Personal Relationships, **15** (2008), 339–357. Printed in the United States of America

A longitudinal test of the relational turbulence model of romantic relationship development

DENISE HAUNANI SOLOMON[a] AND JENNIFER A. THEISS[b]
[a]*Pennsylvania State University and* [b]*Rutgers University*

Abstract

A longitudinal study evaluated associations between intimacy and relational uncertainty and characteristics of interdependence within nonmarital romantic relationships. Three hundred and fifteen college students in the United States completed a Web-based survey about their relationship weekly for 6 weeks. Results indicated nonlinear associations between intimacy and relational uncertainty and perceptions of a partner's interference ($p < .001$) that were inconsistent with hypotheses. Intimacy was positively associated with a partner's influence in and facilitation of activities ($p < .001$). An interaction between intimacy and a partner's influence predicted a partner's interference, such that a partner's influence was more positively associated with interference at low, compared to high, intimacy ($p < .05$). The implications of these findings for rethinking the relational turbulence model are discussed.

Personal relationship scholars have long been interested in the dynamics that characterize the progression from a nonintimate association to a committed romantic partnership. Some research has focused on the trajectory of a developing romantic relationship (e.g., Baxter & Bullis, 1986; Huston, Surra, Fitzgerald, & Cate, 1981). Other theories have examined the processes that move partners toward increased intimacy (e.g., Altman & Taylor, 1973; Berger & Calabrese, 1975; Rusbult & Buunk, 1993). Prior research has also highlighted the day-to-day activities that maintain and manage ongoing relationships (e.g., Baxter & Montgomery, 1996; Dainton & Aylor, 2002). These research traditions have revealed a great deal about the development of romantic associations, but questions about the link between developing characteristics of relationships and specific episodes or events remain.

One theory that addresses the association between global qualities of relationships and specific experiences is the relational turbulence model (Solomon & Knobloch, 2001, 2004).[1] This theory claims that the transition from casual to serious involvement in romantic relationships increases relational uncertainty and goal interference in ways that polarize relationship events. In support of the perspective, studies have shown that uncertainty in dating relationships corresponds with the intensity of emotional reactions to unexpected events or jealousy threats (Afifi & Reichert, 1996; Knobloch, 2005; Knobloch,

Denise Haunani Solomon, Department of Communication Arts and Sciences, Pennsylvania State University; Jennifer A. Theiss, Department of Communication, Rutgers University.

This research is a portion of the second author's dissertation conducted under the direction of the first author at the University of Wisconsin–Madison.

Correspondence should be addressed to Denise Haunani Solomon, Department of Communication Arts and Sciences, Pennsylvania State University, 234 Sparks Building, University Park, PA 16802, e-mail: dhs12@psu.edu

1. One theory that does address the link between global relationship qualities and specific experiences is Bradbury and Fincham's (1992) contextual model of marriage. That perspective emphasizes how evaluations of satisfaction in the relationship shape people's cognitions and behaviors with respect to particular episodes of conflict. The contextual model is similar to the relational turbulence model in that it links relationship characteristics to experiences of day-to-day events; however, it is focused on relational satisfaction as a causal force rather than mechanisms more closely tied to the development of romantic relationships.

Solomon, & Cruz, 2001; Planalp & Honeycutt, 1985), more negative appraisals of a partner's transgression (Solomon & Knobloch, 2004) and the actions of social network members (Knobloch & Donovan-Kicken, 2006), and a greater tendency to avoid talking about certain topics (Knobloch & Carpenter-Theune, 2004). Likewise, interference from a partner corresponds with perceptions of irritations as more severe and relationally threatening (Solomon & Knobloch, 2004) and a greater tendency to see social network members as disrupting a romantic relationship (Knobloch & Donovan-Kicken, 2006). In contrast, the theory's predictions about fluctuations in relational uncertainty and experiences of interference as a function of intimacy have received mixed support at best (Knobloch & Solomon, 2002b, 2004; Solomon & Knobloch, 2001, 2004).

Previous tests of the associations between intimacy and perceptions of relational uncertainty and interference from a partner are limited by a focus on between-person differences in these qualities. Understanding the consequences of within-person changes in perceived intimacy would shed light on whether relationship turmoil is a byproduct of fluctuations within a relationship, rather than a function of the intimacy level in a relationship at a specific point in time. Clarification of this point would provide insight into the mechanisms underlying reactions to specific relationship experiences as well as identify relationship circumstances under which partners can expect more threats to their bond. Thus, this article replicates previous tests of the associations between intimacy and relational uncertainty and interference from a partner using a repeated measures design to examine the consequences of within-person variance in perceptions of intimacy after controlling for between-person differences. As a foundation for the investigation, we review the theory's predictions about how relational uncertainty and interference from a partner map onto intimacy within nonmarital romantic relationships.

The developmental course of relational uncertainty

Relational uncertainty refers to people's confidence in their perceptions of relationship involvement. This definition includes the questions that people have about their own involvement in a given relationship, reservations about a partner's involvement in the relationship, and doubts about the relationship itself (Knobloch & Solomon, 1999, 2002a). Studies using structural equation modeling suggest that partner uncertainty can increase self uncertainty and both self and partner uncertainty contribute to relationship uncertainty (e.g., Knobloch & Solomon, 1999).

Solomon and Knobloch (2001) argued that relational uncertainty might increase during the transition from a casual to a serious dating relationship. Within nonintimate associations, partners can rely on shared cultural norms (Miller & Steinberg, 1975) and detailed cognitive schemas (Clark, Shaver, & Abrahams, 1999; Honeycutt, Cantrill, Kelly, & Lambkin, 1998) to guide behavior. Consequently, relational uncertainty may be limited. Escalations in intimacy, however, raise questions about the nature of involvement in a relationship because neither the presence nor the absence of a commitment is explicit (Baxter, 1987; Baxter & Wilmot, 1985). Relational uncertainty should subside as partners establish mutual commitments to their relationships and their doubts are replaced by a clearer understanding of the association (Baxter, 1987; Knobloch & Solomon, 2002b). Thus, Solomon and Knobloch (2001, 2004) predicted a curvilinear trajectory for relational uncertainty across levels of intimacy, such that a shift from a casual dating to a committed relationship corresponds with increased relational uncertainty.

In a first test of this reasoning, Solomon and Knobloch (2001) found that relationship uncertainty was negatively correlated with intimacy and the curvilinear association was nonsignificant. Solomon and Knobloch (2001) speculated that high levels of uncertainty about a partner's qualities, in general, during relationship initiation may inflate global assessments of relational uncertainty by people in less intimate associations. To disentangle evaluations of relational uncertainty from other global perceptions, a subsequent study hypothesized that relational events evoke more episodic relational uncertainty at

moderate levels of intimacy (Knobloch & Solomon, 2002b). Although that study documented a curvilinear association between the intimacy and the magnitude of relational uncertainty elicited by specific episodes, the association between intimacy and global relational uncertainty consistently takes the form of a negative linear trend (e.g., Knobloch & Carpenter-Theune, 2004; Solomon & Knobloch, 2004).

The developmental course of interference from a partner

Interdependence is the coordination of mutually beneficial systems of behavior between partners, which increases as relationships become more intimate (Perlman & Fehr, 1987). The process of establishing interdependence commences when individuals begin to allow their partner to influence everyday activities; in other words, the completion of individual routines depends upon the actions of the partner (Kelley et al., 1983). Knobloch and Solomon (2004) identified three aspects of interdependence that emerge from Berscheid's (1983, 1990) emotions-in-relationships model: (a) *influence from a partner* refers to how much a partner affects an individual's everyday experiences, (b) *interference from a partner* refers to the extent to which a partner disrupts a person's everyday goals, and (c) *facilitation from a partner* refers to how much a partner helps an individual perform activities and accomplish goals.

