Actor–partner effects in the associations between relationship characteristics and reactions to marital sexual intimacy

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Abstract

This study uses the relational turbulence model and dyadic data analysis to examine how marital relationship characteristics affect emotional and cognitive reactions to sex. We surveyed both spouses from 220 married couples about their sexual relationship. Results indicated that: (i) relational uncertainty and interference from partners were negatively associated with sexual satisfaction and positively associated with negative cognitive and emotional reactions to sex; (ii) an actor's sexual satisfaction was negatively associated with the partner's relational uncertainty and interference from actors; and (iii) an actor's negative emotion and negative cognition following sex were positively associated with the partner's relational uncertainty and interference from partners. These findings highlight dyadic interdependence between spouses' perceptions of sexual intimacy.

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Relationship intimacy is often characterized as closeness, passion, and commitment between relationship partners, or a motivation to share one's private self almost completely with that partner (e.g., Aron, Aron, Tudor, & Nelson, 2004). Similarly, *sexual intimacy* involves acts of physical union between partners that allow them to connect interpersonally and express their mutual passion; consequently, sexual intimacy is normative for romantic relationships (e.g., Christopher & Sprecher, 2000). Previous research identified individual and relational factors that shape sexual experiences. Individual characteristics include goals (Impett, Gordon, & Strachman, 2008), values (Knox, Cooper, & Zusman, 2001), and attitudes (Davidson, Moore, Earle, & Davis, 2008). Relational factors include intimacy (e.g., Brassard, Shaver, & Lussier, 2007) and satisfaction (Hendrick & Hendrick, 1997; Kisler & Christopher, 2008).

In this study, we broaden the array of relationship characteristics relevant to interpreting sexual episodes, consider sexuality in marital relationships, and model partners' dyadic influence on sexual and relational well-being. First, we draw upon the relational turbulence model (Solomon & Knobloch, 2004; Solomon & Theiss, 2008) to identify relationship characteristics that predict reactions to sex. In the relational turbulence model, relational uncertainty and interference from partners are relationship features that heighten emotional, cognitive, and behavioral reactivity to relationship circumstances. Sexual intimacy is an experience ripe for intense emotional reactions and rumination (e.g., Theiss & Solomon, 2007); thus, we focus on relational uncertainty and interference from partners as predictors of emotional and cognitive reactions to sex.

Second, most previous studies on relational turbulence (e.g., Solomon & Knobloch, 2004; Theiss & Solomon, 2006a,b) and sexual intimacy (e.g., Hughes, Morrison, & Asada, 2005; Theiss & Solomon, 2007) focused on one partner's relational perceptions. Therefore, this study extends literatures on relational turbulence and sexual intimacy by focusing on spouses' interdependence among their perceptions of sexual experiences. Therefore, this study joins others (i.e., Knobloch & Theiss, 2010; Theiss & Knobloch, 2009) in exploring the reciprocal influence that relational turbulence has on relational quality.

Finally, this study expands the relational turbulence and sexual intimacy literatures by investigating marital relationships, because research in both relational turbulence (e.g., Knobloch & Carpenter-Theune, 2004; Theiss & Solomon, 2006a,b) and sexual intimacy (e.g., Byers & Lewis, 1988; Christopher & Cate, 1985, 1988) has focused primarily on dating relationships. Moreover, marital sexual behavior studies have primarily favored satisfaction (Hendrick & Hendrick, 1997) and marital quality (Prager & Roberts, 2004), so our focus broadens the collection of relationship characteristics that are influential upon sexual intimacy.

Relational turbulence and reactions to sexual intimacy

In the relational turbulence model (Solomon & Knobloch, 2004; Solomon & Theiss, 2008), relational uncertainty and interference from partners are relationship features that heighten emotional, cognitive, and behavioral reactivity to relationship events. The model is useful for examining reactions to sexual intimacy, because sexual experiences spawn cognitive and emotional responses. Sexual intimacy can be positive and elicit pleasant reminiscing, but it can also generate negative thought and rumination (e.g.,

Theiss & Solomon, 2007). Cognitive responses evoked by a sexual encounter are accompanied by myriad emotional responses likely to vary in valence and arousal (Christopher & Sprecher, 2000; Sprecher, 1989; Sprecher & Regan, 1996). We highlight appraisals of sexual satisfaction and negative thought as cognitive reactivity to sex and we examine anger, sadness, and fear as negative emotional reactivity.

