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Relationship Functioning Moderates the Association Between Depressive Symptoms and Life Stressors

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Abstract

Data from 172 newlywed couples were collected over the first 4 years of marriage to test how behaviors demonstrated during marital interactions moderate associations between depressive symptoms and subsequent life stressors. Depressive symptoms and behaviors coded from problem-solving and social support interactions were analyzed as predictors of nonmarital stressors that were interpersonal and dependent on the participant's actions. Behavioral codes were found to moderate 3 of 16 symptom-to-life event associations for husbands. Husbands' reports of more depressive symptoms predicted greater levels of stress when husbands' positive affect and hard negative affect during problem-solving were relatively infrequent and when wives made frequent displays of positive behaviors during husbands' support topics. These effects remained after controlling for marital satisfaction. For wives, behavioral moderators did not interact with depressive symptoms to predict changes in stress, but marital satisfaction consistently interacted with depressive symptoms to predict future stressors beyond interpersonal behaviors. Specifically, for wives, stress generation was more evident when relationship satisfaction was low than when it was high. Our results, though different for men and women, suggest that relationship functioning can alter associations between depressive symptoms and life stress in the early years of marriage.

Keywords

stress generation; depressive symptoms; couples; marriage; interpersonal communication

Stress generation theory (Hammen, 2006) asserts that stable vulnerability factors and interpersonal deficits contribute to a cyclical association between depressive symptoms and life stress. This model suggests that interpersonal deficits can heighten the effects of depressive symptoms on later stress, while interpersonal strengths can offset these effects. Understood in the context of intimate relationships, an individual with depressive symptoms in an emotionally supportive relationship may be protected against future stressors whereas a

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similar individual involved with an unsupportive partner may be prone to generating more stress, thereby perpetuating depressive symptoms. This proposition builds upon a core assumption of Coyne's interpersonal theory of depression (Coyne, 1976b), that depression is in part a consequence of how close others respond to a depressed person's symptoms and behaviors. Using observational data on couple communication and eight assessments of depressive symptoms and life stress, this research examines interpersonal processes involved in stress generation and considers whether specific behavioral moderators affect the relationship between depressive symptoms and future stressors beyond global marital satisfaction.

In contrast to models implicating stress as a cause of depression, stress generation theory argues that depressive symptoms predict future interpersonal stressors that are at least partially dependent upon the depressed person's actions (Hammen, 2006). Evidence supports this view (Hammen, 2005) and the view that future life events are in part a function of individuals' deficits in interpersonal problem solving (Davila, Hammen, Burge, Paley, & Daley, 1995) and competence (Herzberg et al., 1998). Herzberg and colleagues found that the inability to listen empathically and provide support was associated with future increases in chronic interpersonal stress, as such deficits may heighten interpersonal conflict when close others solicit but do not receive expected support from the target or provoke the partner to withdraw, thereby reducing support when the target requires it. We aim to build on this idea by using observational data on marital interaction to identify possible behavioral moderators of depression-to-stress linkages that are most likely to amplify or offset the stress-generating aspects of depressive symptoms.

Coyne's interpersonal theory of depression (Coyne, 1976b) provides direction for this aim by highlighting how critical feedback from close others worsens depressive symptoms. This model suggests that depressed individuals seek but then reject reassurance from others about their own self-worth, eventually frustrating the partner and precipitating further symptoms. Evidence that depressed individuals who are high in reassurance-seeking are subsequently rejected (e.g., Joiner, Metalsky, Katz, & Beach, 1999) suggests that how depressed individuals behave during social interactions merits consideration as an important component of stress generation, because individuals with depressive symptoms may engage in behaviors that are met with anger, hostility and rejection from others, and this rejection can perpetuate the course or severity of depression.

Coyne and Joiner's research implies that repeated patterns of interpersonal communication between a depressed person and his/her spouse may affect the extent to which depressive symptoms impact the generation of future interpersonal conflict stressors. Particular patterns of responding to a depressed person—especially criticism and rejection—appear to be important in the stress generation process and characterize communication between depressed or dysphoric spouses (Rehman, Gollan, & Mortimer, 2008). These well-established findings suggest that displays of “hard” negative affect like anger and contempt are especially characteristic of interactions among depressed spouses. Problem-solving discussions involving depressed/dysphoric partners are characterized by fewer positive and more negative behaviors (e.g., Du Rocher Schudlich, Papp, & Cummings, 2004), and the longitudinal association between interpersonal stressors and depressive symptoms is

stronger when wives display negative behaviors and emotion while discussing a source of marital conflict (Cohan & Bradbury, 1997). Coyne's interpersonal model is not limited to couples' problem-solving, however, and suggests that communication involving the provision and receipt of social support may also moderate stress generation. For example, individuals experiencing stress or depressive symptoms are impaired in these domains and are especially likely to provide and solicit social support using negative behaviors and affect (Coyne & DeLongis, 1986; Pasch, Bradbury, & Davila, 1997).

