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When Poor Communication Does and Does Not Matter: The Moderating Role of Stress

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Abstract

Although a number of theoretical perspectives in relationship science argue that variability in couples' relationship satisfaction over time is driven by *changes* in their communication, tests of this hypothesis have been limited to single assessments of behavior. To address this gap, we examine within-couple, across-time changes in communication, and we argue further that couples' external circumstances might combine with these behavioral changes to generate changes in relationship satisfaction. Using self-reports of satisfaction and in-home observational data collected four times at 9-month intervals from 414 newlywed couples, we show that fluctuations in dyadic behavior and spousal stress covary with fluctuations in spousal satisfaction. Tests of the interaction between fluctuations in stress and behavior reveal that husbands who experience upward fluctuations in stress and negativity also experience decreases in relationship satisfaction at the same wave. Downward fluctuations in problem-solving effectiveness are associated with lower relationship satisfaction, but only among spouses who had chronically high levels of cumulative stress; when chronic stress is low, reduced problem-solving effectiveness is unrelated to satisfaction. Exclusive focus on between-couple variability in couple communication, without regard for the stressors that couples face, will likely restrict the understanding and prevention of relationship distress.

Keywords

communication; stress; low-income; socioeconomic status; couples; marriage; relationship satisfaction; longitudinal; moderation

Communication processes define and characterize all committed partnerships, and all major theoretical perspectives in relationship science hypothesize that the quality of couples' communication will influence the quality and course of their relationships. A wealth of observational data has been brought to bear on this hypothesis, and many correlational studies using middle-class samples establish consistent, small-to-medium associations

between the quality of observed communication and relationship satisfaction (for meta-analysis, see Woodin, 2011). Longitudinal research, however, yields inconsistent and contradictory findings. For example, observed negativity is sometimes associated with declines in relationship satisfaction (e.g., Markman, Rhoades, Stanley, Ragan, & Whitton, 2010), but in other instances higher levels of negativity are associated with *higher* levels of relationship satisfaction over time (e.g., McNulty & Russell, 2010). Moreover, while some studies indicate that wives displaying more positive behavior are less likely to become distressed over time (e.g., Pasch & Bradbury, 1998), others indicate that wives' positivity is associated with *lower* satisfaction years later (e.g., Gottman & Krokoff, 1989). Randomized controlled trials of interventions add to this mixed picture, as increases in satisfaction from pre- to post-treatment are unmediated by changes in observed communication (e.g., Williamson, Altman, Hsueh, & Bradbury, 2016).

While there is little doubt that couples communicate with more frustration and less warmth when they are dissatisfied in their relationship, the inconsistent and contradictory findings reviewed above highlight the surprising complexity that underlies the association between communication and changes in relationship outcomes. Thus, despite real progress in describing what is arguably the single most theoretically important element in couple relationships, the manner in which communication operates to affect judgments of satisfaction remains a source of confusion and controversy. In the present study, we argue that expecting a consistent association between couple communication and relationship satisfaction is misguided, because it fails to recognize that any given couple will encounter a range of situations and that these situations can alter such an association. This view is based on Baron and Kenny's (1986) observation that unexpectedly weak associations can signal the presence of moderation, and on the more specific idea that behavioral performance under certain conditions will carry greater consequences for relationship satisfaction than under other conditions, even when the behavior itself is topographically identical.

As a consequence of conceptualizing behavior-satisfaction effects as trait-like and invariant across circumstances in couples' lives, study designs have relied upon single assessments of couple communication (even when samples are followed longitudinally) without regard for the ongoing demands that might be influencing partners' affective states in standard observational paradigms. Critically, such one-time assessments make assumptions about couple interaction and can only test hypotheses regarding *between*-person differences in communication (i.e., couples' capacity for constructive communication relative to other couples). This approach fails to align with the assumptions made in major theoretical approaches to relationships— including attachment theory (Hazan & Shaver, 1987), social exchange theory (Thibaut & Kelley, 1959), social learning theory (Jacobson & Margolin, 1979), and the intimacy process model (Reis & Shaver, 1988)—which allow for and even emphasize behavioral *change*. These theories assert that changes in communication are the mechanism by which satisfaction improves: when a couple communicates in a more constructive manner, their satisfaction in the relationship should increase, while moments of poor communication should be associated with downward fluctuations in their relationship satisfaction.

Other theoretical perspectives further argue that the success of a relationship is dependent on partners' ability to modulate their behavior as circumstances and demands change (Neff & Karney, 2017). Though plausible, this central idea has not been examined and tested directly. That is, the majority of studies do not test whether within-person *fluctuations* in spouses' behaviors correspond with within-person *fluctuations* in their relationship satisfaction. Such within-person analyses control for stable, between-person differences and selection effects, and thereby allow for stronger inferences about the links between communication and relationship satisfaction. These questions relating to change have been touched upon with various versions of self-report studies (e.g., diary studies, telephone assessments; Debrot, Siegler, Klumb, & Schoebi, 2017), but such self-report studies fall short of studying actual communication processes. In short, because observational studies almost always include a single assessment of behavior, they permit only a very narrow and perhaps misleading evaluation of models which assert that communication is associated with relationship outcomes. The current study aimed to address this limitation by examining couples' behavior as it fluctuates over time.

If we allow for the possibility that behavior-satisfaction associations are not uniform across settings for a given couple, what theoretical concepts might be used to account for variability in behavioral effects on satisfaction? Emerging socioecological models that build upon seminal work by Bronfenbrenner (1979) describe how forces arising outside of couples' interpersonal transactions can impinge upon their relationships (Bodenmann, 2005; Conger, Rueter, & Elder Jr., 1999; Schulz, Cowan, Pape Cowan, & Brennan, 2004). These external forces can range from more immediate stressors like an argument with a neighbor to less acute but taxing experiences like implicit discrimination in the workplace—all of which may combine to make it more or less likely for couples to sustain rewarding partnerships (Karney, Story, & Bradbury, 2005). Furthermore, it is likely that these adverse influences are heightened among individuals and couples with fewer economic resources and a lower social standing, as, e.g., they will be more reliant on public services, less able to find stable well-paying jobs, or less able to pay for services that could make their lives and their relationships easier. In this way, middle-class samples—used in the majority of couple research—might misrepresent the nature of the association between stress and satisfaction. Thus, more inclusive sampling of stressful experiences is needed to adequately explore the association between stress and relationship satisfaction. Although daily diary studies on stress have begun to shed light on the relationship between changes in stress and satisfaction (Debrot et al., 2017; Totenhagen, Randall, & Lloyd, 2018), such fluctuations are likely to be smaller and less qualitatively different on a day-to-day basis, suggesting that studying stress over longer periods of time is necessary in order to sample a wide range of circumstances within a given couple.

