
Stress Crossover in Newlywed Marriage: A Longitudinal and Dyadic Perspective

Studies of stress and marital quality often assess stress as an intrapersonal phenomenon, examining how spouses' stress may influence their own relationship well-being. Yet spouses' stress also may influence partners' relationship evaluations, a phenomenon referred to as stress crossover. This study examined stress crossover, and conditions that may facilitate crossover, in a sample of 169 newlywed couples over 3.5 years. A significant crossover effect emerged for husbands, which was moderated by couples' observed conflict resolution skills. For wives, a significant stress interaction emerged, such that the influence of husbands' stress on wives' marital satisfaction depended on wives' own stress levels. These findings highlight the importance of a dyadic approach when examining the role of stress in marriage.

Marriages do not occur in a vacuum but take place within environments that may constrain or facilitate marital development. When the environment of a couple contains numerous sources of strain, such as work stress or financial difficulties, marriages tend to suffer. Stressors external to the marriage have been associated, both cross-

sectionally and longitudinally, with lowered marital quality and greater marital instability (Bodenmann, 1997; Conger, Rueter, & Elder, 1999). Consequently, changes in marital quality over time cannot be fully understood without reference to the stressful events outside the relationship to which couples must adapt (Karney & Bradbury, 1995).

To date, most research examining stress and relationship maintenance has examined how individuals' functioning in marriage and other close relationships may be influenced by their own external stress. Yet one of the defining features of a marriage is interdependence, or the idea that one partner's experiences have the capacity to influence the outcomes of the other partner (cf. Thibaut & Kelley, 1959). A purely individualistic perspective on stress overlooks the likelihood that marital development ultimately depends on how stress experienced by one person affects not only the individual but also the partner (O'Brien & DeLongis, 1997).

The way spouses' stress may influence their partners' marital well-being remains unclear. The few studies that have taken a dyadic approach to stress highlight the importance of partners' responses to their spouses' stress for marital outcomes (see Larson & Almeida, 1999, for review). In general, positive responses (e.g., providing support, making allowances for a spouse's negative behavior) should work to contain the negative influence of stress on a marriage, whereas negative responses (e.g., engaging in negative reciprocity) are likely to exacerbate the transmission of stress between partners. Aside

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from these general predictions, however, little is known about the specific conditions in which partners may be more or less susceptible to their spouses' stress. Furthermore, discrepant findings have raised questions about whether husbands or wives are more heavily influenced by their partners' stress (e.g., Larson & Almeida). The goal of the current study was to clarify these issues by examining how and when stressors experienced by each spouse may be linked to the relationship evaluations of both spouses over 3.5 years of marriage.

A DYADIC PERSPECTIVE ON STRESS: SPILLOVER AND CROSSOVER EFFECTS

Stress and the Individual: Spillover Effects

Spouses' stress frequently is associated with changes in their own relationship functioning, a phenomenon referred to as *stress spillover* (Bolger, DeLongis, Kessler, & Wethington, 1989). As external stress increases, spouses engage in more negative behaviors in the home (Bolger et al.) and report increasingly negative relationship evaluations (Tesser & Beach, 1998). Moreover, a 4-year marriage study revealed that when spouses experience higher levels of stress than normal, they not only report more specific problems in the marriage (e.g., problems with communication, showing affection) but also tend to rely on a maladaptive attributional style, blaming their partner for negative marital events (Neff & Karney, 2004). Thus, stress appears to act as a double-edged sword: Under stress, spouses not only are *more* likely to experience negative relationship events but also are *less* likely to process and interpret marital events in an adaptive manner.

Stress and the Partner: Crossover Effects

The consequences of spouses' stressors, however, may reverberate beyond spouses' own relationship evaluations, as the stressful life events of one individual also may influence the emotions and judgments of the partner, a phenomenon referred to as *stress crossover* (Larson & Almeida, 1999). Research on emotional transmission between family members argues that what happens to one family member outside of the relationship may affect how other family members think and behave inside the relationship. In one study, independent observers rated children's

affect as increasingly depressed on days in which their mothers reported higher levels of work stress (Repetti & Wood, 1997). Similarly, cross-sectional studies have revealed that husbands' job stress is associated with elevated levels of psychological distress (Rook, Dooley, & Catalano, 1991) and depression (Katz, Monnier, Libet, Shaw, & Beach, 2000) in wives. Perhaps, the most direct evidence that spouses' stress may contribute to partners' relationship satisfaction was found in a daily diary study of couples in which one partner was preparing for the bar exam. Thompson and Bolger (1999) measured the examinees' mood as well as their partners' relationship feelings each day for the 35 days preceding the exam. Results indicated that if the examinee reported an increase in depression on a given day, the partner reported less positive feelings about the relationship on the following day.