Taken together, this research suggests that repeated patterns of communication between depressed/dysphoric individuals and their partners may affect the relationship between depressive symptoms and later stressful events. One key aim of the current study is to expand upon stress generation research by examining whether any effects associated with marital communication predict dependent and interpersonal stressors that are explicitly outside of marriage. A number of possible mechanisms may help explain how marital communication moderates the generation of nonmarital conflict stressors. First, Hammen's model suggests that how a depressed or dysphoric individual interacts with his/her partner may be an indicator of how he/she interacts more globally. Given the pervasive nature of interpersonal dysfunction, deficits in seeking or providing social support and in problem-solving with one's partner may be an index of general communication deficits that occur across a variety of social contexts. These global interpersonal deficits may affect stress generation outside of the marriage because the depressed individual is likely to employ the same dysfunctional communication (e.g. excessively seeking reassurance) with other people as with one's partner.

A second mechanism suggests that depressive behaviors elicit negative responses from others, including depression contagion and feelings of burden, that ultimately lead them to reject the depressed individual (Coyne, 1976a). This direct pathway by which depressive behaviors predict interpersonal rejection constitutes a stressful event that heightens depressive symptoms.

A third mechanism may be that the manner in which partners respond to a target's depression affects the target's self-esteem and social competence in ways that either promote or hinder the generation of future stressors. For example, partners who support rather than reject a burdensome partner may instill the depressed person with the needed confidence to believe the feedback they receive (thereby reducing excessive reassurance-seeking) and engage in problem-solving and support provision/seeking without resorting to withdrawal or interpersonal conflict. Furthermore, if depressed individuals turn to their partner for advice with interpersonal problems (like a conflict with one's boss), adaptive communication within the marriage may also help individuals solve interpersonal conflicts outside of marriage before they become more severe.

As studies have not yet examined interpersonal behaviors alongside general reports of relationship quality as moderators of the symptoms-to-stressors link, a secondary aim of the study is to test the alternative possibility that global reports of distress are primarily responsible for the behaviors that emerge as stress generation moderators (cf. Whisman, 2007). By controlling for marital satisfaction, our analyses will examine whether the

relationship between depressive symptoms and later stressors reflect effects of marital communication rather than marital distress.

Using observational data collected from couples discussing relationship problems and personal concerns, and multiwave assessments of depressive symptoms and stressful life events, this study will explore the extent to which specific interpersonal behaviors or general marital quality moderate the association between depressive symptoms and future conflict stressors outside of marriage. Three main hypotheses are tested. First, we expect that symptoms of depression will predict 6-month increases in life events and that this association will be more likely to be significant for women than for men, given past findings (Hammen, 1991). The second and more important hypothesis is that the symptoms-to-stress link will be stronger when spouses and their partners display lower levels of positive behaviors and affect and higher levels of negative behaviors and affect during social-support and problem-solving discussions. Although this hypothesis builds on studies linking observed behavior with depression (Rehman et al., 2008) and our earlier argument, it remains tentative as relatively few studies have examined specific behavioral moderators of stress generation. Finally, we predict that any behavioral moderation that we identify will remain independent of concurrent reports of relationship satisfaction, in line with several studies that still found communication deficits among depressed dyads after controlling for levels of marital satisfaction (Rehman et al., 2008). The last two hypotheses represent unique research questions with significant implications for targeting specific patterns of marital communication that may help a depressed or dysphoric individual cope with symptoms so as to reduce future stressful event exposure.

Method

Participants

One hundred seventy-two newlyweds were recruited from Los Angeles County marriage licenses filed between May 1993 and January 1994. Couples received letters asking them to participate in a longitudinal study of newlywed couples. The first 172 couples who were eligible and attended their laboratory appointment comprised the sample.1 Almost all of the initial laboratory sessions occurred during the first 6 months of marriage. Compared with the couples who responded to the letter, nonresponders were significantly lower in years of education (effect size $r = .18$ wives and $r = .29$ husbands), age (wives only, $r = .07$), job status (husbands' $r = .20$, wives' $r = .18$), and rates of cohabitation before marriage ($r = .11$).