Although there may be value in studying effects of distinct forms of stress, stressors do not operate in isolation (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001), and emerging research suggests that the accumulation of stressors across domains—cumulative stress—is uniquely costly to relationship satisfaction above and beyond the effects of the individual components (Rauer, Karney, Garvan, & Hou, 2008). We therefore test whether the association between observed couple communication and relationship satisfaction is dependent on the extent to which spouses experience stress across multiple domains.

Specifically, we examine the cooccurrence and buildup of stress from work, discrimination, and finances, in light of evidence that low-income, ethnically diverse individuals are more likely to work non-standard hours with little paid sick or vacation leave (e.g., Heymann, 2000), to experience discrimination (Lincoln & Chae, 2010), and to report financial strain as a concern in the relationship (Jackson et al., 2016).

Although well-developed literatures examine how couple communication and stress might affect relationships, much of this work overlooks how they combine to affect relationships, thus limiting our understanding of how extradyadic influences combine with intradyadic processes to predict change in relationship satisfaction. Frameworks such as the Vulnerability-Stress-Adaptation model (Karney & Bradbury, 1995) explicitly argue for the integration of behavioral and contextual influences on relationship satisfaction. According to this view, the quality and longevity of relationships is determined by the interplay between partners' experiences of stress, their adaptive (i.e., communication) processes, and the stable and enduring vulnerabilities that partners would bring to any relationship. In this paper, we examine whether the association between couples' communication and relationship satisfaction is altered as a function of the external demands that spouses face, insofar as poor communication and high degrees of stress might both need to be present before there are any associated changes in relationship satisfaction; poor communication in the absence of high levels of stress may be less likely to cooccur with decreases in satisfaction.

While various indices of stress have been shown to covary with divorce and relationship satisfaction (Cohan & Cole, 2002; Randall & Bodenmann, 2009), few studies directly address the combined contributions of stress and observed behavior (cf. Bodenmann et al., 2015). Nonetheless, self-reported dyadic coping has been shown to attenuate the adverse effects of stress on verbal aggression (Bodenmann, Meuwly, Bradbury, Gmelch, & Ledermann, 2010) and the adverse effects of posttraumatic stress on relationship quality (Lambert, Hasbun, Engh, & Holzer, 2015). Studies employing observational coding of behavior also indicate that the effects of couples' communication on relationship satisfaction are dependent on couples' socioeconomic risk (Ross, Karney, Nguyen, & Bradbury, 2019) and changes in their neighborhood environment (see Nguyen, Williamson, Karney, & Bradbury, 2017 for another paper using the same sample). Furthermore, to our knowledge no study has addressed whether the association between behavior and satisfaction is altered by fluctuations in spouses' stress or their level of chronic stress relative to other spouses. Thus, as we outline below, we aim to close the gap between leading explanations for relationship change and the data available to test those explanations.

We address two main aims. First, building from theoretical assertions that interpersonal processes (Jacobson & Margolin, 1979; Thibaut & Kelley, 1959) and stress (Bodenmann, 2005; Conger et al., 1999; Karney & Bradbury, 2005) will predict changes in relationship satisfaction, we examine whether fluctuations in key facets of widely-studied communication behaviors—including positivity, negativity, and problem-solving effectiveness—and fluctuations in cumulative stress covary separately with fluctuations in relationship satisfaction. We also test the effects of communication and cumulative stress simultaneously to examine whether the effects overlap or remain uniquely predictive of changes in relationship satisfaction.

With our second aim we test whether the association between behavior and satisfaction is dependent on spouses' experiences of stress. We do this in two ways. First, we ask whether fluctuations in behavioral processes operate differently on satisfaction when spouses experience acute upward fluctuations in cumulative stress relative to their norm (i.e., within-person interaction between behavior *fluctuations* and stress *fluctuations*). Second, we test whether fluctuations in behavioral process operate differently among spouses who vary in their across-time levels of chronic stress accumulated across domains in the first three years of marriage (i.e., between-person interaction between behavior *fluctuations* and *chronic* stress levels). We predict that stress will moderate behavioral effects on satisfaction in light of other work suggesting that couples are more reactive to relationship experiences when faced with high demands (Neff & Karney, 2009). Existing studies provide no basis for predicting how our three sets of behavioral codes will perform when interacting with within-person fluctuations in stress versus between-person differences in chronic stress. To the extent that differences do emerge, within-person change effects could favor behavioral codes that have the potential to be more labile, particularly positivity and negativity, which are more affect-laden and thus potentially responsive to circumstantial influences. Between-person level effects, in contrast, might favor codes that fluctuate less and are more trait-like in couples' behavioral repertoires, such as problem-solving effectiveness. Nevertheless, because few prior studies examine natural fluctuations in couple communication, our position is necessarily speculative.

We test these two aims using a sample of couples varying widely in socioeconomic status but disproportionately living with low incomes, in recognition of evidence that relationship distress and contextual stressors are overrepresented among economically disadvantaged and culturally diverse populations (Copen, Daniels, Vespa, & Mosher, 2012). We employ a relatively large sample of 414 couples living with low incomes, focusing specifically on first-time newlywed couples to ensure analysis of married couples before they have self-selected out of the sample due to separation or divorce. Couples are assessed in-home at four time points with direct behavioral observation of couples' communication to reduce shared-method variance when predicting relationship satisfaction.

Method

Sampling

Sampling was undertaken to yield first-married newlywed couples in which partners were of the same ethnicity, living in low neighborhoods in Los Angeles County. Recently married couples were identified through names and addresses on marriage license applications. Addresses were matched with census data to identify applicants living in low-income communities, defined as census block groups wherein the median household income is less than 160% of the 1999 federal poverty level for a 4-person family and thereby oversampling an understudied and rarer population of couples living in low-income neighborhoods. Next, names on the licenses were weighted using data from a Bayesian Census Surname Combination, which integrates census and surname information to produce a multinomial probability of membership in each of four racial/ethnic categories (Hispanic, African American, Asian, and Caucasian/other). Couples were chosen using probabilities

proportionate to the ratio of target prevalences to the population prevalences, weighted by the couple's average estimated probability of being Hispanic, African American, or Caucasian, which are the three largest groups of people living in poverty in Los Angeles County (United States Census Bureau, 2002).

