

The Longitudinal Association of Relationship Satisfaction and Sexual Satisfaction

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

Several prominent models of relationship satisfaction and sexual satisfaction imply directional relationships between these constructs (e.g., attachment theory, social exchange models of relationship satisfaction, the interpersonal exchange model of sexual satisfaction). Previous research has demonstrated that sexual satisfaction and relationship satisfaction are distinct but correlated constructs, but relatively few studies have examined how they are related over time. Thus, the first purpose of this study was to examine this association. The second purpose of this study was to test positive, negative, and sexual communication as potential mediators of the longitudinal association between sexual and relationship satisfaction. A sample of heterosexual couples ($N = 113$) completed a longitudinal study spanning two years. At Time 1 they completed measures of relationship satisfaction, sexual satisfaction, and communication (positive, negative, and sexual). At Time 2 they completed the same measures of relationship satisfaction and sexual satisfaction. Data were analyzed according to the principles of the actor-partner interdependence model using structural equation modeling. Significant actor effects were detected such that, for both men and women, one's own earlier sexual satisfaction predicted one's later relationship satisfaction, while one's own earlier relationship satisfaction did not significantly predict one's subsequent sexual satisfaction. Sexual satisfaction was a stronger predictor of subsequent relationship satisfaction for men than women. There were no significant partner effects. Negative communication mediated the association between earlier sexual satisfaction and later relationship satisfaction for women but not men. Positive communication and sexual communication did not mediate the association for men or women. These results contribute to our theoretical understanding of sexuality and sexual satisfaction in the context of long-term relationships by providing support for theories that conceptualize sexual satisfaction as one factor that contributes to relationship satisfaction.

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Dedication

To my parents, John and Barbara Fallis.

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The Longitudinal Association of Relationship Satisfaction and Sexual Satisfaction

Individuals in happy marriages experience a number of benefits, including greater happiness and life satisfaction (Gove, Style, & Hughes, 1990) and better physical and mental health (Levenson, Carstensen, & Gottman, 1993; Murray, 2000). In comparison, individuals who divorce or maintain unhappy marriages may experience negative consequences. For example, individuals in continuously unhappy marriages have lower overall levels of happiness, lower self-esteem, and experience more psychological symptoms relative to those in happy marriages (Hawkins & Booth, 2005), while individuals who divorce may experience temporary or long-standing decreases in well-being (Amato, 2000). Similarly, children of highly distressed or divorced couples may experience negative consequences including poorer school achievement, psychological adjustment, and relationships with each parent (Amato, 2000; Amato & Keith, 1991a; Amato & Keith, 1991b; Booth & Amato, 2001). Given the benefits of happy marriages and the potential consequences of marital distress and divorce, a great deal of research has focused on understanding factors that contribute to relationship satisfaction and stability.

Interestingly, a meta-analysis examining the relative strength of a number of predictors of relationship stability found that relationship satisfaction and sexual satisfaction were the strongest predictors for both men and women (Karney & Bradbury, 1995). More specifically, sexual satisfaction was the strongest predictor of men's relationship stability and relationship satisfaction was the strongest predictor of women's relationship stability, while the reverse comprised the second strongest predictors (Karney & Bradbury, 1995). Given the importance of both sexual satisfaction and relationship satisfaction in contributing to men and women's relationship stability, it is important to understand how sexual satisfaction and relationship

satisfaction are associated over time, whether the association varies by gender, and to identify factors that influence the association.

Although it is fairly easy to intuit what is meant by the terms *relationship satisfaction* and *sexual satisfaction*, it is important to define these constructs with regard to the parameters of the current study. The definition of *sexual satisfaction* proposed by Lawrance and Byes (1995) – “an affective response arising from one’s subjective evaluation of the positive and negative dimensions associated with one’s sexual relationship” (p. 268) – has been adopted because it includes both affective and cognitive elements as is typical in psychological research of constructs related to satisfaction and well-being (Byers & Rehman, 2013). To maintain consistency between the definitions of relationship and sexual satisfaction, Lawrance and Byers’ definition of sexual satisfaction has been adapted to define *relationship satisfaction* as “an affective response arising from one’s subjective evaluation of the positive and negative dimensions associated with one’s romantic relationship.”

Before considering how relationship satisfaction and sexual satisfaction are related, it is necessary to address the conceptual question of whether they are distinct constructs. Several lines of research support the notion that relationship satisfaction and sexual satisfaction are distinct. First, there is research demonstrating that the extent to which sexual satisfaction and relationship satisfaction are related varies between individuals. For example, the associations vary for individuals who differ on characteristics such as level of constructive communication (Litzinger & Gordon, 2005), attachment style (Birnbaum, Reis, Mikulincer, Gillath, & Orpaz, 2006; Butzer & Campbell, 2008), and gender (Hasselbrauk & Fehr, 2002; Sprecher, 2002). If relationship satisfaction and sexual satisfaction were not distinct constructs, the associations would be consistent across individuals. Second, individuals with high relationship satisfaction and low

sexual satisfaction, and high sexual satisfaction and low relationship satisfaction have been identified in empirical studies (Apt, Hurlbert, Pierce, & White, 1996; Hurlbert & Apt, 1994). If relationship satisfaction and sexual satisfaction were not distinct, we would expect only to find individuals who were either satisfied in both domains or not satisfied in both domains. Third, research attempting to identify the dimensional structure that underlies the construct of relationship satisfaction has identified four dimensions: intimacy, agreement, independence, and sexuality (Hasselbrauk & Fehr, 2002). Notably, of the four dimensions, sexuality contributed the least variance to overall relationship satisfaction scores (Hasselbrauk & Fehr, 2002). Thus, the results of empirical studies provide compelling evidence that relationship satisfaction and sexual satisfaction are distinct constructs.

Although they are distinct constructs, a great deal of research demonstrates that sexual satisfaction and relationship satisfaction are positively correlated. This association is robust and has been demonstrated across a variety of adult populations including those who are dating (e.g., Byers, Demmons, & Lawrance, 1998; Davies, Katz, & Jackson, 1999; Sprecher, 2002), in long-term relationships (e.g., Blumstein & Schwartz, 1983; Lawrance & Byers, 1995), and married (e.g., Butzer & Campbell, 2008; Cupach & Comstock, 1990, Yeh et al., 2006). The association has also been found in different countries including Canada (e.g., Butzer & Campbell, 2008; Lawrance & Byers, 1995), the United States (e.g., Cupach & Comstock, 1990; Young, Denny, Luquis, & Young, 1998), Germany (Hasselbrauk & Fehr, 2002), Finland (Haavio-Mannila & Kontula, 1997), and Israel (Birnbaum et al., 2006). Typically correlations for both men and women fall between .4 and .7 (Butzer & Campbell, 2008; Byers & MacNeil, 2006; Cupach & Comstock, 1990; Edwards & Booth, 1994; Hasselbrauk & Fehr, 2002; Lawrance & Byers, 1995; Morokoff & Gilliland, 1993; Peck, Shaffer, & Williamson, 2004; Perlman & Abramson, 1982;

Sanchez, Moss-Racusin, Phelan, & Crocker, 2011; Sprecher, 2002; Yeh, Lorenz, Wickrama, Conger, & Elder Jr., 2006; Young, Denny, Luquis, & Young, 1998; Yucel & Gassanov, 2010).

Despite the influence these constructs may have upon one another, relatively few studies have examined how they are related over time. Our lack of knowledge about their association represents an important gap in our understanding of these variables. Indeed, empirically examining these associations will provide important information for refining our models of relationship and sexual satisfaction. Models of relationship satisfaction and/or sexual satisfaction tend to either imply directional relationships (e.g., attachment theory, social exchange theory) between these constructs, or fail to address the nature of this association (e.g., behavioural models of marriage). Yet, it is important to have an empirically supported understanding of how these constructs are related. Failure to find evidence of an association over time or finding that the association only exists for certain individuals would provide a more nuanced understanding for further model development. This information also has potential clinical relevance. Specifically, if data indicate that one causal pathway is stronger than the other, this result can inform which sorts of preventative intervention efforts are most likely to be beneficial, and may indicate treatments that focus on the causal pathway as opposed to the dependent variable.

Several theoretical perspectives suggest that relationship satisfaction and sexual satisfaction are causally linked. One relevant perspective comes from attachment theory. Supporting the notion that sexual satisfaction influences subsequent relationship satisfaction, attachment theorists argue, “relationship satisfaction depends largely on the satisfaction of basic needs for comfort, care, and sexual gratification” (Hazan & Shaver, 1994, p. 13). A second relevant perspective comes from social exchange theory (Levinger, 1980; Rusbult, 1983; Kelley & Thibaut, 1978). When applied to romantic relationships, social exchange theories posit that

relationship satisfaction is influenced by three factors: rewards (i.e., “whatever gives pleasure and gratification to the person” Kelley & Thibaut, 1978, p. 8), costs (e.g., “factors such as physical or mental effort or pain, embarrassment or anxiety” Kelley & Thibaut, 1978, p. 8), and one’s comparison level (i.e., “the standard against which the participant evaluates the ‘attractiveness’ of the relationship or how satisfactory it is” Kelley & Thibaut, 1978, p. 8-9). The theory proposes that relationship satisfaction will be greater to the extent that a relationship provides more rewards, fewer costs, and experiences of the relationship exceed an individual’s expectations (Rusbult, 1983). From this perspective, one’s satisfaction with the sexual component of one’s relationship can be conceptualized as an important factor that may be experienced as either a reward or cost. Consequently, one’s level of sexual satisfaction would be expected to influence one’s subsequent relationship satisfaction.

A tentative argument for the opposite direction of causation comes from Byers and colleagues. Based on social exchange theories, Byers and colleagues (Byers, Demmons, & Lawrance, 1998; Byers & MacNeil, 2006; Lawrance & Byers, 1995) developed the interpersonal exchange model of sexual satisfaction (IEMSS), which posits that sexual satisfaction is influenced by four factors over time: the individual’s perceptions of the rewards associated with the sexual relationship, the costs associated with the sexual relationship, his or her perceived comparison level, and his or her perception of the level of equality of the couple’s rewards and costs (Lawrance & Byers, 1995). Data gathered by Lawrance and Byers (1995) supported directional pathways from sexual satisfaction to relationship satisfaction and relationship satisfaction to sexual satisfaction. Consequently, the authors added relationship satisfaction to the IEMSS as a predictor of sexual satisfaction, but noted that more research is needed to understand the direction of the association (Lawrance & Byers, 1995).

Some studies have collected relationship and sexual satisfaction data from individuals over time, but have not examined the associations between these variables longitudinally (e.g., Byers & MacNeil, 2006; Lawrance & Byers, 1995). Other studies have looked at the longitudinal association between these variables and have yielded contradictory findings. Edwards and Booth (1994) interviewed a sample of married individuals in 1980 and again in 1988. Using difference scores, they found that the amount of change in people's happiness with their sexual relationships was positively correlated with the amount of change in their marital happiness, providing evidence for the association of these variables over time. These findings do not speak to directionality of the relationship, however.

Henderson-King and Veroff (1994) examined the associations between joyful sex (i.e., "the feeling that sex was joyful and exciting" p. 517) and sexual upset (i.e., "the frequency of feeling upset about sex" p. 517), feelings of affirmation and tension in one's marriage, and four aspects of marital well-being (i.e., marital happiness, marital equity, marital competence, marital control) in a sample of newlywed couples during their first and third years of marriage. Examining their data using cross-lagged correlations, they found no differences in the strength of the correlations between Year 1 sexual feelings and Year 3 feelings of affirmation or tension in one's marriage and Year 1 feelings of affirmation and tension in one's marriage and Year 3 sexual feelings (Henderson-King & Veroff, 1994). Based on this finding, they concluded that the association was likely reciprocal.

Following a sample of dating couples over five years, Sprecher (2002) found that changes in sexual satisfaction were positively associated with changes in relationship satisfaction (as well as love and commitment), but that sexual satisfaction was not a significant predictor of subsequent relationship satisfaction, nor was relationship satisfaction a significant predictor of

subsequent sexual satisfaction. Sprecher suggested that the influence of one variable on the other might occur “almost simultaneously,” (p. 195) in which case it would not be detected in her data.

Similarly, Byers (2005) failed to find evidence of a causal relationship between relationship satisfaction and sexual satisfaction, although she found scores on these variables changed concurrently. Nonetheless, exploratory analyses revealed that (a) relationship satisfaction predicted subsequent sexual satisfaction for people whose sexual satisfaction had increased, but not for people whose sexual satisfaction had decreased and (b) sexual satisfaction predicted subsequent relationship satisfaction for people whose relationship satisfaction had decreased, but did not for those whose relationship satisfaction had increased. Based on these results, Byers proposed, “there may not be a single causal direction between relationship satisfaction and sexual satisfaction. Rather, it may be that in some situations or for some individuals, low sexual satisfaction causes a decrease in relationship satisfaction” (Byers, 2005, p. 117).

Finally, Yeh and colleagues (2006) examined the associations between marital satisfaction, sexual satisfaction, and marital stability in a sample of married couples who completed questionnaires on five occasions over 11 years. The results showed that, for both men and women and controlling for demographic and personality variables, greater sexual satisfaction predicted greater marital satisfaction and decreased marital instability at the next time point. Marital satisfaction and marital instability did not predict subsequent sexual satisfaction. They also found that marital satisfaction mediated the relationship between sexual satisfaction and marital instability.

Together the results from these studies provide strong evidence that relationship satisfaction and sexual satisfaction change concurrently, but they do not clearly demonstrate the

nature of this association. Further, in considering these results it is important to note a number of methodological limitations. First, as noted by Byers (2005), because Henderson-King and Veroff (1994) used cross-lagged correlations they did not appropriately control for the baseline association between the two variables. Second, Sprecher (2002) used a two-item measure of sexual satisfaction, which may not provide a good operationalization of the construct. Third, Byers (2005) recruited a heterogeneous sample comprised of individuals in both dating and marital relationships and students, university staff, and community members of whom relatively few (36%) completed the both parts of the study. These participants also completed the study by mail, so it was not possible to ensure respondents had privacy while completing their questionnaires. Thus, it is possible that Sprecher and Byers failed to find the associations they predicted due to the methodological limitations of their research designs. Although Yeh et al. (2006) improved upon past research by collecting data from both partners within a couple and analyzing their data using Structural Equation Modeling (SEM), they used a two-item measure of relationship satisfaction and did not directly test for gender effects in the association between relationship satisfaction and sexual satisfaction. Despite its limitations, the methodology used by Yeh et al. is expected to provide the best information for understanding the association between sexual satisfaction and relationship satisfaction over time.

The Present Research

The present research builds on the methodology employed by Yeh et al. (2006), while extending this work by testing gender effects and examining the role of two additional factors (i.e., partner effects and communication) in influencing the longitudinal association between relationship satisfaction and sexual satisfaction. Additionally, the proposed research addresses methodological limitations of previous studies by using multi-item measures of relationship

satisfaction, sexual satisfaction, and communication that have been previously validated and demonstrated to have strong psychometric properties; by gathering data from a sample of heterosexual couples as opposed to individuals; and by using data analytic methods (discussed in further detail below) that appropriately control for the interdependence present in couple data.

Research question 1: What is the nature of the association between relationship satisfaction and sexual satisfaction over time?