Husbands' mean age was 27.9 years ($SD = 3.9$). They also averaged 15.6 ($SD = 2.2$) years of education and earned a median annual income between $21,000 and $30,000. Sixty-seven percent of husbands were Caucasian, 15% were Latino/Chicano, 13% were Asian-American/Pacific Islander, 4% were African-American, and 1% were Middle Eastern. Wives' mean age was 26.0 years ($SD = 3.4$). They averaged 16.2 ($SD = 3.4$) years of

[1]Our paper uses the same sample as several other publications on the developmental course of marriage (e.g., Davila et al., 1997; Johnson et al., 2005; Lavner & Bradbury, 2010; Sullivan et al., 2010). However, this study represents the first from our laboratory to use social support and problem-solving behaviors at multiple time points as moderators of stress generation, to consider how marital satisfaction is involved in this process, and to use as an outcome variable the combination of interpersonal and dependent life stressors that are explicitly outside of the marital domain.

education, with a median annual income between $11,000 and 20,000. Sixty-one percent of wives were Caucasian, 16% were Latina/Chicana, 15% were Asian-American/Pacific Islander, 5% were African-American, 2% were Middle Eastern, and 1% identified as "other."

Procedure

Spouses completed questionnaires and marital discussions during an initial laboratory session, with a follow-up laboratory session a year later at which 152 of the 172 couples returned, and where 150 couples provided problem-solving affect data and 148 provided social support data. During the laboratory sessions, questionnaires including marital satisfaction and depressive symptomatology were completed separately, after which couples participated in four 10-minute discussions; two that centered around a non-marital area that one partner wished to change about him/herself (social support conversation), and two that focused on a source of conflict in the marriage (problem-solving discussion). For the social support discussions, one partner (the helpee) was selected to "talk about something you would like to change about yourself," while the other spouse (the helper) was asked to "be involved in the discussion and respond in whatever way you wish." Example topics included weight loss and finding a more suitable job. In the problem-solving discussions, couples were told to "discuss the topic for 10 minutes and try to work toward a mutually satisfying solution." After a break, partners switched roles so that each partner was a provider and recipient of support and the focus and listener of the problem-solving discussion. All conversations were videotaped and coded by external raters.

Six months after the initial laboratory session, couples completed mailed questionnaires. After an additional 6-month interval, couples returned for a second laboratory session that included questionnaires and the discussions. Across five additional 6-month periods, couples responded to mailed questionnaires. For all six nonlaboratory sessions, couples were mailed a questionnaire packet and instructed to answer all questions independently of their partner. Couples were paid $75 after completing each of the two laboratory sessions and $25 after each of the six nonlaboratory assessments. Therefore, the first 4 years of marriages were studied across eight time points with a 6-month interval between each assessment period.

Materials

Stressful life events—A 168-item Survey of Life Events (Bradbury, 1990) was administered at all eight time points and assessed life stressors that occurred over the past six months within nine domains, including work, marriage, and personal health. Participants endorsed whether each event occurred to themselves or their partner and then rated its impact on a seven-point scale ranging from "extremely negative" (−3) to "extremely positive" (+3).

All checklist items were coded by nine raters, who, in accordance with stress generation theory, assessed if each item involved another person (interpersonal) and was at least partially dependent upon the participant's behaviors (dependent) after reading a coding manual created by the first author. Items were selected as being dependent and interpersonal if seven out of nine raters agreed. Items were excluded if they were symptoms of depression

or involved one's partner, to remove marital stressors and depressive symptoms from the acute measure. Thirteen events were identified as interpersonal and dependent. We then computed each person's average impact rating of each item, and we constructed 95% confidence intervals around these means to determine whether the sample average impact rating of each item was significantly more negative than zero ($p < .05$). These procedures resulted in 7 items[2] that were both interpersonal and dependent life events, and the outcome variable was the number of these items endorsed. The average impact rating for each item was more negative than −.75 (argument with coworkers) and the average impact rating across persons and items was −1.01. All items chosen were, on average, rated at least 1 *SD* more negatively than 0. Our measure of life stress is consistent with interpersonal conflict stressors that are often the hallmark of stress generation research.

Depressive symptoms—Depressive symptoms over the past week were assessed at all time points with the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), a commonly-used 21-item measure with good reliability (coefficient alphas above .80) and validity in nonpsychiatric samples (Beck, Steer, & Garbin, 1988).

Marital satisfaction—Marital satisfaction was assessed eight times through the six-item Quality of Marriage Index (QMI; Norton, 1983). A key strength of the QMI is that it assesses global sentiments about the marriage rather than behavioral processes that may contribute to feelings of satisfaction. The QMI has high reliability with newlywed samples (alpha > .95; Karney & Bradbury, 1997). The first five items are scored on a 1–7 scale, while the final item is scored on a 1–10 scale; higher scores indicate higher marital satisfaction.