Participants

The 431 identified couples participated in data collection four times over 36 months. At baseline, marriages averaged 4.8 months in duration ($SD = 2.5$) and 0.6 children ($SD = 1.0$). Mean age for husbands was 27.9 ($SD = 5.8$) and 26.3 ($SD = 5.0$) for wives. Mean income was \$34,153 ($SD = \$27,094$) for husbands and \$28,672 ($SD = \$24,549$) for wives. Twelve percent of couples were African American, 12% were Caucasian, and 76% were Hispanic, consistent with proportions of people living in poverty in Los Angeles County (12.9% African American, 14.7% Caucasian, and 60.5% Hispanic; U.S. Census Bureau, 2002). Of the Hispanic couples, 33% spoke Spanish in their interactions; all African American and Caucasian couples spoke English.

Procedure

At T1 couples were visited in their homes by two interviewers who took spouses to separate areas to ensure privacy and orally administered self-report measures. Partners were then reunited for three 8-min videotaped discussions—a problem solving discussion, husband social support discussion, and wife social support discussion. Interviewers returned 9 months (T2; $n = 375$), 18 months (T3; $n = 359$), and 27 months after baseline (T4; $n = 336$) and administered the same interview protocol. Couples were debriefed and paid \$75 for T1, \$100 for T2, \$125 for T3 and \$150 for T4. The RAND Corporation Institutional Review Board approved all procedures.

Behavioral Observation

Videotapes were scored by 16 trained coders using the Iowa Family Interaction Rating Scales (IFIRS; Melby et al., 1998). Unlike microcoding systems, the IFIRS gives each spouse a single score for each code at the end of the task rather than for multiple short time segments. Coders—five of whom were native Spanish speakers—coded only in their native language. Coders participated in 10 hours of training per week for 3 months and were required to pass written and viewing tests at an 80% accuracy level before coding tapes. Coders also participated in weekly 2-hour training meetings consisting of a variety of structured activities (e.g., watching examples of specific codes) designed to minimize drift and ensure fidelity to the IFIRS codes. Coders viewed each of the interaction tasks three to four times using the Noldus Observer XT coding software, using the built-in capabilities to note behaviors of both spouses. Coders then used their recorded notations to assign a single score for each spouse for each code, using the criteria from the IFIRS coding manual (Melby et al., 1998). The possible scores range from 1–9, with a score of 1 indicating that the behavior did not occur and a score of 9 indicating that “the behavior occurs frequently or with significant intensity” (Melby et al., 1998, pp. 7–8). To assess reliability, 20% of the videos were randomly assigned to be coded by two coders chosen at random from the pool of 16 coders. The scores of the two coders were compared, and any scores discrepant by more than one point were resolved by both coders working together. The final set of scores

used in analyses included scores that matched across the two coders during their initial individual coding (when codes were off by 1 point, the score from the randomly designated “primary coder” was used), and discrepant scores were replaced by the scores from the second joint coding. Factor analysis reduced the IFIRS codes to positivity, negativity, and effectiveness.

Measures

Relationship satisfaction.—Satisfaction was assessed by summing responses on an 8-item questionnaire. The measure was adapted from Rauer et al. (2008) and included items from the General Social Survey (Davis, Smith, & Marsden, 2006). It has been used in large surveys with low-income couples Rauer et al. (2008) and racially diverse couples (Trail, Goff, Bradbury, & Karney, 2012), and has been shown to covary systematically with observed communication (Williamson, Karney, & Bradbury, 2013), thus lending support to its validity as an indicator of relationship functioning. Five items asked how satisfied the respondent was with certain areas of their relationship (e.g., “amount of time spent together”), and were scored on a 5-point scale (ranging from 1 = *very dissatisfied* to 5 = *very satisfied*). Three items asked the degree to which the participant agreed with a statement about their relationship, (e.g., “How much do you trust your partner?”) and were scored on a 4-point scale (1 = *not at all*, 2 = *not that much*, 3 = *somewhat*, 4 = *completely*). Scores are a summation of the item responses, with scores ranging from 8 (very dissatisfied) to 37 (very satisfied). Coefficient α exceeded .70 for husbands and wives across all waves of the study.

Observed dyadic communication behavior.—Using the IFIRS, positivity, negativity, and effectiveness scores were calculated for each partner at each of the four assessments and then averaged across spouses to create dyadic indicators of positivity, negativity, and effectiveness. A positivity behavioral scale, accounting for expressions of warmth and closeness within the interaction, was created by averaging an individual’s scores on the group enjoyment, positive mood, warmth/support, physical affection, humor/laugh, endearment, and listener responsiveness codes. Coefficient α for positivity ranged from .65 to .74 for husbands and wives across all waves of the study. A negativity behavioral scale, accounting for anger and divisive behaviors within the interaction, was created by averaging an individual’s scores on the angry coercion, contempt, denial, disruptive process, dominance, hostility, interrogation, and verbal attack codes. Coefficient α for negativity ranged from .76 to .82 for husbands and wives across all waves of the study. An effectiveness behavioral scale, accounting for the couple’s problem-solving skills in resolving an issue, was created by averaging an individual’s scores on the assertiveness, communication, effective process, solution quality, and solution quantity codes. Coefficient α for effectiveness ranged from .65 to .78 across all waves of the study. Possible scores on the measures of observed positivity, negativity, and effectiveness range from 1 to 9. Given the interdependent nature of couples’ behaviors during communication tasks, husbands’ and wives’ scores for positivity, negativity, and effectiveness were averaged to create a dyadic measure for each of the three domains.

Cumulative Stress.—Using three self-report measures, spouses were asked to rate their degree of stress in three domains: work, finances, and discrimination. Work stress was

assessed by summing responses on a 5-item questionnaire. Two items assessed the degree of stress of each spouse's current job over the past month as well as nine months, and three assessed its impact on family. Coefficient α ranged from .58 to .76 for husbands and wives across all waves of the study. Spouses' perceived experience of day-to-day discrimination was assessed using six questions adapted from the Midlife Development in the U.S. (MIDUS) survey (Kessler, Mickelson, & Williams, 1999). Participants were asked "a series of questions about how people might treat you because of your gender, your ethnicity, or your English speaking ability." Participants indicated how often they experienced: being treated as inferior, people acting "as if they are afraid of you," being treated with less respect than others, people acting "as if you are dishonest," being called names or insulted, and being threatened or harassed. Coefficient α ranged from .69 to .83 for husbands and wives across all waves of the study. The measure of financial stress included five items assessing the degree of difficulty the couple has had fulfilling financial obligations and purchasing necessary items, including food. Coefficient α exceeded .75 for husbands and wives across all waves of the study. To assess the number of domains in which spouses were experiencing significant stress at each wave, three dichotomous values were calculated and summed for each stress domain (i.e., a cumulative stress index; see Evans, 2003). Specifically, for each stressor, couples were given a value of 1 if they were in the top 75th percentile in that stress domain and a value of 0 if below the 75th percentile. The dichotomous values for the three stress domains were then summed, yielding a score ranging from 0 to 3 for each wave of the study.