Solomon and Knobloch (2001, 2004) suggested that interference from a partner peaks at moderate levels of intimacy within developing romantic relationships because a partner's influence in everyday routines precedes the formation of facilitative patterns. As a relationship commences, partners begin involving each other in their activities; for example, they might share a ride to work or plan to eat meals together. Initially, these attempts at interdependence go awry—carpooling makes one partner late to work or the partners disagree about what to eat. Eventually, partners learn to coordinate their behaviors in ways that enhance, rather than disrupt, their routines. This reasoning prompted Solomon and Knobloch (2001) to advance three hypotheses concerning the associations between aspects of developing interdependence and intimacy. In general, they predicted the experience of interference from partners follows a curvilinear trajectory, such that interference is most prevalent at moderate levels of intimacy. Because people gradually incorporate a partner into more of their daily routines, a partner's influence in everyday activities is likely to increase with the intimacy of the association. When intimacy is low, a partner's involvement is more likely to produce goal interference because partners have yet to learn how to facilitate each other's actions; when intimacy is high, a partner is more likely to behave in ways that are helpful rather than disruptive.

Notably, the patterns the relational turbulence model specifies depart somewhat from the results of empirical investigations. A study that collected retrospective accounts from newlyweds reflecting on their courtship showed that disagreements and arguments tended to increase as couples progressed from casual to serious dating, and the frequency of conflict remained consistent across more intimate stages of relationship development (Huston et al., 1981). Similarly, Knobloch and Solomon (2004) observed a significant nonlinear association between intimacy and interference, such that interference increased from low to moderate levels of intimacy and then tapered off. Other studies have documented either small (Knobloch & Solomon, 2004) or nonsignificant (Solomon & Knobloch, 2001, 2004) associations between these variables. In addition, although two studies have found that a partner's influence in everyday activities is more positively associated with a partner's interference at low levels of intimacy than at high levels of intimacy (Knobloch & Solomon, 2004; Solomon & Knobloch, 2001), Knobloch and Solomon (2004) did not find a partner's influence to be more positively associated with a partner's facilitation at high levels of intimacy.

Hypotheses

Previous tests of the relational turbulence model have employed cross-sectional research

designs; therefore, they address the association between perceived intimacy within a relationship and perceptions of relational uncertainty and elements of interdependence. What these studies do not address, however, is whether a change within a relationship is at the root of these patterns. Do the negative linear associations between relational uncertainty and intimacy reflect the demise of relationships in which uncertainty persists or do intimacy and uncertainty decline in concert? Likewise, might the asymptotic association linking intimacy and perceived goal interference suggest something unique about partnerships that achieve intimacy or does it reflect changes that occur as partners become interdependent? Several influential theories assume that these patterns reflect developmental changes (e.g., Altman & Taylor, 1973; Berger & Calabrese, 1975; Braiker & Kelley, 1979; Honeycutt, Cantrill, & Greene, 1989); however, investigations of the within-person trajectories of perceived intimacy, relational uncertainty, and elements of interdependence have relied primarily on retrospective recall methods (e.g., Baxter & Bullis, 1986; Huston et al., 1981; Surra, 1985). In this study, we used a longitudinal research design to replicate tests of hypotheses deduced from the relational turbulence model:

H1: *Intimacy is curvilinearly associated with self, partner, and relationship uncertainty, such that they peak at moderate levels of intimacy in nonmarital romantic associations.*

H2a: *Intimacy is curvilinearly associated with a partner's interference, such that interference peaks at moderate levels of intimacy in nonmarital romantic associations.*

H2b: *Intimacy is positively associated with a partner's influence.*

H2c: *Intimacy interacts with a partner's influence to predict interference and facilitation from partners, such that a partner's influence is more positively associated with a partner's interference when intimacy is low rather than high, and a partner's influence is more positively associated with a partner's facilitation when intimacy is high rather than low.*

Method

Research design

We conducted the study at the University of Wisconsin, a research university in the Midwestern United States that enrolls more than 30,000 undergraduates, 93% of whom are in the top 25% of their high school graduating class. We gave students in communication classes a small amount of extra credit for completing Web-based surveys about a current romantic association once per week for 6 weeks.[2] Several considerations influenced the research design. On one hand, we were concerned that a lengthy interval between assessments would miss important fluctuations in perceptions of relationships. At the same time, we believed that asking people to complete more frequent assessments in this time period would be burdensome to participants. Assessing perceptions of relationships six times, once per week, reflects a balancing of these two issues.

Previous longitudinal and retrospective studies of relationship development informed our selection of a 6-week time frame. VanLear's (1987) study of self-disclosure between acquaintances documented significant changes in private or personal disclosures and patterns of reciprocity during a 6-week period. In addition, retrospective accounts of turning points in romantic relationships, plotted in monthly intervals from the beginning of a relationship to the point at which partners are 100% committed, reveal that romantic couples can experience events that substantially increase or decrease intimacy and commitment in a single 1-month

2. The data from this study also contributed to Theiss and Solomon (2006a, 2006b). Those studies examined the influence of intimacy, relational uncertainty, and interference from partners on appraisals of relational irritations, experiences of jealousy, and communicative indirectness.

interval (e.g., Baxter & Bullis, 1986; Huston et al., 1981; Surra & Hughes, 1997). These findings suggested to us that a 6-week period would capture fluctuations in intimacy. From a logistical standpoint, the time frame we selected was responsive to the academic schedule of the study participants. We conducted this study during the spring semester in the United States, which includes spring break—an event marked by vacations that can be critical events in romantic relationships. Consequently, we implemented the study during the 6 weeks following spring break to avoid sample variance arising from the spring break phenomenon.

Sample

We recruited individuals who had a romantic interest in another person with whom they had previously interacted and with whom they anticipated future interaction.[3] As a result, our sample included people who perceived a romantic connection with an acquaintance or friend as well as established dating relationships. Our use of a convenience sample is consistent with the research this study replicates, and it reflects the lack of an appropriate sampling frame. Recruiting college students also replicates previous studies of the relational turbulence model. Moreover, college-aged students are in a developmental phase of life (i.e., emerging adulthood) during which people experiment with romantic relationships and identify ways of relating to others that they will adopt as adults (Arnett, 2000). Hence, romantic associations during this stage of the lifespan merit study.

In total, 315 undergraduate students (88 male, 225 female, and 2 unreported) completed the study. Students at the University of Wisconsin are predominantly Caucasian (88%); although 10% of the student body comes from outside the United States, most students (57%) are residents of the state of Wisconsin. Participants in this study ranged in age from 18 to 30 years with a mean age of 20.72. The majority of the sample was White or Caucasian (89.8%), with an additional 7.3% Asian, 2.2% Hispanic, 0.6% Native American, 0.6% Black, and 0.3% other. Of the relationship partners, 221 were male and 89 were female (5 unreported). Partners ranged in age from 17 to 43 years with a mean of 22.79 years. When asked to characterize the status of their relationship during the first week of the study, 5.1% reported that they were acquaintances, 21.7% were friends, 22.7% were casually dating, 46.6% were seriously dating, 2.6% were engaged, and 1.3% were married. We excluded engaged and married individuals from the analyses to be consistent with prior research (e.g., Solomon & Knobloch, 2004). The remaining respondents reported on relationships that ranged from 0 to 317 weeks long (M = 60.81, SD = 66.94, Mdn = 158.5).

Procedures

We administered weekly questionnaires through an Internet Web site. We e-mailed participants a username and password to access the first survey. During subsequent weeks, the participants received a new password to access the corresponding weekly survey. Instructions to participants asked them to complete their questionnaires at roughly the same time each week. Across all weeks of the study, participants submitted 68.7% of the questionnaires within 5–9 days of the previous week's submission, 16.6% within 1–4 days of the previous submission, and 14.7% within 10–12 days of the previous submission.