Support discussion—Social support discussions were coded using the Social Support Interaction Coding System (Pasch & Bradbury, 1998). Each turn of speech by both helper and helpee was coded for negative behaviors and positive behaviors. Helper behaviors could either be negative (e.g. rejection, blaming), positive instrumental (providing helpful advice), positive emotional (reassurance), positive other (other positive behaviors that assisted the discussion process), neutral, or off-topic. In accordance with previous research (Johnson et al, 2005), positive instrumental, positive emotional, and positive other codes when individuals were the helper in the social support task were summed and reduced to a single positive behavioral code. Helpee behaviors were coded as negative (e.g. criticizing, complaining) or positive (e.g. a clear statement of feelings). Taken together, four distinct support behaviors (positive as helper, positive as helpee, negative as helper, negative as helpee) were used. Intraclass correlations at laboratory session 1 (.80 for helper's negative, .86 for helper's positive, .75 for helpees' negative, .79 for helpees' positive) and at session 2 (.67 for helper's negative, .83 for helper's positive, .72 for helpees' negative, .84 for helpees' positive) determined an appropriate amount of agreement (Sullivan et al., 2010). For purposes of this study, neutral and off-topic behaviors were disregarded, and raw counts of the total number of positive and negative behaviors as both helper and helpee served as the predictor variables, as others have done (Sullivan et al., 2010).

[2]The following items comprised the full list of the seven interpersonal and dependent stressors: “argument with a boss,” “argument with co-workers,” “dispute with neighbors,” “ended relationship with a friend,” “argument with brother or sister,” “argument with parents,” and “argument with other relatives.”

Problem-solving discussion—Each spouse identified a source of tension within the marriage which became the problem-solving discussion topic. Trained raters focused on voice tone and pitch, posture, gestures and facial expressions to rate affect displayed in five-second intervals using the Specific Affect Coding System (SPAFF; Gottman & Krokoff, 1989). Each interval was rated with one of five possible negative affect codes (anger, contempt, whining, anxiety, or sadness) one of three possible positive affect codes (humor, interest, or affection) or neutral affect if displays were indeterminable/subthreshold. For analytic purposes, predictor variables included counts of total positive affect and hard negative affect (anger and contempt) displayed by participants during their own and their partner's problem-solving topic; the reliability for the whining code was poor, while anxiety and sadness occurred rarely and were therefore dropped from the analyses in accordance with previous research by this laboratory (Sullivan et al., 2010), leaving the sum of anger and contempt dubbed “hard negative affect” (Johnson et al., 2005). Therefore, four affect codes (hard negative during own topic, hard negative during partner's topic, positive during own topic, positive during partner's topic) were available. The same rating team coded data at the first and third time points, and intraclass correlations revealed consistent inter-rater reliability (.91 for wives' hard negative affect .66 for husbands' hard negative affect, .68 for wives' positive affect, .93 for husbands' positive affect) between the two time points (Sullivan et al., 2010).

Data Analysis

The data include repeated reports on stressful events and depressive symptoms by married spouses, violating the independence assumptions of more traditional analyses. To accommodate these data characteristics, we chose a multilevel approach using the HLM/2L program. In our model, level 1 included data from eight time points nested within husbands and wives, comprising 172 couples (level 2). We used an extension of multilevel modeling for dyads, allowing for simultaneous estimation of both partners' coefficients in a single model, to estimate within-person associations between depressive symptoms and prospective increases or decreases in life stressors over six months (a multiple intercept approach; Kenny, Kashy, & Cook, 2006).

Results

Preliminary Analyses

Husbands' mean baseline BDI was 3.94 (SD = 3.95, range = 0–19), while wives' mean was 4.41 (SD = 4.11, range = 0–21). Husbands' initial mean QMI was 41.32 (SD = 4.04, range = 22–45); wives' mean QMI was 41.60 (SD = 4.28, range = 25–45). Table 1 lists the correlations between husbands' and wives' marital satisfaction and depressive symptoms across all eight time points and indicates that the within-person fluctuations of depressive symptoms and marital satisfaction were virtually independent of each other. Furthermore, justifying averaging across Time 1 and 3 with respect to marital quality as a behavioral moderator, the correlation between husbands' QMI at Time 1 and 3 was r = .70, while the corresponding correlation was r = .57 for wives; both values were significant at the $p < .001$ level.

Behavioral codes at the two laboratory sessions were substantially correlated, with a median value of $r = .41$ for behaviors/affect during one's own topic (range: $r = .08$ to $r = .56$) and a median correlation of $r = .44$ for behaviors/affect during the partner's topic (range: $r = .24$ to $r = .63$). To reduce measurement error and improve reliability, we averaged behaviors from both assessments. Values of behaviors displayed at the first session were used instead of this average for the 22 (social support) and 24 (problem-solving) couples who did not provide behavioral data at the second session. However, systematic changes in life stress or depressive symptoms may affect behavioral codes at the second laboratory session, such that couples who experience more depressive symptoms or life stressors over the one year period engage in marital interactions that are characterized by higher levels of negative behaviors/affect and lower levels of positive behaviors/affect. To account for this possibility, in all analyses that included behavioral moderators, we also controlled for each person's average level of depressive symptoms across all eight time points.