Assessing the Independent Effects of Spillover and Crossover

Despite these suggestive findings, our understanding of stress crossover is hindered by several limitations of the existing research. First, the literature generally has failed to control for partners' own stress when examining the crossover process. Approaching stress from a dyadic perspective is complicated by the fact that there are three kinds of stressors in the context of a marriage: stressors originating in the context of Partner A but not Partner B (e.g., Partner A's heavy workload), stressors originating in the context of Partner B but not Partner A (e.g., Partner B's problems with friends), and stressors shared by both members of the couple (e.g., financial difficulties). By ignoring Partner B's own stress when examining crossover effects, prior research overlooks not only Partner B's unique stressors but also the many shared stressors found within couples. Failing to account for these stressors leaves open the question of whether spouses' stress has a unique influence on partners' satisfaction independent of the influence of partners' own stress. If spouses share many of the same stressors, and an association is found between Partner A's stress and Partner B's satisfaction, it is unclear whether that association represents a crossover effect, or is simply a spillover effect for Partner B. Without research examining spillover and crossover simultaneously, the independent effects of stress crossover and spillover cannot be teased apart.

Second, most stress research relies on cross-sectional or short-term daily diary designs. Diary studies have an important advantage over cross-sectional designs in that they allow for the examination of the within-couple association between spouses' stress and partners' well-being, controlling for extraneous variables such as personality or general response tendencies. Given the difficulty of obtaining daily reports, though, diary studies generally span only the course of several weeks. Thus, the long-term implications of these interpersonal transfers of stress are unknown without research examining stress and marital quality over a more significant length of time.

Third, most crossover research has been restricted to examining whether spouses' stress is associated with heightened psychological distress in the partner. Although increased distress may be one mechanism through which stress leads to poor relationship outcomes, little evidence exists to directly link spouses' stress to their partners' relationship evaluations.

To address these limitations, the first goal of the study was to examine spillover and crossover effects over 3.5 years of marriage. Specifically, we examined, at the within-couple level, whether increases in spouses' stress were associated with decreases in partners' marital satisfaction over time, controlling for changes in partners' own stress (e.g., partners' spillover effects). Controlling for partners' own stress allowed us to account for partners' unique stressors as well as those stressors shared by the couple when examining crossover effects, providing a stringent test for independent crossover effects. When simultaneously modeling spillover and crossover effects, we predicted that stress crossover would be observed independent of stress spillover.

MODERATORS OF STRESS CROSSOVER: WHEN ARE COUPLES MOST VULNERABLE TO CROSSOVER EFFECTS?

The existing literature is further limited by confusion regarding the circumstances that may intensify or buffer couples' experience of stress crossover. Evidence suggests that in some situations, partners may think and act in ways that contain the deleterious effects of stress. For instance, in the previously cited study by Thompson and Bolger (1999), the stress crossover effect was no longer significant on the days immediately prior to the exam. It appeared that, when the exam was looming, partners made allowances

for the examinee's distress, tolerating negative emotions they did not previously tolerate. The second goal of this study was to examine two factors that may facilitate positive responses to stress, thereby influencing whether partners are successful in protecting their own relationship evaluations from the negative effects of their spouses' stress.

Partners' Own Stress and Crossover Effects: The Interactive Effects of Spouses' Stress

One potential moderator of stress crossover involves the dynamic life circumstances of the partner, namely partners' own levels of stress. Research on stress spillover indicates that when spouses' stress is high, they are likely to exhibit more negative behaviors in the relationship (Bolger et al., 1989). How partners respond to this increase in their spouses' negativity (i.e., whether they are susceptible to stress crossover) may depend on their own current stressful conditions. For instance, satisfied partners appear motivated to reframe their spouses' occasional negative behaviors in order to maintain a positive relationship evaluation (Bradbury & Fincham, 1990). Partners with little stress of their own may be maximally capable of engaging in these sorts of transformations, correctly attributing their spouses' behavior to the stressor and thus making allowances for spouses' negativity (cf. Gilbert, Pelham, & Krull, 1988). This coping response should allow partners' satisfaction to remain high in the presence of their spouses' stress, limiting the stress crossover effect.

If partners also have high stress, however, they may be unable to discount their spouses' negativity in this manner. Coping with their own stress may tax partners' cognitive resources, leaving them with fewer resources to manage negative relationship perceptions. For instance, individuals whose psychological resources are depleted tend to be more receptive to negative emotions transmitted from their partners (Larson & Almeida, 1999). Thus, when coping with their own stress, partners' information processing in the relationship may be simplified, enhancing crossover effects. To address this idea, we examined the interactive effects of each spouse's stress on relationship evaluations at the within-couple level. We expected that crossover between partners would be greatest when both partners were experiencing higher levels of their own stress at the same time.

Conflict Resolution Skills and Crossover Effects

Interdependence theory (Thibaut & Kelley, 1959) argues that ultimately all interpersonal influence travels through behavioral interactions. The transmission of stress between spouses, then, should be affected by couples' interaction styles during stressful periods. Specifically, the couple's skill at resolving marital conflicts may comprise a second moderator of these effects. External stress has been associated with increases in specific marital problems (Neff & Karney, 2004), suggesting that one spouse's stress may create new sources of relationship conflict that the couple must negotiate as a unit (Cohan & Bradbury, 1997). Thus, the skill with which couples resolve problem issues should moderate the toll stress ultimately takes on the marriage. If the couple is better equipped to manage problems adaptively, any negativity resulting from one spouse's stress is likely to be handled effectively, insulating the partner's satisfaction from the effects of stress. On the contrary, couples with maladaptive conflict skills may find themselves unable to resolve problems brought about by stressors, facilitating the spread of one spouse's stress to the other partner's satisfaction. The third goal of the study was to examine whether, at the between-couple level, those couples who exhibit better conflict resolution skills are less vulnerable to crossover effects.