The first purpose of the current study was to examine the direction of the longitudinal association between relationship satisfaction and sexual satisfaction. Consistent with social exchange models of relationship satisfaction (e.g., Levinger, 1980; Rusbult, 1983; Kelley & Thibaut, 1978) and attachment theory perspectives (e.g., Hazan & Shaver, 1994), as well as the results of research by Yeh and colleagues (2006), it was hypothesized that earlier sexual satisfaction would predict later relationship satisfaction, controlling for initial levels of relationship satisfaction. The model used to investigate this hypothesis also tested the possibilities that earlier relationship satisfaction predicts later sexual satisfaction, while controlling for initial levels of sexual satisfaction (as posited by Byers' and colleagues IEMSS; Lawrance & Byers, 1995), and that the association between relationship satisfaction and sexual satisfaction is bidirectional (as proposed by Sprecher, 2002). Additionally, the synchronous common factor model, which posits that relationship satisfaction and sexual satisfaction both load onto a general factor (e.g., a "general satisfaction" factor) that is relatively stable over time, was evaluated.

It is possible that the strength of the association between relationship satisfaction and sexual satisfaction varies depending on how important people consider it to be sexually satisfied in their relationships. No previous studies have examined this issue, so exploratory analyses were

conducted. Specifically, the study examined whether the extent to which one considers being sexually satisfied in his or her relationship to be important moderates the association between his or her sexual satisfaction and relationship satisfaction. Tentatively, it was predicted that the association would be stronger for individuals who place more importance on being sexually satisfied relative to those who place less importance on being sexually satisfied.

Research question 2: How do one's partner's relationship satisfaction and sexual satisfaction relate to changes in one's own relationship satisfaction and sexual satisfaction?

Just as one's own sexual satisfaction can be conceptualized as a reward or cost in one's romantic relationship, so too can one's partner's sexual satisfaction be viewed as a potential reward or cost (Byers & MacNeil, 2006). Previous research has not examined the impact of one's partner's level of sexual satisfaction on one's relationship satisfaction over time. However, two studies have examined partner effects using cross-sectional designs. Byers and MacNeil (2006) found that one's partner's balance of sexual rewards and costs explained unique variance in one's own sexual satisfaction above and beyond one's own relationship satisfaction and sexual exchange variables, for both men and women. Unfortunately, they did not examine partner relationship satisfaction in their analyses. Yucel and Gassanov (2010) examined whether one's own and one's partner's relationship satisfaction predicted one's own sexual satisfaction. They found significant partner effects such that one's partner's relationship satisfaction predicted one's own sexual satisfaction above and beyond one's own level of relationship satisfaction (Yucel & Gassanov, 2010).

Because these studies are cross-sectional, they provide strong evidence that partner variables are relevant to one's sexual satisfaction and relationship satisfaction, but do not provide a stringent test of the direction of the association. Thus, given that one's partner's sexual

satisfaction can be viewed by an individual as a reward or cost in his or her romantic relationship, it was hypothesized that one's partner's earlier sexual satisfaction would predict one's own later relationship satisfaction, controlling for initial levels of one's own relationship satisfaction and sexual satisfaction. The model used to test this hypothesis also tested two alternative possibilities: that one's partner's relationship satisfaction predicts changes in one's own sexual satisfaction, and that one's partner relationship satisfaction and sexual satisfaction are bidirectionally related to one's own relationship satisfaction and sexual satisfaction. Consistent with the findings of Yucel and Gassanov (2010) and with research suggesting that partner effects generally tend to be weaker than actor effects (Kenny & Malloy, 1988), it was predicted that actor effects would be stronger than partner effects.

Research question 3: Does the nature of the longitudinal association between relationship satisfaction and sexual satisfaction differ for men and women?

There are theoretical reasons to expect gender differences in the association between relationship satisfaction and sexual satisfaction. One line of reasoning suggests that sexual satisfaction should be more strongly associated with men's relationship satisfaction than women's relationship satisfaction, because sexuality is thought to be more important to men than women (Byers, 2005; Sprecher, 2002). The results of a few studies have supported this notion (e.g., Hassebrauck & Fehr, 2002; Sprecher, 2002). Researchers have also posited that the association between relationship satisfaction and sexual satisfaction should be stronger for women, as women must feel their relationships are going well in order to enjoy sex (Byers, 2005; Edwards & Booth, 1994; Schwartz & Young, 2009). Byers (2005) examined gender effects in her study of the longitudinal association between relationship satisfaction and sexual satisfaction, and found no differences between men and women. Given that relatively few studies have

directly examined gender differences in the association between relationship satisfaction and sexual satisfaction, and because there are theoretical reasons to expect gender differences in opposite directions, gender differences were examined, but no specific hypotheses were proposed.

Research question 4: Does couple communication mediate the longitudinal association of relationship satisfaction and sexual satisfaction?

General communication.

One factor consistently found to be associated with relationship satisfaction is the nature of couples' communication (referred to here onward as general communication; Bradbury, Fincham, & Beach, 2000; Heavey, Layne, & Christensen, 1993; Gottman, 1998). Indeed, both self-reported perceptions of the quality of communication between partners and behaviours observed during couples' discussions are robustly related to relationship satisfaction. More specifically, self-report and observational studies suggest that distressed couples' communication is more negative than nondistressed couples' communication (Gottman, 1998; Heyman, 2001). In particular, compared to nondistressed couples, distressed couples are more hostile, engage in fewer positive behaviours, and more often engage in negative reciprocity (i.e., once negative communication has begun each partner tends to respond negatively, causing conflict to escalate), and the demand-withdraw communication pattern (i.e., "one partner pressures the other through emotional demands, criticisms, and complaints, while the other retreats through withdrawal, defensiveness, and passive inaction" Christensen & Heavey, 1990; p. 73; Gottman, 1998; Heyman, 2001).

General communication has also been shown to relate to sexual satisfaction. Cupach and Metts (1989) argue that communication is an essential element for satisfying sexual

relationships, citing research showing that general communication predicts the sexual satisfaction of married people (Schenk, Pfrang, & Rausche, 1983). Additionally, previous research has demonstrated that relationally dissatisfied and sexually dissatisfied couples engage in similar types of problematic communication behaviours (Zimmer, 1983).

In the literature, communication has been conceptualized and operationalized differently across studies. One aspect of communication that has received a substantial attention is self-disclosure. Research has consistently demonstrated that greater self-disclosure is associated with greater sexual satisfaction (Byers & Demmons, 1999; MacNeil & Byers, 2005; MacNeil & Byers, 2009). Another conceptualization of general communication that has been examined in relation to sexual satisfaction is the effectiveness of couples' communication. Although it is somewhat unclear how the authors defined effective communication, the self-report measure used to measure the construct was developed to assess "the extent to which partners feel they are able to express themselves and feel understood in their relationships" (Montesi, Rauber, Gordon, & Heimberg, 2011, p. 596). Similar to self-disclosure, more effective communication was associated with greater sexual satisfaction (Montesi et al., 2011). Using the same measure, Byers (2005) found that "quality of intimate communication" was correlated with changes in sexual and relationship satisfaction and partially mediated the relationship between changes in these variables.

Sexual communication.

Another variable expected to influence the longitudinal association of relationship satisfaction and sexual satisfaction is the quality of couples' communication about sexual topics specifically (referred to here onward as sexual communication). Cupach and Metts (1991) proposed two mechanisms by which sexual communication could influence relationship

satisfaction and sexual satisfaction. The mechanisms were subsequently elaborated on and labeled the Instrumental Pathway and the Expressive Pathway by Byers and her colleagues. According to MacNeil and Byers (2005), the instrumental pathway is posited to work such that when individuals disclose information about their sexual preferences to their romantic partners, the partners learn information that helps couples develop maximally satisfying sexual scripts (i.e., a couple's tacit understanding that guides when, where, and how they have sex; Simon & Gagnon, 1986), which contributes to increased sexual satisfaction. The expressive pathway is posited to work such that when individuals engage in sexual self-disclosure with their romantic partners, it fosters the development of intimacy and relationship satisfaction for the couple, which in turn contributes to greater sexual satisfaction (MacNeil & Byers, 2005). Byers and her colleagues have conducted a series of studies that largely support the existence of these pathways (Byers & Demmons, 1999; MacNeil & Byers, 2005; MacNeil & Byers, 2009).

Similar to general communication, multiple conceptualizations and operationalizations of sexual communication exist in the literature. Much of the research on sexual communication has focused on sexual self-disclosure (i.e., extent of disclosure about one's sexual likes and dislikes to one's partner). For example, research has demonstrated that dating couples disclose more about their nonsexual likes and dislikes relative to their sexual likes and dislikes (Byers & Demmons, 1999). Sexual self-disclosure is positively associated with both relationship satisfaction and sexual satisfaction (Byers & Demmons, 1999; MacNeil & Byers, 2005; MacNeil & Byers, 2009).

Sexual communication has also been conceptualized as one's satisfaction with the sexual communication in one's relationship (e.g., Cupach & Comstock, 1990; Montesi, Rauber, Gordon, & Heimberg, 2011; Wheelless, Wheelless, & Baus, 1984). This construct too has been

shown to be positively associated with sexual satisfaction (Cupach & Comstock, 1990; Montesi et al., 2011). Unfortunately, it is difficult to interpret this finding, as both the conceptualization and operationalization of the variable are problematic. Specifically, the conceptualization is problematic in that one couple might choose not to discuss their sexual relationship and be satisfied with this decision, despite the fact that research on sexual self-disclosure suggests this is not a beneficial strategy. Meanwhile, another couple might engage in significantly more discussion of sexual topics, but might desire yet more communication and thus be less satisfied. The operationalization of the construct is problematic because it is unclear what the Sexual Communication Satisfaction Scale (SCSS; Wheelless, Wheelless, & Baus, 1984), the typical measure of satisfaction with sexual communication, truly assesses. The SCSS was initially designed to include equal numbers of items tapping four “subconcepts” of sexual communication satisfaction: general satisfaction with one’s level of communication about sexual topics, the extent to which people discuss sexual behaviours with which they are satisfied (but not behaviours with which they are dissatisfied, arguably an important element of sexual communication), satisfaction with what people perceive as being communicated by particular sexual behaviours, and willingness/ability to talk about sex with one’s partner (Wheelless, Wheelless, & Baus, 1984). Based on the results of a factor analysis 14 items were dropped, while the remaining items were found to load on a single factor. The authors failed to characterize the items that were retained and dropped and thus it is unclear which of the four subconcepts, or combination thereof, the measure captures.

A third relevant conceptualization of sexual communication is “understanding” (i.e., the accuracy of one’s perceptions of one’s partner’s sexual preferences; Purnine & Carey, 1997). Research into this construct has produced results that differ somewhat from other

conceptualizations. For example, men's greater understanding of their partners' sexual preferences is associated with greater sexual satisfaction for both men and women, while women's understanding is significantly associated only with their own sexual satisfaction (Purnine & Carey, 1997). Understanding is not associated with either men or women's relationship satisfaction, however (Purnine & Carey, 1997). In considering these results, it is important to note that measuring one's understanding of one's partner's sexual preferences may be more accurately conceptualized as an *outcome* of communication processes as opposed to a direct measure of sexual communication.

In the current study, sexual communication is conceptualized as individuals' perceived (i.e., self-reported) quality of communication within the context of their sexual relationships. Quality is considered different from satisfaction in that quality is determined relative to objective standards, rather than subjective satisfaction with behaviours that may or may not be beneficial. More specifically, perceived quality encompasses people's perceptions of how comfortable they are discussing sexual topics within their relationships and how well they expect discussions of sexual topics to go. A focus on perceptions of sexual communication is warranted as research into a variety of relationship domains has demonstrated that perceptions are often more important than objective "truths" in driving many relationship processes. For example, Murray, Holmes, Bellavia, Griffin, and Dolderman (2002) found that when people perceived their romantic partners as more similar to themselves than was accurate, they were more satisfied in their relationships than when they more accurately perceived their partners as less similar to themselves.

Previous research with general and sexual communication.

Only a few studies have examined the associations between relationship satisfaction,

sexual satisfaction, general communication, and sexual communication. Litzinger and Gordon (2005) examined the cross-sectional associations between three of these four variables: relationship satisfaction, sexual satisfaction, and general communication. In their study, general communication was operationalized as couples' perceptions of the extent to which they engage in both positive (e.g., mutual discussion, expression of emotions, negotiation) and negative communication behaviours (e.g., demand-withdraw, mutual blame, avoidance). Sexual satisfaction was found to moderate the association between marital communication and relationship satisfaction such that when the level of constructive communication was high, sexual satisfaction was not related to relationship satisfaction, but when the level of constructive communication in the relationship was low, sexual satisfaction predicted relationship satisfaction. The authors speculated that better sexual satisfaction might buffer the negative impacts of poorer communication on relationship satisfaction (Litzinger & Gordon, 2005).

Montesi et al. (2011) examined the associations between all four variables in a sample of undergraduate student couples. They found that both general communication and sexual communication predicted unique variance in relationship satisfaction, while only sexual communication predicted unique variance in sexual satisfaction.¹ They also found support for the hypothesis that sexual satisfaction partially mediates the association between sexual

¹ The main effect of sexual communication in predicting relationship satisfaction was qualified by a significant three-way interaction between sexual communication, relationship length, and gender. Specifically, sexual communication was more strongly associated with relationship satisfaction for males than for females, and the association was stronger for males who had been in relationships for less than one year relative to males in relationships longer than one year. For women, the association was stronger for those in relationships longer than one year relative to those in relationships less than one year.

The main effect of sexual communication in predicting sexual satisfaction was qualified by a two-way interaction between sexual communication and relationship length such that the association was stronger for people who had been in relationships longer than one year relative to people in relationships less than one year.

communication and relationship satisfaction, but did not test any alternative models.

In reviewing these studies it becomes clear that the researchers have examined similar sets of questions, but drawn quite different conclusions about how these constructs are related. A theoretical perspective that can guide thinking about how general and sexual communication relate to sexual satisfaction and relationship satisfaction is the vulnerability-stress-adaptation model (Karney & Bradbury, 1995). This model was developed in order to explain why relationship satisfaction changes over the course of marriage (Karney & Bradbury, 1995). In part, the model suggests that adaptive processes mediate the associations of both enduring vulnerabilities and stressful events to couples' relationship satisfaction. Adaptive processes include things such as communication and the nature of the attributions people make for their partners' behaviour (Karney & Bradbury, 1995). Consistent with the vulnerability-stress-adaptation model, both general communication (conceptualized as by Litzinger & Gordon, 2005) and sexual communication can be viewed as adaptive processes that will mediate the association between sexual satisfaction (which, when low, is a potential stressor within the relationship) and relationship satisfaction over time. It is reasoned that that better communication (both in general and specific to the sexual relationship) is an adaptive process that gives couples a method by which to process dissatisfying sexual experiences and build intimacy.

Given that previous research has shown general communication and sexual communication predict variance in relationship satisfaction (Montesi, Rauber, Gordon, & Heimberg, 2011), it is important to examine the impacts of both variables. The vulnerability-stress-adaptation model implies that these adaptive processes would function similarly and thus, their effects were hypothesized to be additive.

Method

Participants

A sample of 117 heterosexual couples was recruited from the community to participate in a longitudinal study examining the effects of interpersonal factors on sexual satisfaction and sexual functioning. Couples were recruited from Kitchener, Waterloo, Cambridge, and Guelph using posters placed in local businesses and offices of physicians and mental health professionals, referrals from physicians and mental health professionals, advertisements placed in local newspapers, and online classified ads (e.g., Kijiji). All recruitment materials were titled either “couples needed for relationship study” or “are you having relationship problems?” and included a detailed description of the purpose of the study, the eligibility criteria, and the study procedure. The online classified ads, newspaper ads, and posters had the highest success rates, while couples referred by couples and sex therapists represented a very small percentage (approximately 2%) of the total sample. Four couples who completed the initial assessment were deemed ineligible for the study because it became apparent during the assessment that they did not meet the eligibility criteria described below. Thus, the final sample was 113 couples.