During the 1st week, participants provided demographic information and they completed closed-ended scales to report their perceptions of intimacy, relational uncertainty, and the extent to which a partner influenced, interfered with, and facilitated everyday activities at that point in their relationships. Questionnaires during subsequent weeks began by asking participants to provide an open-ended account of relationship events during the past 7 days and then presented the same measures of relationship characteristics that we included in the baseline questionnaire. The instructions

3. We gave individuals the option to participate in either a separate study or a nonresearch alternative if they did not have a romantic interest in another person.

directed respondents to answer questions during Weeks 2 through 6 based on events and characteristics of their relationship in the past week. In this way, the first questionnaire provides a baseline of relationship conditions at the start of the study, and each weekly questionnaire is focused on experiences since respondents completed the previous questionnaire.

Measures

We used a variety of close-ended Likert type scales to operationalize variables in the study. We conducted confirmatory factor analyses (CFAs) on all the multi-item scales to ensure that they met the criteria of face validity, internal consistency, and parallelism (Hunter & Gerbing, 1982). We used the chi-square test, the comparative fit index (CFI), and the root mean square error of approximation (RMSEA) to determine the goodness of fit of the CFA models. The criteria for model fit were a chi-square test with $p > .05$, CFI $> .90$, and RMSEA $< .10$ (per Browne & Cudeck, 1993; Kline, 1998). We created composite scores by averaging responses to the individual items (see the Appendix). Table 1 provides descriptive statistics for each measure in each week of the study.

Intimacy. Consistent with Solomon and Knobloch's (2004) previous test of the relational turbulence model, we operationalized intimacy through a composite measure that incorporated indicators of intimacy associated with developmental patterns. One component of the composite measure was Rubin's (1970) Love Scale, which uses a nine-item Likert scale (1 = *not at all true*, 9 = *definitely true*) to assess three important components of *love*: feelings of affiliative need, willingness to help, and exclusiveness toward a partner (CFI = .99, RMSEA = .04, $\alpha = .93$). We measured *commitment* to continuing the association by four items rated on a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*; CFI = .99, RMSEA = .08, $\alpha = .92$); this measure has been used in a number of previous studies including Solomon and Knobloch (2001). The final aspect of the composite intimacy variable asked participants to indicate their

Table 1. *Weekly descriptive statistics for all variables*

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Sample size (N)	295	279	278	284	277	282
Intimacy						
Love	5.80 (1.77)	5.41 (1.54)	5.17 (1.71)	5.23 (1.84)	5.14 (1.92)	5.10 (2.01)
Commitment	4.66 (1.26)	4.65 (1.26)	4.50 (1.39)	4.41 (1.50)	4.31 (1.56)	4.35 (1.60)
Chance of lifelong commitment	45.58 (31.56)	44.45 (31.97)	44.14 (32.04)	44.20 (32.01)	41.92 (33.36)	41.95 (33.65)
Self uncertainty	2.34 (1.06)	2.36 (1.10)	2.37 (1.18)	2.40 (1.24)	2.40 (1.26)	2.34 (1.30)
Partner uncertainty	2.69 (1.34)	2.70 (1.39)	2.65 (1.37)	2.59 (1.37)	2.70 (1.48)	2.57 (1.44)
Relationship uncertainty	2.58 (1.16)	2.56 (1.17)	2.50 (1.18)	2.47 (1.25)	2.54 (1.25)	2.47 (1.30)
Influence from partners	3.12 (1.12)	2.99 (1.20)	2.96 (1.23)	2.92 (1.26)	2.97 (1.24)	2.80 (1.34)
Facilitation from partners	3.21 (1.24)	3.17 (1.28)	3.12 (1.31)	3.16 (1.40)	3.06 (1.38)	3.00 (1.44)
Interference from partners	2.60 (1.07)	2.61 (1.21)	2.57 (1.24)	2.51 (1.24)	2.54 (1.21)	2.41 (1.26)

Note. Cell entries are means. Values in parentheses are standard deviations.

perception of the *likelihood of marriage* (or a similar serious commitment) by indicating a response from 0% to 100% on a scale that provided 5% increments (cf. Lloyd, Cate, & Henton, 1984). Bivariate correlations indicated sizable overlap between love and commitment ($r = .79, p < .001$), between love and likelihood of marriage or serious commitment ($r = .72, p < .001$), and between commitment and likelihood of marriage or serious commitment ($r = .71, p < .001$). We also conducted a principle axis exploratory factor analysis with varimax rotation to determine if these three variables formed a single unidimensional factor. Results indicated that all three variables loaded onto a single factor explaining 83.2% of the variance. Thus, we converted the measures of love, commitment, and likelihood of marriage to z scores, and we computed their average (range = −2.28 to 1.48, $SD = 0.89$, $\alpha = .90$).

Relational uncertainty. To assess relational uncertainty, the survey presented respondents with a stem that read "How certain are you about ... ," followed by a series of statements (per Knobloch & Solomon, 1999). Participants used a 6-point Likert scale (1 = *completely or almost completely uncertain*, 6 = *completely or almost completely certain*) to rate their certainty with respect to each statement, and we reverse scored their responses. We identified unidimensional subscales for *self uncertainty* (CFI = .98, RMSEA = .05, $\alpha = .92$), *partner uncertainty* (CFI = 1.0, RMSEA = .03, $\alpha = .95$), and *relationship uncertainty* (CFI = .99, RMSEA = .03, $\alpha = .94$).

Elements of interdependence. Following Knobloch and Solomon (2004), we asked respondents to indicate on a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*) the degree to which their partner influenced, interfered with, or facilitated everyday activities. We averaged items within subscales to yield measures for *partner's influence* (CFI = .97, RMSEA = .05, $\alpha = .83$), *partner's interference* (CFI = 1.0, RMSEA = .00, $\alpha = .81$), and *partner's facilitation* (CFI = 1.0, RMSEA = .00, $\alpha = .89$).

Time. We quantified the passage of time during the study in weeks. We represented Week 0 as the baseline week of the study and we quantified the remaining Weeks 1 through 5, for a total of 6 weeks.

Results

Preliminary analyses

Using data from the baseline questionnaire, we conducted independent sample t tests to evaluate sex differences in our measures. The results revealed no significant differences between males and females on any of the variables in this study, so we conducted all analyses on the combined sample of males and females. We also assessed the bivariate correlations among all the variables as measured in the baseline questionnaire (Table 2). Results indicated that intimacy was negatively associated with all three facets of relational uncertainty and positively associated with all three elements of interdependence. In addition,

Table 2. *Correlations among relationship characteristics measured in the baseline survey*

Variable	1	2	3	4	5	6	7
Intimacy	—						
Self uncertainty	−.69***	—					
Partner uncertainty	−.63***	.65***	—				
Relationship uncertainty	−.70***	.75***	.86***	—			
Partner's interference	.24***	−.15*	−.25***	−.20***	—		
Partner's influence	.26***	−.46***	−.50***	−.50***	.65***	—	
Partner's facilitation	.67***	−.46***	−.54***	−.53***	.65***	.73***	—

*$p < .05$. ***$p < .001$.

self, partner, and relationship uncertainty were all positively correlated. We also observed positive correlations among a partner's influence, interference, and facilitation. Finally, the three facets of relational uncertainty were all negatively associated with partner's influence, interference, and facilitation.

We also assessed the trajectory of intimacy over the course of the study. We defined a model in which intimacy was predicted by the weeks of the study, controlling for relationship status at the start of the study. We included the interaction between time, measured by weeks, and the respondent's baseline relationship status to determine if the growth rate of intimacy varied for individuals at different levels of initial relational involvement. Although the within-person variance was small, results indicated that intimacy increased slightly over the course of the study ($\gamma = .06$, $p < .01$). Moreover, there was a significant interaction between time and baseline relationship status, such that individuals at high levels of relationship status (i.e., seriously dating or engaged) showed little change in intimacy, but participants who started the study at low levels of relational involvement experienced more substantial increases in relational intimacy over the course of the study. Notably, these analyses aggregate data from individuals, and there is no reason to expect people reporting on different relationships to experience similar changes in intimacy from week to week. Figure 1, which plots weekly intimacy scores for six randomly selected respondents, illustrates how some respondents reported fairly stable levels of intimacy, whereas other participants experienced more week-to-week fluctuations in intimacy.