Gender Differences in Crossover Effects

A final limitation of prior research is the failure to resolve questions about gender differences in crossover effects. Research frequently has focused on how one partner's work stress may influence the other partner's well-being. Many of these studies (e.g., Repetti, 1989) either have examined specifically how husbands' stress affects wives' well-being, or have examined job stress in careers that tend to be predominately held by men. As a result, these studies were ill equipped to address the links between wives' stress and husbands' well-being.

On the one hand, some studies that do examine the flow of stress in both directions indicate that husbands' stress may be more likely to affect wives' well-being than vice versa (see Larson & Almeida, 1999, for review). For example, some evidence suggests that women may take active steps to prevent their work stress from affecting relationships at home (Repetti & Wood, 1997).

Furthermore, the fact that women are generally reported to be more empathic (Eagly & Crowley, 1986) suggests that they may be more vulnerable to their partners' stress than are husbands.

On the other hand, other evidence suggests that the link between wives' stress and husbands' well-being may be stronger. Receiving support from a partner buffers relationships from the effects of stress (Cutrona, 1996). Yet husbands and wives may not provide their partners with the same level of support during stressful times. For instance, wives are more likely than husbands to increase their workload at home on days in which their partners experienced stress at work, thereby facilitating their partners' recovery from stress (Bolger et al., 1989). Also, a diary study of support revealed that on days when husbands had greater stress than normal, wives increased the support they provided. On days in which wives had higher stress than normal, however, husbands behaved more negatively toward their wives (Neff & Karney, 2005). If, during stressful times, wives support their husbands more than husbands support their wives, this could suggest that although the negative influence of husbands' stress may be contained by the support they receive, wives' stress may be more likely to spill into the marriage, causing the marital processes of both partners to suffer.

In light of these discrepant findings, the final goal of the study was to explore potential gender differences in the susceptibility to crossover effects. By examining husbands' and wives' stress simultaneously, the current study extends prior research by allowing for the direct comparison of the relative influence of husbands' and wives' stress on marital satisfaction.

Overview of Current Study

Newlywed couples participating in a broader study of marriage provided information on their stressful experiences and their relationship satisfaction every 6 months over 3.5 years. Newlyweds were examined for several reasons. First, newlyweds are an appropriate sample in which to examine issues of change and stability because, compared to more established marriages, these couples experience more dramatic changes in relationship quality and are at elevated risk of marital disruption (Cherlin, 1992). Second, couples in the early years of marriage are more likely to be exposed to a variety of stressful events, as a number of stressors tend to

accompany youth and the transition to marriage (e.g., relocation, starting a new job).

METHOD

Participants

Recruitment for the study began in the spring of 2000. Couples were recruited using two methods. First, advertisements were placed in community newspapers and bridal shops. Second, letters were sent to couples who had applied for marriage licenses in Alachua County, Florida. Couples responding to either method of solicitation were screened in a telephone interview to determine whether they met the following criteria: (a) this was the first marriage for each partner and (b) the couple had been married fewer than 6 months. The final sample consisted of 169 couples (for more information regarding recruitment and screening, see Karney, Kreitz, & Sweeney, 2004). On average, husbands were 25.6 ($SD = 4.1$) years old, and had received 16.3 ($SD = 2.4$) years of education. Fifty-nine percent were employed full time and 34% were full-time students. Wives averaged 23.4 ($SD = 3.6$) years old and had received 16.2 ($SD = 2.0$) years of education. Forty-five percent were employed full time, and 45% were full-time students. Slightly over 65% of the sample was Christian and 94% of husbands and 86% of wives were White. The average household income of couples was under \$20,000. Though this income appears quite low, it should be noted that a sizable percentage of spouses were full-time students.

Procedure

Within the first 6 months of their marriage, couples were scheduled to attend a laboratory session. Prior to this session, couples were mailed a packet of questionnaires containing self-report measures of stress and of relationship perceptions as well as a letter instructing couples to complete all questionnaires independently of one another. Couples were asked to bring these questionnaires with them to the lab session. During this session, couples were interviewed individually and each couple engaged in two videotaped 10-minute discussions designed to assess the general skill with which spouses are able to communicate and resolve conflicts. For each discussion, one spouse was asked to identify an area of difficulty in the

marriage and to discuss the problem with the partner, with the goal of working toward some resolution on the issue. Spouses were encouraged not to choose the same issues. Couples were paid \$70 for participating in this part of the study.

Following this initial session, couples were contacted by phone every 6 months over a 3.5-year period. At each assessment, couples were mailed the same questionnaires described earlier as well as a letter instructing couples to complete all questionnaires independently of one another. Upon returning the questionnaires via mail, couples were paid \$50. At Time 7, the final wave of data presented in this article, 157 couples were still married and 12 couples (7.1%) had divorced. Of the 157 couples who were still married and participating in the study, 127 couples (81.0%) returned completed packets at Time 7. As data were examined through growth curve modeling, participants who did not provide all seven waves of data (i.e., participants who had missing data or divorced during the study) could be included in all analyses. Thus, results reported are based on data from all 169 couples. Omitting couples who divorced did not change any of the results reported.