Relational uncertainty and negative reactions to sex

Relational uncertainty refers to people's confidence in their perceptions of a relationship, and includes three sources of doubt (Berger & Bradac, 1982; Knobloch & Solomon, 1999): self uncertainty, which refers to doubts about one's own relational involvement; partner uncertainty, which refers to doubts about a partner's relational involvement; and relationship uncertainty, which involves doubts of the relationship status. Dating relationships are particularly susceptible to relational uncertainty as partners consistently define the relationship (Knobloch & Solomon, 1999). Although theorists argued that relational uncertainty should subside as intimacy increases (e.g., Berger & Calabrese, 1975), relational uncertainty is persistent in committed relationships, including marriage (Knobloch, 2008; Laurenceau, Barrett, & Rovine, 2005).

Relational uncertainty intensifies cognitive and emotional reactions to relationship events. Cognitively, relational uncertainty is associated with increased turmoil (Knobloch, 2007), more severe irritations (Solomon & Knobloch, 2004; Theiss & Solomon, 2006b), and perceptions of social network members as unsupportive of the relationship (Knobloch & Donovan-Kicken, 2006). Emotionally, relational uncertainty relates to negative emotions (Knobloch, Miller, & Carpenter, 2007; Planalp & Honeycutt, 1985) and jealousy (Afifi & Reichert, 1996; Knobloch, Solomon, & Cruz, 2001; Theiss & Solomon, 2006a).

Perceptions of sexual satisfaction are one indicator of cognitive reactivity to sex. *Sexual satisfaction* refers to the evaluations that people make regarding the quality of their sexual involvement with a partner. Although sexual satisfaction might include assessments of sexual frequency, we consider sexual satisfaction as a marker of the quality of sexual encounters. People are less satisfied with sexual episodes when intimacy is relatively low (Christopher & Sprecher, 2000). Given that lower levels of intimacy correspond with heightened levels of relational uncertainty (e.g., Berger & Bradac, 1982; Solomon & Theiss, 2008), we expect relational uncertainty to be associated with decreased sexual satisfaction. Relational uncertainty is also positively related to negative rumination about sexual involvement (e.g., Theiss, 2005). Finally, because relational uncertainty corresponds with more negative emotions in relationships (Knobloch et al., 2007), we also anticipate that relational uncertainty is associated with more negative emotional reactions to sex. In sum, this evidence points to the following hypothesis:

H1: Relational uncertainty is negatively associated with sexual satisfaction and positively associated with negative emotional and cognitive reactions to sex.

Interference from partners and reactions to sex

Interference from partners refers to the degree to which an individual perceives a partner as undermining personal actions. In developing relationships, partner interference occurs

in situations when one person's routine is interrupted by efforts to coordinate actions with a relational partner (Berscheid, 1983). In other words, when partners attempt to integrate their lives and coordinate their actions, situations will inevitably arise when partners get in each other's way, challenge one another's way of life, and prevent each other from performing individual routines. Partner interference emerges when partners attempt to establish interdependence (Berscheid, 1983). As partners incorporate one another into personal routines, opportunities for interference arise because partners have not established mutually beneficial patterns of behavior. As partners develop coordinated actions, interference should be replaced by facilitation. Facilitation expedites, rather than hinders, both partners' individual goals and actions.

Although interference likely subsides as partners become more skilled at integrating their individual behaviors, it does not disappear in highly intimate relationships, but plateaus across high levels of intimacy (Solomon & Theiss, 2008). This suggests a partner's interference likely sparks heightened reactivity in marriage. Moreover, because married partners' lives are almost completely intertwined, there are likely increased opportunities for partner interference. Although couples might resolve some interference throughout their relationship, partners are likely consistently frustrated by differences in how they fold laundry, do the dishes, discipline children, or spend money that thwart individual goal achievement. Thus, even in marriage, there are opportunities for partner interference.

In the relational turbulence model, interference from partners is a feature of close relationships that contributes to polarized emotional and cognitive reactions to relationship circumstances (Solomon & Knobloch, 2001, 2004; Solomon & Theiss, 2008). Cognitively, partner interference corresponds with appraisals of relational irritations as more severe and relationally threatening (Theiss & Solomon, 2006a), suspicion over third-party rivals (Theiss & Solomon, 2006b), perceptions that social networks are unsupportive of the relationship (Knobloch & Donovan-Kicken, 2006), and appraisals of turmoil (Knobloch, 2007). Emotionally, partner interference corresponds with emotional jealousy (Theiss & Solomon, 2006a) and negative emotions in general (Knobloch et al., 2007).