Test of the Basic Stress Generation Model

In an autoregressive two-level model, we predicted stressful life events at a subsequent time point from depressive symptoms at the current time point, the number of combined interpersonal and dependent stressful life events at the current time point, and separate predictors for husbands and wives. Depressive symptoms thus predicted prospective change in life events from current depression scores. In order to capture within-person associations, all predictors were centered around each individual's mean on the variable. The level-1 equation was:

$$Y_{ij}+1=\beta_{1j}(H)+\beta_{2j}(W)+\beta_{3j}(H\_\,\mathrm{BDIC})+\beta_{4j}(W\_\,\mathrm{BDIC})+\beta_{5j}(H\_\,\mathrm{EVENTC})+\beta_{6j}(W\_\,\mathrm{EVENTC})+r_{ij} \quad (1)$$

where an individual's number of life stressors at the next time point ($Y_{ij} + 1$) was predicted from separate intercepts for husbands ((β_1) and wives (β_2), individual-mean centered depressive symptoms at each time point for husbands (β_3) and wives (β_4), individual mean-centered stressors at each time point for husbands (β_5) and wives (β_6) and an error term (r_{ij}). The level-2 model was unconditional, but a variance component was estimated for each parameter. We interpreted robust standard errors in all analyses and, due to the specific directional hypotheses that we made, we reported one-tailed significance values. All significant results were re-run using the extension for Poisson distributions. As the results did not differ in any appreciable way, we reported results from models assuming a normal distribution for clarity of interpretation.

We found a significant positive association between current depressive symptoms and future stressors in husbands ($\beta_3 = .035$, $t = 2.40$, $p = .009$), lending support to stress generation theory. For every 1 *SD* increase in depressive symptoms at any given time point, future experienced life stressors at the next time point are expected to increase by .128 events. No significant effect resulted for wives ($\beta_4 = .002$, $t = .30$, $p = .381$). Importantly, variance in

stress generation effects varied across couples [husbands: $SD = .10$; $\chi^2(1) = 6.99$, $p = .008$; wives: $SD = .03$; $\chi^2(1) = 3.91$, $p = .048$], making the testing of potential moderators meaningful.

Behavioral Moderators of the Depressive Symptoms-Life Stress Relationship

Social support behaviors—Building upon this model, we tested for moderator effects of one's own behavior during one's social support topic (“helpee”), and partners' behaviors as a support provider (“helper”), controlling for the average level of depressive symptoms across all time points and the average marital satisfaction at lab sessions 1 and 2. These controls helped determine whether specific behavioral processes moderated stress generation above and beyond the unique effects of global marital satisfaction. Separate models examined moderation of the average number of positive and negative behaviors displayed as the helpee and helper. Therefore, eight separate combinations were tested (husband positive support as helper, husband positive support as helpee, husband negative support as helper, husband negative support as helpee, wife positive support as helper, wife positive support as helpee, wife negative support as helper, wife negative support as helpee). The corresponding level-2 equations were:

$$\begin{aligned}
\beta_{1j} &= \gamma_{10} + \gamma_{11}(H/W_\text{BEH}) + \gamma_{12}(H/W_\text{QMI}) + \gamma_{13}(H/W_\text{ABDI}) + \text{u}_{1j} \\
\beta_{2j} &= \gamma_{20} + \gamma_{21}(W/H_\text{BEH}) + \gamma_{22}(H/W_\text{QMI}) + \gamma_{23}(H/W_\text{ABDI}) + \text{u}_{2j} \\
\beta_{3j} &= \gamma_{30} + \gamma_{31}(H/W_\text{BEH}) + \gamma_{32}(H/W_\text{QMI}) + \gamma_{33}(H/W_\text{ABDI}) + \text{u}_{3j} \\
\beta_{4j} &= \gamma_{40} + \gamma_{41}(W/H_\text{BEH}) + \gamma_{42}(H/W_\text{QMI}) + \gamma_{43}(H/W_\text{ABDI}) + \text{u}_{4j} \\
\beta_{5j} &= \gamma_{50} + \text{u}_{5j} \\
\beta_{6j} &= \gamma_{60} + \text{u}_{6j}
\end{aligned} \tag{2}$$

The grand-mean centered behaviors predicted husbands' (γ_{11}) or wives' (γ_{21}) average number of stressors and the effects of depressive symptoms on future stressors for husbands' (γ_{31}) or wives' (γ_{41}) after controlling for marital satisfaction and average levels of depressive symptoms as previously described. The estimates for u_{1j} and u_{2j} represent husbands' and wives' correlated level-2 residuals, and u_{3j} and u_{4j} represent variation in spouses' effects of depressive symptoms on life stressors unexplained by behaviors. Behaviors when discussing one's own issues were tested as moderators of one's own stress generation process,[3] while behaviors when discussing one's partner's issues were examined as moderators of one's partner's stress generation process.