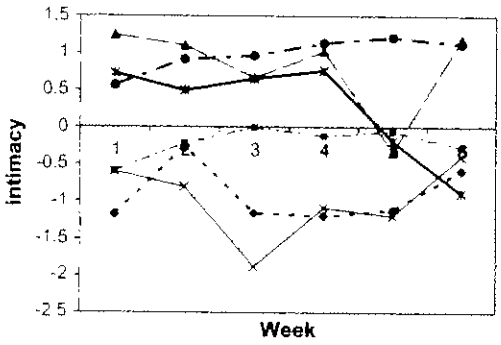

Figure 1. Weekly intimacy score for 6 participants.

Finally, we calculated the intraclass correlation (ρ) for each of the dependent variables. The ρ calculates the proportion of total variation in the outcome variable that is attributed to between-person, as opposed to within-person, variance. An intraclass correlation that is close to 0 indicates that the variability in the dependent variable is attributable mostly to within-person variance, and a correlation that is close to 1 suggests that most of the variance is between persons (Kreft & De Leeuw, 2002; Snijders & Bosker, 2003). The majority of variability in the dependent variables in this study was attributable to between-persons variation (intimacy $\rho = .88$, self uncertainty $\rho = .64$, partner uncertainty $\rho = .69$, relationship uncertainty $\rho = .71$, influence from partners $\rho = .66$, interference from partners $\rho = .61$, facilitation from partners $\rho = .71$).

Substantive analyses

The longitudinal analyses focused on how within-person changes in intimacy from week to week corresponded with changes in relational uncertainty and elements of interdependence. We analyzed the data using hierarchical linear modeling 6.0 (HLM) software, which is designed to accommodate nonindependent or nested data (Bryk & Raudenbush, 1992).[4] We treated the multiple observations across weeks as nested within the individual; we represented relationship change through a two-level model using full maximum likelihood estimation with time-varying, within-person predictors at Level 1 and stable person or relationship characteristics as between-person predictors

4. One advantage of using HLM, as opposed to other types of repeated measures analysis, is that this treatment of multiple observations as nested counteracts difficulties that often arise with unbalanced designs. For example, whereas standard repeated measures analysis requires complete data from all participants collected at the same point in time, HLM analyses can be used in unbalanced designs when the number and spacing of time points vary across cases

at Level 2. Thus, the HLM models provided insight into the structure and predictors of individual change (Raudenbush & Bryk, 2002). In the following models, the subscript i refers to the time of measurement (Level 1) and the subscript j refers to the respondent (Level 2). One consideration in HLM is whether to include predictors in the model as uncentered variables, group mean–centered variables (where the observed variable is centered around the individual's mean across the 6 weeks of the study), or grand mean-centered variables (where the observed variable is centered around the population mean for the variable). In the following models, we indicated centered variables in parentheses with the group mean or the grand mean subtracted from the observed variable. We denoted a group mean as lowercase and italicized and a grand mean as uppercase and italicized.

To test H1 and H2, we evaluated the three facets of relational uncertainty and the three facets of interdependence as dependent variables in separate models. The variables included in the Level 1 equation in this model are repeated measures and represent within-person variation. To control for variance due to the passage of time, we included time as a Level 1 covariate. Evaluating the role of intimacy required two variables: We included the composite intimacy measure to test the linear association between intimacy and the dependent variables, and we squared the linear intimacy variable to produce the quadratic term needed to assess the predicted curve. The variables included in the Level 2 equation in this model are individual level variables because they reflect a single measurement or composite of an individual characteristic and they represent between-person variation. We entered baseline relationship status as a Level 2 covariate on the intercept of the model to control for between-person differences in relationship status. We also included the within-person mean for intimacy as a covariate on the intercept, which is a strategy that covaries the between-person effect for intimacy. We also entered relationship status on the slope for linear intimacy to test for a possible interaction between intimacy and relationship status. In this model, time was a group mean-centered variable, relationship status was a grand mean-centered variable, and all other variables were uncentered. We estimated the intercept as a random effect and the slopes as fixed effects. The following equations comprised the model that tested the association between intimacy and relational uncertainty (H1), a partner's interference (H2a), and a partner's influence (H2b).

Model 1. Predicting facets of relational uncertainty and interdependence from linear and curvilinear intimacy

Level 1 equation

$$Y_{ij} = \pi_{0j} + \pi_{1j}(\text{time}_{ij} - \text{time}_{.j}) + \pi_{2j}(\text{intimacy}_{ij}) + \pi_{3j}(\text{intimacy}^2_{ij}) + r_{ij}$$

Level 2 equation

$$\pi_{0j} = \beta_{00} + \beta_{01}(\text{relationship status}_{ij} - \text{RELATIONSHIP STATUS}_{..}) + \beta_{02}(\text{intimacy}_{.j}) + u_{0j}$$

$$\pi_{1j} = \beta_{10}$$

$$\pi_{2j} = \beta_{20} + \beta_{21}(\text{relationship status}_{ij} - \text{RELATIONSHIP STATUS}_{..})$$

$$\pi_{3j} = \beta_{30}.$$

In the Level 1 model, π_{0j} represents the intercept for the model, π_{2j} (intimacy$_{ij}$) represents the linear effect for intimacy, π_{3j} (intimacy$^2_{ij}$) represents the curvilinear effect for intimacy, and r_{ij} represents the random effect. In the Level 2 equation for the intercept, β_{01} (relationship status$_{ij}$ − RELATIONSHIP STATUS..) represents between-person differences in the intercept based on relationship status, and β_{02} (intimacy$_{.j}$) controls for the within-person mean for intimacy to assess between-person effects on the intercept. In the Level 2 equation for the linear intimacy effect (π_{2j}), β_{21} (relationship status$_{ij}$ − RELATIONSHIP STATUS..) represents the change in slope attributable to between-person differences in relationship status.

In the model testing H2c, again we included group mean-centered time as a Level 1 covariate. Level 1 predictors included the linear intimacy term and the quadratic intimacy term.

a partner's influence, and a Level 1 variable computed as the product of intimacy and a partner's influence to evaluate the interaction between these variables. We entered the interaction between intimacy and a partner's influence as a Level 1 variable because it is a product of two Level 1 variables. In the Level 2 equation, again we included baseline relationship status and the within-person mean for intimacy as covariates on the intercept as well as baseline relationship status as a covariate on the slope for the linear intimacy term. We entered a partner's influence as a group mean-centered variable and the interaction term as an uncentered variable. We estimated the intercept as a random effect and the slopes as fixed effects. The following equations comprise the model testing H2c.

Model 2. Predicting facets of relational uncertainty and interdependence from the interaction between intimacy and a partner's influence

Level 1 equation

$$Y_{ij} = \pi_{0j} + \pi_{1j}(\text{time}_{ij} - \text{time}_{.j}) + \pi_{2j}(\text{intimacy}_{ij}) + \pi_{3j}(\text{intimacy}_{ij}^2) + \pi_{4j}(\text{partner influence}_{ij} + \text{partner influence}_{.j}) + \pi_{5j}(\text{Intimacy}_{ij} \times \text{Influence From Partners}_{ij}) + r_{ij}$$

Level 2 equation

$$\pi_{0j} = \beta_{00} + \beta_{01}(\text{relationship status}_{ij} - \text{RELATIONSHIP STATUS}_{..}) + \beta_{02}(\text{intimacy}_{.j}) + u_{0j}$$

$$\pi_{1j} = \beta_{10}$$

$$\pi_{2j} = \beta_{20} + \beta_{21}(\text{relationship status}_{ij} - \text{RELATIONSHIP STATUS}_{..})$$

$$\pi_{3j} = \beta_{30}$$

$$\pi_{4j} = \beta_{40}$$

$$\pi_{5j} = \beta_{50}.$$

The components in this model can be interpreted in the same way that we interpreted the identical variables in Model 1. In addition, in the Level 1 equation for Model 2, π_{4j} (partner influence$_{ij}$ + partner influence$_{.j}$) represents the within-person slope for a partner's influence, and π_{5j} (Intimacy$_{ij}$ × Influence From Partners$_{ij}$) represents the Level 1 interaction between intimacy and a partner's influence.