Analytic Plan

Data was analyzed using multilevel modeling (MLM). Using Raudenbush, Brennan, and Barnett's (1995) multivariate approach, analyses were conducted as 2-level models with repeated measures (Level 1, within-person) nested within individuals (Level 2, between-person). To examine within-person fluctuations from individual means, we used mean/intercept models with no underlying trajectory of change in our study variables. Husbands and wives were included in the same model to account for interdependence in the dyadic data. Analyses were conducted in SAS Studio version 3.7; the variance-covariance matrix was specified as a full, unstructured matrix and the estimation method was specified as Restricted Maximum Likelihood (REML).

Testing Behavioral and Stress Models (Model 1 and 2).—To test covariation between behavior and relationship satisfaction, we use a *within-couple* model and ask: On waves in which couples display upward fluctuations in positivity, negativity, or effectiveness (i.e., relative to the couple's own cross-wave average), do spouses report higher or lower relationship satisfaction than usual within that *same* wave (Model 1)? Similarly, to test the Stress Model (Model 2) we use a *within-person* model and ask: On waves in which individuals experience higher levels of cumulative stress than usual (i.e., relative to their own cross-wave average), do individuals report higher or lower satisfaction than usual? These models allow us to see how fluctuations in behavior and cumulative stress are associated with fluctuations in satisfaction.

We test for within-person effects at Level 1 (repeated observations; see Equations 1 and 2) with no predictors at Level 2 (not depicted). Relationship satisfaction at a given wave is modeled as a function of intercept, time, and fluctuations in dyadic positivity, negativity, and effectiveness (Model/Equation 1) or as a function of fluctuations in spousal cumulative stress (Model/Equation 2). We center behavioral variables around the dyad’s mean, and we center cumulative stress around the individual’s mean (creating person-centered variables). Thus, values below zero represent a level lower than average for that dyad or individual and values above zero represent a level higher than average.

$$\begin{aligned}
 \text{Relationship satisfaction}_{it} = & (\text{female})_{it} \\
 & [\pi_{f0i} + \pi_{f1i}(\text{time})_{it} + \pi_{f2i}(\Delta \text{ positivity})_{it} + \pi_{f3i}(\Delta \\
 & \text{negativity})_{it} + \pi_{f4i}(\Delta \text{ effectiveness})_{it}]
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 \text{Relationship satisfaction}_{it} = & (\text{female})_{it}[\pi_{f0i} + \pi_{f1i}(\text{time})_{it} + \pi_{f2i}(\Delta \text{ cumulative stress})_{it} \\
 & + (\text{male})_{it}[\pi_{m0i} + \pi_{m1i}(\text{time})_{it} + \pi_{m2i}(\Delta \text{ cumulative stress})_{it}] \\
 & + e_{it}
 \end{aligned} \tag{2}$$

Testing Independent Effects of Behavior and Stress (Model 3).—To test whether communication and cumulative stress overlap or remain uniquely predictive of fluctuations in relationship satisfaction, Model 3 includes all three behaviors and the cumulative stress measure simultaneously at Level 1 (see Equation 3 with no predictors at Level 2).

$$\begin{aligned}
 \text{Relationship satisfaction}_{it} = & (\text{female})_{it} [\pi_{f0i} + \pi_{f2i}(\text{time})_{it} \\
 & + \pi_{f2i}(\Delta \text{ positivity})_{it} + \pi_{f3i}(\Delta \\
 & \text{negativity})_{it} + \pi_{f4i}(\Delta \text{ effectiveness})_{it} + \pi_{m5i}(\Delta \text{ cumulative stress})_{it}] \\
 & + (\text{male})_{it} [\pi_{m0i} + \pi_{m1i}(\text{time})_{it} + \pi_{m2i} \\
 & (\Delta \text{ positivity})_{it} + \pi_{m3i}(\Delta \text{ negativity})_{it} + \pi_{m4i}(\Delta \\
 & \text{effectiveness})_{it} + \pi_{m5i}(\Delta \text{ cumulative stress})_{it}] + e_{it}
 \end{aligned} \tag{3}$$

Testing Interactive Models (Model 4 and 5).—Two models are estimated to examine multiplicative associations between observed behavior and stress in their prediction of satisfaction. Model 4 tests whether *fluctuations* in couples’ behavior interact with *fluctuations* in spousal cumulative stress, allowing us to examine whether upward fluctuations in dyadic positivity/negativity/effectiveness are associated with spouses’ experience of smaller or larger changes in relationship satisfaction when their cumulative stress also fluctuates during the same wave. We test for within-person interaction effects at Level 1 with no predictors at Level 2 (Equation 4).

$$\begin{aligned}
 \text{Relationship satisfaction}_{it} = & (\text{female})_{it} \\
 & [\pi_{f0i} + \pi_{f1i}(\text{time})_{it} + \pi_{f2i}(\Delta \text{ positivity})_{it} + \pi_{f3i}(\Delta \\
 & \text{negativity})_{it} + \pi_{f4i}(\Delta \text{ effectiveness})_{it} + \pi_{m5i}(\Delta \text{ cumulative stress})_{it} \\
 & + \pi_{f6i}(\Delta \text{ positivity} * \Delta \text{ cumulative stress})_{it} + \pi_{f7i}(\Delta \text{ negativity} * \Delta \\
 & \text{cumulative stress})_{it} + \pi_{f8i} \\
 & (\Delta \text{ effectiveness} * \Delta \text{ cumulative stress})_{it}] + (\text{male})_{it}[\pi_{m0i} + \pi_{m1i}(\text{time})_{it} \\
 & + \pi_{m2i}(\Delta \text{ positivity})_{it} + \pi_{m3i}(\Delta \text{ negativity})_{it} + \pi_{m4i}(\Delta \text{ effectiveness})_{it} \\
 & + \pi_{m5i}(\Delta \text{ cumulative stress})_{it} + \pi_{m6i}(\Delta \text{ positivity} * \Delta \text{ cumulative stress})_{it} + \pi_{m7i} \\
 & (\Delta \text{ negativity} * \Delta \text{ cumulative stress})_{it} \\
 & + \pi_{m8i}(\Delta \text{ effectiveness} * \Delta \text{ cumulative stress})_{it}] \\
 & + e_{it}
 \end{aligned} \tag{4}$$