In order to be eligible for the study, participants either had to be married or have been living together as if married for a minimum of two years. In order to ensure that both married ($n = 81$) and cohabiting couples ($n = 32$) were similarly committed to their relationships, cohabiting couples were required to have been living together for a minimum of two years. There were no significant differences between the levels of commitment reported by women who were married ($M = 93.72$; $SD = 9.41$) and cohabiting ($M = 92.28$; $SD = 9.06$), $t(109) = 0.74$, $p = .461$, or men who were married ($M = 94.27$; $SD = 8.96$) and cohabiting ($M = 94.77$; $SD = 7.11$), $t(108) = -0.28$, $p = .778$. In addition, both members of the couple had to be between the ages of 21 and 65

at the time of the first assessment, and both members of the couple had to report being able to speak and read English at a grade 8 level to ensure that they would be able to accurately understand and complete all of the study measures. Given that new parents tend to be discontent with their sex lives (Ahlborg, Dahlof, & Hallberg, 2005), and consistent with other studies examining the effects of interpersonal factors on sexual satisfaction (e.g., Purnine & Carey, 1997), the female partner could not have given birth during the six months prior to her participation in the first study assessment.² Finally, both members of the couple had to be willing to participate in the study.

At the time of the initial lab assessment, couples had been together for an average of 10.47 ($SD = 9.97$) years. Of the couples who participated, 39% ($n = 44$) had no children and the remaining couples had an average of 2.36 ($SD = 1.31$) children (including biological, step, and adopted children); 15% of couples ($n = 17$) experienced the birth of a child during the course of the study.³ Consistent with the population of Kitchener-Waterloo and the surrounding area, the majority of the sample was White (87% of men and 93% of women). Please see Table 1 for a description of male and female participants' individual demographic characteristics.

² Although women who had given birth during the six months prior to their Time 1 assessment were not eligible to participate in the study, a small subset of the participating couples experienced the birth of a child during the course of the study ($n = 17$). This sample is too small to allow hypothesis testing, but key study hypotheses were evaluated both including and excluding these couples.

³ Given that relationship length and number of children are dyadic variables, male and female partners' reports of these variables were averaged in order to provide more reliable estimates compared to their individual reports. Individual variables (e.g., age, education) were examined separately for men and women.

Measures

Background Questionnaire.

This questionnaire was developed for the current study. It gathered information about participants' demographic characteristics (e.g., age, income, educational achievement), their relationship histories (e.g., marital status, relationship length) and their individual sexual histories. It also included an item that asked, "To what extent is being sexually satisfied in your relationship important to you?" Participants responded on a five-point scale that ranged from 0 (*Not at All Important*) to 4 (*Extremely Important*). An abbreviated version of this questionnaire was administered during the Time 2 assessment. The Time 2 background questionnaire assessed changes in relationship status, separations, employment, children, and medications during the past year and gathered an updated sexual history.

Broderick Commitment Scale (Beach & Broderick, 1983).

The Broderick Commitment Scale provides a definition of commitment before asking participants to report on their commitment to their current relationships on a scale from 0 (*Not at All Committed*) to 100 (*Completely Committed*). The Broderick Commitment Scale has been shown to distinguish between clinical and nonclinical samples and to have good construct validity (Beach & Broderick, 1983). This measure was used for descriptive purposes and was administered at Time 1 and Time 2.

Quality of Marriage Index (QMI; Norton, 1983).

The QMI is a 6-item questionnaire that assesses participants' satisfaction with their current romantic relationships. Participants rated their agreement with five statements such as "We have a good relationship" on a scale from 1 (*Very Strongly Disagree*) to 7 (*Very Strongly Agree*). They also rated their overall happiness in the relationship on a scale from 1 (*Very*

Unhappy) to 10 (*Perfectly Happy*). Scores on the QMI range from 6 to 45 with higher scores indicating greater relationship satisfaction. The QMI is a frequently used measure of relationship satisfaction that has been shown to have good construct, convergent, and discriminant validity and high internal consistency (Heyman, Sayers, & Bellack, 1994). Additionally, the QMI is an evaluative, global measure of relationship satisfaction, consistent with the definition of relationship satisfaction used in the current study. The QMI was administered at each time point and showed excellent internal consistency in the current sample (see Table 2).

Index of Sexual Satisfaction (ISS; Hudson, 1993).

The ISS is a 25-item measure of sexual satisfaction within a relationship. Participants responded to the items on a scale from 1 (*None of the Time*) to 7 (*All of the Time*). The ISS is typically scaled such that scores range from 0 to 100 with lower scores indicating greater sexual satisfaction. However, for ease of communication, scores on the ISS have been rescaled so that higher scores indicate greater sexual satisfaction. This was accomplished by calculating the ISS scores using the original formula and then subtracting the total from 100. The ISS is a frequently used measure of sexual satisfaction. It has been shown to distinguish between individuals who are and are not experiencing sexual problems and has been shown to have good construct and discriminant validity in diverse populations (Hudson, Harrison, & Crosscup, 1981). The ISS was administered at each time point and showed excellent internal consistency in the current sample (see Table 2).

Dyadic Sexual Communication Scale (DSCS; Catania, 1998).

The DSCS is 13-item questionnaire that assesses participants' perceptions of the quality of their communication about sexual topics as a couple. Participants rated their agreement with statements such as "My partner rarely responds when I want to talk about our sex life" on a scale

from 1 (*Disagree Strongly*) to 6 (*Agree Strongly*). Scores on the DSCS range from 13 to 78 with higher scores indicating better perceived quality of communication about sexual issues within the relationship. Previous research has demonstrated that scores on the DSCS distinguish between individuals with and without sexual problems and that it has good internal consistency (Catania, 1998). The DSCS was administered at Time 1 and showed good internal consistency in the current sample ($\alpha = .86$ for men; $\alpha = .82$ for women).

Communication Patterns Questionnaire – Short Form (CPQ-SF; Christensen, 1988).

The CPQ-SF is an 11-item self-report measure used to assess participants' perceptions of the degree to which they engage in several common marital communication behaviours and patterns as a couple. The communication behaviours assessed include mutual discussion, avoidance, expression of feelings, blaming, and negotiation. The patterns assessed include criticize-defend and demand-withdraw. Participants rated their agreement with statements such as "Both members blame, accuse, and criticize each other" on a scale from 1 (*Very Unlikely*) to 9 (*Very Likely*). Subscale scores for negative interaction behaviours and positive interaction behaviours were calculated as per recommendations from Futris, Campbell, Nielsen, and Burwell (2010). Scores on the negative interaction subscale range from eight to 72, while scores on the positive interaction subscale range from three to 24. The scores are interpreted such that higher scores indicate the communication behaviour occurs more frequently. Futris et al. investigated the psychometric properties of the CPQ-SF and found that it had good construct validity (e.g., participants with high and low relationship satisfaction had significantly different scores in the expected directions) and adequate internal consistency. The CPQ-SF was administered at Time

1. Both subscales showed adequate reliability in the current sample (Negative Interaction: $\alpha = .77$ for men, $\alpha = .77$ for women; Positive Interaction: $\alpha = .69$ for men, $\alpha = .77$ for women).

Procedures

All study measures and procedures were reviewed and approved by the University of Waterloo's Office of Research Ethics. Couples were recruited and participated in their first in-lab assessment between January of 2009 and January of 2011. Couples completed a second in-lab assessment approximately two years after their initial lab visits. Between these assessments, approximately one year after the Time 1 participation date, couples completed a brief telephone interview in which they responded to an abbreviated background questionnaire, the Quality of Marriage Index, and the Index of Sexual Satisfaction. The data gathered during the telephone interviews showed an unexpected pattern, which is detailed in Appendix A. Appendix A also includes a description of the telephone interview procedure and describes some reasons as to why the telephone interview data many not reflect accurate assessments of relationship and sexual satisfaction. Given the pattern of the telephone interview data, these data were not analyzed in the current study. Thus, the data analyzed in the current study were gathered during the first in-lab assessment (referred to here onward as Time 1) and the second in-lab assessment (referred to here onward as Time 2).

Telephone screening.

Recruitment materials instructed prospective participants to contact the Relationship Research Lab by telephone. Prospective participants spoke with a research assistant who used a standardized recruitment script to describe the study purpose, procedures (including the study's longitudinal nature), and eligibility criteria. Participants who indicated that they met study eligibility criteria and were interested in participating were scheduled for an in-lab assessment.

Time 1: In-lab assessment.

Two trained research assistants (undergraduate research assistants or the author) individually assessed each couple. When the couple arrived at the lab, the research assistants reviewed the information letter and each member of the couple signed a consent form. The male and female partners were then separated into two different rooms where they completed all questionnaires individually. One research assistant was randomly assigned to work with each partner from that point forward. Participants began by completing the Background Questionnaire and Broderick Commitment Scale using paper and pencil. They then completed the remaining measures relevant to the current study in random order using a laptop (i.e., QMI, ISS, DSCS, and CPQ). Participants also completed additional questionnaires and a discussion task that were part of the larger project but are not relevant to the current study. When both members of the couple had finished the study, they were debriefed and received \$50.00 each for their time. They were also given a list of sexual health resources. The entire study procedure took approximately three hours.

Time 2: In-lab assessment.

One year after completing the telephone interview less two to three weeks, a research assistant contacted each participating couple by telephone or email to schedule their Time 2 in-lab assessment session. The Time 2 assessment was scheduled for approximately one year after the telephone interview. The Time 2 assessments followed the same procedure as the Time 1 assessments. At Time 2, participants began by completing the Background Questionnaire and Broderick Commitment Scale using paper and pencil. They then completed the remaining measures relevant to the current study in random order using a laptop. Participants also completed additional questionnaires, a semi-structured interview, and a discussion task that were

part of the larger project, but are not relevant to the current study. The entire study procedure took approximately three hours. For his or her participation in the Time 2 assessment, each partner received \$50.00. Couples were given an additional \$50.00 if they had completed all three assessments.

Couples who moved away from the Kitchener-Waterloo area prior to their Time 2 assessment were offered two options for completing the assessment. The first option involved completing the Telephone Interview procedure in lieu of the Time 2 in-lab assessment protocol. One couple completed this study procedure. The second option involved completing the Telephone Interview procedure and completing all of the study measures, which were mailed to the participants. The packages mailed to the participants included cover letters, which instructed them to complete the questionnaire in a private place without consulting each other. Partners were provided with individual return envelopes to protect the privacy of their responses. One couple completed this study procedure. Each partner received \$50.00 in appreciation for his or her time.

Participant Retention

Of the 113 couples who were deemed eligible for the study following their Time 1 assessments, 84 couples (81%)⁴ completed the Time 2 assessment. Eight couples did not complete the Time 2 assessment because their relationships had ended and 21 couples did not complete the Time 2 assessment because they were not interested in participating or could not be reached.

⁴ Percentage calculated excluding couples who were unable to participate because their relationships had ended.

Results

Preliminary Analyses

Sample descriptive characteristics.

Table 3 lists the means and standard deviations of men's and women's scores on key study variables and results of tests of gender differences. Both men and women in the current sample reported fairly high levels of relationship and sexual satisfaction, suggesting that overall the sample is relationally and sexually satisfied. Additionally, mean scores suggest that the sample is generally satisfied with their sexual communication and engage in relatively high levels of positive interaction behaviours and relatively low levels of negative interaction behaviours. On average, both men and women reported that it was moderately to very important to them to be sexually satisfied in their relationships. Men's and women's mean scores on study measures were compared using multi-level regressions (with individuals nested within couples) in order to account for the interdependence present in data collected from couples. Gender was effects coded (female = 1; male = -1) and used to predict each variable in turn. The only significant gender difference was in sexual satisfaction scores: men reported being more sexually satisfied than women at both time points. There were no significant gender differences in relationship satisfaction, communication, or importance placed on being sexually satisfied in one's relationship.

Comparison of couples who did and did not complete three study assessments.

Multi-level regressions were also used to determine if couples who completed all three study assessments differed from couples who did not complete three study assessments. Couples' study completion status (i.e., completed all three study assessments or did not complete all three study assessments) was effects coded (completed = 1; not completed = -1) and used to predict

each key demographic variable and Time 1 measure in turn. There were no significant differences between the mean ages, years of education, relationship satisfaction, sexual satisfaction, sexual communication, and levels of positive interaction in couples that did and did not complete all study assessments (see Table 4). However, there was a significant difference in reported levels of negative interaction, such that couples who completed all three assessments reported engaging in lower levels of negative interaction compared to couples who did not complete all of the study assessments (see Table 4). In order to determine whether this difference reflected differences in characteristics of couples that did and did not break up over the course of the study (rather than characteristics of couples who could not be reached and/or those who were not interested in completing one or two of the follow up assessments), the same analyses were repeated excluding the couples ($n = 8$) who were unable to complete the three study assessments because their relationships ended during the course of the study. When the couples who broke up were excluded, the difference in reported levels of negative communication became nonsignificant, $b = -1.82$, $t(103.19) = -1.52$, $p = .132$. No new significant effects or changes in the direction of effects emerged when couples who broke up were excluded from the analyses.

Differences in two additional variables were also examined: the amount of time couples had been together (before and after marriage combined, as applicable) and the number of children couples had (including biological, step, and adopted children). These variables were measured differently than the variables described above, in that male and female partner reports were averaged to provide more reliable estimates of these demographic variables. Consequently, these variables did not differ across gender and thus multi-level regression was not appropriate. Instead, a one-way multivariate analysis of variance (MANOVA) was conducted with both relationship length and number of children included as dependent variables predicted by study

completion status. The MANOVA was not significant, indicating there were no significant differences in the amount of time couples had been living together and the number of children they had at Time 1, depending on whether they completed all of the study assessments, $F(2, 110) = 2.61, p = .078$; Wilk's $\Lambda = 0.96$. The same pattern of results emerged when couples who ended their relationships during the course of the study were excluded from these analyses.

Change in relationship satisfaction and sexual satisfaction means over time.

In order to determine if mean levels of relationship satisfaction and sexual satisfaction changed significantly over time, men's and women's levels of relationship and sexual satisfaction at Time 1 and Time 2 were compared using paired samples t-tests (see Table 3 for means scores). Men's levels of relationship satisfaction did not differ significantly at different time points, $t(81) = 0.46, p = .646$. However, men's levels of sexual satisfaction did differ significantly between time points, $t(81) = 2.61, p = .009$, such that their sexual satisfaction was higher at Time 1 compared to Time 2. Women showed the same pattern of results. Their levels of relationship satisfaction did not differ significantly across time points, $t(80) = 0.16, p = .987$; their levels of sexual satisfaction did differ significantly across time points, $t(80) = 3.08, p = .003$, such that their sexual satisfaction was higher at Time 1 compared to Time 2.

Data Analytic Strategy

To address study research questions, data were analyzed using Structural Equation Modeling in AMOS 21. Missing data were handled using the Full Information Maximum Likelihood (FIML) procedure in AMOS. Data were missing for participants who did not complete Time 2 and due to technical problems with the laptops used to administer the study questionnaires (Time 1 = 3 individuals; Time 2 = 1 individual). The data met univariate normality criteria as outlined by Kline (2005). Specifically, all univariate skew statistics were

less than |2.3| and all univariate kurtosis statistics were less than |6.3|. Assumptions about multivariate normality were evaluated by identifying potential influential outliers using Mahalanobis distance and the associated p -values (Arbuckle, 2012). Twenty-one cases were identified as potentially influential outliers (i.e., p^2 values $< .001$). The models for research questions 1 and 2 were re-estimated excluding these cases. The exclusion of these cases had very little impact on the regression coefficients, so results using the entire sample are reported below.

Research Questions 1 and 3: What is the Nature of the Association Between Relationship Satisfaction and Sexual Satisfaction Over Time? Does This Association Differ by Gender?