One out of the eight tested behavioral moderators was significant beyond the effects of marital satisfaction: wives' positive behaviors during husbands' topics significantly moderated the impact that husbands' depressive symptoms had on husbands' subsequent stressful events ($\gamma_{31} = .007$, $t = 2.97$, $p = .002$). These results suggest that husbands high in depressive symptoms are especially likely to generate future stressors to the extent that they are married to wives who provide social support using a high number of positive behavioral codes; for each one SD increase in wives' displayed positive behaviors over and above

[3]We use the term “stress generation process” or “stress generation effect” to mean the association between current depressive symptoms and future experienced life stressors.

husbands' average marital satisfaction at times one and three and depressive symptoms at all time points, husbands' stress generation effect is likely to increase by .193 units. However, husbands' positive behaviors during wives' topics failed to moderate wives' stress generation process (γ_{41} = 000, t = .38, p = .353). Furthermore, neither husbands' (γ_{41} = .000, t = .06, p = .475) nor wives' (γ_{31} = −.003, t = −1.20, p = .116) negative behaviors during their partner's topic significantly moderated the relationship between their partner's depressive symptoms and subsequent life stressors. Neither husbands' (γ_{31} = −.000, t = −.16, p = .437) nor wives' (γ_{41} = −.001, t = −.97, p =.168) positive behaviors during their own support topic significantly moderated the relationship between their own depressive symptoms and subsequent life stressors. Similarly, neither husbands' (γ_{31} = −.000, t = −.16, p = .439)nor wives' (γ_{41} = −.001, t = −.49, p = .311) negative behaviors during their own topic moderated their own stress generation process.

Problem-solving affect—As with the support behaviors, separate models examined the average number of positive and hard negative affect codes across both times as a selector and an observer of the problem-solving topic. Eight models were run (husbands' positive affect during own topic, husbands' positive affect during wives' topic, husbands' hard negative affect during own topic, husbands' hard negative affect during wives' topic, wives' positive affect during own topic, wives' positive affect during husbands' topic, wives' hard negative affect during own topic, and wives' hard negative affect during husbands' topic), with two significant results.

Husbands' positive affect (γ_{31} = −.007, t = −1.99, p = .024) and hard negative affect (γ_{31} = −.002, t = −1.95, p = .027) during husbands' problem-solving topic moderated the association between husbands' depressive symptoms and future increases in life stressors after controlling for husbands' marital satisfaction and average depressive symptoms. These results indicate that husbands with higher levels of depressive symptoms are especially likely to generate future stressors when they attempt to solve their identified marital problems through displaying low levels of positive and hard negative affect; for every 1 *SD* increase in displayed anger or contempt during their own topics, husbands' stress generation effect will decrease by .077 units, while for every 1 *SD* increase in displayed positive affect, husbands' stress generation effect will decrease by .088 units at the next time point. Neither wives' positive affect (γ_{41} = 002, t = .88, p = .192) nor hard negative affect (γ_{41} = 000, t = .54, p = .296) during her own problem-solving topic significantly moderated her own stress generation process. Finally, neither husbands' (γ_{41} = .002, t = .82, p = .208) nor wives' (γ_{31} = −.003, t = −.94, p = *.176*) positive affect during their partner's problem-solving topic, nor husbands' (γ_{41} = .000, t = .13, p = .448) nor wives' (γ_{31} = —.000, t = —.47, p = .319) hard negative affect during their partner's topics, predicted their partner's stress generation after controlling for their partner's self-reported marital satisfaction and depressive symptoms.4

[4]We also ran a stress generation model that included the three significant behavioral moderators simultaneously alongside the other controls, and significant findings for the behaviors were maintained: husbands' hard negative affect during husbands' problem-solving topics still moderated the association between husbands' depressive symptoms and husbands' future experienced stressors (γ_{32} = −.002, t = −2.25, p = .013) and husbands' positive affect during husbands' problem-solving topics still moderated the association between his depressive symptoms and subsequent stressors (γ_{33} = −.009, t = −2.80, p = .003), while wives' positive behaviors during husbands' support topics still moderated the relationship between husbands' depressive symptoms and husbands' experienced stressful events (γ_{13} = .007, t = 3.37, p < .001).

Figure 1 illustrates all significant interaction effects, displaying stress generation at times when spouses were one *SD* above or below their average levels of depressive symptoms, and when spouses were one *SD* above and below their mean on the behavioral moderators. We also found no strong correlations between the three significant behavioral moderators (all correlation coefficients were smaller than $r = -.18$).