In light of this evidence, interference from partners should predict people's cognitive and emotional reactions to sexual intimacy. Motivations and goals for sexual intimacy are a central part of the sexual experience (e.g., Impett et al., 2008). Thus, a partner's interference in personal and sexual goals should produce cognitive and emotional reactions that mirror responses studied in previous research. Specifically, we predict that people are less sexually satisfied and experience more negative cognition and emotion when partner interference is high.

H2: A partner's interference is negatively associated with sexual satisfaction and positively associated with negative emotional and cognitive reactions to sex.

Dyadic effects for relationship characteristics and reactions to sex

Thus far, we have focused exclusively on the ways that an individual's perceptions of relational uncertainty and interference from partners are associated with his or her own reactions to sexual intimacy. Because of the inherently dyadic nature of romantic relationships, researchers consistently emphasize the need to examine both partners' perspectives when investigating relationship characteristics, processes, and perceptions

(e.g., Duck, 1990, 2008; Kenny, Kashy, & Cook, 2006). Dyadic effects have appeared for a variety of relationship variables. For example, dissatisfied spouses are more sensitive to their partner's negativity during interaction (Sillars, Weisberg, Burggraf, & Zietlow, 1990). Moreover, suppressing emotion or stonewalling during marital interaction predicts both the suppressor's and the partner's decreased relationship satisfaction (Gottman & Levenson, 1988). In summary, each partner's cognition and emotion influence the other's relational perceptions. Thus, our study also examines how actors' cognitive and emotional reactions to sexual intimacy have a reciprocal influence on partners' relational uncertainty and perceptions of interference from partners.

For cognitive reactivity, we consider how one partner's sexual satisfaction or rumination contributes to doubts and annoyances for the other partner. Negativity in romantic relationships corresponds with decreased satisfaction and increased negative affect over time (e.g., Gottman & Krokoff, 1985; Levenson & Gottman, 1985). One study of marital dyads revealed that husbands' negativity was related to wives' dissatisfaction two years later and husbands became more negative over time when wives were dissatisfied early in the marriage (Huston & Vangelisti, 1991). Thus, one person's appraisals of an event have implications for the partner's relationship perceptions. Specifically, we expect that actors who are sexually satisfied have partners who are less uncertain about the relationship and perceive less interference. In contrast, actors who experience negative rumination about sex have partners who perceive heightened relational uncertainty and partner interference. Thus, we advance the following hypotheses:

H3: Actors' sexual satisfaction is negatively associated with partners' relational uncertainty and perceptions of partner interference.

H4: Actors' negative cognition about sex is positively associated with partners' relational uncertainty and perceptions of partner interference.

We predict a similar effect for negative emotional reactions to sex. Emotional reactivity is particularly intense and predominantly negative. Unlike cognitive reactivity, emotional reactivity has more visible manifestations and is more difficult to suppress. Thus, attentive individuals are likely to notice their partner's negative emotional reactions to sex, which may influence their relational perceptions. For example, expressions of jealousy are associated with increased relational uncertainty for the message receiver (Bevan, 2004). Moreover, actors who demonstrate negative emotional reactions to sex might contribute to partners' perceptions that the actor is compromising their ability to effectively enact their goal of pleasurable sexual contact (cf. Hill & Preston, 1996). Therefore, we expect that actors' negative emotional reactions to sex are positively correlated with partners' relational uncertainty and perceptions of partner interference. Specifically:

H5: Actors' negative emotional reactions to sex are positively associated with partners' relational uncertainty and perceptions of partner interference.

Method

Both spouses were recruited to report their relationship perceptions and reactions to sexual intimacy. Undergraduate students in communication classes at a large

Northeastern U.S. university earned extra credit for recruiting married couples. The students gave a packet containing instructions, consent forms, and questionnaires to a married couple who were not college students. Married couples could either directly mail completed consent forms and questionnaires to the researchers or have the student return the packet. Couples were entered in a drawing for a gift certificate for a popular retail store and were asked to complete an entry form with their contact information, including phone number. Couples were informed that the researchers would use phone numbers to contact a random sample of participants to verify the validity of responses. Couples who did not provide contact information were excluded from the sample. One-third of couples were randomly contacted, revealing no falsified data or anomalies.