Hypothesis 1

The test of H1 indicated a curvilinear association between the intimacy and the facets of relational uncertainty (Table 3). With regard to the covariates on the intercept, baseline relationship status was negatively associated with partner uncertainty and relationship uncertainty, such that people with a higher relationship status started with less partner and relationship uncertainty. The slopes for the model indicated that intimacy shared a negative linear association with each of the facets of relational uncertainty. In the model predicting self uncertainty, baseline relationship status was a significant moderator on the slope for the linear intimacy variable, indicating an interaction between intimacy and baseline relationship status predicting self uncertainty. As predicted in H1, results also revealed a negative curvilinear association between the intimacy and the three facets of relational uncertainty.

To examine the nature of the interaction and nonlinear associations, we plotted the relationship between intimacy and self uncertainty at different levels of baseline relationship status (Figure 2) and the overall associations between intimacy and partner and relationship uncertainty. Across levels of relationship status, self uncertainty increases slightly or decreases modestly from low to moderate levels of intimacy and declines steadily across moderate to high levels of intimacy. Notably, individuals at the lowest levels of relationship status have considerably more relational uncertainty at low levels of intimacy and a steeper decline in uncertainty across higher levels of intimacy than individuals at higher levels of relationship status. Although the trajectories of partner and relationship uncertainty did not vary by baseline relationship status, they follow the same general course; in both cases, changes in relational uncertainty are relatively small from low to moderate levels of intimacy and then the negative association

Table 3. *Associations between intimacy and the facets of relational uncertainty and interdependence*

	Relational Uncertainty						Elements of interdependence					
Model Parameters	Self Uncertainty		Partner Uncertainty		Relationship Uncertainty		A partner's interference		A partner's influence		A partner's facilitation	
Intercept (π_{0j})	2.61***	(0.05)	2.90***	(0.07)	2.73***	(0.06)	2.70***	(0.07)	3.11***	(0.06)	3.16***	(0.06)
Baseline relationship status (β_{01})	−.02	(0.05)	−.38***	(0.07)	−.29***	(0.06)	.19*	(0.08)	.10	(0.07)	−.04	
Intimacy mean (β_{02})	.04	(0.11)	.02	(0.13)	.08	(0.11)	−.15	(0.12)	.06	(0.10)	.19	
Slopes												
Time (π_{1j})	.02	(0.01)	−.01	(0.01)	−.01	(0.01)	−.04***	(0.01)	−.06***	(0.01)	−.05***	(0.01)
Intimacy (π_{2j})	−.94***	(0.10)	−.82***	(0.11)	−.82***	(0.10)	.31***	(0.09)	.61***	(0.09)	.87***	(0.09)
Baseline relationship status (β_{21})	.25***	(0.08)	.10	(0.09)	.10	(0.08)	−.06	(0.08)	−.16*	(0.07)	−.11	(0.07)
Intimacy^2 (π_{3j})	−.39***	(0.06)	−.28***	(0.07)	−.24***	(0.06)	−.19***	(0.06)	−.09	(0.05)	−.00	(0.05)
Random effect (r_{ij})	.31***		.53***		.40***		.75***		.55***		.51***	

Note. $N = 295$ (adjusted for missing data). Cell entries are γ, which are unstandardized slopes. Values in parentheses are standard errors. The coefficients for baseline relationship status and intimacy mean under the intercept represent the magnitude of change in the intercept when that variable is included as a covariate. Similarly, the coefficient for baseline relationship status under the slope for intimacy represents the change in the gradient of the slope when that variable is included as a covariate. The cell entries in the random effects category are τ and represent the remaining unexplained variation in the intercept.

*$p < .05$. ***$p < .001$.

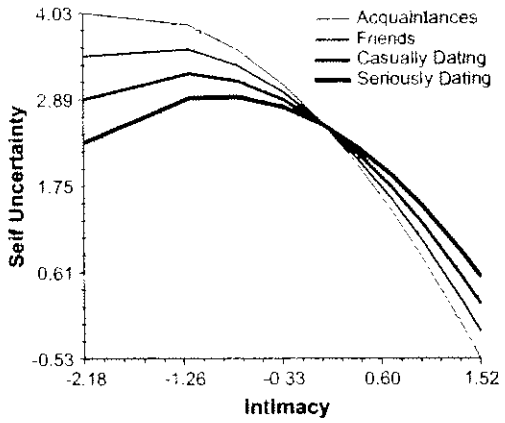

Figure 2. The association between intimacy and self uncertainty at different levels of relationship status.

Note. We excluded respondents who reported that they were strangers, engaged, or married from all analyses. When partner uncertainty and relationship uncertainty were the dependent variable, results indicated curvilinear associations that were not moderated by baseline relationship status. The plots of those associations were quite similar to the association between intimacy and self uncertainty among friends that is illustrated in this figure.

between relational uncertainty and intimacy increases.

To determine whether the addition of the quadratic intimacy term provided a better fitting model than the linear model, we performed likelihood ratio tests for each model. The likelihood ratio test assesses the difference between the deviances (i.e., the lack of fit between the data and the model) for each model and it is distributed as a chi-square statistic (Hayes, 2006). Results of this test indicated that the inclusion of the quadratic intimacy variable produced a better fitting model than the linear model (self uncertainty $\chi^2 = 90.98$, $p < .001$; partner uncertainty $\chi^2 = 33.44$, $p < .001$; and relationship uncertainty $\chi^2 = 35.66$, $p < .001$). In addition, we also calculated the proportional reduction of error in the model by adding the curvilinear intimacy variable, which produces values that are analogous to $R^2\Delta$ in a standard ordinary least squares regression (Hayes, 2006; Snijders, & Bosker, 2003). Results of this test also revealed that the addition of the quadratic intimacy term explained a significant proportion of the variance in the dependent variable (self uncertainty = .18, partner uncertainty = .07, and relationship uncertainty = .11)

Hypothesis 2

The second hypothesis predicted a curvilinear association between intimacy and a partner's interference (H2a), a positive linear association between intimacy and a partner's influence (H2b), and an interaction between intimacy and a partner's influence predicting a partner's interference and a partner's facilitation (H2c). As summarized in Table 3, the covariates on the intercept revealed a positive association between baseline relationship status and a partner's interference. The slopes for the model revealed that time was negatively associated with all three facets of interdependence. With regard to H2a, there was a negative curvilinear association between intimacy and a partner's interference, in addition to the positive linear association. A plot of the association between intimacy and a partner's interference reveals that this trend resembles an asymptote in which interference steadily increases across low levels of intimacy and then levels off after partners achieve moderate levels of intimacy (Figure 3). Results of the likelihood ratio test indicated that the curvilinear model provided a better fit to the data than

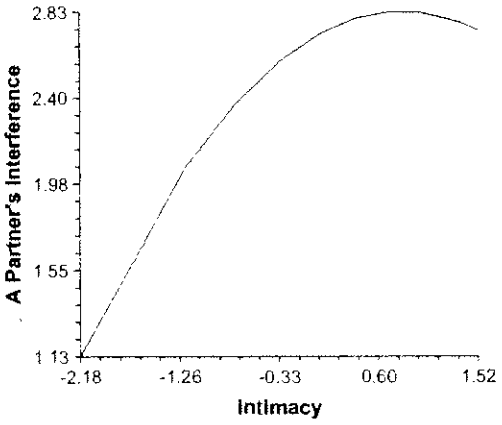

Figure 3. The association between intimacy and a partner's interference.

the linear model ($\chi^2 = 15.28$, $p < .001$), and the curvilinear model accounted for 4% more variance in a partner's interference than the linear model.