Materials

Global marital satisfaction. Several of the most commonly used measures of marital satisfaction (e.g., the Dyadic Adjustment Scale; Spanier, 1976) contain items that assess spouses' evaluations of specific areas of potential conflict as well as items assessing spouses' sentiments toward the relationship as a whole. To ensure these two ideas were not confounded in the current study, satisfaction was measured with an instrument that obtains global evaluations of the relationship exclusively. Specifically, spouses completed a 15-item version of the Semantic Differential (Osgood, Suci, & Tannenbaum, 1957). This scale asked spouses to rate their current feelings about their marriage on 7-point scales between two opposite adjectives (e.g., "Bad-Good," "Satisfied-Dissatisfied," "Unpleasant-Pleasant"). Scores on the measure can range from 15 to 105, with higher scores indicating greater satisfaction. The internal consistency of the measure was high across all waves of data collection, ranging from .93 to .97 for both spouses.

Stressful life circumstances. During their laboratory visit at Time 1, each spouse was interviewed

individually to assess external stress using a modification of a protocol developed by Hammen et al. (1987). Spouses were asked to describe in detail the quality of the following 12 life domains over the prior 6 months: the marital relationship, parenthood, relationships with family, relationships with in-laws, relationships with friends, experiences at school, experiences at work, unemployment, finances, living conditions, own health, and spouse's health. For each domain, interviewers were instructed to probe for concrete indicators of the ongoing stressors that the spouse may be experiencing. After describing each domain, spouses were instructed to rate their experiences within that domain over the prior 6 months on a 9-point scale (1 = *exceptionally positive circumstances* and 9 = *exceptionally stressful circumstances*). At Time 5, when spouses returned to the laboratory for a second interview, the same procedure was used. At all other follow-up assessments, spouses read through a series of questions about each domain (taken from the initial interview) and were asked to rate their experiences in the same way as during their interviews. At all time points, the questionnaire was structured such that spouses were asked about their marriage first, then the other domains. This ordering of questions was chosen in order to encourage spouses to separate their marital stress from their stress in the other domains (e.g., Strack, Martin, & Schwarz, 1988). Of the 12 domains included on the original measure, we selected only those domains representative of stress occurring outside the marriage to be included in the final composite score (i.e., ratings of stress in the marital relationship were omitted from analyses). Scores on the measure could range from 11 to 99, with higher scores indicating greater non-marital stress.

Behavioral observation coding. Prior observational studies of conflict resolution behavior frequently characterize negative communications during conflict discussions as evidence of poor conflict skills (e.g., Cohan & Bradbury, 1997). Thus, to assess the negativity of spouses' communications during the conflict interaction task, a modified version of the Verbal Tactics Coding Scheme (Sillars, 1982) was used. Each 10-minute interaction was divided into speaking turns and each speaking turn was then coded. Using this version of the coding scheme, each speaking turn may receive one of four codes: negative, positive,

neutral, or off-task. Negative codes are assigned to behaviors that either directly fault, reject, or criticize the speaker or indirectly criticize the partner through hostile sarcasm, avoiding responsibility, or hostile questions. Positive codes are given to behaviors that further the resolution of the problem by helping to define the problem, suggesting a plan for coping with the issue, conveying understanding of the partner's feelings and perspectives, or providing encouragement or affection to the partner, or both. Neutral is assigned to behaviors related to the problem but factual in nature. Finally, off-task is given to all behaviors not relevant to the issue. Four research assistants were trained to code the interactions independently using the coding scheme. Interrater reliability, which was assessed by having randomly selected pairs of observers code a randomly selected 25% of the interactions, was generally quite high (for husbands, intraclass correlation coefficients = .95 for negative, .85 for positive, .96 for neutral, and .98 for off-task. For wives, intraclass correlation coefficients = .82 for negative, .86 for positive, .99 for neutral, and .98 for off-task). To analyze the codes in subsequent analyses, the number of times each code was assigned to each spouse was divided by the total number of speaking turns of that spouse. Thus, each code was analyzed as a proportion of the total speaking turns to control for variation across spouses in the number of speaking turns.

To create a couple-level index of conflict behavior, the following steps were taken. First, an index of the overall positivity of husbands' and wives' behavior was calculated for each interaction by computing the difference between the total proportion of positive behavior and the total proportion of negative behavior. Husbands' behavior was significantly positively associated with their wives' behavior within each interaction, $r(157) = .50, p < .001$ for discussions of husbands' topics and $r(155) = .70, p < .001$ for discussions of wives' topics. Thus, husbands' and wives' behaviors were combined to create a couple-level index of problem-solving behavior for each of the two interactions. Finally, given that couples' behaviors were significantly correlated across the interactions, $r(149) = .30, p < .001$, the conflict behaviors from the two interactions were averaged to create a single index of couple-level behavior across the interactions. Because of technical difficulties, 26 (8%) of the 338 conflict interactions could not

be coded. For this reason, all analyses utilizing the couple-level index of conflict behavior are based on data from 149 (88%) of the 169 couples. The few interactions that could not be coded were randomly distributed across all interactions, suggesting no systematic bias in the types of interactions that could not be coded. Moreover, couples with missing conflict data did not differ in their stress or their satisfaction from the remainder of the sample.