The structural equation model depicted in Figure 1 was used to evaluate the longitudinal association between relationship satisfaction and sexual satisfaction. This model includes men's and women's relationship satisfaction and sexual satisfaction measured at Time 1 and Time 2. All possible correlations between men's and women's relationship satisfaction and sexual satisfaction at Time 1 are included in the model, as there is robust evidence that these variables are correlated when assessed at the same point in time. Additionally, the model includes representations of the variance (e_1 - e_4) in Time 2 relationship satisfaction and sexual satisfaction that is not explained by the exogenous variables. These error terms are allowed to correlate with each other to reflect the fact that unexplained variance in relationship satisfaction and sexual satisfaction may be attributable to common variables. Specific to Research Question 1, paths representing actor effects are included in this model. Paths a and e represent the impact of one's own relationship satisfaction on one's subsequent relationship satisfaction. Paths d and h represent the impact of one's own sexual satisfaction on one's subsequent relationship satisfaction. Paths b and g represent the impact of one's own relationship satisfaction on one's subsequent sexual satisfaction. Paths c and f represent the impact of one's own sexual

satisfaction on one's subsequent relationship satisfaction. There are no partner effects included in this model. This model fit the data extremely well, $\chi^2(8, N = 113) = 9.41, p = .309$, comparative fit index (CFI) = .997, root-mean-square error of approximation (RMSEA) = .040, and $pclose = .504$.

The model was used to test the study hypotheses by estimating the impact of one's own sexual satisfaction on one's subsequent relationship satisfaction (paths c and f) and one's own relationship satisfaction on one's subsequent sexual satisfaction (paths b and g), while controlling for initial levels of relationship satisfaction (paths a and e) and initial levels of sexual satisfaction (paths d and h; see Figure 2). Consistent with the study hypothesis, men's and women's own earlier sexual satisfaction predicted their subsequent relationship satisfaction such that greater sexual satisfaction was associated with greater relationship satisfaction (men: $\beta = .46, p < .001$; women: $\beta = .25, p = .008$), while earlier relationship satisfaction did not predict subsequent sexual satisfaction (men: $\beta = .01, p = .886$; women: $\beta = -.07, p = .391$). With regard to the control variables, as expected, one's own relationship satisfaction predicted one's subsequent relationship satisfaction (men: $\beta = .39, p < .001$; women: $\beta = .44, p < .001$) and one's own sexual satisfaction predicted one's own subsequent sexual satisfaction (men: $\beta = .85, p < .001$; women: $\beta = .77, p < .001$).

In order to determine if the magnitude of these effects differed significantly between men and women, each pair of paths was constrained to be equal in a separate model and the fit of the constrained model was compared to that of the unconstrained model. For men, as compared to women, sexual satisfaction was a stronger predictor of subsequent relationship satisfaction, $\Delta\chi^2(1) = 5.53, p = .019$. In particular, men's Time 1 sexual satisfaction accounted for 14% of the variance in their Time 2 relationship satisfaction, whereas women's Time 1 sexual satisfaction

accounted for 8% of the variance in their Time 2 relationship satisfaction. There were no significant gender differences in the effects of (a) one's own relationship satisfaction on subsequent relationship satisfaction ($\Delta\chi^2(1) = 0.12, p = .733$); (b) one's own sexual satisfaction on subsequent sexual satisfaction ($\Delta\chi^2(1) = 1.85, p = .174$); or (c) one's own relationship satisfaction on subsequent sexual satisfaction ($\Delta\chi^2(1) = 0.83, p = .364$).

In order to determine to what extent these results were impacted by the effects of childbirth and transition to parenthood for study participants, this model was estimated a second time, excluding those couples who reported experiencing pregnancy and/or the birth of a child during the course of the study ($n = 17$). Although the magnitudes of the parameter estimates changed slightly, none of the directions or significance of the effects changed with the exception of the gender difference in the impact of sexual satisfaction on subsequent relationship satisfaction, which was no longer significant ($\Delta\chi^2(1) = 2.48, p = .116$). Model fit improved very slightly when new parents were excluded from the sample, $\chi^2(8, N = 96) = 8.23, p = .412$, CFI = .999, RMSEA = .017, $pclose = .580$.

In order to determine if relationship length impacted the longitudinal associations between relationship satisfaction and sexual satisfaction a relationship length variable (the mean of both partners' reports of the number of months they had been together) was added to the model as a predictor of Time 2 relationship and sexual satisfaction. The relationship length variable was allowed to correlate with Time 1 relationship satisfaction and sexual satisfaction. Relationship length was a significant predictor of women's Time 2 relationship satisfaction ($\beta = .23, p = .008$), women's Time 2 sexual satisfaction ($\beta = .18, p = .011$), and men's Time 2 sexual satisfaction, ($\beta = .13, p = .017$) but not men's Time 2 relationship satisfaction ($\beta = .10, p = .174$). Inclusion of relationship length in the model had very little impact on the estimates of the

impacts of Time 1 relationship and sexual satisfaction on Time 2 relationship and sexual satisfaction. Specifically, the significance and direction of the effects did not change and the change in the magnitude of the estimates was quite small (i.e., the largest change was a difference of .032 in the beta weights).

An Alternative Explanation: The Synchronous Common Factor Model

The synchronous common factor model is an alternative model that might provide a plausible explanation for the association between relationship satisfaction and sexual satisfaction over time. The model (see Figure 3) posits that relationship satisfaction and sexual satisfaction both load onto a general factor (e.g., a general satisfaction factor) that is relatively stable over time. In the model, the general satisfaction factor is represented at both time points by the circles labeled F1 and F2. Path a represents the stability of the factor over time and d1 is a residual term representing the variance in F2 that is not explained by the variables included in the model. The factor loading for relationship satisfaction is set to 1 at both time points (for identification purposes), while paths b and c represent estimates of the factor loadings for sexual satisfaction on the proposed general satisfaction factor, and e1 through e4 are error variables.

This model was evaluated separately for men and women in order to determine if it provided a plausible explanation for the study data. The unconstrained version of the model produced error variance estimates that were out of range for both men and women, so variances for the same measures at different time points were constrained to be equal. The subsequent model did not fit the data well (men: $\chi^2(3, N = 113) = 15.45, p = .001, CFI = .945, RMSEA = .192, p_{close} = .006$; women: $\chi^2(3, N = 113) = 34.70, p < .001, CFI = .783, RMSEA = .307, p_{close} < .001$), produced a stability coefficient and a squared multiple correlation that were out of range for men, and produced implausible parameter estimates for the women's relationship satisfaction

variables (see Figures 4 and 5). Thus, the synchronous common factor model does not provide a plausible explanation for the study data.

Research Questions 2 and 3: How Do One's Partner's Relationship Satisfaction and Sexual Satisfaction Relate to Changes in One's Own Relationship Satisfaction and Sexual Satisfaction? Do these Associations Differ by Gender?

The model used to address Research Question 1 was amended in order to address Research Question 2. Specifically, paths representing partner effects were added to the model (see Figure 6). Paths i and m represent the impacts of one's partner's relationship satisfaction on one's subsequent relationship satisfaction; paths l and p represent the impacts of one's partner's sexual satisfaction on one's subsequent sexual satisfaction; paths k and o represent the impacts of one's partner sexual satisfaction on one's subsequent relationship satisfaction; and paths j and n represent the impacts of one's partner's relationship satisfaction on one's subsequent sexual satisfaction.

This model was used to evaluate the hypothesis that one's partner's earlier sexual satisfaction would predict one's subsequent relationship satisfaction, as well as to test the alternative hypothesis that one's partner's relationship satisfaction would predict one's subsequent sexual satisfaction, while controlling for all actor effects (see Figure 7). Neither hypothesis was supported: one's partner's earlier relationship satisfaction did not predict one's subsequent sexual satisfaction (men: $\beta = -.02, p = .766$; women: $\beta = .11, p = .312$), nor did one's partner's earlier sexual satisfaction predict one's subsequent relationship satisfaction (men: $\beta = .02, p = .882$; women: $\beta = -.07, p = .638$). Further, one's partner's relationship satisfaction did not predict one's own subsequent relationship satisfaction (men: $\beta = .15, p = .140$; women: $\beta = .16, p = .201$), nor did one's partner's sexual satisfaction predict one's own subsequent sexual

satisfaction (men: $\beta = .17, p = .058$; women: $\beta = -.20, p = .098$). The direction and significance of the actor effects did not change when partner effects were added to the model. Given that the hypothesized partner effects were not significant, the relative strength of actor and partner effects was not evaluated.

In order to determine if the magnitude of these effects differed significantly between men and women, each pair of paths was constrained to be equal in a separate model and the fit of the constrained model was compared to that of the unconstrained model. There were no significant gender differences in the effects of (a) one's partner's relationship satisfaction on one's own subsequent relationship satisfaction ($\Delta\chi^2(1) = 0.11, p = .916$); (b) one's partner's sexual satisfaction on one's own subsequent sexual satisfaction ($\Delta\chi^2(1) = 3.67, p = .056$); (c) one's partner's relationship satisfaction on one's own subsequent sexual satisfaction ($\Delta\chi^2(1) = 0.78, p = .367$), or (d) one's partner's sexual satisfaction on one's own subsequent relationship satisfaction ($\Delta\chi^2(1) = 0.15, p = .699$).

Including partner effects in the model accounted for only slightly increased proportions of variance in Time 2 relationship satisfaction and sexual satisfaction. Specifically, for women, actor and partner relationship satisfaction and sexual satisfaction accounted for 41% (versus 35%) of the variance in subsequent relationship satisfaction and 60% (versus 56%) of the variance in subsequent sexual satisfaction. For men, actor and partner relationship satisfaction and sexual satisfaction accounted for 58% (versus 55%) of the variance in subsequent relationship satisfaction and 74% (versus 72%) of the variance in subsequent sexual satisfaction.

Research Question 4: Does Couple Communication Mediate the Longitudinal Association of Relationship Satisfaction and Sexual Satisfaction?

In the current study, hypotheses regarding mediation were examined using bias-corrected

bootstrapping in AMOS, as bootstrapping has been demonstrated to be one of the most powerful tests of mediation and provides estimates of confidence intervals and *p*-values for the relevant indirect effects (Woody, 2011). For these bootstrap analyses, missing data were addressed by using the regression-based single imputation function in AMOS, 5000 bootstrap samples were generated, and the bias-corrected method was used to compute confidence intervals.

The model used to test the mediation hypotheses (see Figure 8) included men's and women's Time 1 sexual satisfaction, Time 1 relationship satisfaction, Time 1 communication, and Time 2 relationship satisfaction. Time 1 relationship satisfaction was included in the model and allowed to predict both communication (paths d and i) and Time 2 relationship satisfaction (paths e and j) in order to account for the fact that Time 1 relationship satisfaction is a theoretically relevant third variable that correlates strongly with all of the variables included in the proposed mediation. The indirect effects of Time 1 sexual satisfaction on Time 2 relationship satisfaction for women and men are represented by paths a times b and f times g, respectively. (The direct effects of Time 1 sexual satisfaction on Time 2 relationship satisfaction for women and men are represented by paths c and h, respectively.) As with the other models tested in this study, all possible correlations between men's and women's relationship satisfaction and sexual satisfaction at Time 1 are included in the model. Additionally, the model includes representations of the variance (e1-e4) in Time 1 communication and Time 2 relationship satisfaction that is not explained by the exogenous variables. For each of the possible mediators evaluated, this model fit reasonably well (Positive Communication: $\chi^2(12, N = 113) = 51.72, p < .001, CFI = .918, RMSEA = .172, pclose < .001$; Negative Communication: $\chi^2(12, N = 113) = 58.59, p < .001, CFI = .908, RMSEA = .186, pclose < .001$; Sexual Communication: $\chi^2(12, N = 113) = 35.60, p < .001, CFI = .955, RMSEA = .133, pclose = .005$).

General communication.

Two measures of general communication were evaluated as potential mediators of the longitudinal relationship between sexual satisfaction and relationship satisfaction: positive interaction behaviours and negative interaction behaviours. The results did not support positive interaction behaviours as a mediator of the association between earlier sexual satisfaction and later relationship satisfaction for either men (standardized indirect effect $< .001$, 95% confidence interval = $-.029$ to $.033$, $p = .967$) or women (standardized indirect effect = $.024$, 95% confidence interval = $-.005$ to $.091$, $p = .126$). However, for negative interaction behaviours, the results supported the hypothesis that negative interaction behaviours mediate the association between earlier sexual satisfaction and later relationship satisfaction for women (standardized indirect effect = $.044$, 95% confidence interval = $.002$ to $.142$, $p = .032$), such that greater sexual satisfaction contributes to engaging in lower levels of negative interaction behaviours and engaging in lower levels of negative interaction behaviours contributes to greater relationship satisfaction. Negative interaction behaviours did not mediate the association between sexual satisfaction and relationship satisfaction for men (standardized indirect effect = $.003$, 95% confidence interval = $-.025$ to $.034$, $p = .729$). Estimates of the direct effects are provided in Table 5.

Sexual communication.

The quality of sexual communication within couples' relationships was also evaluated as a potential mediator of the longitudinal relationship between sexual satisfaction and relationship satisfaction. The results did not support sexual communication as a mediator of the association between earlier sexual satisfaction and later relationship satisfaction for either men (standardized indirect effect = $.107$, 95% confidence interval = $-.010$ to $.238$, $p = .071$), or women

(standardized indirect effect = .008, 95% confidence interval = -.092 to .122, $p = .867$).

Estimates of the direct effects are provided in Table 5.

Exploratory Analyses: The Effect of Importance Placed on Being Sexually Satisfied in One's Relationship

In order to determine if the importance that one places on being sexually satisfied in one's relationship moderates the impact of sexual satisfaction on subsequent relationship satisfaction, a new model was developed (see Figure 9) by adding variables and paths to the actor effects model used to address Research Question 1. The revised model includes a measure of how much importance participants place on being sexually satisfied in their relationships (referred to from here on as importance). These variables are represented separately for men and women. In addition, the model includes variables representing the interaction between importance and Time 1 sexual satisfaction. To appropriately calculate the interaction terms, all variables were centered. Paths representing the main effects of importance (paths y and w) and the effects of the interaction term (paths z and x) for men and women were drawn to Time 2 relationship satisfaction. All possible correlations between men's and women's Time 1 relationship satisfaction, Time 1 sexual satisfaction, importance, and the interaction terms were included in the model. Additionally, the model includes representations of the variance ($e1$ - $e4$) in Time 1 communication and Time 2 relationship satisfaction that is not explained by the exogenous variables and all possible correlations between the error terms were included in the model. This model (see Figure 10) fit the data very well, $\chi^2(20, N = 113) = 31.59, p = .048$, CFI = .980, RMSEA = .072, $pclose = .210$.

For both men and women, placing less importance on being sexually satisfied predicted greater subsequent relationship satisfaction (men: $b = -1.66, p = .011$; women: $b = -1.48, p =$

.025). The Importance*Time 1 Sexual Satisfaction interaction term was not a significant predictor of men's ($b = 0.05, p = .270$) or women's ($b < 0.01, p = .999$) later relationship satisfaction. In order to determine if the magnitude of these effects differed significantly between men and women, each pair of paths was constrained to be equal in a separate model and the fit of the constrained model was compared to that of the unconstrained model. There were no significant gender differences in the effects of importance on subsequent relationship satisfaction ($\Delta\chi^2(1) = 0.04, p = .844$), or the interaction between importance and Time 1 sexual satisfaction on subsequent relationship satisfaction ($\Delta\chi^2(1) = 0.67, p = .415$). When the impact of relationship length was controlled, importance continued to be a significant predictor of men's subsequent relationship satisfaction ($b = -1.65, p = .011$), while the effect became marginally significant for women ($b = -1.13, p = .060$).

Together the predictors in this model explained 39% of the variance in women's relationship satisfaction and 59% of the variance in men's relationship satisfaction. Thus, the addition of the importance variable and its interaction with sexual satisfaction resulted in slight increases in the amount of variance explained in men and women's relationship satisfaction (4% for women and 4% for men) relative to the actor effects model.