Sample

Respondents were 220 married couples, ranging in age from 20 to 81 years old ($M = 43.43$; $SD = 11.23$; *Median* $= 45$). Sample ethnicities included Caucasian (68%), Hispanic (9.4%), Asian (8.7%), African American (8.5%), Middle Eastern (0.9%), and Native American (0.2%). Length of marriage ranged from one month to 56 years ($M = 15.16$ years; $SD = 11.49$ years; *Median* $= 15$ years). The majority of the sample (74.9%) had at least one child and 14.7% had been previously married. Respondents were asked to report on the frequency with which they engaged in a variety of sexual behaviors. On average, respondents received oral sex 0.95 times per week (range $= 0$–10), performed oral sex 1.05 times per week (range $= 0$–10), engaged in anal sex 0.20 times per week (range $= 0$–5), engaged in mutual masturbation 0.58 times per week (range $= 0$–7), and engaged in penile-vaginal intercourse 1.98 times per week (range $= 0$–10).

Procedures

Undergraduate students were given packets containing instructions, consent forms, and questionnaires and were asked to give them to a married couple. Instructions asked respondents to complete the questionnaires independently and not to share their answers with their spouse. To further ensure the privacy of spouses' responses, individuals were instructed to seal their questionnaire in an envelope separately from their spouse's consent forms and questionnaire.

Measures

Confirmatory factor analyses were conducted on all multi-item scales to ensure that they met the criteria of face validity, internal consistency, and parallelism (Hunter & Gerbing, 1982). All scales had to meet the fit criteria of $\chi^2/df < 3.0$, comparative fit index (CFI) $> .90$, and root mean square error of approximation (RMSEA) $< .10$ (Kline, 1998). After confirming unidimensionality, composite scores for each scale were constructed by averaging responses to all items.

Relational uncertainty. Knobloch's (2008) measure of the sources of relational uncertainty in marriage included a stem that read, "How certain are you about...?" followed by a

series of statements. Each item was accompanied by a six-point Likert-type scale (1 = *completely or almost completely uncertain*, 6 = *completely or almost completely certain*). All items were reverse coded so that the resulting measure indexed relational *un*certainty. The *self uncertainty* scale included four items (e.g., your ability to emotionally support your spouse; $M = 1.54$, $SD = .74$, $\alpha = .91$), the *partner uncertainty* scale three items (e.g., your spouses' view of your marriage; $M = 1.68$, $SD = .93$, $\alpha = .93$), and *relationship uncertainty* four items (e.g., the current status of your marriage; $M = 1.60$, $SD = .76$, $\alpha = .87$). The three sources of relational uncertainty were independent (i.e., were not unidimensional). Consequently, we followed previous research by treating each as a separate variable (e.g., Knobloch, 2006, 2008).

Partner interference. Interference from partners was measured with five items (Solomon & Knobloch, 2001). Each item was accompanied by a six-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*) (e.g., my spouse interferes with whether I achieve the everyday goals I set for myself; $M = 2.28$, $SD = 1.05$, $\alpha = .82$).

Sexual satisfaction. We developed a sexual satisfaction scale that included eight items designed to assess respondents' satisfaction with the quality of their most recent sexual encounter (e.g., my partner and I have a fulfilling sexual relationship). Each of the items was accompanied by a six-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*). Based on the confirmatory factor analysis (CFA), we deleted two items, leaving six items in the scale ($M = 4.29$, $SD = 1.17$, $\alpha = .85$).

The questionnaire also contained a single item regarding respondents' satisfaction with the *quantity* of sexual contact (66.2% of respondents desired more sexual contact, 31.8% of respondents wanted the frequency of sexual contact to stay the same, and 2% of respondents desired less sexual contact). Because this item differed qualitatively from items measuring satisfaction with sexual quality and was on a different scale, it was not included in the CFA. Moreover, because single-item measures lack reliability it was not used in any model.

Negative cognition. Theiss and Solomon's (2007) four-item scale measured negative cognition following the most recent sexual encounter (e.g., I was unable to stop thinking negatively about the sexual encounter; $M = 1.36$, $SD = .71$, $\alpha = .85$). Respondents indicated agreement on a five-point scale (1 = *strongly disagree*, 5 = *strongly agree*).

Negative emotion. Dillard, Kinney, and Cruz' (1996) scales operationalized anger, sadness, and fear people felt following their most recent sexual encounter. Three emotions were introduced with the stem "I felt ... " (1 = *not at all*, 6 = *a lot*) to measure *anger* (angry, mad, and frustrated; $M = 1.36$, $SD = .77$, $\alpha = .84$), *sadness* (sad, gloomy, and depressed; $M = 1.38$, $SD = .73$, $\alpha = .68$), and *fear* (afraid, scared, and frightened; $M = 1.23$, $SD = .60$, $\alpha = .77$).