Model 5 tests whether levels of stress accumulated across the first three years of marriage interact with fluctuations in the three communication behaviors to predict satisfaction, thus allowing us to address whether spouses experiencing consistently high levels of stress also experience smaller or larger changes in satisfaction as observed behaviors fluctuate, as compared to spouses reporting lower levels of accumulated stress. For this analysis we collapsed across time to create a mean rating for each spouse (i.e., T1-T4 average), with higher scores reflecting higher across-time levels of cumulative stress. We now test for between-person effects at Level 2 (Equation 5). At Level 2, we enter a between-person chronic cumulative stress variable (i.e., T1-T4 mean cumulative stress), thus creating a two-way cross-level interaction.

Level 1:

$$\begin{aligned}
 \text{Relationship satisfaction}_{it} = & (\text{female})_{it} \\
 & [\pi_{f0i} + \pi_{f1i}(\text{time})_{it} + \pi_{f2i}(\Delta \text{ positivity})_{it} \\
 & + \pi_{f3i}(\Delta \text{ negativity})_{it} + \pi_{f4i}(\Delta \text{ effectiveness})_{it}] \\
 & + (\text{male})_{it}[\pi_{m0i} + \pi_{m1i}(\text{time})_{it} + \pi_{m2i}(\Delta \text{ positivity})_{it} + \pi_{m3i}(\Delta \text{ negativity})_{it} \\
 & + \pi_{m4i}(\Delta \text{ effectiveness})_{it}] + e_{it}
 \end{aligned} \tag{5}$$

Level 2:

$$\begin{aligned}
 \pi_{f0i} &= \beta_{f00} + \beta_{f01}(\text{female } M \text{ cumulative stress})_i + u_{f0i} \\
 \pi_{f1i} &= \beta_{f10} + u_{f1i} \\
 \pi_{f2i} &= \beta_{f20} + \beta_{f21}(\text{female } M \text{ cumulative stress})_i + u_{f2i} \\
 \pi_{f3i} &= \beta_{f30} + \beta_{f31}(\text{female } M \text{ cumulative stress})_i + u_{f3i} \\
 \pi_{f4i} &= \beta_{f40} + \beta_{f41}(\text{female } M \text{ cumulative stress})_i + u_{f4i} \\
 \pi_{m0i} &= \beta_{m01} + \beta_{m0l}(\text{male } M \text{ cumulative stress})_i + u_{m0i} \\
 \pi_{m1i} &= \beta_{m10} + u_{m1i} \\
 \pi_{m2i} &= \beta_{m20} + \beta_{m21}(\text{male } M \text{ cumulative stress})_i + u_{m2i} \\
 \pi_{m3i} &= \beta_{m30} + \beta_{m31}(\text{male } M \text{ cumulative stress})_i + u_{m3i} \\
 \pi_{m4i} &= \beta_{m40} + \beta_{m41}(\text{male } M \text{ cumulative stress})_i + u_{m4i}
 \end{aligned}$$

Results

Descriptive Statistics

Means and standard deviations of all study variables are presented in Table 1. Dyadic positivity, negativity, and effectiveness were all moderately correlated at baseline ($r = .18-.32$, $p < .01$), suggesting that the three dimensions of communication behaviors were related but distinguishable. The correlation between husbands' and wives' cumulative stress and intercorrelations between behavior and cumulative stress were all nonsignificant at baseline. A full correlation matrix is presented in Table 1 of the online supplemental materials.

Are Changes in Behavior and Changes in Stress Linked with Changes in Satisfaction?

Model 1: Behavior.—Consistent with behavioral conceptions of marriage, fluctuations in communication behavior covaried reliably with fluctuations in relationship satisfaction. When couples were less positive during their interactions relative to their own average, both spouses experienced downward fluctuations in relationship satisfaction within the same wave (husbands' $t = 2.38$, $p = .017$; wives' $t = 2.02$, $p = .043$; see Table 2, Model 1). When couples were more negative than usual during interactions, wives also experienced downward fluctuations in satisfaction ($t = -2.78$, $p = .005$).¹

Model 2: Stress.—Consistent with socioecological models of relationship functioning, husbands and wives experiencing upward fluctuations in cumulative stress experienced downward fluctuations in satisfaction within the same wave (husbands' $t = -2.02$, $p = .043$; wives' $t = -2.99$, $p = .002$; see Table 2, Model 2).¹

Model 3: Behavior and stress.—To test whether observed communication behaviors and stress account for shared or unique variance in satisfaction, we entered all behavioral and stress variables in the model simultaneously. Results indicate that behavior and stress account for unique variance in predicting satisfaction. Specifically, the three significant effects found for wives' satisfaction—that is, for positivity, negativity, and for wives' cumulative stress—remained significant, as did the two significant effects relating positivity and cumulative stress to husbands' satisfaction (see Table 2, Model 3).

Does Stress Moderate the Association Between Communication and Satisfaction?

Model 4: Fluctuations in cumulative stress x fluctuations in behavior.—The association between fluctuations in behavioral negativity and husbands' changes in relationship satisfaction varied as a function of husbands' cumulative stress. Specifically, relative increases in observed dyadic negativity were associated with decreases in husbands' relationship satisfaction when husbands also experienced less cumulative stress, whereas decreases in observed negativity in the presence of less stress were associated with increases in husbands' satisfaction ($t = -2.00$, $p = .045$, see Figure 1 and Table 2, Model 4).

¹The pattern of results remained the same after controlling for baseline/initial levels of the time-varying predictors.