Discussion

The current study used a prospective, longitudinal design to examine how relationship satisfaction and sexual satisfaction are related over time in a sample of 113 heterosexual, committed couples. By collecting data from couples rather than individuals it was possible to examine both actor effects and partner effects. Furthermore, through the use of a longitudinal design it was possible to investigate the direction of this association. Additionally, the current study examined gender effects and tested the hypothesis that communication would mediate the association of sexual satisfaction and relationship satisfaction over time.

What is the Nature of the Association Between Relationship Satisfaction and Sexual Satisfaction Over Time?

Among the effects examined in this study, actor effects have been most commonly studied in previous research because they can be investigated in samples of individuals. Based on a review of the existing empirical literature and a consideration of relevant theories of romantic relationships (i.e., social exchange models of relationship satisfaction; Levinger, 1980; Rusbult, 1983; Kelley & Thibaut, 1978, and attachment theory perspectives; Hazan & Shaver, 1994), it was hypothesized that men's and women's sexual satisfaction would predict their subsequent relationship satisfaction, while controlling for initial levels of relationship satisfaction. The possibilities that relationship satisfaction would predict subsequent sexual satisfaction, that relationship satisfaction and sexual satisfaction are bidirectionally related, and the synchronous common factor model were also tested and not supported. The hypothesized association was supported: men's and women's earlier sexual satisfaction predicted their subsequent relationship satisfaction, while earlier relationship satisfaction did not significantly predict subsequent sexual satisfaction, controlling for initial levels of relationship and sexual satisfaction, respectively. This

finding is consistent with attachment theory perspectives, which suggest that degree of satisfaction of a few basic needs, including sexual gratification, influences relationship satisfaction (Hazan & Shaver, 1994). Examined within a social exchange theory framework (Levinger, 1980; Rusbult, 1983; Kelley & Thibaut, 1978), this finding is consistent with the notion that an individual's sexual relationship and sexual satisfaction may be perceived by the individual as either rewards or costs of the relationship, and these in turn influence relationship satisfaction. In the interpersonal exchange model of sexual satisfaction, relationship satisfaction is posited to be a predictor of sexual satisfaction. However, when Lawrance & Byers (1995) included relationship satisfaction in this model, they noted that more research was needed in order to clarify the direction of the association between sexual satisfaction and relationship satisfaction. In the current study, when controlling for initial levels sexual satisfaction, relationship satisfaction was not a significant predictor of subsequent sexual satisfaction.

Specific hypotheses regarding gender effects were not proposed, because the existing literature provides inconsistent reasoning and empirical evidence regarding the significance and direction of gender effects. However, these effects were tested. The first set of tests showed that the impact of (a) one's own relationship satisfaction on later relationship satisfaction and (b) one's own sexual satisfaction on later sexual satisfaction did not differ across genders. In other words, the stability of relationship satisfaction and the stability of sexual satisfaction did not differ by gender.

Relationship satisfaction was not a significant predictor of subsequent sexual satisfaction for either men or women and this result did not differ significantly by gender. In contrast, for both men and women, earlier sexual satisfaction predicted later relationship satisfaction, but this effect was stronger for men than women. This finding is consistent with results found in a

longitudinal study of heterosexual dating couples (Sprecher, 2002) and studies of Canadian and German adults in heterosexual relationships (Hasebrauck & Fehr, 2002). The finding is also consistent with the line of reasoning that suggests sexual satisfaction should be more strongly associated with relationship satisfaction for men than women, because sexual aspects of the relationship are more important to men than women (Byers, 2005; Sprecher, 2002). Although this is one possible explanation as to why sexual satisfaction might be a stronger predictor of relationship satisfaction for men than women, it is interesting to note that men's and women's reports of how much importance they place on being sexually satisfied in their relationships did not differ significantly in the current sample, which does not support the idea that the cause of this difference is importance placed on sexual satisfaction of the relationship. This could be because importance placed on being sexually satisfied is different than importance placed on sexual aspects of the relationship more broadly, or it could be that other variables are responsible for the gender difference.

Together these results provide a consistent and compelling framework for refining our theoretical understanding of sexuality and sexual satisfaction in the context of romantic relationships. Specifically, they provide support for theories (e.g., attachment theory) that conceptualize sexual satisfaction as one component that contributes to relationship satisfaction. They are also consistent with previous research suggesting that sexual satisfaction and relationship satisfaction are distinct constructs. Finally, the results make an important contribution to understanding gender differences by demonstrating that gender differences are differences in degree rather than differences in kind.

How Do One's Partner's Relationship Satisfaction and Sexual Satisfaction Relate to Changes in One's Own Relationship Satisfaction and Sexual Satisfaction?

In the current study, one's partner's level of sexual satisfaction was conceptualized within the context of social exchange models of relationship satisfaction (e.g., Levinger, 1980; Rusbult, 1983; Kelley & Thibaut, 1978). Specifically, just as one's own level of sexual satisfaction can be considered to be a potential reward or cost of one's relationship, so too can one's partner's level of sexual satisfaction. Because partner sexual satisfaction was conceptualized in this way, it was predicted that one's partner's earlier sexual satisfaction would predict one's own later relationship satisfaction. However, no significant partner effects were found with respect to the impact of sexual satisfaction on subsequent relationship satisfaction or vice versa. Thus, the hypothesized relationship was not supported, nor was the alternative possibility that partners' relationship satisfaction would predict subsequent sexual satisfaction. The fact that there were no significant partner effects of relationship satisfaction on subsequent sexual satisfaction is inconsistent with previous cross-sectional research by Yucel and Gassanov (2010), who found that one's partner's sexual satisfaction predicted one's own sexual satisfaction above and beyond one's own level of relationship satisfaction in a sample of married couples.

It will be important to re-examine partner effects in future research in order to provide more definitive evidence as to whether one's partner's sexual satisfaction is a key determinant of one's own relationship satisfaction over time. In the current study, a substantial number of effects were included in the partner effects model (i.e., actor control variables, actor hypotheses, partner control variables, partner hypotheses). Thus, one possibility is that the nonsignificant partner effects indicate that one's partner's sexual satisfaction is not particularly important to one's later relationship satisfaction when the effects of all of these other variables are taken into

account. This possibility is consistent with previous research suggesting that partner effects generally tend to be weaker than actor effects (Kenny & Malloy, 1988). Alternatively, it is possible that the current sample provided insufficient power to detect these partner effects, even though partner sexual satisfaction is a determinant of one's later relationship satisfaction.

Does Couple Communication Mediate the Longitudinal Association of Relationship Satisfaction and Sexual Satisfaction?

Karney and Bradbury's (1995) vulnerability-stress-adaptation model was used to guide hypotheses about how couples' communication might impact the longitudinal association of relationship satisfaction and sexual satisfaction. Based on this model, which posits that adaptive processes (e.g., communication) mediate the associations of enduring vulnerabilities and stressful events (e.g., low sexual satisfaction) to couples' relationship satisfaction, it was hypothesized that both general and sexual communication would mediate the association between earlier sexual satisfaction and later relationship satisfaction. The results indicated that women's negative interaction behaviours mediate the association between their earlier sexual satisfaction and later relationship satisfaction. In other words, the results suggested that women's sexual satisfaction influences the extent to which couples engage in negative interaction behaviours (e.g., demand-withdraw) and, in turn, the extent to which couples engage in negative interaction behaviours influences women's relationship satisfaction. Given that sexual satisfaction was negatively associated with negative communication and negative communication was negatively associated with relationship satisfaction, the results suggested that greater sexual satisfaction contributes to engaging in lower levels of negative interaction behaviours and engaging in lower levels of negative interaction behaviours contributes to greater relationship satisfaction for women. Indeed, there is a great deal of research supporting the

association between general communication and relationship satisfaction (e.g., Bradbury, Fincham, & Beach, 2000; Heavey, Layne, & Christensen, 1993; Gottman, 1998). The results of the current study are also consistent with Byers' (2005) finding that quality of general communication was associated with changes in both sexual satisfaction and relationship satisfaction.

Previous studies have found support for communication as a mediator of the association between a number of stressors (e.g., depressive symptoms, Du Rocher Schudlich, Papp, & Cummings, 2011; emotional numbing in individuals with PTSD, Campbell & Renshaw, 2013; work stress, job-home stress, and family stress, Woszidlo & Segrin, 2014) and relationship satisfaction, consistent with the vulnerability-stress-adaption model. For this reason it is somewhat surprising that only negative interaction behaviours mediated the association between relationship satisfaction and sexual satisfaction, and this was only for women. One possibility as to why the majority of the current mediation hypotheses were not supported is that that Karney and Bradbury's (1995) vulnerability-stress-adaption model is somewhat unclear as to the precise way in which adaptive processes are posited to impact the association between stress/vulnerabilities and relationship satisfaction. Specifically, although Karney and Bradbury primarily describe the role of adaptive processes as mediating the association between vulnerabilities and relationship satisfaction (e.g., "by positioning adaptive processes as mediating the effects of stress and vulnerability on marital outcomes, the framework suggests specific mechanisms through which stress and vulnerability lead to changes in marriage" p. 25), they sometimes also imply that adaptive processes will moderate the association between stress/vulnerabilities and relationship satisfaction (e.g., "If data on the interaction between enduring vulnerabilities and adaptive processes does not account for changes in marital quality

significantly better than either factor independently... then the present framework will have been refuted” p. 25). Consistent with the latter perspective, other researchers (e.g., Fallis, Rehman, & Purdon, 2014; Graham & Barnow, 2013; Litzinger & Gordon, 2005) have suggested and found that stressors/vulnerabilities and coping resources *interact* to predict relationship outcomes. A second possibility as to why the majority of the mediation hypotheses were not supported is that the current sample had a relatively high mean level of sexual satisfaction (discussed further below). Perhaps, as a result of testing the mediation in relatively sexually satisfied couples, it was not appropriate to consider sexual satisfaction to be a potential stressor that could result in couples needing to rely on adaptive processes like communication. More research is needed with samples characterized by broader ranges of relationship and sexual satisfaction scores in order to better understand the nature of the relationships between communication, sexual satisfaction, and relationship satisfaction.

The Effect of Importance Placed on Being Sexually Satisfied in One’s Relationship

A final goal of the current study was to determine if the level of importance people place on being sexually satisfied in their relationships is an important variable to take into account in understanding the association between sexual satisfaction and relationship satisfaction. The results showed that importance was a significant predictor of later relationship satisfaction for both men and women. Specifically, the effect was such that placing less importance on being sexually satisfied in one’s relationship predicted greater levels of relationship satisfaction two years later. One potential explanation for this finding is that placing less importance on being sexually satisfied means that fluctuations in people’s sexual satisfaction have less impact on their subsequent relationship satisfaction (this might be particularly relevant for times when sexual satisfaction decreases). However, this possibility was tested in the current study through the

inclusion of the Importance*Time 1 Sexual Satisfaction term in the model, and the interaction term was not a significant predictor of later relationship satisfaction for either men or women. Alternatively, it may be that the measure of importance acted as a proxy for individual differences in the types of beliefs and expectations that people have for their relationships. Previous research has shown that people's beliefs and expectations about relationships are associated with their relationship satisfaction (Eidelson & Epstein, 1982; Metts & Cupach, 1990; Sullivan & Schwebel, 1995). This research has focused specifically on five problematic beliefs identified by Eidelson and Epstein (1982): "disagreement is destructive" (p. 715), "mindreading is expected" (p. 715), "partners cannot change" (p. 715), "sexual perfectionism" (p. 716), and "the sexes are different" (p. 716). Participants' levels of endorsement of these beliefs are moderately correlated (Eidelson & Epstein, 1982). Thus, it may be that the importance variable in the current study tapped sexual perfectionism, or sexual perfectionism and other problematic relationship beliefs, and consistent with past research, these problematic beliefs were associated with lower relationship satisfaction over time.

Clinical Implications

Although comprehensive treatment protocols have been developed and researched for specific sexual dysfunctions and relationship distress, there has been little empirical focus on treatments for sexual dissatisfaction. As a result, clinicians rely on clinical wisdom and experience to address sexual dissatisfaction. McCarthy, Bodnar, and Handal (2004) identify two conflicting pieces of clinical wisdom that may guide sex therapy. First, "Dysfunctional sex has traditionally been viewed as a symptom of a more basic relationship issue with the assumption that if the relational problem was understood and changed, the sexual problems would automatically be cured" (p. 573). This idea has largely not been supported in empirical work

(McCarthy et al., 2004). Similarly, the results of the current study are inconsistent with this viewpoint, as they suggest that sexual satisfaction influences subsequent relationship satisfaction and not the reverse. It is important to note, however, that the current sample was generally relationally and sexually satisfied.

The results of the current study are, however, fairly consistent with McCarthy and colleagues' second piece of clinical wisdom: "when sexuality functions well in a relationship it serves a small but integral role, contributing 15 to 20% to marital vitality and satisfaction" (p. 574). Indeed, it is reasonable to assume that sexuality was functioning well for the majority of participants in the current study, and it was found that men's earlier sexual satisfaction accounted for 14% of the variance in their later relationship satisfaction while women's earlier sexual satisfaction accounted for 8% of the variance in their later relationship satisfaction. The study results provide preliminary support for the idea that it may be useful to develop interventions specific to sexual dissatisfaction, as such interventions have the potential to positively impact people's sexual satisfaction and in turn their satisfaction with their relationships more broadly.

Strengths and Contributions

The current study makes a number of contributions to the literature seeking to understand the nature of the association between relationship satisfaction and sexual satisfaction.

Methodologically, the current study improves on past research in several ways. The measures of key variables employed in the study were multi-item measures that have been validated and frequently used in previous research. Previous studies of the longitudinal association between relationship satisfaction and sexual satisfaction have tended to use measures of relationship satisfaction or sexual satisfaction with as few as two items (e.g., Sprecher, 2002; Yeh et al., 2006) or that were not previously validated (e.g., Henderson-King & Veroff, 1994). The

participant retention rate is also a strength of the current study. Indeed, several steps were taken in order to maximize participant retention and these steps appear to have been effective. First, prospective participants were made aware of the longitudinal nature of the study during recruitment. Second, participants who moved were provided with alternatives to visiting the lab in order to complete their participation (i.e., telephone interview, or telephone interview and completing questionnaires by mail). Third, participants were asked to provide contact information for up to three individuals who would have their contact information should study researchers be unable to reach them. Excluding those couples who ended their relationships during the course of the study, 81% of the study participants completed both the Time 1 and Time 2 assessments, which spanned two years. In contrast, Byers (2005) had a retention rate of 36% in her longitudinal study, which spanned 18 months, while Yeh et al. (2006) had a retention rate of 67% over 11 years. Thus, the results of the current study are least likely to have been influenced by differences between those participants who opted to complete all study assessments and those who did not.

Previous studies in this area have collected data from individuals (Byers, 2005), or collected data from couples and either examined the association separately for men and women (Sprecher, 2002; Yeh et al., 2006) or used statistical techniques that did not appropriately control for the interdependence that is present in data collected from couples (Henderson-King & Veroff, 1994). Thus, the current study contributes to the existing literature by collecting data from couples and analyzing it using statistical techniques (i.e., testing actor-partner interdependence models using structural equation model) that appropriately control for this interdependence. The statistical approach also made it possible to control for baseline associations between relationship satisfaction and sexual satisfaction. Additionally, because the current study collected data from a

sample of couples, it allowed partner effects hypotheses to be tested. Partner effects have not been examined in published longitudinal research on the association between relationship satisfaction and sexual satisfaction.