As H2b predicted, a partner's influence was positively associated with intimacy (Table 3). Because the quadratic intimacy term was not significant, the results point to a predominantly linear association between a partner's influence and intimacy. The significant effect of baseline relationship status on the slope for intimacy indicates that the association between a partner's influence and intimacy is moderated by relationship status. In particular, we observed the strongest positive association between influence and intimacy among individuals who started the study as acquaintances and the magnitude of that association decreased as the status of the relationship at baseline increased in intimacy. Although we did not advance hypotheses concerning the association between intimacy and a partner's facilitation, we also observed a positive linear association between those variables.

Recall that our test of H2c involved adding a partner's influence and a term representing the interaction between intimacy and a partner's influence to the set of independent variables in the previous model (Table 4). Results indicated that baseline relationship status increased the value of the intercept for a partner's interference, and the within-person mean of intimacy was positively associated with a partner's interference and a partner's facilitation. Time was negatively associated with a partner's facilitation. Consistent with the previous findings, intimacy was linearly associated with a partner's facilitation and curvilinearly associated with a partner's interference. As predicted, a partner's influence was positively associated with both a partner's interference and a partner's facilitation; however, the two-way interaction between intimacy and a partner's influence was only significant in the model predicting a partner's interference. Specifically, the association between a partner's influence and a partner's interference was stronger for people at low levels of intimacy compared to high levels of intimacy. Thus, our results provide partial support for H2c.

To summarize, the results indicated convex curvilinear associations between the intimacy and the three facets of relational uncertainty; however, these associations were characterized

Table 4. *Predicting a partner's interference and a partner's facilitation from a partner's influence, intimacy, and their interaction*

Model parameters	A partner's interference	A partner's facilitation
Intercept (π_{0j})	2.61*** (0.06)	3.12*** (0.06)
Baseline relationship status (β_{01})	.21** (0.08)	−.02 (0.07)
Intimacy mean (β_{02})	.28** (0.10)	.48*** (0.10)
Slopes		
Time (π_{1j})	.00 (0.01)	−.02** (0.01)
Intimacy (π_{2j})	−.14 (0.08)	.93*** (0.13)
Baseline relationship status (β_{21})	.04 (0.05)	−.06 (0.07)
Intimacy^2 (π_{3j})	−.10* (0.04)	.04 (0.06)
A partner's influence (π_{4j})	.73*** (0.02)	.48*** (0.03)
Intimacy × A Partner's Influence (π_{5j})	−.05* (0.02)	−.04 (0.04)
Random effect (r_{ij})	.82***	.53***

Note. $N = 295$ (adjusted for missing data). Cell entries are γ, which are unstandardized slopes. Values in parentheses are standard errors. The coefficients for baseline relationship status and intimacy mean under the intercept represent the magnitude of change in the intercept when that variable is included as a covariate. Similarly, the coefficient for baseline relationship status under the slope for intimacy represents the change in the gradient of the slope when that variable is included as a covariate. The cell entries in the random effects category are τ and represent the remaining unexplained variation in the intercept.

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

by a predominantly linear negative trend rather than the inverted U-shaped distribution specified by H1. Our findings also revealed the convex curvilinear association between intimacy and a partner's interference that was specified by H2a, but again, the specific form of this association was inconsistent with the hypothesis. As H2b predicted, intimacy was positively associated with a partner's influence. Finally, H2c was partially supported, such that a partner's influence was more positively associated with a partner's interference at low rather than high levels of intimacy, but the interaction was not a significant predictor of a partner's facilitation.

Discussion

This investigation used a 6-week longitudinal design to assess within-person changes in perceptions of intimacy, relational uncertainty, and facets of interdependence. Notably, most of the variance in the data set was due to between-person differences rather than week-to-week fluctuations. This finding underscores that intimacy, relational uncertainty, and interdependence vary between relationships in important ways. Does this conclusion suggest that within-person changes are not meaningful? We think not. The results of the study indicate that the level of intimacy people perceived within a relationship in any given week significantly predicted perceptions of relational uncertainty and interference from a partner, even after the between-person effects were covaried. We also note that the linear associations between time and intimacy and a partner's influence, facilitation, and interference in everyday activities that we observed do not reflect the unique trajectories for individual respondents, as illustrated in Figure 1. In addition, this study documented a nonlinear association between intimacy and relational uncertainty that was not apparent in previous research focused on between-person effects (e.g., Knobloch & Carpenter-Theune, 2004; Solomon & Knobloch, 2001, 2004). In total, these findings suggest to us that within-person fluctuations in perceptions of relationships are meaningful aspects of nonmarital romantic relationships.

Although we are encouraged that longitudinal data more effectively captured nuances in the association between intimacy and perceptions of relational uncertainty and goal interference, the form of the curvilinear associations resembled asymptotes that did not conform to the logic of the relational turbulence model. The relational turbulence model implies that relational uncertainty is low in nonintimate associations governed by social conventions, whereas our data revealed the highest levels of relational uncertainty when intimacy was low and more rapid decreases in relational uncertainty from moderate to high levels of intimacy. Conversely, a partner's interference increased from low to moderate levels of intimacy and then remained high, even within relatively intimate associations.

The departure in these trends from the inverted U-shaped trajectories that we predicted raises questions about the importance of the linear versus nonlinear aspects of these associations. When we situate the findings for relational uncertainty among the patterns in prior research, the weight of the evidence suggests that relational uncertainty shares a predominantly negative linear association with intimacy. The nonlinear pattern reminds us that doubts and ambiguity are present throughout the formative period of close relationships, but these questions appear to resolve themselves quickly once intimate bonds are formed. With respect to interference from a partner, the nonlinear trend illustrates how interference is an inevitable part of developing closeness and it continues to be an inherent part of interdependent associations.

The relationship between intimacy and perceptions of goal interference is also illuminated when we consider it against the backdrop of previous research. Braiker and Kelley (1979) represented conflict as an inherent part of interdependent associations, and other scholars have suggested that these inevitable tensions sustain relationships by making them interesting and responsive to changing circumstances (Baxter & Montgomery, 1996; Gottman, Swanson, & Swanson, 2002). Accordingly, retrospective accounts of conflict, defined as expressed disagreement, show an initial increase in arguments as courtships

develop, which holds steady from moderate to high levels of intimacy (Huston et al., 1981). Moreover, physically aggressive conflict behavior tends to occur only after couples reach a level of involvement characterized as serious dating (Cate, Henton, Koval, Christopher, & Lloyd, 1982). Perhaps because expressions of conflict and disagreements about goal disruption are more pronounced in close relationships, perceptions of goal interference persist. What remains to be seen is whether the disruption of everyday routines remains high, or whether objective interference decreases while the tendency for interference to evolve into open conflicts increases the salience of these missteps.

The associations among intimacy and perceptions of a partner's influence, interference, and facilitative actions bear on this issue. The results of this study suggest that a partner's influence is a relatively disruptive force in nonintimate relationships and that increases in intimacy are marked by greater facilitation, rather than decreased interference. Although speculative, these patterns remind us of Gottman's observations about the relationship between positive and negative affect within stable marriages (e.g., Gottman & Levenson, 1999; Gottman et al., 2002). In particular, Gottman and his colleagues have suggested that stable relationships can involve frequent negative experiences, provided that a correspondingly high number of positive experiences balance those episodes. In our vernacular, a partner's interference can be tolerable, perhaps even helpful, if it accompanies or points to ways in which couples can coordinate their actions more effectively. In the context of the ongoing romantic associations examined in our study, intimacy appears to be marked by heightened levels of influence that contribute to both helpful and disruptive outcomes.