It should be noted that for husbands, marital satisfaction was never a statistically significant moderator of husbands' stress generation beyond the behavioral moderators; for all eight analyses, the marital satisfaction variable failed to reach statistical significance. These findings lend support to that idea that, among this sample, three specific kinds of interpersonal behaviors moderate the linkage between husbands' depressive symptoms and future life stressors whereas general self-reports of marital quality do not. On the other hand, while in none of the eight analyses did behaviors moderate wives' stress generation, wives' self reports of marital satisfaction moderated her stress generation process in all eight of the analyses, with coefficients ranging from −.001 to −.005 and *p*-values ranging from $p = .006$ to $p = .021$. Irrespective of interpersonal behaviors, wives' who reported lower levels of marital satisfaction and higher levels of depressive symptoms were especially likely to generate subsequent interpersonal conflict stressors. Taken together, interpersonal communication moderated husbands' stress generation while martial satisfaction moderated wives' stress generation.

Discussion

The current study used Hammen's stress generation theory and Coyne's interpersonal model of depression to clarify how specific interpersonal processes in marriage govern links between depressive symptoms and 6-month changes in stressors outside of marriage across the first 4 years of marriage. Depressive symptoms predicted future stressors for husbands, and three specific forms of marital communication moderated husbands' stress generation beyond the effects of husbands' marital satisfaction. Specifically, husbands one *SD* above the average level of depression were especially likely to generate future stressors to the extent that husbands made infrequent displays of positive affect and anger/contempt when problem-solving and wives displayed a greater number of positive behaviors during a social support conversation. Husbands' marital satisfaction never moderated husbands' stress generation. In contrast, behavioral variables never moderated wives' stress generation beyond the effects of wives' marital satisfaction, whereas wives' marital satisfaction moderated their depressive symptoms-to-stress associations. Overall, this work suggests that relationship functioning—captured by behavioral variables in the case of husbands, and reports of relationship satisfaction in the case of wives—moderates stress-generation effects in the first 4 years of marriage.

Interpretation of these results is limited in several ways. First, participants initially had low levels of depression and stress and high levels of marital quality. Therefore, this sample may lack some variability in their exposure to stressful events, depressive symptoms, and negative marital conversations compared to groups recruited from a depressed/ distressed population. Even subclinical levels of depression, however, can impair an individual's social functioning and physical health (Judd, Paulus, Wells, & Rapaport, 1996) and affect work

performance. Subclinical levels of depressive symptoms also predict clinical depression and place individuals at substantial risk for future diagnoses of major depressive disorder (Wells, Burnam, Rogers, Hays, & Camp, 1992). Furthermore, an analysis of depressive symptoms across all time points revealed that between 5 and 15% of participants experienced mild-moderate symptoms (a BDI score of 10 or above) at any time point, demonstrating that a portion of our participants faced clinically relevant symptoms that may be obscured by only examining mean BDI scores.

Second, behavioral data were collected in the first 6-18 months of marriage, and we have no evidence that the interactional processes were stable over longer durations. Third, while we examined marital quality, we did not assess for relationship quality with the friends, relatives or coworkers who were the sources of examined stress. We therefore cannot fully address how relationship quality affects stress generation and interpersonal communication, as there is a mismatch between the dyadic partner who communicates with the target and the partner who contributes to the observed stress. Fourth, coding the problem-solving discussions for non-verbal affect and the support discussions for verbal behaviors confounds the coding system with the conversation topic, making it difficult to determine whether kind of conversation or coded behaviors moderates stress generation. It should be noted, however, that these coding systems are common in previous literature (Sullivan et al., 2010), that within-person support behaviors and problem-solving affect were often moderately to highly correlated, and that conversation type was constant, as all participants took part in four discussions.

Fifth, reported effects were relatively small in clinical terms, with a one *SD* increase in depressive symptoms predicting a .128 event increase in future experienced stressors, and a one *SD* change in communication behaviors predicting between a .077 and .193 unit change in the stress generation effect. Although these effects are small, they are the aggregate of some large effects and many small or zero effects and the limited range of our outcome measure (0–7 events) also likely restricts the potential for variation in stressful event reporting. Sixth, the self-report measure of life stressors may introduce biases due to idiosyncrasies in reporting, inaccurate recall of stressors or depressive symptoms themselves. However, this study did not examine between-person differences in self-reported life stressors, but rather within-person change in the incidence of life stressors. The results are therefore less likely to be subject to systematic recall or response biases. Finally, only three of the 16 tested behavioral moderators were significant, suggesting that, in this sample, behavioral codes generally failed to moderate the relationship between depressive symptoms and subsequent interpersonal and dependent stressors outside of marriage. However, it is possible that more behavioral moderators would have been significant if our sample had a greater proportion of individuals with clinically relevant depressive symptoms.