Finally, the study makes a contribution to the literature in the particular variables and hypotheses it examined. Specifically, this study examines gender differences in the longitudinal association between relationship satisfaction and sexual satisfaction and tests both general communication and sexual communication as potential mediators of the longitudinal association between sexual satisfaction and relationship satisfaction. It also takes into account the role of an unstudied variable related to the association between relationship satisfaction and sexual satisfaction: the impact of the level of importance people place on being sexually satisfied in their relationships.

Limitations and Future Directions

One limitation of the current study is that it relied on a convenience sample, which may limit the generalizability of the results in several ways. First, consistent with the population of the Ontario cities from which it was recruited, the sample was primarily White and Canadian born and thus the results may not generalize to couples from other cultures or of other ethnicities. Future research might focus on examining this association in couples with other backgrounds. It might be particularly interesting to compare the association between sexual satisfaction and relationship satisfaction in cultures that vary in the degree to which sexuality is valued and considered acceptable, given that the current study showed that the degree of importance one places on being sexually satisfied in one's relationship predicted subsequent relationship satisfaction. Also related to the current study's possible lack of generalizability, the study does not speak directly to the association between sexual satisfaction and relationship satisfaction in

same-sex couples. Given that many variables predict relationship quality equally well for heterosexual and same-sex couples (Kurdek, 2004), that the theoretical reasons for expecting particular associations are not specific to heterosexual relationships, and that gender differences detected in the current study were few, it is expected that the associations would be similar for same-sex couples. However, it would be worthwhile to examine this question directly and consider variables that might alter the association in same-sex couples (e.g., importance placed on being sexually satisfied in one's relationship).

Second, as is the case with sexuality research in general, relying on a convenience sample may have resulted in a sample that self-selected for particular characteristics associated with being willing to participate in studies of sexuality. Previous research has shown, for example, that people who are willing to participate in sexuality studies tend to be more sexually experienced and less traditional in their attitudes toward sex, compared to people who are not willing to participate in sexuality studies (Wiederman, 1999).

Finally, overall the sample reported relatively high levels of relationship satisfaction and sexual satisfaction over the course of the study. In most past research, relationship satisfaction has been conceptualized as a continuous variable. However, some more recent studies have provided support for a "marital discord taxon," implying that distressed couples are qualitatively different from satisfied couples (e.g., Whisman, Beach, & Snyder, 2008). Assuming the existence of the marital discord taxon, the current study does not speak to whether sexual satisfaction and relationship satisfaction are related in the same way in distressed couples. Thus one important area for future research is to examine this association in distressed couples specifically. Indeed, understanding this association in both distressed and nondistressed couples was an aim in the current study, and steps were taken to recruit distressed couples (e.g.,

recruiting participants through couples and sex therapists, developing ads targeting couples who were experiencing problems). Declines in relationship satisfaction are associated with relationship dissolution (Kurdek, 2004), so the fact that a small subset of the study participants ended their relationships during the course of the study suggests some success of the targeted recruitment. Nonetheless, recruiting distressed couples proved challenging, consistent with the experiences of other sexuality researchers (e.g., Lawrance & Byers, 1995; Yucel & Gassanov, 2010).

A second limitation of the current study is that, although data were collected at three time points, data from only two points were analyzed. Data gathered at three or more time points offer several advantages for understanding how variables change together over time (e.g., ability to test the assumption that change is linear, ability to correct for measurement error; Woody, 2010). Thus, an important contribution for future research would be to replicate the current findings using data collected over more than two time points. Collecting data over a longer time period would also offer advantages in terms of allowing more opportunities for couples to end their relationships. Given sufficient data, it would be quite informative to try to replicate Karney and Bradbury's (1995) finding that sexual satisfaction is the strongest predictor and relationship satisfaction is the second strongest predictor of men's relationship stability, while relationship satisfaction is the strongest and sexual satisfaction is the second strongest predictor of women's relationship stability. Karney and Bradbury came to this conclusion using meta-analyses and comparing the relative strengths of different predictors across studies. Thus, it would be quite informative to compare the relative strength of these predictors in the same model and to be able to directly compare the strength of the effects for men and women.

The current study improved upon previous research in terms of its dyadic sample, strong methodology, and data analytic approach. It investigated the nature of the association between relationship satisfaction and sexual satisfaction using a longitudinal design and also examined partner effects, gender effects, and the role of communication in this association. The study results demonstrated a consistent pattern of actor effects such that sexual satisfaction predicts subsequent relationship satisfaction for both men and women (controlling for initial levels of relationship satisfaction and relationship length), while relationship satisfaction did not predict subsequent sexual satisfaction when controlling for initial levels of sexual satisfaction. The study also demonstrated that sexual satisfaction is a stronger predictor of relationship satisfaction for men than women. These results provide important information for refining our theoretical understanding of relationship satisfaction and sexual satisfaction and guiding future research designed to understand these constructs.

Table 1.

Demographic Data for Men and Women.

	<u>Men</u>	<u>Women</u>
Mean Age in Years (SD)	37.96 (11.54)	35.73 (11.09)
Mean Years of Education (SD)	15.65 (3.13)	16.28 (3.65)
Modal Personal Gross Annual Income	\$20,000 to \$40,000	\$20,000 to \$40,000

Note. Years of education are counted starting from Grade 1.

Table 2.

Cronbach's Alpha Values for the Quality of Marriage Index and the Index of Sexual Satisfaction by Study Time Point and Gender.

	<u>QMI</u>		<u>ISS</u>	
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
Time 1	.94	.93	.93	.94
Time 2	.96	.97	.93	.93

Table 3.

Means and Standard Deviations for Men's and Women's Scores on Key Study Variables.

	<u>Men</u>	<u>Women</u>	<u>Test of Gender Difference</u>
Relationship Satisfaction			
QMI Time 1	38.46 (6.72)	38.70 (6.90)	$b = 0.13, t(111.52) = 0.47, p = .643$
QMI Time 2	38.50 (8.08)	38.73 (7.86)	$b = 0.11, t(80.62) = 0.29, p = .770$
Sexual Satisfaction			
ISS Time 1	75.87 (15.01)	73.48 (17.53)	$b = -1.15, t(111.12) = -2.00, p = .048$
ISS Time 2	75.10 (15.79)	70.47 (16.94)	$b = -2.45, t(80.28) = -3.21, p = .002$
General Communication			
CPQ Negative Interaction	27.88 (11.34)	29.23 (12.49)	$b = 0.66, t(111.52) = 1.23, p = .220$
CPQ Positive Interaction	19.91 (4.52)	19.96 (4.70)	$b = 0.03, t(111.68) = 0.14, p = .890$
Sexual Communication			
DSCS	61.46 (11.41)	62.04 (10.89)	$b = 0.29, t(111.92) = 0.54, p = .589$
Importance	2.73 (0.77)	2.61 (0.87)	$b = -0.62, t(112) = -1.24, p = .217$

Table 4.

Means and Standard Deviations for Demographic Variables and Time 1 Measures for Couples who Did and Did Not Complete All Study Assessments.

	<u>Completed</u>	<u>Not Completed</u>	<u>Test of Difference</u>
Demographic Variables			
Age	36.92 (11.29)	36.63 (11.59)	$b = 0.24, t(111.00) = 0.21, p = .838$
Education	16.01 (3.36)	15.83 (3.55)	$b = 0.16, t(110.59) = 0.54, p = .589$
Time 1 Variables			
Relationship Satisfaction	38.83 (7.13)	37.88 (5.81)	$b = 0.48, t(111.34) = 0.73, p = .466$
Sexual Satisfaction	76.14 (15.88)	70.68 (17.00)	$b = 2.61, t(111.18) = 1.67, p = .097$
Negative Interaction	27.32 (11.60)	31.93 (12.24)	$b = -2.30, t(111.24) = -2.10, p = .038$
Positive Interaction	20.07 (4.70)	19.58 (4.31)	$b = 0.26, t(111.06) = 0.63, p = .531$
Sexual Communication	62.65 (11.28)	59.27 (10.41)	$b = 1.93, t(111.31) = 1.92, p = .058$

Table 5.

Standardized Estimates (beta weights) and p-values for the Direct Effects in Models Testing Communication as a Mediator of the Association Between Earlier Sexual Satisfaction and Later Relationship Satisfaction.

	<u>Men</u>					<u>Women</u>				
	<u>Path f</u>	<u>Path g</u>	<u>Path h</u>	<u>Path i</u>	<u>Path j</u>	<u>Path a</u>	<u>Path b</u>	<u>Path c</u>	<u>Path d</u>	<u>Path e</u>
Positive Communication	.17	< .001	.48***	.41***	.44***	.20*	.12	.23**	.32***	.49***
Negative Communication	-.24*	-.01	.44***	-.35***	.46***	-.21*	-.21**	.26***	-.41***	.42***
Sexual Communication	.58***	.19*	.36***	.19*	.41***	.53***	.02	.28**	.10	.51***

Note. Paths f and a represents the effect of Time 1 sexual satisfaction on communication. Paths g and b represents the effect of communication on Time 2 relationship satisfaction. Paths h and c represents the effect of Time 1 sexual satisfaction on Time 2 relationship satisfaction. Paths i and d represent the effect of Time 1 relationship satisfaction on communication and. Paths j and e represent the effect of Time 1 relationship satisfaction on Time 2 relationship satisfaction.

Table 6.

Correlations Between Measures of Relationship Satisfaction and Sexual Satisfaction Across Study Time Points.

	<u>Time 1 & Phone Interview</u>	<u>Phone Interview & Time 2</u>	<u>Time 1 & Time 2</u>
Men			
Relationship Satisfaction	.50***	.49***	.69***
Sexual Satisfaction	.75***	.72***	.88***
Women			
Relationship Satisfaction	.44***	.56***	.61***
Sexual Satisfaction	.87***	.68***	.75***

*** $p < .001$.

Table 7.

Means and Standard Deviations of Men's and Women's Relationship Satisfaction and Sexual Satisfaction Scores Collected in the Telephone Interview.

	<u>Men</u>	<u>Women</u>	<u>Test of Gender Difference</u>
Relationship Satisfaction (QMI)	39.13 (6.29)	38.25 (6.81)	$b = -0.44, t(103) = -1.73, p = .088$
Sexual Satisfaction (ISS)	77.61 (14.62)	74.90 (16.27)	$b = -1.35, t(103) = -2.49, p = .015$

Figure 1. Model of Actor Effects.

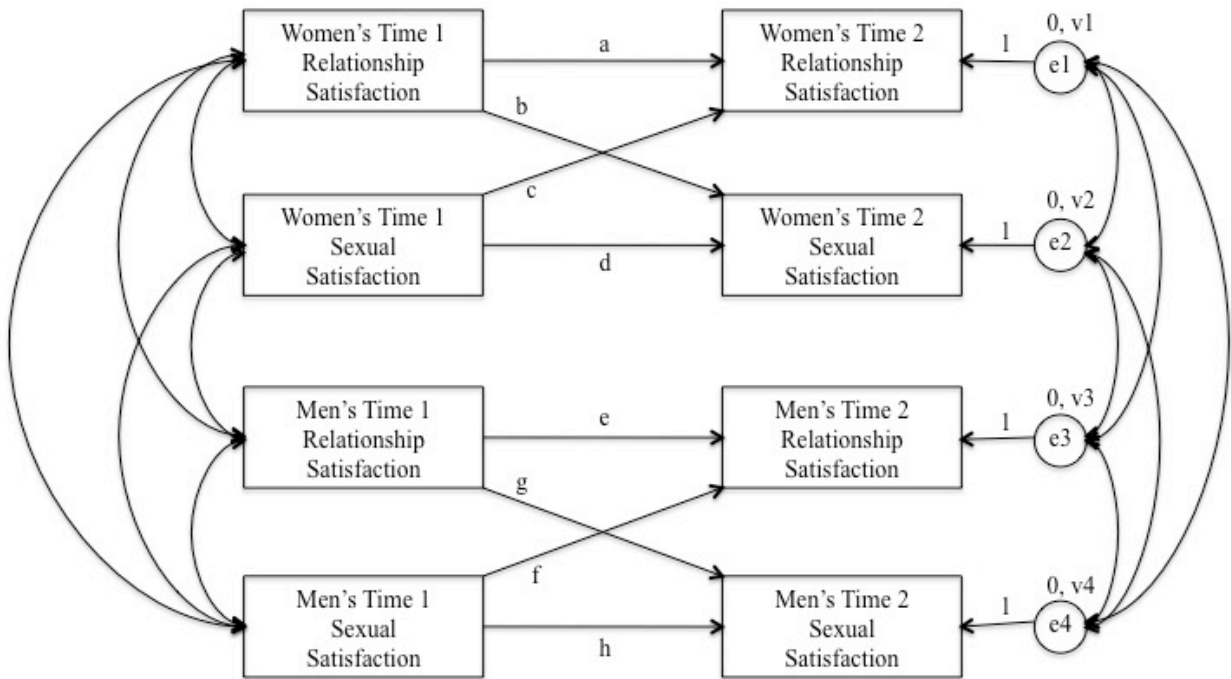


Figure 2. Standardized Estimates of Actor Effects.

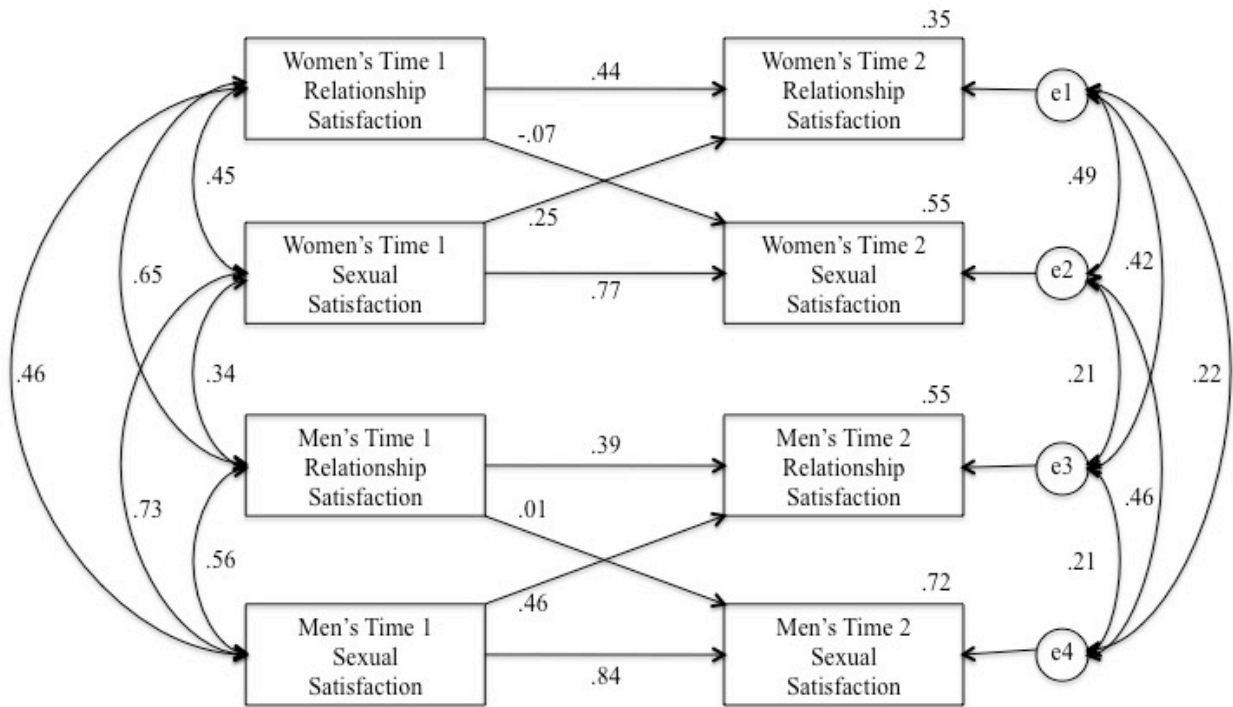


Figure 3. The Synchronous Common Factor Model.