Interestingly, we observed a higher positive correlation between reports of a partner's interfering and facilitating behavior in this study relative to a previous cross-sectional study (Knobloch & Solomon, 2004). We wonder if orienting participants toward experiences in the past week prompted them to report perceptions of a partner's interfering or facilitating actions rather than their general perceptions of their partner as disruptive versus helpful. When providing a global evaluation of a relationship, people may resolve contradictory characterizations of a partner as both helpful and hindering (e.g., Miell, 1987), which would suppress the observed correlation between a partner's interference and a partner's facilitation. By gathering weekly reports on relationships, our method may have reduced this recall bias, thereby revealing the frequent co-occurrence of interfering and facilitating behavior within intimate associations. This methodological insight can contribute to other research on interdependence processes.

When considered in combination, the curvilinear trends in our data deviate from the relational turbulence model in ways that suggest a need to rethink important aspects of the theory. The results of this study (Solomon & Knobloch, 2001, 2004) provide compelling evidence that relational uncertainty and interference vary nonlinearly with intimacy but are not especially pronounced at moderate levels of intimacy. On the other hand, we previously reviewed studies that are consistent with the theory's assertion that relational uncertainty and interference from partners contribute to intensified emotional, cognitive, and communicative experiences. As a set, these findings suggest that relational uncertainty and interference from partners are influential in personal relationships, but that the effects of these mechanisms are not limited to moderate levels of intimacy in nonmarital romantic relationships.

Recognizing how week-to-week changes in the intimacy of romantic associations are manifest in subjective experiences of relational uncertainty and goal interference also has practical value. Emerging adulthood corresponds with increased drug abuse (Bates & Labouvie, 1997) and rising rates of depression (Radloff, 1991), which may stem from the instability people experience in their self-perceptions and their personal relationships (Arnett, 2000). As health service providers help emerging adults cope with the stressors that characterize this phase of life, it may be helpful to note the ways in which romantic relationships might be inherently challenging. Our results suggest that when

intimacy ebbs, doubts about the relationship emerge and when intimacy increases, interference from a partner tends to rise. Making emerging adults aware of how romantic associations inevitably pose a threat to a person's subjective well-being (cf. Fincham, 2000) might help them to form more realistic romantic relationship goals.

The implications we have noted are qualified by important limitations in our method. First, our use of weekly questionnaires allowed us to assess fluctuations in perceptions of relationships, but these accounts are still subject to recall bias as partners generalize about their experiences in the previous week. Although we believed that daily diaries would be too burdensome to complete over a period spanning several weeks, efforts to gather more immediate day-to-day perceptions would provide further insight into the variability of relationship judgments over time. We also note that the baseline questionnaire asked respondents to report perceptions of their relationship in general, whereas subsequent questionnaires asked them to reflect on their experiences in the previous week. Because the baseline evaluations were not tied to a specific time point, they could be more prone to more measurement error than measures obtained at the other five weekly intervals.

Another methodological issue concerns our decision to gather data from respondents over a 6-week period. As noted previously, both empirical and practical considerations influenced this design element. At the same time, the data showed that variation in relationship qualities over the course of the study was relatively limited. This fact imposes a practical limitation in that the restricted variance may have limited our ability to detect associations among the variables. In addition, the patterns in the data suggest that the ebb and flow of intimacy, relational uncertainty, and elements of interdependence follow a more gradual trajectory within nonmarital romantic relationships.

Our study is also limited by a lack of diversity in our sample. Because the population we drew upon is predominantly White and middle to upper class, we cannot speculate about how applicable our findings are to a non-White and noncollegiate population. Moreover, our convenience sample included students in communication courses at a university where more than half of the students are residents of the local state; these factors further limit the general applicability of our findings. Also, although a college sample affords us access to a population in which courtship and romantic relationship issues are prominent, it does not reflect the broader reality of dating relationships. Similarly, we wonder how well the results of this study apply to other cultures where norms for nonmarital romantic relationships are different; in particular, the relevance of relational uncertainty and elements of interdependence as facets of romantic involvement may be confined to individualistic cultures, such as the United States. We note, too, that we limited our sample to individuals who were neither engaged nor married. Although a focus on nonmarital romantic relationships is consistent with the scope conditions of the relational turbulence model, we see merit in exploring the application of the theory to longer term romantic associations.

In conclusion, this study marks an important contribution to research on the relational turbulence model because it uses longitudinal data to test the theory's assumptions. In particular, the repeated measures nature of our research design allowed us to examine how fluctuations in intimacy corresponded with changes in both relational uncertainty and interdependence processes over time. The length of this study was relatively short and the week-to-week changes in relationship characteristics were admittedly small; however, the cumulative effect of these shifts might translate to significant changes in relationship development over time.

References

Afifi, W. A., & Reichert, T. (1996). Understanding the role of uncertainty in jealousy experience and expression. *Communication Reports, 9*, 93–103.

Altman, I., & Taylor, D. (1973). *Social penetration: The development of interpersonal relationships*. New York: Holt, Rinehart, & Winston.

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist, 55*, 469–480.

Bates, M. E., & Labouvie, E. W. (1997). Adolescent risk factors and the prediction of persistent alcohol and drug use into adulthood. *Alcoholism: Clinical and Experimental Research, 21*, 944–950.

Baxter, L. A. (1987). Cognition and communication in the relationship process. In R. Burnett, P. McGhee, & D. Clark (Eds.), *Accounting for relationships* (pp. 192–212). London: Methuen.

Baxter, L. A., & Bullis, C. (1986). Turning points in developing romantic relationships. *Human Communication Research, 12*, 469–493.

Baxter, L. A., & Montgomery, B. M. (1996). *Relating: Dialogues and dialectics*. New York: Guilford.

Baxter, L. A., & Wilmot, W. W. (1985). Taboo topics in close relationships. *Journal of Social and Personal Relationships, 2*, 253–269.

Berger, C. R., & Calabrese, R. J. (1975). Some explorations in initial interaction and beyond: Toward a developmental theory of interpersonal communication. *Human Communication Research, 1*, 99–112.

Berscheid, E. (1983). Emotion. In H. H. Kelley, E. Berscheid, A. Christensen, J. Harvey, T. L. Huston, G. Levinger, et al. (Eds.), *Close relationships* (pp. 110–168). San Francisco: Freeman.

Berscheid, E. (1990). Contemporary vocabularies of emotion. In B. S. Moore & A. M. Isen (Eds.), *Affect in social behavior* (pp. 22–38). New York: Cambridge University Press.

Bradbury, T. N., & Fincham, F. D. (1992). Attributions and behavior in marital interaction. *Journal of Personality and Social Psychology, 63*, 613–628.

Braiker, H. B., & Kelley, H. H. (1979). Conflict in the development of close relationships. In R. L. Burgess & T. L. Huston (Eds.), *Social exchange in developing relationships* (pp. 135–168). New York: Academic Press.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.

Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage.

Cate, R. M., Henton, J. M., Koval, J., Christopher, F. S., & Lloyd, S. (1982). Premarital abuse: A social psychological perspective. *Journal of Family Issues, 3*, 79–90.

Clark, C. L., Shaver, P. R., & Abrahants, M. F. (1999). Strategic behaviors in romantic relationship initiation. *Personality and Social Psychology Bulletin, 25*, 707–720.

Dainton, M., & Aylor, B. (2002). Routine and strategic maintenance efforts: Behavioral patterns, variations associated with relational length, and the prediction of relational characteristics. *Communication Monographs, 69*, 52–66.

Fincham, F. D. (2000). The kiss of the porcupines: From attributing responsibility to forgiving. *Personal Relationships, 7*, 1–23.

Gottman, J. M., & Levenson, R. W. (1999). What predicts change in marital interaction over time? A study of alternative models. *Family Process, 38*, 143–158.

Gottman, J. M., Swanson, C., & Swanson, K. (2002). A general systems theory of marriage: Nonlinear difference equation modeling of marital interaction. *Personality and Social Psychology Review, 6*, 326–340.

Hayes, A. F. (2006). A primer on multilevel modeling. *Human Communication Research, 32*, 385–410.

