI = 0.94; RMSEA = 0.048; SRMR = 0.051. The investment model's predictions were confirmed, such that relationship satisfaction ($\beta = 0.36$) and investment ($\beta = 0.36$) were significantly related to commitment, whereas quality of alternatives ($\beta = -0.18$) was negatively associated with commitment. Both network uncertainty ($\beta = -0.24$) and network overlap ($\beta = -0.10$) were significantly and negatively related to commitment. The Change in explained variation (i.e., R^2) after adding network variables into the model was significant ($R^2\Delta = .04$). Figure 2 displays the full model.

Mediation tests revealed, as predicted, both relationship satisfaction ($\beta = -0.03$) and investment ($\beta = -0.10$) were indirectly (and negatively) related to commitment, through network uncertainty, supporting Hypotheses 1a and 1b. Counter to our predictions relationship satisfaction ($\beta = -0.03$) and investment ($\beta = -0.02$) both shared a negative, indirect relationship with commitment through network overlap, disconfirming Hypotheses 2a and 2b. Quality of alternatives shared no indirect relationship through commitment through either mediating variable, Appropriately answering both RQ1 and RQ2.

6 | DISCUSSION

Decades of advancements have provided multiple alterations to the original predictions of the investment model. This study explored how two social network-based variables—network uncertainty (Stein et al., 2019) and network overlap (Aron et al., 1992; Surra, 1988) mediate the investment model's propositions. Previous investment

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[1] A *t*-test revealed that FWBRs and romantic participants significantly differenced on several measured variables. Thus relationship type was controlled for un substantive analyses.

[2] This original measure gauges closeness. Items were altered to illustrate network overlap. To accompany this one-item measure, participants were asked to report the % of overlap they felt they had with partners. These measures correlated at .89 and were thus combined into a single latent variable during substantive analyses.

[3] This study used latent variables, with each exogenous and endogenous variable being constructed from the items that gauged each factor.
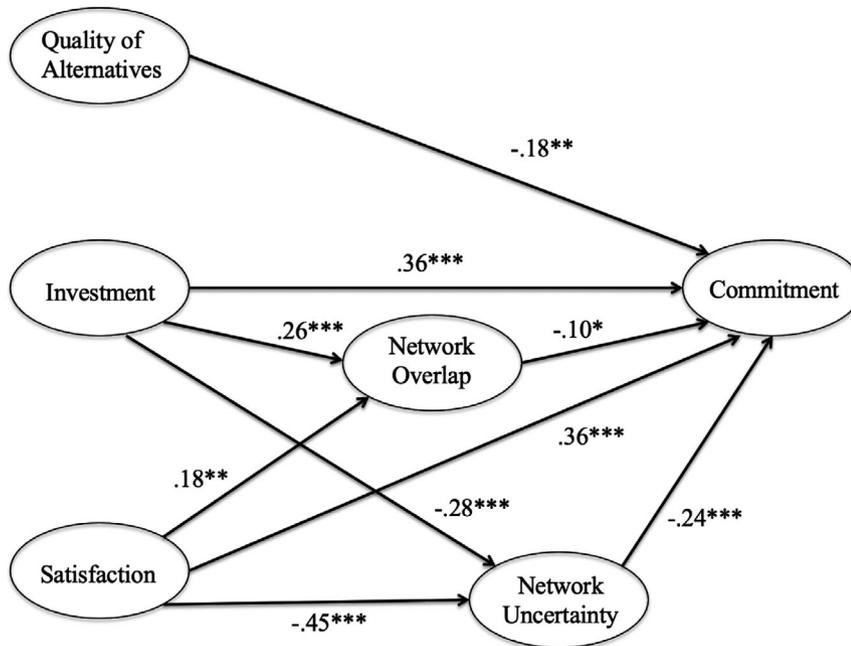
FIGURE 2 Results of hierarchical structural equation modeling. χ^2 (913) = 1,726.95; χ^2/df = 1.89; CFI = 0.94; RMSEA = 0.048; SRMR = 0.051. *$p < .05$; **$p < .01$; ***$p < .001$. Indirect paths are not shown in this model (see Table 2). Relationship length, ethnicity, and relationship type are controlled for, but not shown in this model