Model 5: Chronic cumulative stress x fluctuations in behavior.—Finally, we tested whether the association between maladaptive communication and satisfaction would be stronger under conditions of high chronic cumulative stress. The association between fluctuations in observed effectiveness and fluctuations in relationship satisfaction was significantly moderated by spouses' own chronic cumulative stress (husbands' $t = 1.96$, $p = .049$; wives' $t = 3.32$, $p < .001$; see Table 2, Model 5). Figure 2 depicts the interaction between changes in dyadic effectiveness and average levels of cumulative stress for husbands (left) and wives (right). As Figure 2 shows, decreases in effectiveness were associated with decreases in relationship satisfaction, but only among spouses who had chronically high levels of cumulative stress relative to other spouses. That is, husbands and wives who experienced average or above average levels of cumulative stress over 36 months also experienced downward fluctuations in relationship satisfaction when they displayed less effective communication behaviors during their interactions. Conversely, among individuals experiencing below average levels of chronic stress, fluctuations in observed effectiveness were unrelated to fluctuations in relationship satisfaction.

Discussion

A wealth of theoretical models in relationship science (e.g., attachment, social-exchange, social learning theory) hypothesize that exchanges between partners provide the raw material from which couples evaluate their relationship. Yet empirical tests of these hypotheses—many of which assess communication at one time point—have limited our ability to adequately test whether changes in couples' behavior predict their satisfaction because reliance on one-time behavioral assessments only permit comparisons *between* couples rather than behavioral fluctuations *within* a couple. Moreover, alternative conceptions of relationships (e.g., Bodenmann, 2005) hold that spouses' behaviors, and their global evaluations of relationship quality, are also related to ongoing demands and challenges in their lives. This study examined how couple communication and stress, considered independently and multiplicatively, covary with spouses' fluctuating evaluations of relationship satisfaction over the early years of marriage.

With tests of our first aim we demonstrated that within-couple fluctuations in communication behaviors and within-person fluctuations in cumulative stress (i.e., the number of stressors individuals accumulated at any given wave) predicted fluctuations in spouses' own relationship satisfaction. Specifically, when couples expressed less warmth and cooperation (i.e., positivity) and more hostility and sarcasm (i.e., negativity) relative to their own norm, husbands and wives also reported less relationship satisfaction at that same time point (Table 2, Model 1). Within-person fluctuations in cumulative stress during a given wave were also associated with their own fluctuations in relationship satisfaction. Specifically, upward fluctuations in individuals' cumulative stress—arising from work, experiences of discrimination, and financial strain—covaried with downward fluctuations in husbands' and wives' satisfaction (Table 2, Model 2). When examining the effects of observed positivity, negativity, and problem-solving effectiveness simultaneously with reports of cumulative stress, results remained consistent (Table 2, Model 3). Thus we find evidence that fluctuations in communication and in cumulative stress covary with fluctuations in satisfaction, corroborating on the within-person level effects that are familiar

at the between-person level. Directions of causation cannot be established with these data, yet we can see that evaluations of relationship quality are reliably linked in predicted directions with changing experiences in dyadic and extradyadic factors.

With the second aim of the study, we integrated behavioral and stress-based views by examining how these elements interacted to predict relationship satisfaction. First, we tested whether the association between fluctuations in behavior and fluctuations in satisfaction were moderated by within-person *fluctuations* in spouses' reports of cumulative stress within a given time point. Results depicted in Figure 1 reveal that the simultaneous experience of upward fluctuations in dyadic negativity (relative to that couple's own norm of negativity) and in husbands' cumulative stress (relative to his norm in cumulative stress) was associated with downward fluctuations in husbands' relationship satisfaction. Conversely, husbands' experiences of upward fluctuations in stress but downward fluctuations in negativity was associated with upward fluctuations in satisfaction. We do not have a ready explanation for this latter effect, though it is possible that relationships improve relative to their own baseline as stress increases to the extent that those stressors are in a manageable range, potentially bringing partners closer together. Outside of this range, higher levels of stress might undermine satisfaction even as negativity remains low (see Tesser & Beach, 1998).

Second, we tested whether the same behavior-satisfaction effect was moderated by between-person differences in *chronic* levels of stress, as averaged across the first three years of marriage. As Figure 2 illustrates, among husbands and wives who reported high chronic cumulative stress from work, discrimination, and finances (relative to other husbands and wives), downward fluctuations in problem-solving effectiveness were associated with downward fluctuations in spouses' relationship satisfaction. Conversely, among husbands and wives who reported average or below average chronic stress (relative to other husbands and wives), fluctuations in dyadic effectiveness were not associated with spouses' judgements of satisfaction in the relationship. Although our results were not robust across behavioral codes, obtained findings are not inconsistent with the view that identical forms of observed couple communication—in this case, problem-solving effectiveness—vary in their association with satisfaction as a function of the accumulated demands that spouses are facing. When those demands are high, communication may matter more for relationship satisfaction than when those demands are low (relative to other couples).

Before considering the implications of the study in greater detail, we provide some reasons for caution in interpreting the results. First, given that we studied naturally occurring changes in behavior and stress rather than true experimental manipulation, causal inferences are not possible. Second, although the interacting effects of behavior and stress on relationship satisfaction are statistically reliable, we cannot make strong claims about their magnitude because traditional estimates of effect sizes do not apply to multilevel models (Holden, Kelley, & Agarwal, 2008). Nonetheless, as our figures demonstrate, the scale of changes in our relationship satisfaction variable were not large in magnitude and thus give further reason for caution. Third, our primary dependent variable—relationship satisfaction—may be too broad and undifferentiated to capture outcomes that are crucial to couples living with low incomes. Although they will likely correlate with satisfaction, inclusion of

outcomes such as relationship confidence, having a sense of shared purpose, trust, and willingness to maintain the relationship may permit a finer-grained perspective on how couples across the socioeconomic spectrum are managing their partnership. Finally, we remain tentative about the interaction results of the study because, although there is some suggestion that the effects of behavior and cumulative stress are dependent on one another, our evidence is preliminary and results were not always consistent between spouses or across all behavioral codes. Specifically, although acute within-person changes in husbands' cumulative stress moderated the effect of dyadic negativity on husbands' satisfaction, we found no evidence for this interaction effect among wives nor for the other domains of communication.