Data Analysis

Examining stress crossover processes, as well as potential moderators of the stress crossover effect, requires both within-couple and between-couple analyses. A within-couple approach allowed us to examine whether changes in a spouse's stress were associated with changes in the partner's relationship satisfaction, controlling for spouses' idiosyncratic tendencies to view their relationship and their stress more or less favorably. The between-couple approach allowed us to evaluate whether the degree of stress crossover present within a couple was associated with the couple's conflict resolution skills. To address both the within-couple and between-couple hypotheses, data were examined with multilevel modeling (MLM) (Bryk & Raudenbush, 1992). This approach was adopted for several reasons. First, in contrast to other approaches to analyzing multilevel models (e.g., structural equation modeling), MLM provides reliable estimates of within-subject parameters even when sample sizes are relatively small. Second, MLM provides maximally efficient estimates of these parameters by weighting individual estimates according to empirical Bayes theory. When the within-subject parameter for an individual can be estimated precisely, the final estimate relies heavily on the individual data. When the parameter cannot be estimated precisely (e.g., because of missing data), the final estimate relies more heavily on the mean of the sample. Because the most precise estimates therefore contribute more to the final estimated variance of the sample, variances estimated in this way tend to be more conservative than those obtained through traditional ordinary least squares methods. For all of the analyses reported, parameters describing husbands' and wives' data were estimated simultaneously to control for the nonindependence of couple data, according to procedures described by Raudenbush, Brennan, and Barnett (1995).

RESULTS

Descriptive Statistics

Table 1 presents descriptive statistics for measures of global satisfaction and external stress for each of the seven waves of data collection. On average, spouses reported high levels of global marital satisfaction and somewhat low levels of stress. To examine whether husbands and wives differed in their marital satisfaction or the amount of stress they tend to experience, paired-sample *t* tests were conducted at each of the seven waves of data collection. No significant differences were found between husbands and wives at any assessment.

Are Changes in Spouses' Stress Associated With Changes in Their Own Marital Satisfaction?

The first goal of the study was to replicate prior work on stress spillover. To do this, we examined the within-person association between spouses' stress and their own marital satisfaction over the first 3.5 years of marriage. It was predicted that, over time, increases in external stress would be associated with corresponding decreases in marital satisfaction. Before addressing this hypothesis, however, we first examined the linear trajectory of marital satisfaction over time for husbands and for wives using the following equation:

$$\text{Satisfaction} = \beta_{0j} + \beta_{1j}(\text{time}) + \text{error} \quad (1)$$

On average, satisfaction significantly declined over the first years of marriage for both husbands and wives (for husbands, $\beta_{1j} = -.94$, $SE = .19$, $t(168) = -5.0$, $p < .001$, effect size $r = .36$; for wives, $\beta_{1j} = -.89$, $SE = .19$, $t(168) = -4.7$, $p < .001$, effect size $r = .34$). Consequently, to address stress spillover, we examined the within-person association between spouses' stress and their marital satisfaction controlling for time according to the following model:

$$\text{Satisfaction} = \beta_{0j} + \beta_{1j}(\text{time}) + \beta_{2j}(\text{own stress}) + \text{error} \quad (2)$$

where time and stress were centered within-persons. In this equation, β_{0j} represents an estimate of the average level of a spouse's marital satisfaction. β_{1j} represents the slope of a spouse's satisfaction over time. β_{2j} captures

Table 1. Means of Global Marital Quality and External Stress for Husbands and Wives

Spouse	Time 1	Time 2	Time 3	Time 4	Time 5	Time 6	Time 7
Global marital satisfaction							
Husbands							
<i>M</i>	95.5	91.8	92.0	92.7	91.6	91.8	89.2
<i>SD</i>	10.3	13.3	12.9	11.5	14.7	14.8	15.8
<i>n</i>	169	163	161	145	139	113	126
Wives							
<i>M</i>	97.6	93.5	94.7	95.5	94.1	94.1	92.0
<i>SD</i>	9.5	13.6	13.0	11.0	12.9	13.7	14.5
<i>n</i>	169	163	161	149	142	116	128
External stress							
Husbands							
<i>M</i>	27.5	30.5	29.2	29.2	28.9	29.1	29.2
<i>SD</i>	10.5	11.1	10.9	9.9	11.0	11.0	10.6
<i>n</i>	169	163	159	150	140	113	127
Wives							
<i>M</i>	27.8	31.2	29.9	29.6	28.6	28.9	29.8
<i>SD</i>	9.3	10.5	11.0	9.7	9.1	9.8	10.4
<i>n</i>	169	163	161	150	142	116	128

Note: For the measure of external stress, higher scores indicate higher levels of stress.

the within-person association between changes in stress and changes in satisfaction, controlling both for a spouse’s tendency to view the marriage as more or less satisfying and for the tendency for satisfaction to decrease over time. Thus, β_{2j} is an index of stress spillover. On average, when spouses were experiencing greater stress than normal, they reported decreases in their own marital satisfaction (For husbands, $\beta_{2j} = -.18$, $SE = .04$, $t(168) = -4.3$, $p < .001$, effect size $r = .32$; for wives, $\beta_{2j} = -.23$, $SE = .04$, $t(168) = -5.4$, $p < .001$, effect size $r = .30$). Replicating prior research, these results provide evidence of stress spillover over 3.5 years of marriage.

Does Stress Crossover Exist Independent of Stress Spillover?