Honeycutt, J. M., Cantrill, J. G., & Greene, R. W. (1989). Memory structures for relational escalation: A cognitive test of the sequencing of relational actions and stages. *Human Communication Research, 16*, 62–90.

Honeycutt, J. M., Cantrill, J. G., Kelly, P., & Laubkin, H. (1998). How do I love thee? Let me consider my options: Cognition, verbal strategies, and the escalation of intimacy. *Human Communication Research, 25*, 39–63.

Hunter, J. E., & Gerbing, D. W. (1982). Unidimensional measurement, second order factor analysis, and causal models. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior* (Vol. 4, pp. 267–320). Greenwich, CT: JAI Press.

Huston, T. L., Surra, C. A., Fitzgerald, N. M., & Cate, R. M. (1981). From courtship to marriage: Mate selection as an interpersonal process. In S. Duck & R. Gilmour (Eds.), *Personal relationships 2: Developing personal relationships* (pp. 53–88). New York: Academic Press.

Kelley, H. H., Berscheid, E., Christensen, A., Harvey, J. H., Huston, T. L., Levinger, G., et al. (1983). Analyzing close relationships. In H. H. Kelley, E. Berscheid, A. Christensen, J. Harvey, T. L. Huston, G. Levinger, et al. (Eds.), *Close relationships* (pp. 20–67). San Francisco: Freeman.

Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York: Guilford.

Knobloch, L. K. (2005). Evaluating a contextual model of responses to relational uncertainty increasing events: The role of intimacy, appraisals, and emotion. *Human Communication Research, 31*, 60–101.

Knobloch, L. K., & Carpenter-Theune, K. E. (2004). Topic avoidance in developing romantic relationships: Associations with intimacy and relational uncertainty. *Communication Research, 31*, 173–205.

Knobloch, L. K., & Donovan-Kicken, E. (2006). Perceived involvement of network members in courtships: A test of the relational turbulence model. *Personal Relationships, 13*, 281–302.

Knobloch, L. K., & Solomon, D. H. (1999). Measuring the sources and content of relational uncertainty. *Communication Studies, 50*, 261–278.

Knobloch, L. K., & Solomon, D. H. (2002a). Information seeking beyond initial interaction: Negotiating relational uncertainty within close relationships. *Human Communication Research, 28*, 243–257.

Knobloch, L. K., & Solomon, D. H. (2002b). Intimacy and the magnitude and experience of episodic relational uncertainty within romantic relationships. *Personal Relationships, 9*, 457–478.

Knobloch, L. K., & Solomon, D. H. (2004). Interference and facilitation from partners in the development of interdependence within romantic relationships. *Personal Relationships, 11*, 115–130.

Knobloch, L. K., Solomon, D. H., & Cruz, M. G. (2001). The role of relationship development and attachment in the experience of romantic jealousy. *Personal Relationships, 8*, 205–224.

Kreft, I., & De Leeuw, J. (2002). *Introducing multilevel modeling*. Thousand Oaks, CA: Sage.

Lloyd, S. A., Cate, R. M., & Henton, J. M. (1984). Predicting premarital relationship stability: A methodological refinement. *Journal of Marriage and the Family, 46*, 71–76.

Miell, D. (1987). Remembering relationship development: Constructing a context for interactions. In R. Burnett & P. McGhee (Eds.), *Accounting for relationships: Explanation, representation and knowledge* (pp. 60–73). New York: Methuen.

Miller, G. R., & Steinberg, M. (1975). *Between people: A new analysis of interpersonal communication*. Chicago: Science Research Associates

Perlman, D., & Fehr, B. (1987). The development of intimate relationships. In D. Perlman & S Duck. (Eds.), *Intimate relationships: Development, dynamics, and deterioration* (pp. 13–42). Newbury Park, CA: Sage.

Planalp, S., & Honeycutt, J. M. (1985). Events that increase uncertainty in personal relationships. *Human Communication Research, 11*, 593–604.

Radloff, L. S. (1991). The use of the Center for Epidemiologic Studies Depression Scale in adolescents and young adults. *Journal of Youth and Adolescence, 20*, 149–166.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage.

Rubin, Z. (1970). Measurement of romantic love. *Journal of Personality and Social Psychology, 16*, 265–273.

Rusbult, C. E., & Buunk, B. P. (1993). Commitment processes in close relationships: An interdependence analysis. *Journal of Social and Personal Relationships, 10*, 175–204.

Snijders, T. A. B., & Bosker, R. J. (2003). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. Thousand Oaks, CA: Sage.

Solomon, D. H., & Knobloch, L. K. (2001). Relationship uncertainty, partner interference, and intimacy in dating relationships. *Journal of Social and Personal Relationships, 18*, 804–820.

Solomon, D. H., & Knobloch, L. K. (2004). A model of relational turbulence: The role of intimacy, relational uncertainty, and interference from partners in appraisals of irritations. *Journal of Social and Personal Relationships, 21*, 795–816.

Surra, C. A. (1985). Courtship types: Variation in interdependence between partners and social networks. *Journal of Personality and Social Psychology, 49*, 357–375.

Surra, C. A., & Hughes, D. K. (1997). Commitment processes in accounts of the development of premarital relationships. *Journal of Marriage and the Family, 59*, 5–21.

Theiss, J. A., & Solomon, D. H. (2006a). A relational turbulence model of communication about irritations in romantic relationships. *Communication Research, 33*, 391–418.

Theiss, J. A., & Solomon, D. H. (2006b). Coupling longitudinal data and hierarchical linear modeling to examine the antecedents and consequences of jealousy experiences in romantic relationships: A test of the relational turbulence model. *Human Communication Research, 32*, 469–503.

VanLear, C. A. (1987). The formation of social relationships: A longitudinal study of social penetration. *Human Communication Research, 13*, 199–322.

Appendix

Scale items for intimacy, relational uncertainty, and elements of interdependence intimacy

Love

I feel that I could confide in my partner about virtually everything.

I would do anything for my partner.

If I couldn't be with my partner, I would feel miserable.

If I am lonely, my first thought is to seek my partner out.

One of my primary concerns is my partner's welfare.

I would forgive my partner for practically anything.

I feel responsible for my partner's well being.

I would enjoy being confided in by my partner.

It would be hard for me to get along without my partner.

Commitment

I am very committed to maintaining this relationship.

I would make a great effort to maintain my relationship with this person.

I am committed to my relationship.

I would like this relationship to last a lifetime.

Chance of marriage or lifelong commitment

At this point in time, what do you feel the chance is of your relationship leading to marriage?

Relational uncertainty (all items began with the stem "How certain are you about ... .")

Self uncertainty

Whether or not you want the relationship to work out in the long run?

Whether or not you want the relationship to last?

How much you like your partner?

How important the relationship is to you?

How much you are romantically interested in your partner?

Whether or not you are ready to commit to your partner?

Partner uncertainty

Whether or not your partner is ready to commit to you?

How committed your partner is to the relationship?

Whether or not your partner wants to be with you in the long run?

How important the relationship is to your partner?

Whether or not your partner wants the relationship to work out in the long run?

How much your partner is attracted to you?

Relationship uncertainty

Whether or not the relationship will work out in the long run?

Whether or not you and your partner feel the same way about each other?

Whether or not you and your partner will stay together?

Whether or not the relationship is a romantic one?

The boundaries for appropriate and/or inappropriate behavior in the relationship.

Whether or not your partner likes you as much as you like him/her?

Whether or not it is a romantic or a platonic relationship?

How you can or cannot behave around your partner?

Elements of interdependence

Partner's influence

This person influences the amount of time I spend with my friends.

This person influences whether I achieve the everyday goals I set for myself.

This person influences my ability to use my time well.

This person influences whether I do the things I need to do each day.

Partner's facilitation

This person helps me to do the things I need to do each day.

This person helps me in my efforts to spend time with my friends.

This person helps me to use my time well.

Partner's interference

This person interferes with the amount of time I spend with my friends.

This person interferes with my ability to use my time well.

This person interferes with the things I need to do each day.