Analyses

Preliminary analyses

We conducted paired-sample *t*-tests to evaluate sex differences. Tests revealed that husbands perceived significantly more partner interference than wives. Next, we computed bivariate correlations among all of the actor variables and between the substantive actor and partner variables (see Table 1). For actors and between actors and partners, the three sources of relational uncertainty were strongly and positively intercorrelated, and positively related to partner interference, negative cognition, and negative emotion, and negatively associated with sexual satisfaction. In addition, interference from partners was negatively associated with sexual satisfaction and positively associated with negative cognition and negative emotion.

We also calculated intraclass correlations (ρ) for each dependent variable. The intraclass correlation quantifies the proportion of total variation attributable to between-person variance (i.e., between individuals) or between-groups variance (i.e., between couples). Intraclass correlations close to zero indicate that variability is mostly attributable to between-person variance and intraclass correlations close to one suggest most variance is between groups (Kreft & De Leeuw, 1998; Snijders & Bosker, 2003). Chi-square tests of Level 2 variance components were performed to verify sufficient between-groups variability to conduct a multi-level model. Intraclass correlations and chi-square tests for negative cognition, anger, sadness, fear, and interference from partners demonstrated mostly between-groups variance and for sexual satisfaction and the three sources of uncertainty revealed relatively equal amounts of between-persons and between-groups variance (detailed results available from the contact author). All chi-square tests indicated sufficient between-groups variability for multi-level analysis.

Substantive analyses

Hierarchical linear modeling (HLM) 6.0 software, designed to test multi-level models and accommodate non-independent data (Bryk & Raudenbush, 1992), tested the hypotheses. We treated individuals as nested within dyads and tested hypotheses using a two-level model using maximum likelihood (ML) estimation with individual characteristics at Level 1 and dyadic characteristics at Level 2. Models constructed for H1 and H2 contain only actor effects, which reveal the within-person associations between the mechanisms in the relational turbulence model and all of the outcome variables. Actor–partner interdependence models (APIMs) modeled the dyadic effects predicted by H3–H5, because they consider the interdependence between partners (e.g., Cook & Kenny, 2005; Cook & Snyder, 2005; Kashy & Kenny, 1999). For these analyses, data were configured such that each individual's record was combined with the spouse's data. The models for H3, H4, and H5 reveal partner effects, which show how an actor's perceptions of sexual satisfaction, negative cognition, or negative emotion following sex predicted his or her partner's perceptions of relational uncertainty and interference from partners.

Table 1. Bivariate correlations among all variables

	V1	V2	V3	V4	V5	V6	V7	V8	V9
V1. *Self uncertainty*									
V2. Partner uncertainty	.72 ***								
V3. Relationship uncertainty	.86 ***	.77 ***							
V4. Interference from partners	.32 ***	.27 ***	.31 ***						
V5. Sexual satisfaction	−.44 ***	−.46 ***	−.45 ***	−.23 ***					
V6. Negative cognition	.41 ***	.26 ***	.35 ***	.25 ***	−.40 ***				
V7. Anger	.37 ***	.28 ***	.38 ***	.25 ***	−.38 ***	.57 ***			
V8. Sadness	.41 ***	.28 ***	.38 ***	.25 ***	−.33 ***	.66 ***	.67 ***		
V9. Fear	.24 ***	.18 ***	.21 ***	.26 ***	−.27 ***	.49 ***	.64 ***	.57 ***	
V10. Partner's self uncertainty	.52 ***	.49 ***	.51 ***	.19 ***	−.35 ***	.24 ***	.24 ***	.24 ***	.16 ***
V11. Partner's partner uncertainty	.49 ***	.42 ***	.51 ***	.17 ***	−.34 ***	.18 ***	.18 ***	.21 ***	.12 *
V12. Partner's relationship uncertainty	.51 ***	.51 ***	.53 ***	.20 ***	−.38 ***	.24 ***	.25 ***	.28 ***	.17 ***
V13. Partner's interference from partners	.19 ***	.17 ***	.20 ***	.21 ***	−.12 **	.11 *	.13 **	.15 **	.09

*p < .05; **p < .01; ***p < .001.