We next examined whether spouses’ stress was associated with their partners’ relationship evaluations, over and above the effects of each partner’s stress on their own satisfaction. To investigate stress crossover processes, we examined the within-couple association between spouses’ stress and their partners’ marital satisfaction over the first 3.5 years of marriage. It was predicted that increases in spouses’ stress would be associated with corresponding decreases in their partners’ marital satisfaction, con-

trolling for fluctuations in partners’ own stress levels. This hypothesis was addressed using the following equation:

Partner’s Satisfaction

$$= \beta_{0j} + \beta_{1j}(\text{time}) + \beta_{2j}(\text{partner’s own stress}) + \beta_{3j}(\text{spouse’s stress}) + \text{error} \quad (3)$$

where time, partner’s own stress, and spouse’s stress were centered within-persons. In this equation, β_{0j} , β_{1j} , and β_{2j} can be interpreted as in Equation 2. The new parameter, β_{3j} , captures the within-couple association between changes in a spouse’s stress and changes in a partner’s marital satisfaction over time, controlling for a partner’s tendency to view the relationship as more or less satisfying, for the tendency of satisfaction to decrease linearly over time, and for changes in a partner’s own level of stress. β_{3j} , then, is an index of stress crossover.

As seen in Table 2, when including both partners’ levels of stress in the model, the spillover effect found for both husbands and wives remained significant. Additionally, results revealed a significant stress crossover effect for husbands but not for wives. On average, at times when wives were experiencing higher levels of external

Table 2. Associations Between External Stress and Global Marital Satisfaction: Evidence for Independent Spillover and Crossover Effects

	β	SE	<i>t</i>	Effect Size <i>r</i>	χ^2 Test for Gender Differences
Spillover effects (controlling for crossover; <i>df</i> = 168)					
Husbands	-.14	0.04	-3.4***	.25	
Wives	-.27	0.04	-5.6***	.40	4.5*
Crossover effects (controlling for spillover; <i>df</i> = 168)					
Husbands	-.14	0.04	-3.3**	.25	
Wives	.01	0.04	0.18	.01	5.1*

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

stress, their husbands reported less satisfaction with the marriage, controlling for the association between husbands' own stress and their satisfaction. Changes in husbands' stress, however, did not seem to be significantly associated with their wives' marital happiness when accounting for wives' own levels of stress. To determine whether the association between partners' satisfaction and spouses' stress was significantly stronger for husbands than for wives, a model was specified in which the size of the association was constrained to be equal for husbands and for wives. As reported in the final column of Table 2, this model did not fit the data as well as the unconstrained model, suggesting that the crossover effect was significantly stronger for husbands than for wives.

Overall, the pattern of results thus far indicates that when wives are experiencing greater levels of stress, they report being less happy in the marriage, and independently, their husbands also report declines in marital happiness. When husbands experience greater stress, however, this stress only seemed to be associated with changes in their own evaluations of the marriage.

Does Partners' Own Stress Moderate the Stress Crossover Effect?

To examine potential moderators of the stress crossover effect, we next examined whether partners' own stress may influence the strength of this effect. Though evidence of an independent crossover effect was not found for wives, the possibility remains that husbands' and wives' stress may interact to affect wives' satisfaction. Thus, this idea was examined for both husbands and wives. It was expected that, at the within-couple level, stress crossover would be greatest at times when partners were also experiencing high levels of

their own stress. This hypothesis was modeled according to the following equation:

Partner's Satisfaction

$$\begin{aligned}
 &= \beta_{0j} + \beta_{1j}(\text{time}) \\
 &+ \beta_{2j}(\text{partner's own stress}) \\
 &+ \beta_{3j}(\text{spouse's stress}) \\
 &+ \beta_{4j}(\text{own stress} \times \text{spouse's stress}) + r_{ij} \quad (4)
 \end{aligned}$$

where time, partner's own stress, and spouse's stress were centered within-persons. In this equation, β_{0j} , β_{1j} , β_{2j} , and β_{3j} can be interpreted as in the previous equation. β_{4j} , the new parameter, captures the within-couple association between the interaction of both spouses' stress and the partner's satisfaction, controlling for all other parameters.

Results revealed a significant interaction for wives, but not for husbands (see Table 3). As seen in the final column in Table 3, a model constraining the interaction term to be equal for husbands and wives did not fit the data as well as the unconstrained model, suggesting that this gender difference was significant. Thus, though a basic crossover effect was found for husbands, such that increases in wives' stress were associated with decreases in husbands' satisfaction, this effect was not moderated by the amount of stress husbands were currently experiencing. For wives, however, increases in husbands' stress were more strongly associated with decreases in wives' satisfaction when wives also reported higher levels of their own stress (see Figure 1). In other words, wives seemed most vulnerable to crossover effects at those times when they too had greater stress. So, although a basic crossover effect was not found for wives, these results

Table 3. Within-Couple and Between-Couple Moderators of Stress Crossover

	β	SE	t	Effect Size r	χ^2 Test for Gender Differences
Partner's own stress as a moderator of stress crossover (df = 168)					
Husbands	-.004	0.05	-0.59	.05	
Wives	-.01	0.05	-2.2*	.17	3.4*
Couple-level conflict skills as a moderator of stress crossover (df = 145)					
Husbands	.33	0.15	2.3*	.19	
Wives	-.26	0.17	-1.5	.12	9.1**

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

suggest that wives' satisfaction was not completely immune to changes in their husbands' stress.