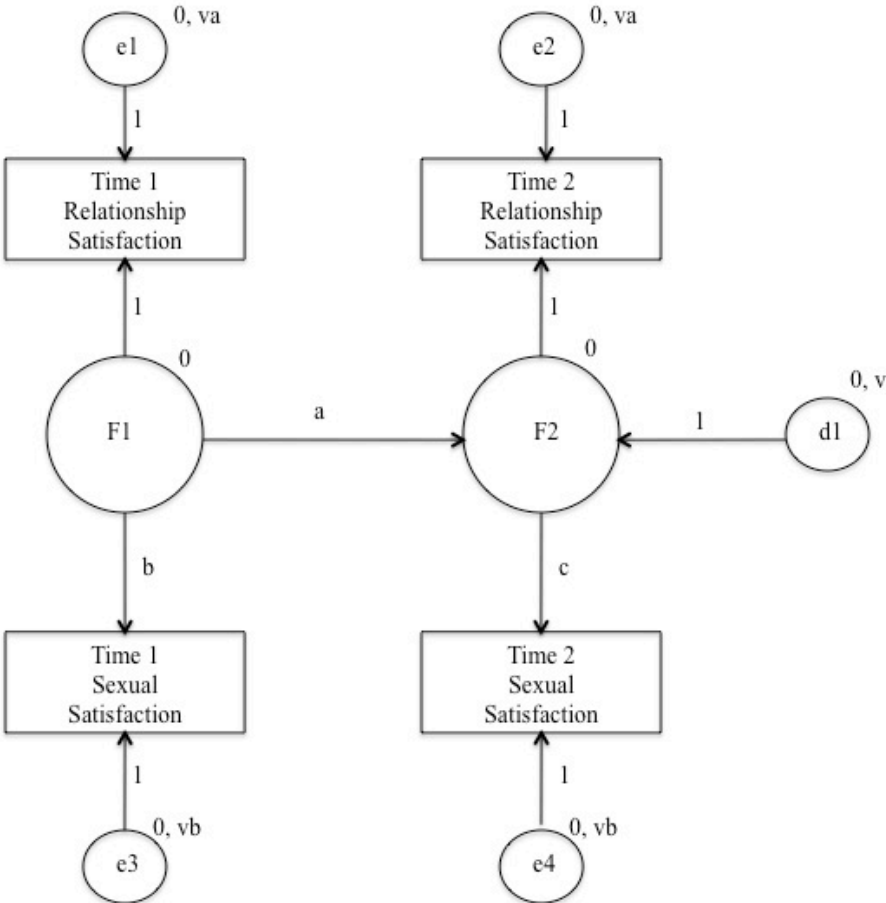


Figure 4. Standardized Estimates of the Synchronous Common Factor Model for Men.

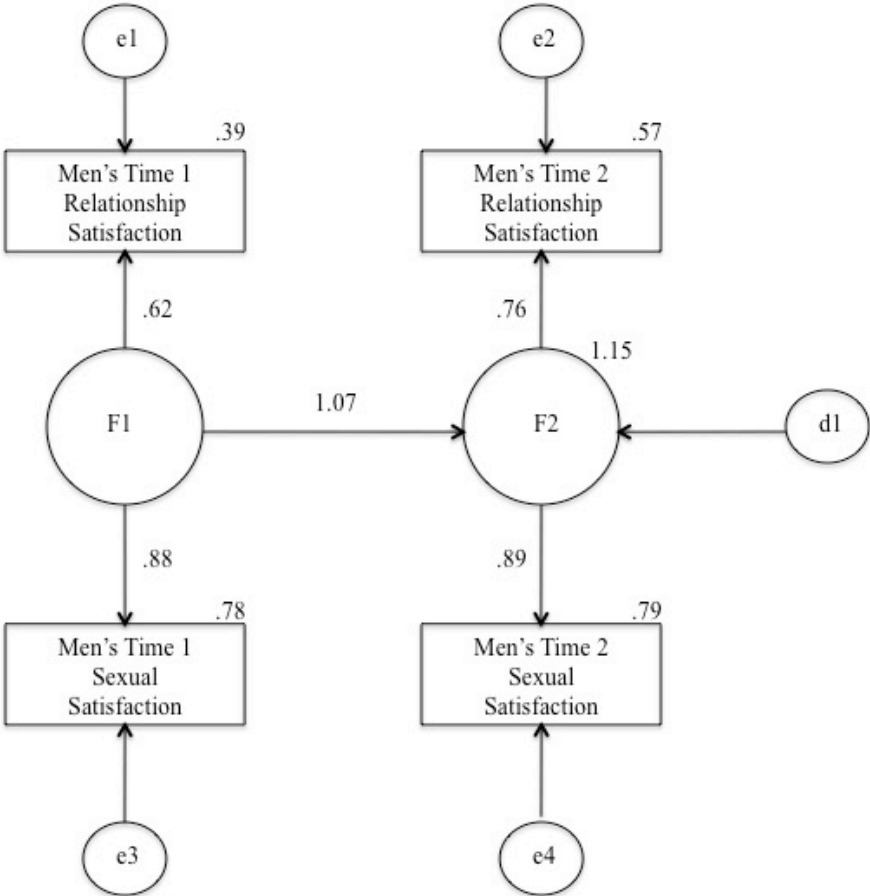


Figure 5. Standardized Estimates of the Synchronous Common Factor Model for Women.

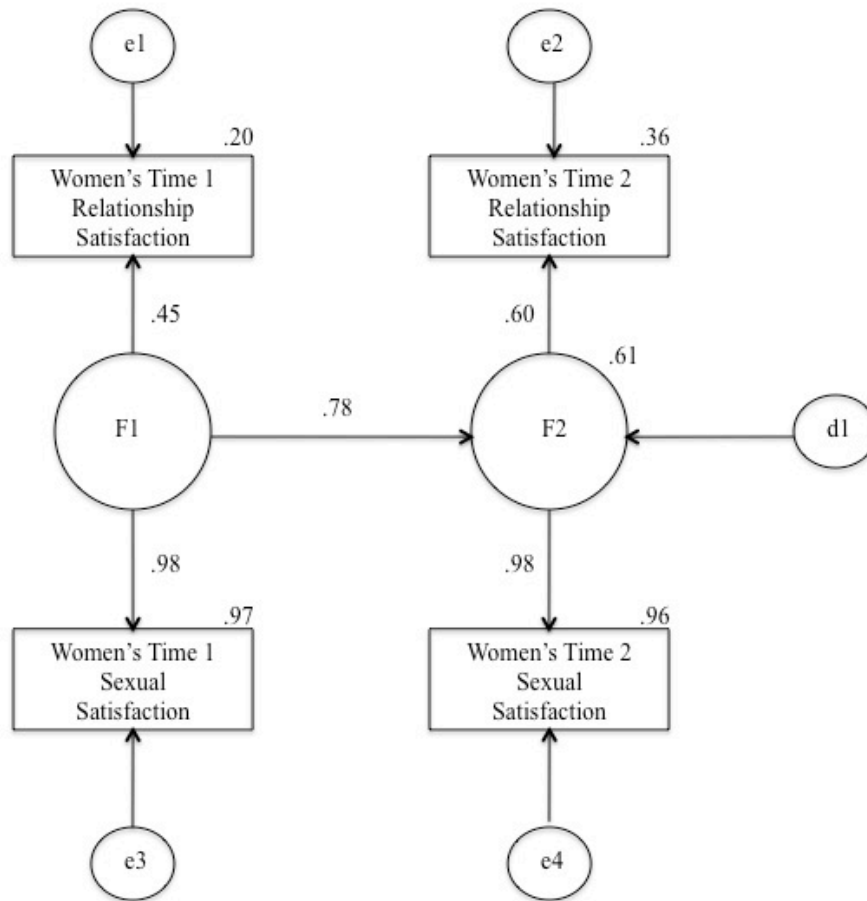


Figure 6. Model of Actor and Partner Effects.

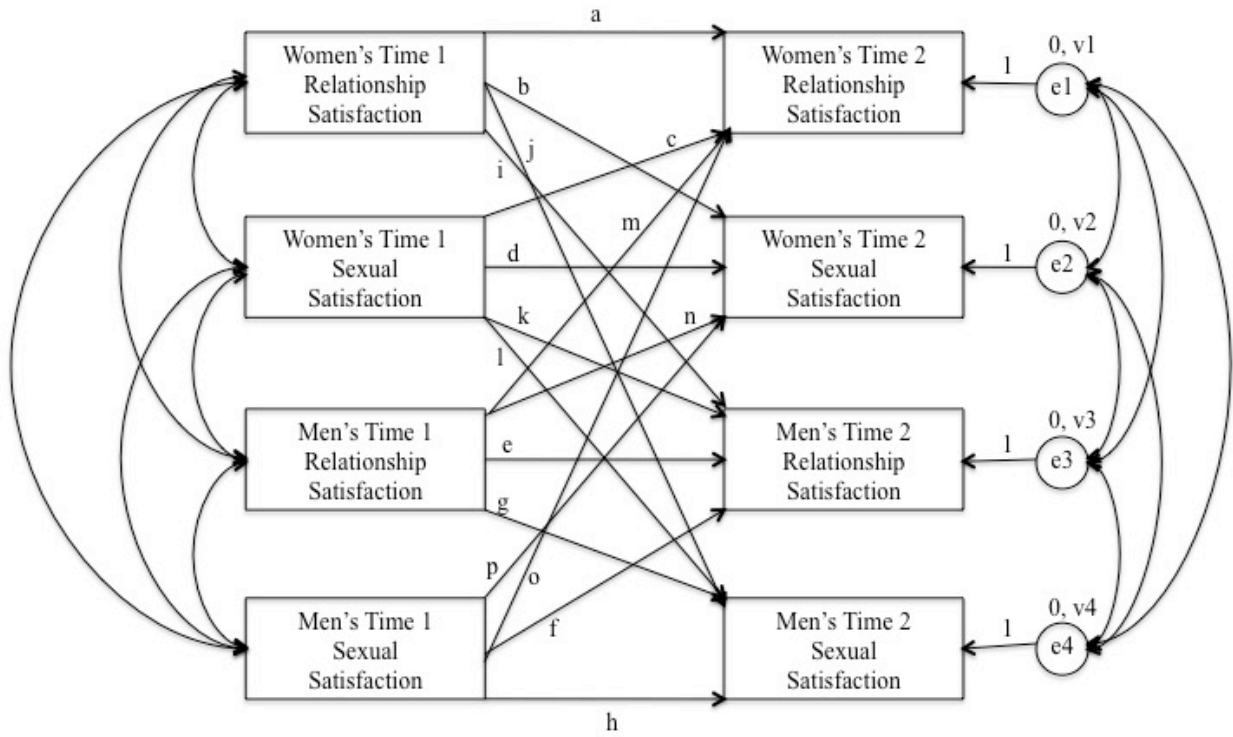
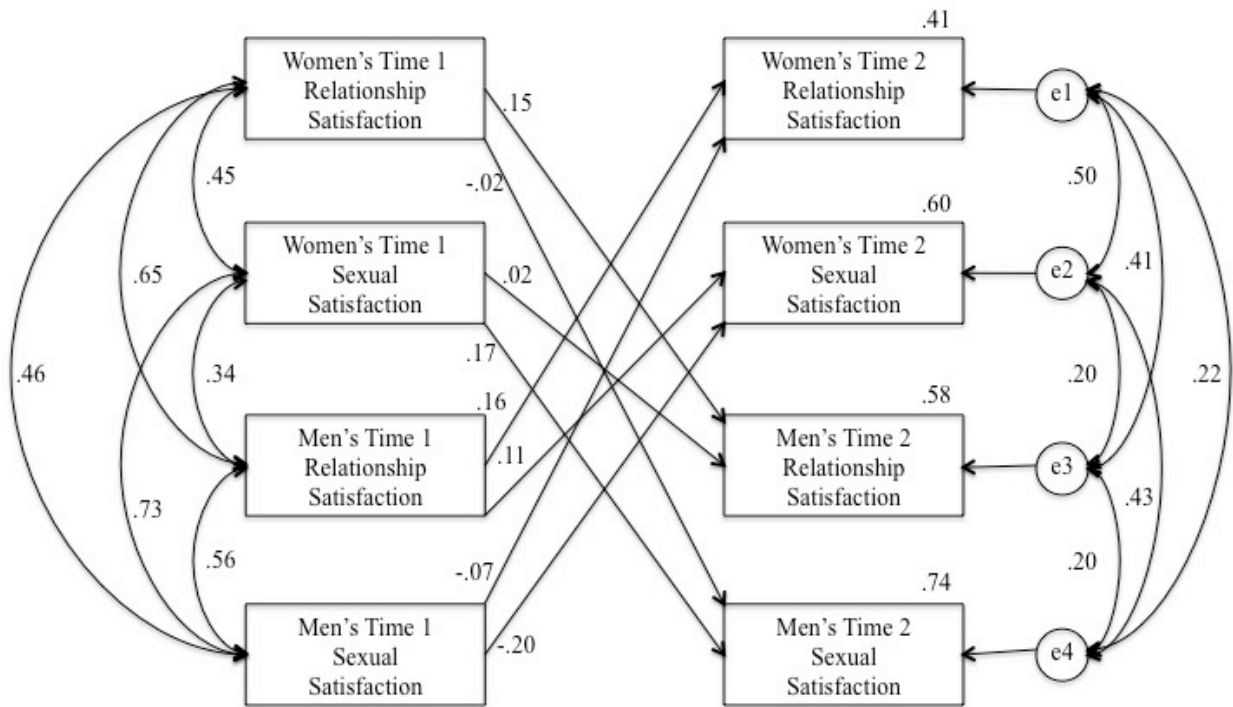


Figure 7. Standardized Estimates of Partner Effects.



Note. Estimates of partner effects were obtained in a model that included actor effects. However the estimates of actor have not been included in the figure for clarity.

Figure 8. Model to Test Communication as a Mediator of the Association Between Sexual Satisfaction and Subsequent Relationship Satisfaction.