TABLE 2 Test for mediation using bootstrapping method. Unstandardized effects for total, direct, and indirect effects

			Total effect		Direct effect		Indirect effect		
IV	DV	MV	Estimate	SE	Estimate	SE	Estimate	SE	95% CI
INV	CM	NU	0.29**	0.06	0.38**	0.07	−0.10**	0.04	[0.49, 0.22]
RS	CM	NU	0.74**	0.16	0.80**	0.16	−0.06*	0.04	[1.26, 0.61]
QA	CM	NU	−0.20**	0.05	−0.21**	0.05	0.01	0.01	[−0.14, −0.31]
INV	CM	NO	0.38**	0.06	0.40**	0.06	0.02*	0.01	[0.51, 0.24]
RS	CM	NO	0.77**	0.15	0.83**	0.16	0.05*	0.03	[1.14, 0.51]
QA	CM	NO	−0.20**	0.05	0.20**	0.05	<0.01	0.01	[−0.12,−0.29]

Note: Results demonstrate partial mediation for network uncertainty and network overlap, such that both variables weaken the positive relationships shared by investment and relationship satisfaction with commitment.

Abbreviations: CM, commitment; INV, investment; NO, network overlap; NU, network uncertainty; QA, quality of alternatives; RS, relationship satisfaction.

*$p < .05$; **$p > .01$.

model studies have explored the mediating effects of satisfaction/investment (Wieselquist, 2009) and commitment (Rusbult & Martz, 1995). Few, if any, have explored the factors that mediate the model's original predictions. Our novel study displays that there are factors that modulate the strength of these relationships.

The most interesting finding in this study was the negative relationship between network overlap and commitment. At first glance, this counters previous findings by Agnew et al. (2001); however, collection method may explain these results. In their study, participants were asked to report on the percentage of "joint friends" that they had with their partner. The present study asked about the percentage of network overlap that participants shared with their partners. In many cases, a substantial portion of network overlap in romantic relationships exists because of relational obligation (Sprecher, 2011). People may have duocentric network ties to unfriendly and unsupportive individuals.

The above implications help to explain the mediation results found in this investigation. Both network uncertainty and network overlap shared a negative and direct relationship with commitment. These effects mediated the indirect, negative associations that both relationship satisfaction and investment shared with commitment. If people dislike large portions of their shared networks, it may be that both uncertainty and overlap within that network harm the associations posed by the investment model. Parks and colleagues (1983) first alluded to this possibility by demonstrating that support from and attraction to a partner's network are essential for romantic involvement. Applied to investment model, negative perceptions of network members (e.g., uncertainty), or the presence of unwanted members, are vessels through which investments and satisfaction move through. Our findings highlight the intricate factors, both direct and indirect, that predict commitment in close relationships.

This study echoes ongoing calls for the inclusion of social network variables as central to relational theory development and expansion (see Stein et al., 2019). Foundational work has demonstrated the need to consider social networks as active role-players in relational development (Parks et al., 1983; Sprecher, 2011) and dissolution (Parks et al., 1983; Sprecher, 2011). Our study adds an additional theoretical lens to this existing work. These results call for specific theories of dyad–network accommodation. Such theories would explore and predict the ways in which a couple interact with their shared network(s) to alter relationship perceptions and progression.

7 | LIMITATIONS AND CONCLUSION

This study is bound by two main limitations. First, the study is cross-sectional in nature. Time-ordered effects are imperative in the construction of causal claims and theoretical propositions. Therefore, future studies should consider assessing these hypotheses and research questions using lagged data collection. Second, the sample was heterogenous on the basis of age, sexual orientation, and ethnicity. A more heterogeneous sample would allow more confidence in the assessment of our findings. For example, the university population is likely one in which relational investments and commitment are both low, compared with the general population. As such, more heterogenous samples will be needed to further bolster our findings.

Overall, these findings lay out an important addendum to an already useful model of relationship interaction. It is our hope that these findings are an important step in the ongoing search for extradyadic factors that alter relationship development. Ultimately, these results can be used to advance ongoing relationship theories as well as forge new theories of dyad–network interaction.

PEER REVIEW

The peer review history for this article is available at https://publons.com/publon/10.1002/jts5.109.

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