Results

Relational uncertainty, partner interference, and sexual reactions

We predicted that relational uncertainty (H1) and a partner's interference (H2) are negatively associated with sexual satisfaction and positively associated with negative cognitive and emotional reactions to sex. To test these hypotheses, we constructed multi-level models with sexual satisfaction, negative cognition, or the three negative emotions as dependent variables and relational uncertainty and interference from partners as Level 1 predictors. The sources of relational uncertainty and interference from partners were evaluated as predictors in separate models to avoid multicollinearity (Knobloch & Solomon, 1999). All Level 1 predictors were entered as group mean centered, the intercept was estimated as a random effect, and the Level 1 slopes were estimated as fixed effects. (Contact the first author for model equations.)

The results generally supported the predictions. The slopes indicating the sources of relational uncertainty were negatively associated with sexual satisfaction and positively associated with negative cognition (see Table 2). For the emotional reactions to sex, self uncertainty was positively associated with all three negative emotions, but partner uncertainty and relationship uncertainty were positively associated only with anger and sadness (see Table 3). Thus, H1 was supported for all outcomes except fear. As predicted, interference from partners was negatively associated with sexual satisfaction and positively associated with negative cognition (see Table 2). Interference from partners was also positively associated with anger and fear, but not sadness (see Table 3). Thus, H2 was supported for all of the outcome variables except sadness.

Dyadic effects in predicting relationship characteristics

We predicted (H3–H5) dyadic effects between actors' reactions to sexual intimacy and partners' relational uncertainty and interference from partners. We constructed multi-level models where partner's relational uncertainty sources or partner interference was the dependent variable and Level 1 predictors were the actor's sexual satisfaction, negative cognition, or negative emotions. Because the partner's reactions to sexual intimacy were highly correlated with his/her own relationship perceptions, we included the partner's corresponding cognitive or emotional sexual reactions. Each cognitive and emotional reaction to sexual intimacy was assessed as a predictor in separate models. Level 1 predictors were uncentered. The intercept was estimated as a random effect and the Level 1 slopes were estimated as fixed effects.

For sexual satisfaction, consistent with H3, actors' sexual satisfaction was negatively associated with partners' relational uncertainty and interference from partners after controlling for the partners' own reports of sexual satisfaction (see Table 4). Second, actors' negative cognition was positively associated with partners' relational uncertainty, but not with the partner's perceptions of interference, after controlling for the partners' negative cognition. Thus, H4 was supported for relational uncertainty but not partner interference. Finally, findings for negative emotion provided mixed results and only partial support for H5 (see Table 5). Actors' anger and sadness were positively associated with all three sources of partners' relational uncertainty, but actors' fear was only

Table 2. Relational uncertainty and interference from partners predicting sexual satisfaction and negative cognition

	Models predicting sexual satisfaction				Models predicting negative cognition			
	Self-uncertainty	Partner uncertainty	Relationship uncertainty	Interference from partners	Self uncertainty	Partner uncertainty	Relationship uncertainty	Interference from partners
Intercept	4.35 ***	4.35 ***	4.35 ***	4.35 ***	1.32 ***	1.32 ***	1.32 ***	1.32 ***
Slopes								
Self uncertainty	−.26 **				.31 ***			
Partner uncertainty		−.25 ***				.10 *		
Relationship uncertainty			−.24 **				.26 ***	
Interference from partners				−.10 *				.08 *

*p < .05; **p < .01; ***p < .001.

Table 3. Relational uncertainty and interference from partners predicting anger, sadness, and fear

	Models predicting anger				Models predicting sadness				Models predicting fear			
	S.U.	P.U.	R.U.	P.I.	S.U.	P.U.	R.U.	P.I.	S.U.	P.U	R.U.	P.I.
Intercept	1.33 ***	1.33 ***	1.33 ***	1.33 ***	1.34 ***	1.34 ***	1.34 ***	1.34 ***	1.22 ***	1.20 ***	1.22 ***	1.22 ***
Slopes												
Self uncertainty	.25 **				.35 ***				.14 *			
Partner uncertainty		.13 *				.11 *				.08		
Relationship uncertainty			.26 ***				.25 ***				.11	
Partner interference				.09 *				.07				.11 **

*p < .05; **p < .01; ***p < .001.
S.U.: self uncertainty, P.U.: partner uncertainty, R.U.: relationship uncertainty, P.I.: partner interference.

Table 4. Actor's sexual satisfaction and negative cognition predicting partner's relational uncertainty and interference from partners

	Sexual satisfaction predicting outcomes				Negative cognition predicting outcomes			
	Self uncertainty	Partner uncertainty	Relationship uncertainty	Interference from partners	Self uncertainty	Partner uncertainty	Relationship uncertainty	Interference from partners
Intercept	2.80 ***	3.30 ***	3.01 ***	2.98 ***	.84 ***	1.06 ***	.94 ***	1.75 ***
Slopes								
Actor's sexual satisfaction	−.29 ***	−.38 ***	−.33 ***	−.17 **				
Partner's sexual satisfaction	−.44 ***	−.64 ***	−.46 ***	−.35 **				
Actor's negative cognition					.12 *	.14 *	.12 *	.07
Partner's negative cognition					.40 ***	.31 ***	.37 ***	.31 ***

*p < .05; **p < .01; ***p < .001.