To the extent that we do find interaction results, between-person differences in chronic cumulative stress more consistently interacted with dyadic problem-solving effectiveness in predicting both husbands and wives' satisfaction. There was no evidence, however, for interactions between chronic stress and the other behavioral codes. Although we had no a priori reason for expecting that the different behavioral codes would interact differently with within-person fluctuations in stress (Level 1 interaction) versus between-person differences in level of chronic stress (Level 2 interaction), one possible explanation is that Level 1, within-person-change interactions may favor behavioral codes that have the potential to be more labile and affect laden, particularly negativity, which are the target of emotion-regulation interventions in skill-based interventions (e.g., communication training in Traditional Behavioral Couple Therapy). It is possible that more frequent assessments of communication tasks (e.g., weekly, monthly) and assessments of stress *during* interaction tasks would have captured the lability of affect to a greater degree and accordingly detect interaction effects for wives and/or detect interaction effects for positivity to the extent that positivity is more labile within-person rather than between-person. Thus, future studies are needed to replicate and then clarify whether husbands are uniquely vulnerable to acute accumulation of stress interacting with negativity. Experimental work by Bodenmann et al. (2015) does suggest that stressed husbands, compared to unstressed husbands, may become emotionally flooded and display less positivity and more negativity when responding to a stressed partner, though the longer-term implications of this tendency for relationship quality remain unknown. Between-person differences or Level 2 interaction effects, in contrast, might favor codes that fluctuate less within an individual and are more trait-like in couples' behavioral repertoires. Thus, codes that capture communication effectiveness (e.g., assertiveness, ability to generate high quality of solutions) might be more likely to yield Level 2 interaction effects, perhaps because chronic rather than acute stress poses a direct problem that necessitates long-term planning skills. Nevertheless, because few prior studies examine natural fluctuations in couple communication and few studies test for interactions between observed behavior and stress, our position is speculative.

Notwithstanding the limitations of this study, the results have theoretical implications regarding the role of behavior and stress in intimate relationship functioning. Although it has been largely assumed that the effects of behavioral processes on relationship satisfaction are fundamental and uniform, this study offers some suggestion that the effects of behavior and stress on satisfaction are profitably viewed as interconnected and interdependent. That is, behavioral linkages with satisfaction are not immutable and may differ as a function of

spouses' experiences of chronic stress, and the opposite view is equally valid: that linkages between stress and satisfaction may differ as a function of the fluctuating quality of couple communication. Continued efforts to establish main effects of communication on satisfaction, without consideration of the contextual forces that might be affecting (or are being affected by) communication, likely oversimplifies a more complex and dynamic portrait of how couples navigate their daily lives. Overall, a full understanding how communication processes influence relationship outcomes requires an appreciation of how those processes are situated within the larger array of settings that couples inhabit.

The results of this study also have practical implications for strengthening couple relationships. Future efforts to help couples via existing communication-based skills training may need to be adapted to account for the effects of stress, and might benefit from identifying low-income couples experiencing high levels of social and economic adversity. Indeed, interventions that transcend simple efforts to change basic communication skills with vulnerable populations are already showing promise by focusing specifically on the contexts in which those skills are being enacted. For example, the Protecting Strong African American Families (ProSAAF) program is designed to directly target couples' daily burdens and stress (e.g., from work, racism, money, family) using cognitive and behavioral techniques in addition to targeting communication skills (Barton, Beach, Bryant, Lavner, & Brody, 2018; Barton et al., 2017; Barton, Beach, Wells, et al., 2018; Beach et al., 2016). Promising results indicate that the ProSAAF intervention can buffer couples from the effects of financial hardship on partners' relationship confidence over time (Barton, Beach, Wells, et al., 2018). More generally, growing interest in studying and enhancing the relationships of under-resourced couples is now highlighting how communication processes often operate in the service of anticipating or managing circumstances that might otherwise destabilize those relationships, highlighting the need for deeper analysis of how forces operating within and upon couples can be harnessed to enhance their well-being.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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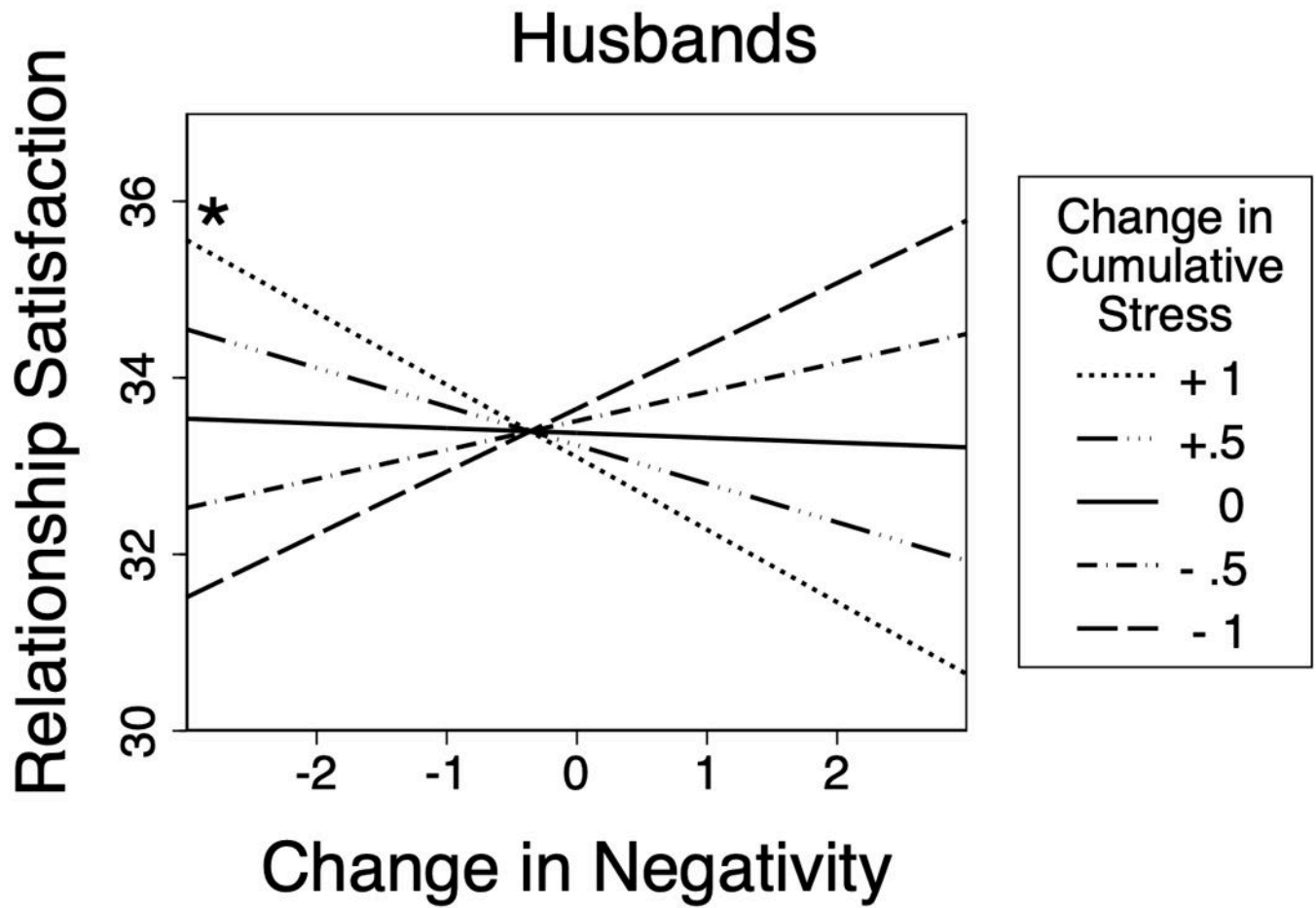