Do Conflict Resolution Skills Moderate Crossover Effects?

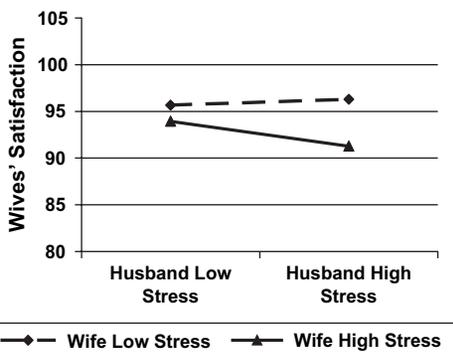
The final goal was to examine whether couples' ability to resolve conflicts in positive manner would moderate the stress crossover effect. It was expected that crossover effects should be greatest for couples exhibiting poor conflict resolution skills. To examine this hypothesis, couples' conflict skills were entered into the between-subjects level of the MLM analysis. In addition, the couples' average level of stress across the 3.5-year period was controlled for at this level. In this way, we were able to examine the association between conflict skills and crossover effects, controlling for couples' general tendency to have more or less stress in their lives. Thus, at the within-subjects level, we modeled the basic stress crossover effect as seen in Equation 3. At the between-subject level, couples'

conflict skills and average stress were entered to predict each of the parameters in Equation 3. The equation of interest for the current analysis was as follows:

$$\beta_{3j}(\text{i.e., Stress Crossover}) = \gamma_{30} + \gamma_{31}(\text{Conflict Skills}) + \gamma_{32}(\text{Average Stress}) + \mu_{1j} \quad (5)$$

where conflict skills and average stress were centered around the sample mean. For the purposes of these analyses, γ_{31} was the main parameter of interest. It captures the between-couples association between vulnerability to stress crossover and couples' ability to resolve conflict in a positive manner, controlling for the average amount of stress present in couples' lives. In addition, this analysis controlled for the associations between conflict skills and all other parameters identified in Equation 3 (i.e., initial satisfaction, satisfaction slope, and spillover). Results indicated a significant association for husbands but not for wives (see Table 3). Wives' stress was more strongly associated with husbands' satisfaction in those couples displaying poor conflict resolution skills. Conflict skills were not significantly associated with wives' vulnerability to stress crossover from their husbands.

FIGURE 1. THE INTERACTIVE EFFECTS OF SPOUSES' STRESS ON WIVES' MARITAL SATISFACTION.



DISCUSSION

Stressful life events can severely challenge a couple's ability to maintain their relationship, suggesting that some of the antecedents of marital decline may be found in the external context of a marriage. Extending prior work on stress and marriage, which has focused primarily on the intrapersonal effects of stress, the current study took a dyadic approach toward understanding the links between stress and marital quality by

examining the unique and independent effects of stress spillover and stress crossover over the early years of marriage.

Replicating previous research, this study found evidence of stress spillover over 3.5 years of marriage. At times when spouses had greater levels of stress than usual, they reported being less satisfied in their relationships. Controlling for this spillover effect, a significant crossover effect emerged for husbands but not for wives. When wives experienced higher stress, husbands reported lower marital satisfaction, controlling for changes in their own stress. This study provided a more stringent test of crossover effects than found in prior work, as controlling for husbands' spillover allowed us to control not only for husbands' unique stressors but also those stressors shared by both members of the couple. By isolating the association between wives' unique stress and husbands' satisfaction, the current results represent a genuine crossover effect.

Furthermore, supporting the notion that the transmission of stress within the dyad should be affected by the nature of couples' interactional style, results revealed that couples' observed conflict resolution skills moderated this crossover effect. Husbands were more likely to experience stress crossover if the couple displayed a more negative conflict resolution style. Thus, it seems the ability to handle conflict effectively acts as a buffer to contain the negative effects of one spouse's stress.

Turning to the results for wives, wives were more likely to experience stress crossover when they were contending with higher levels of their own stress. Thus, whereas a basic crossover effect was not found for wives, this result indicates that husbands' stress may nevertheless influence their wives' satisfaction under certain conditions. In this way, the current study offers additional perspective on prior research suggesting that partners' responses to their spouses' stress may affect the crossover process (e.g., Thompson & Bolger, 1999). Considering stress from a dyadic perspective suggests that one important factor constraining partners' ability to respond positively to their spouses' stressful circumstances is their own stress. Partners' own stress may make it all the more difficult for them to give their spouses the "benefit of the doubt" and to make allowances for their spouses' negative behaviors (Neff & Karney, 2004), thereby enhancing stress crossover effects.

Together, these results suggest that when wives are coping with greater levels of external stress, both husbands and wives are less happy in the marriage. When husbands are experiencing greater external stress, however, husbands are less happy, but their wives are only less happy if they too are under greater stress. Thus, whereas prior research has not directly compared the influence of husbands' and wives' stress on marital quality, the current study provides some evidence that wives' stress may play a particularly important role in shaping marital development. As mentioned, one possible explanation for this gender difference may involve the level of support spouses receive from their partners during times of stress. Growing evidence argues that wives may be more likely to support their husbands during these times than vice versa (Bolger et al., 1989; Neff & Karney, 2005). If wives support their husbands during stressful times, this support may serve to contain the deleterious effects of husbands' stress and limit crossover effects. Alternatively, if husbands are not supporting their wives, wives' stress may be more likely to seep into the marriage and affect both members of the dyad. Future research should examine whether, at the within-subjects level, the amount of support received from a partner may moderate stress crossover effects.