Table 5. Actor's anger, sadness, and fear predicting partner's relational uncertainty

	Anger predicting outcomes				Sadness predicting outcomes				Fear predicting outcomes			
	S.U.	P.U.	R.U.	P.I.	S.U.	P.U.	R.U.	P.I.	S.U.	P.U.	R.U.	P.I.
Intercept	.86 ***	1.03 ***	.88 ***	1.71 ***	.79 ***	.98 ***	.83 ***	1.69 ***	.99 ***	1.16 ***	1.05 ***	1.63 ***
Slopes												
Actor's anger	.16 ***	.15 **	.18 ***	.10								
Partner's anger	.32 ***	.31 ***	.35 ***	.30 ***								
Actor's sadness					.13 **	.17 **	.18 ***	.12				
Partner's sadness					.41 ***	.33 ***	.38 ***	.30 ***				
Actor's fear									.15 *	.13	.17 *	.08
Partner's fear									.28 ***	.28 ***	.27 ***	.42 ***

$*p < .05$; $**p < .01$; $***p < .001$
S.U.: self uncertainty, P.U.: partner uncertainty, R.U.: relationship uncertainty, P.I.: partner interference.

positively associated with partners' self uncertainty and relationship uncertainty. Moreover, the partner's negative emotion predicted perceptions of partner interference, but actor effects for negative emotions were non-significant.

Discussion

This study employed the relational turbulence model to identify relationship characteristics that predict intensified cognitive and emotional reactions to sex, and it used an APIM to showcase dyadic effects. Our findings highlight reactions to sexual intimacy as a manifestation of relational turbulence in marriage. Moreover, this study's results extend the literatures on relational turbulence and sexual intimacy in two important ways. First, by examining marriage this study extends the relational turbulence model beyond dating contexts to understand the relational influences on sexual intimacy in long-term romantic associations. Second, this study adds to our understanding of relational turbulence and sexual intimacy by considering the dyadic nature of sex in marriage.

Implications for the relational turbulence model

The relational turbulence model identifies relational uncertainty and interference from partners as romantic relationship features likely to heighten reactivity to relational circumstances. We used this framework to identify relationship characteristics that spark intensified cognitive and emotional reactions to marital sexual intimacy. Our results revealed that relational uncertainty (H1) and interference from partners (H2) were negatively associated with sexual satisfaction and positively associated with negative cognition and most negative emotional reactions to sex.

This study also extends the relational turbulence model beyond courtship. Although initial tests of the model focused on the transition to serious commitment, recent research indicates the influence of relational uncertainty and partner interference beyond courtship. Relational uncertainty and interference from partners do not completely dissipate, but stagnate across high levels of intimacy (Solomon & Theiss, 2008). Consequently, researchers have applied the relational turbulence model to understand tensions in marital relationships. For instance, Knobloch (2008) found that married couples report different dyadic sources of relational uncertainty (e.g., children, finances, careers, and external family members) and Steuber and Solomon (2008a,b) investigated relational turbulence when married couples encounter health concerns, such as infertility and breast cancer (Weber & Solomon, 2007). This study adds to the growing body of research that aims to extend the model to the context of marriage.

Although the relational turbulence model applies to sexual intimacy in marriage, relational uncertainty means were relatively low and means for partner interference were below the scale's midpoint. Although our measure was developed specifically for marriage (Knobloch, 2008), these low means imply that relational uncertainty, in particular, may not have been very salient in these marriages. Even given these low levels of relational uncertainty, these characteristics still related significantly as both predictors and outcomes of sexual reactivity. In addition, the present findings should not be

considered causal relationships. Although the relational turbulence model suggests that relationship characteristics should predict reactivity, the associations could work in the opposite direction. In fact, the present partner effects suggest just that. Longitudinal research is required to determine the causal order of these variables.

Our study also contributes to the growing body of research highlighting inter-dependence between partners. Research has documented actor and partner effects for turbulence, such as appraisals of irritations (Theiss & Knobloch, 2009), and turmoil and general negative emotion (Knobloch & Theiss, 2010). Moreover, our study points to the reciprocal effects of an actor's intensified reactions to sexual intimacy predicting the partner's relationship perceptions. Taken together, these studies point to the dynamic and interdependent nature of romantic relationships.