Figure 1. Interaction between *fluctuations* in dyadic negativity and *fluctuations* in husbands’ cumulative stress. When couples were observed communicating more negatively (relative to the couple’s norm) *and* husbands were concurrently reporting upward fluctuations in cumulative stress, husbands also reported downward fluctuations in relationship satisfaction at the same wave. Note that the simple slope for –1 cumulative stress was not statistically significant ($p = .093$). $*p < .05$.

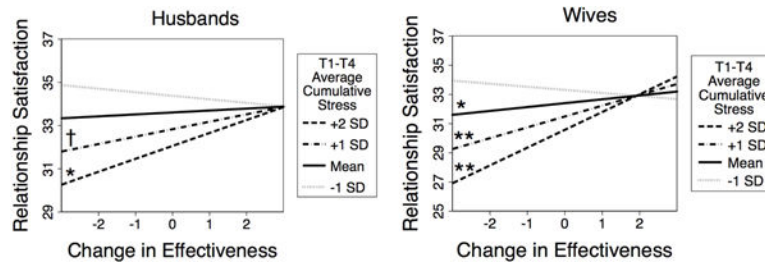


Figure 2. The interaction between fluctuations in dyadic problem-solving effectiveness and spouses’ *chronic* level of cumulative stress (i.e., T1-T4 average) is depicted on the left for husbands and on the right for wives. When couples were observed communicating less effectively (relative to the couple’s norm) *and* spouses reported high chronic cumulative stress (relative to other individuals), spouses reported the greatest downward fluctuations in relationship satisfaction. When chronic stress was low, reduced problem-solving effectiveness was unrelated to satisfaction. † $p < .06$, * $p < .05$, ** $p < .01$.

Table 1

Means and Standard Deviations of Time-Varying Variables

	Time 1 (<i>n</i> = 431)		Time 2 (<i>n</i> = 375)		Time 3 (<i>n</i> = 359)		Time 4(<i>n</i> = 336)	
	Husbands <i>M</i> (<i>SD</i>)	Wives <i>M</i> (<i>SD</i>)	Husbands <i>M</i> (<i>SD</i>)	Wives <i>M</i> (<i>SD</i>)	Husbands <i>M</i> (<i>SD</i>)	Wives <i>M</i> (<i>SD</i>)	Husbands <i>M</i> (<i>SD</i>)	Wives <i>M</i> (<i>SD</i>)
Spouse's Own Marital Satisfaction	33.9 (3.05)	33.15 (3.39)	33.43 (3.71)	32.83 (3.69)	33.44 (3.50)	32.38 (4.08)	33.02 (4.05)	32.3 (4.15)
Dyadic Positivity	2.36 (0.73)	2.36 (0.73)	2.3 (0.56)	2.3 (0.56)	2.24 (0.52)	2.24 (0.52)	2.34 (0.56)	2.34 (0.56)
Dyadic Negativity	1.93 (0.51)	1.8 (0.53)	1.8 (0.53)	1.8 (0.53)	1.87 (0.59)	1.87 (0.59)	1.87 (0.54)	1.87 (0.54)
Dyadic Effectiveness	4.24 (0.78)	4.24 (0.78)	3.92 (0.88)	3.92 (0.88)	3.83 (0.77)	3.83 (0.77)	3.92 (0.77)	3.92 (0.77)
Spouse's Own Cumulative Stress	0.98 (0.87)	0.82 (0.81)	0.66 (0.75)	0.63 (0.75)	0.63 (0.77)	0.63 (0.77)	0.65 (0.79)	0.57 (0.73)

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Table 2

Hierarchical Linear Modeling Coefficients. Fluctuations in relationship satisfaction as predicted by fluctuations in (1) Behavior, (2) Stress, (3) Behavior and Stress, (4) Behavior * Stress Interactions, and (5) Behavior * Chronic Stress Interactions

Variable	Model 1		Model 2		Model 3		Model 4		Model 5	
	Husbands <i>b</i> (SE)	Wives <i>b</i> (SE)	Husbands <i>b</i> (SE)	Wives <i>b</i> (SE)	Husbands <i>b</i> (SE)	Wives <i>b</i> (SE)	Husbands <i>b</i> (SE)	Wives <i>b</i> (SE)	Husbands <i>b</i> (SE)	Wives <i>b</i> (SE)
Dyadic Positivity	.40 (.17) *	.35 (.18) *			.45 (.17) **	.38 (.17) *	.45 (.17) **	.38 (.17) *	.20 (.27)	.11 (.27)
Dyadic Negativity	.01 (.18)	-.50 (.18) **			-.02 (.18)	-.53 (.18) **	.01 (.18)	-.51 (.18) **	-.41 (.27)	-.50 (.29)
Dyadic Effectiveness	.08 (.12)	.20 (.13)			.08 (.12)	.21 (.12)	.07 (.12)	.21 (.12)	-.21 (.18)	-.26 (.19)
Spouse's Own Cumulative Stress			-.23 (.11) *	-.35 (.12) **	-.25 (.11) *	-.40 (.12) ***	-.20 (.11)	-.39 (.12) **		
Positivity * A Cumulative Stress							-.15 (.37)	.31 (.39)		
Negativity * Cumulative Stress							-.71 (.35) *	-.31 (.40)		
Effectiveness * Cumulative Stress							.12 (.26)	-.31 (.26)		
Avg. Cumulative Stress									-1.48 (.21) ***	-1.94 (.26) ***
Positivity * Avg. Cumulative Stress									.41 (.30)	.57 (.33)
Negativity * Avg. Cumulative Stress									.44 (.27)	-.03 (.31)
Effectiveness * Avg. Cumulative Stress									.37 (.19) *	.71 (.21) ***

Note: = Delta change / fluctuations, Avg. = T1-T4 mean/average. Models also include intercept and time effect (not shown).

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