Strengths and Limitations of the Study

Our confidence in the results of this study is enhanced by a number of strengths in its methodology and design. First, the current study relied on the use of within-subjects analyses to examine the associations between stress and relationship satisfaction. Within-subjects analyses allowed for the estimation of the association between changes in stress and changes in satisfaction, controlling for spouses' stable tendencies to view their stress and their relationship in a particular manner. Second, when examining the unique influences of stress spillover and stress crossover in marital change and development, the MLM approach allowed for the estimation of stress crossover effects, controlling for stress spillover effects, ensuring that these parameters were not confounded. Third, the MLM approach also allowed for direct tests of gender differences, thereby enabling the current study to shed some light on prior inconsistencies in the crossover literature regarding the influence of

husbands' and wives' stressors. Fourth, in contrast to prior research that has relied almost exclusively on cross-sectional or short-term diary data, this study used longitudinal data that allowed us to examine stress and marital satisfaction over 3.5 years of marriage. Fifth, spouses' conflict behaviors were assessed through observational techniques, providing a more objective measure of couples' relationship skills. Finally, also in contrast to much prior research that has addressed samples varying widely in marital duration, the analyses reported here examine data from a relatively homogeneous sample of recently married couples, reducing the likelihood that the effects observed here result from uncontrolled differences in marital duration. Moreover, the use of a fairly homogeneous sample provided a more conservative test of our hypotheses.

Despite these strengths, several factors limit interpretations of the current findings. First, all of the data reported were correlational. Consistent with other theoretical perspectives, this study suggests that stress may lead to changes in relationship evaluations. These data, though, cannot rule out the alternative perspective that the nature of spouses' marriages may lead to changes in the amount of external stress they experience. Most likely, the link between stress and marital satisfaction may be a reciprocal one. Initially, external stressors may start to cause problems for the marriage and may produce decreases in newlywed couples' highly positive marital evaluations. As these marital problems increase, they may begin to spill over and create additional stress in other domains of couples' lives. Regardless of the direction of the effects, these data nevertheless highlight the importance of considering the marital context when examining relationship processes.

Similarly, a second limitation is the use of self-report stress measures, which allows for the possibility that a third variable (e.g., neuroticism) may account for the associations between stress and marital evaluations. The use of within-subjects analyses did allow us to partial out spouses' stable tendencies to view their stress and their relationship in a particular manner, limiting the possibility that third variables influenced the results. Still, future research may want to examine stress crossover using objective stress measures, such as interviewer ratings, to further clarify the directional link between stress and relationship processes.

Though also an important strength, a third limitation involves the use of a relatively homogeneous sample of couples. These couples were generally well educated (approximately one third of the sample were full-time graduate students), young, White, financially secure, and very happy in their marriages. Moreover, these couples were experiencing relatively low levels of external stress. All of these factors should lower power to detect effects. Given this conservative sample, the fact that stress predicted spouses' satisfaction not only enhances our confidence in the findings but also attests to the fact that even among the happiest and most privileged of couples, external stress may be associated with strained relationship well-being. As the broader stress literature consistently points to the detrimental effects stress can have on marital satisfaction, we expect that in a more heterogeneous sample, the associations between stress and satisfaction may be similar, but even stronger. Nevertheless, generalizations to other samples should be made with caution.

Directions for Future Research

In this study, couples' behavioral skills were found to moderate stress crossover for husbands. This finding appears consistent with the approach of many marital intervention programs, which argue that equipping couples with better conflict skills may aid them in becoming resilient to stress. Nevertheless, these positive relationship skills also may suffer during periods of high stress. Prior research has found that at times when couples are experiencing greater stress, even spouses who generally exhibit positive relationship skills may be unable to draw upon or express those skills effectively (Neff & Karney, 2004). For instance, in one experimental study, couples' interactions were observed both before and after couples engaged in a stress induction task. Following the stressor, the quality of couples' communication decreased by 40% (Bodenmann & Shantinath, 2004). Further research is necessary to clarify how relationship skills may both moderate and mediate the association between stress and marital quality. Though skills may deteriorate as stress increases, starting at a higher level of relationship skills may still help buffer the marriage from stress.

Future research also may want to examine whether particular types of stressors have a larger influence on marital processes. Generally, research has taken one of two approaches when

examining the links between stress and marriage. One approach, used in the current study, is to examine the aggregate effects of numerous stressors on marital well-being. This approach attends to the amount of external stress found in a couples' context, and is less concerned with the particular stressors couples must face. A second approach is to examine the influence of a single specific stressor, such as unemployment or health problems, on marital processes. What is missing from the existing literature, then, is research comparing the relative effects of different types of stressors. Currently, the literature is silent with regard to which particular stressors may have the largest and most important impact on marital outcomes. Identifying important types of stressors may provide a more complete understanding of the processes that shape marital well-being over time.

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