Our results revealed consistent associations between an actor's reactions to sexual intimacy and the partner's relational uncertainty, but the findings concerning part-ner's interference were less consistent. Specifically, actors' sexual satisfaction was the only variable that predicted partners' interference judgments. Why would a partner's relational uncertainty be more sensitive than the partner's perceptions of interference to the actor's reactions to sexual intimacy? We pose two possible explanations for this effect. First, knowledge of a partner's sexual dissatisfaction may be more likely to produce doubt than annoyance. Sensing a partner's unhap-piness with sex may cast doubt on the actor's ability to sexually please the partner and, in turn, raise questions about commitment and fidelity. Second, an actor's emotional and cognitive reactivity is unlikely to produce behavioral disruptions. Although individuals may be aware of their partner's dissatisfaction, cognitions and emotions do not prevent partners from enacting action sequences that help accom-plish personal goals. Of course, these explanations are speculative and future research should explore the reasons behind this divergence between relational uncertainty and partner interference.

Implications for sexual intimacy

This study also contributes to the literature on sexual intimacy. Frequency of sexual contact declines as marriages evolve (e.g., Call, Sprecher, & Schwartz, 1995; Laumann, Gagnon, Michael, & Michaels, 1994), perhaps due to aging, sexual habituation, and challenging life circumstances (Call et al., 1995). In general, dissatisfied and unhappy spouses tend to engage in less sexual contact (Call et al., 1995). Our study suggests that relational uncertainty and interference from partners may account for less frequent sexual contact. Many of the explanations for sexual decline that emerged in prior research reflect heightened relational uncertainty and/or partner interference (e.g., doubts about their partner's attraction to their aging physique, their ability to perform sexually, and their own desire for an aging partner). Moreover, stressful jobs, illness, and childbirth all create relational changes that require realigning goals and routines. Thus, our findings point to relational uncertainty and partner interference as two factors that are related to many of the explanations for sexual decline.

This study also highlights spousal interdependence in reactions to sexual intimacy and relational perceptions. One partner's negative cognitive and emotional reactions to a

sexual episode corresponded with the partner's heightened relational uncertainty. In addition, increased relational uncertainty is associated with more negative reactions to sex. These findings suggest intricate reciprocity between partners' sexual experiences. When one partner experiences relational uncertainty, he/she responds more negatively to sexual episodes. Negative cognitive and emotional reactions to sex are associated with the partner's increased relational uncertainty, who should then also have more negative reactions to the next sexual encounter, which may then further increase relational uncertainty for the first partner. Thus, the negative cycle continues. Just as happy couples tend to have more sex and therefore become even happier (Call et al., 1995), couples experiencing relationship problems have more dissatisfying sex and therefore experience even more relationship dissatisfaction. Of course, as noted before, these data were not designed to assess causality, so these reciprocal patterns are speculative. If this pattern is causal, however, this spiraling negativity has important relational ramifications (e.g., partners might become more withdrawn both sexually and relationally). Future research should model causality between these variables to identify strategies and interventions to break the negative spiral.

Strengths, limitations, and future directions

This study has a number of strengths. First, this study answers the call for dyadic data to consider both partners relationship perceptions. Moreover, we obtained a relatively large sample of married couples. Second, we capitalized on the dyadic data by employing an APIM to examine how possessive – partners' relationship perceptions and reactions to sexual intimacy are interrelated. These analytic strategies significantly extend both the relational turbulence model and the literature on sexual intimacy. Third, this study extends the relational turbulence model to marriage, which, to date, has been largely uncharted territory for the model. Finally, this study advances the literature on sexual intimacy in two important ways: (i) unlike many studies of sexual intimacy that focused on dating or casual sex, we investigated sexual involvement in marriage; and (ii) the identification of relational uncertainty and interference from partners as two relationship qualities that shape spouses' sexual perceptions.

Although our dyadic data marks a significant strength, the fact that couples completed questionnaires at home meant that we had no control over the data collection, including the independent completion of questionnaires. Second, given that most couples had been married for several years, we cannot generalize these findings to new marriages. Future studies should sample from marriages at all stages of development. Finally, our cross-sectional data limits our causal conclusions. Longitudinal data would help to parse the sources of influence. We encourage researchers to investigate these associations longitudinally in future research.

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Conflict of interest statement

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