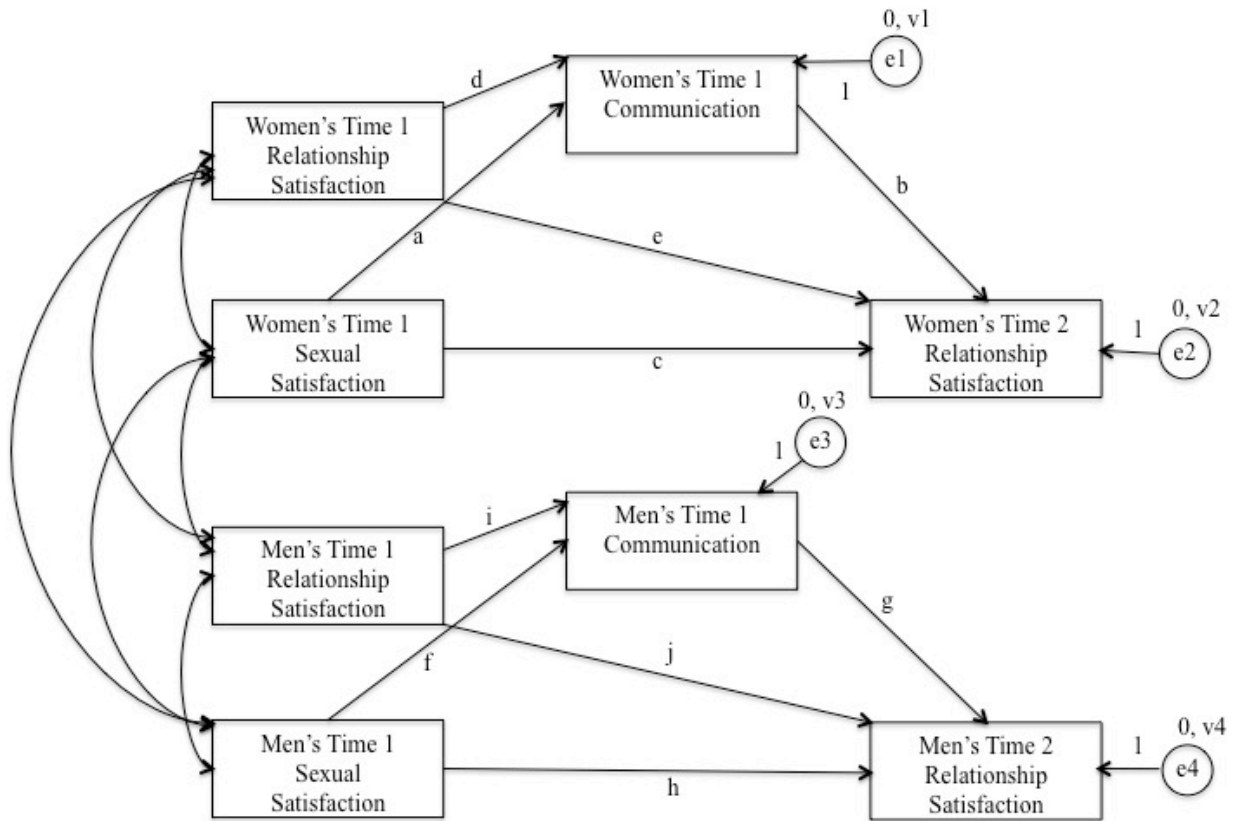
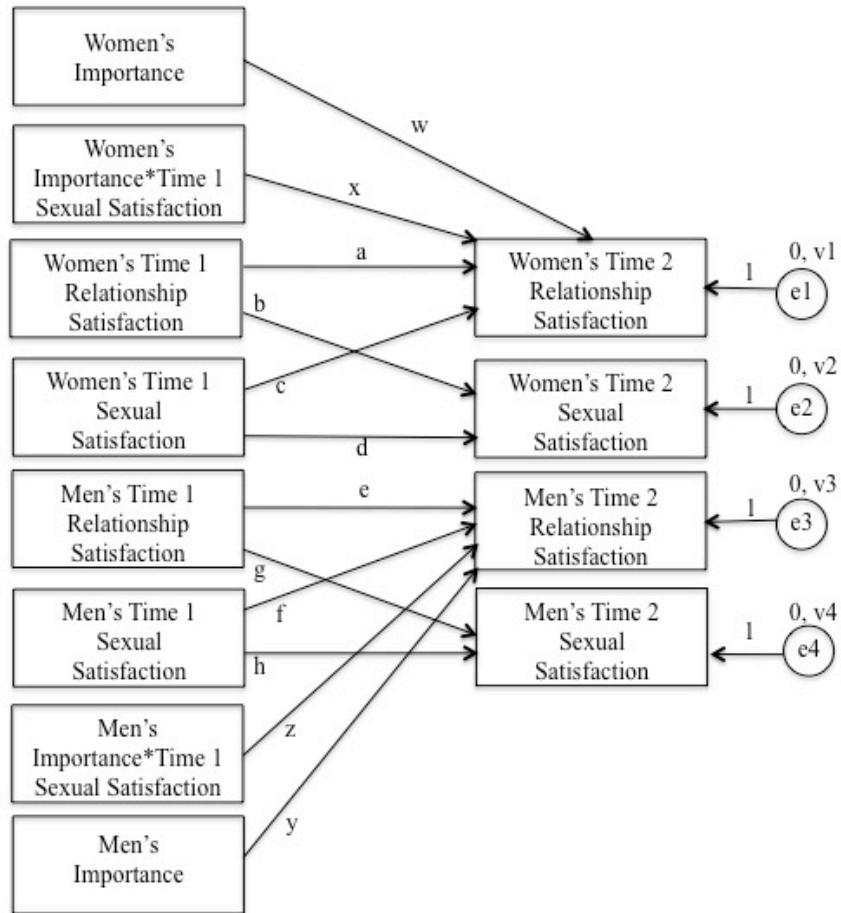
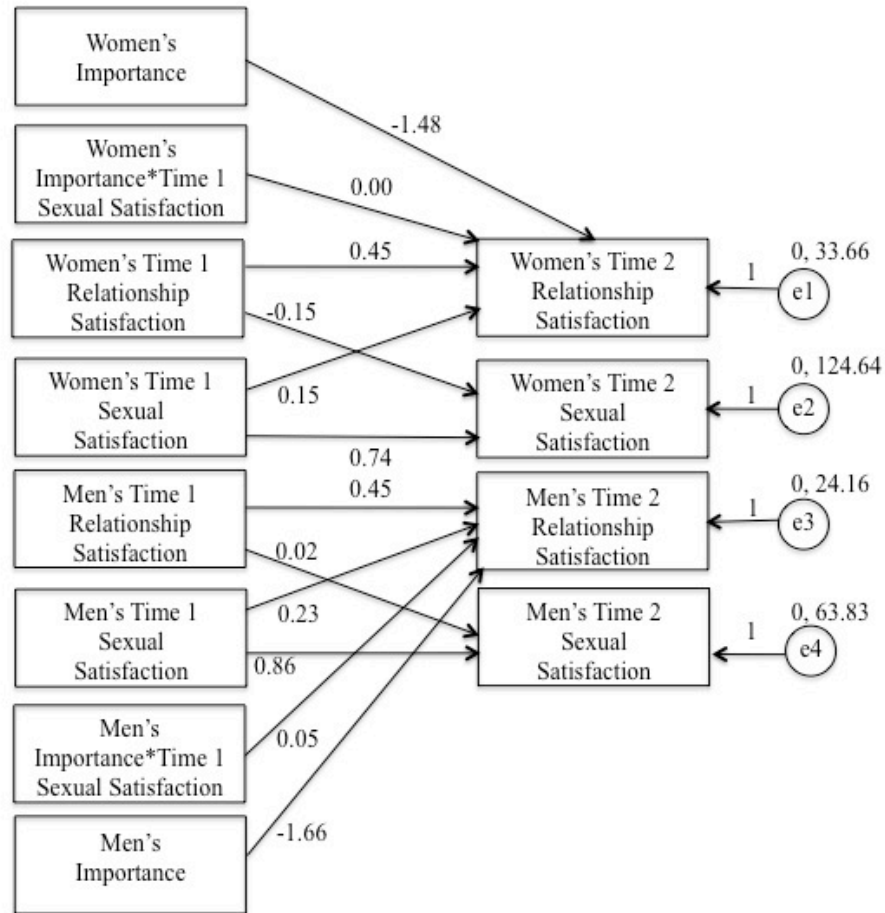


Figure 9. Model to Test the Moderation of Sexual Satisfaction by Importance of Sexual Satisfaction in Predicting Subsequent Relationship Satisfaction.



Note. The model used to test the moderation by importance included all possible correlations (a) between men's and women's Time 1 relationship satisfaction, Time 1 sexual satisfaction, importance and the importance interaction term, and (b) the error terms. However, these correlations not been represented in the figure for clarity.

Figure 10. Unstandardized Estimates of the Moderation of Sexual Satisfaction by Importance of Sexual Satisfaction in Predicting Subsequent Relationship Satisfaction



Note. The model used to test the moderation by importance included all possible correlations (a) between men's and women's Time 1 relationship satisfaction, Time 1 sexual satisfaction, importance and the importance interaction term, and (b) the error terms. However, these correlations not been represented in the figure for clarity.

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Appendix

Telephone Interview Procedure

One year after completing the Time 1 assessment less two to three weeks, a research assistant contacted each participating couple by telephone or email to schedule their telephone interview. The telephone interview was scheduled for approximately one year after the Time 1 participation date. In advance of the interview, participants were emailed a copy of the response options for the questionnaires they would complete during the interview. During the interview, a research assistant (an undergraduate student or the author) spoke with each partner individually over the phone. The interviewer spoke first to the partner who answered the phone. The participant was instructed to go to a room in which he or she would have privacy and was reminded to look at the response options. If the participant did not have a copy of the response options, the interviewer asked the participant write them down before starting each questionnaire. The interviewer first read the participant a letter of information and asked for his or her permission to participate in the telephone interview. The interviewer then read questions from the abbreviated background questionnaire, the QMI, and the ISS. The participant responded to each question by stating the numbers that corresponded to his or her responses and the interviewer recorded these responses. At the conclusion of the interview, the interviewer thanked the participant for his or her time, read a feedback letter, and asked to speak to the participant's partner. The same procedure was repeated with the second participant. The entire procedure took approximately 15 minutes per person, and in appreciation for his or her time, each partner received \$15.00.

Telephone Interview Data Analysis

Given that data were collected at three time points in this study, two data analytic strategies were originally considered: growth curve models and autoregressive models. Study data were initially analyzed using growth curve models. However, when the growth curve models, which modeled the intercepts and slopes of change in sexual satisfaction and relationship satisfaction across the three times points, were estimated, the solutions produced were inadmissible. Investigation into the cause of the inadmissible solutions revealed an unusual pattern of correlations across the measures. Campbell and Kenny (1999) state that, “the correlational structure of longitudinal data almost always has a *proximally autocorrelated* structure: adjacent waves of measurement correlate more highly than nonadjacent waves, and more remote in time, the lower the correlation” (p. 121). However, an examination of the current study data (see Table 6) revealed that men’s and women’s relationship satisfaction and sexual satisfaction were not proximally autocorrelated. For men’s relationship satisfaction, men’s sexual satisfaction, and women’s relationship satisfaction the magnitude of the correlations between each variable and itself across the time points was stronger between Time 1 and Time 2 than between Time 1 and the telephone interview, and the telephone interview and Time 2. For women’s sexual satisfaction scores the correlation between Time 1 and Time 2 ($r = .75$) was greater than the correlation between the telephone interview and Time 2 ($r = .68$), but not Time 1 and the telephone interview ($r = .87$).

The fact that the key study measures were not proximally autocorrelated had two important implications for the study. First, it suggested that the telephone interview data may have been compromised in some way and thus likely did not provide an accurate representation of participants’ relationship satisfaction and sexual satisfaction. This is despite the fact that the

measures administered during the telephone interview showed excellent internal consistency for both men and women (Quality of Marriage Index: $\alpha = .94$ for men; $\alpha = .93$ for women; Index of Sexual Satisfaction: $\alpha = .93$ for men; $\alpha = .94$ for women) and the means appeared comparable to those of the Time 1 and Time 2 data (see Table 7). A review of factors that may have influenced the Telephone Interview data appears below. Second, it was inappropriate to analyze the study data using either growth curve analyses or autoregressive models, as both types of models imply proximal autocorrelation. As a result of these implications, the decision was made to omit the telephone interview data from the study analyses and to investigate the longitudinal association of relationship satisfaction and sexual satisfaction using only the data collected during in-lab assessments.

Factors that May Have Influenced Telephone Interview Data Collection

Administration mode: Interview versus questionnaire.

One factor that varied between the telephone interview and the other assessments was the mode of question administration. Specifically, the telephone interview required participants to provide their responses to an interviewer, while in-lab sessions required participants to self administer the questionnaires by providing their responses using a laptop. During the informed consent process for the in-lab sessions, participants were told that their responses to the relevant questionnaires would be collected using a laptop and that no one in the lab would see their responses that day. In contrast, during the telephone interviews participants provided their responses directly to the interviewer. Within the sexuality research field, there is a literature examining the impact of administration mode on participants' responses to sensitive questions, defined as questions that "rais[e] concerns about disapproval or other consequences (such as legal sanctions] for reporting truthfully or if the question itself is seen as an invasion of privacy"

(Tourangeau & Smith, 1996, p. 276). Studies consistently find that participants who respond in modes that offer greater levels of privacy (e.g., self administered questionnaires on computers relative to self administered paper and pencil questionnaires; self administered questionnaires relative to interviewer administered questionnaires) report greater levels of sensitive behaviours and seem to be less impacted by self presentation concerns (Catania, 1999; Catania, Gibson, Marin, Coates, & Greenblatt, 1990; Gribble, Miller, Rogers, & Turner, 1999; Tourangeau & Smith, 1996; Turner, Ku, Rogers, Lindberg, Pleck, & Sonenstein, 1998). A recent study aimed at validating the Quality of Marriage Index for use over the telephone found that when participants completed the QMI over the telephone mean scores for both men and women were significantly higher compared to scores they provided on a paper-and-pencil version of the questionnaire administered a week prior (Woods, Priest, & Denton, 2013). It is possible that the different administration mode employed in the telephone interviews relative to the in-lab sessions influenced participants' responses thus contributing to the unusual pattern of results.

Administration location: Home versus in-lab.

A second factor that varied between the telephone interview and the other assessments was the location in which participants completed the study questionnaires. Specifically, participants completed the in-lab assessments alone in separate rooms within a research lab, while they completed the telephone interviews at home or another location of their choosing (e.g., workplace). The nature of the research lab made it possible to exercise more control over participants' environments while they completed questionnaires in the lab versus at home. In particular, the lab setting ensured that participants had privacy and were not influenced by each other or other individuals while completing the study questionnaires.

In developing the protocol for the telephone interviews, care was taken to ensure the privacy of participants while completing the interview. For example, participants were advised to find a location in which they would have privacy to complete the telephone interview and the interviewer waited until the participant confirmed that he or she was alone to begin the interview. If it was not possible for the participant to be alone to complete the interview, the interviewer offered to reschedule the interview. Additionally, participants were provided with a copy of the numerical responses that represented each scale anchor and were asked to respond to items using numerical values, thus minimizing the meaning that other people in the household could glean from the participant's responses if someone happened to overhear the conversation. Despite taking these steps, the fact that the interviews were conducted over the telephone means it was not possible to guarantee that participants were indeed alone and could not be overheard during the interview. Perhaps some participants were concerned that their answers might be overheard, and this caused them to respond differently to the study measures than they did when completing the in-lab assessments.

Gender match between interviewers and participants.

A third factor that may have varied with the administration mode and/or administration location to influence participants' responses to study measures is gender match/mismatch between female participants and their interviewers and male participants and their interviewers. The literature on gender match between interviewer and participant in sexuality studies has produced somewhat inconsistent findings. Specifically, in a study of telephone interviewing, Catania et al. (1996) found that the impacts of gender match/mismatch varied for different types of sexual behaviour questions (e.g., reported rates of extramarital sex and sexual problems increased with gender match, but reported number of sex partners and reported age of first

intercourse did not differ between gender matched and mismatched dyads). Catania et al. speculated that:

Sexuality interviews may be particularly sensitive to interviewer-gender effects.

Heterosexual respondents, for instance, may have any number of strong emotional reactions to being asked sexual questions by an opposite-gender interviewer (arousal, disgust, embarrassment) that in turn stimulate over- or underreporting of sexual activities. (p. 348)

Catania et al. (1996) also examined men and women's preferences for same versus opposite gendered interviewers and found that their preferences differ. Specifically, 94% of women who were given the opportunity to select the gender of their interviewer and opted to do so selected a female interviewer, while men in the same situation were less consistent in their preferences: 45% of men opted for a male interviewer and 55% of men opted for a female interviewer. In the current study, all of the telephone interviewers were female and thus female participants consistently experienced gender match with their interviewers. Men, in contrast, never experienced gender match with their interviewers. Given that Catania et al.'s (1996) study suggests about half of the male sample may have preferred a male interviewer, this gender mismatch may influenced some of the male participants' responses. Unfortunately, research has not examined how gender match or mismatch impacts reports of sexual satisfaction specifically. Nonetheless, the existing research does suggest that gender match/mismatch is one variable that may have varied with the mode and/or administration of the questionnaire to influence the telephone interview data, particularly for men.