A key aim was to replicate Hammen's stress generation model in newlyweds and to consider how interpersonal behaviors affect this mechanism. In contrast to previous research that found stress generation among women (Hammen, 1991), we found that men who were higher in depressive symptoms were more likely to experience subsequent interpersonal and dependent life events, demonstrating that stress generation can occur within a predominantly psychiatrically healthy population. The fact that stress generation was found among men but

not women may reflect that two out of seven stressors involved conflicts at work, and that significantly more men than women were employed. Due to the nature of the stressors, men may have had more opportunities to engage in interpersonal conflict events. Also, the small number of clinically depressed women in our sample differs from Hammen's previous studies involving samples with a greater proportion of depressed women, leaving open the possibility that we did not find stress generation because our sample failed to have an adequate number of depressed women.

With respect to the behavioral moderators, our results underscore the emerging idea that positive affect and behaviors can be consequential for individual and relationship functioning. Here, husbands' positive affect like humor or affection when discussing a marital problem was related to an attenuation of the relationship between men's depressive symptoms and nonmarital stressors. Men reporting symptoms of depression who remain positive and even-handed when solving problems and approach conflict with humor and interest may either perceive or receive a higher quality of support from their partner. This felt or actual support may help men feel reassured and potentially improve men's estimation of relationship quality, reducing marital conflict. Men's positive affect may therefore facilitate successful provisions of support from wives that improves men's confidence, generalizes to other stressful topics and allows for a successful resolution of the problem that removes it as a source of future potential conflict.

Two counterintuitive behavioral moderators were found, such that men were more likely to generate stressors to the extent that they less frequently displayed anger and contempt when problem-solving and had wives who displayed more positive behaviors when providing support. Cohan and Bradbury's research (1997) suggests some possible explanations for these results, as they found that wives' frequent displays of anger during problem-solving were associated with increased marital satisfaction and reduced depressive symptoms among wives with a high occurrence of major stressful events. Cohan and Bradbury suggested that displays of anger may be beneficial if anger represents active engagement in problem-solving and facilitates effectively solving stressors outside of marriage, and it is possible that anger is similarly constructive in promoting active problem-solving among men. Likewise, wives' repeated provisions of positive behaviors like reassurance or encouragement when supporting dysphoric men may only encourage men's persistence with excessive reassurance-seeking, in that depressed men may continually fail to believe the positive feedback they receive, in accordance with Coyne's model.

Finally, while marital satisfaction did not moderate men's stress generation beyond observed behavioral variables, women's stress generation was moderated by their self-reported marital satisfaction. These findings support past research suggesting different pathways between marital satisfaction and depressive symptoms for men and women, and they add to the view that women's mood is linked more strongly with perceived relationship satisfaction or social support (e.g. Davila, Bradbury, Cohan, & Tochluk, 1997; Fincham, Beach, Harold, & Osborne, 1997). Pending replication, the present results could implicate different strategies for inhibiting stress generation in men and women, with a focus on enhancing specific interpersonal behaviors (promoting more frequent displays of positive affect and also problem-solving engagement more broadly, even if that has a negative tone) among men

during problem-solving discussions of topics they identify, while suggesting the more difficult task of improving women's global perceptions of relationship satisfaction.

Future research on stress generation processes might benefit from a sequential analysis of how one partner's behaviors or affect impact the other's, in order to clarify the mechanism by which depressive symptoms and interpersonal communication predict future stressors. Stress generation research might also examine this process across shorter time frames; daily diary studies should be used to more closely link together symptoms, interpersonal behaviors, and life stressors. This line of research could examine how diurnal changes in mood predict specific communication patterns between partners that lead to subsequent stressors or hassles. Daily diary studies could also minimize recall errors that may occur when reporting retrospectively about stressors. Finally, future work could use naturalistic approaches to examine how day-to-day interactions with friends or employers amplify or modulate the potential for interpersonal conflict. Research that directly tests these mechanisms and collects data from a variety of social interactions could examine whether patterns of interaction in one domain pervade others.

These findings also suggest implications for improving the quality of interpersonal conversations so as inhibit the propensity for depressive symptoms to be associated with future stressors. Given that husbands' positive affect during support conversations protected against experiencing future stressors, interventions that help husbands solve interpersonal problems using positive affect could create an interpersonal environment that buffers against the stress-inducing effects of depressive symptoms. In the same way that marital discord and conflict predict dysphoria/depression (e.g., Whisman, 2007), repeated exchanges that promote positive affect when problem-solving may protect against stress generation that perpetuates the cycle of depression and relationship discord.

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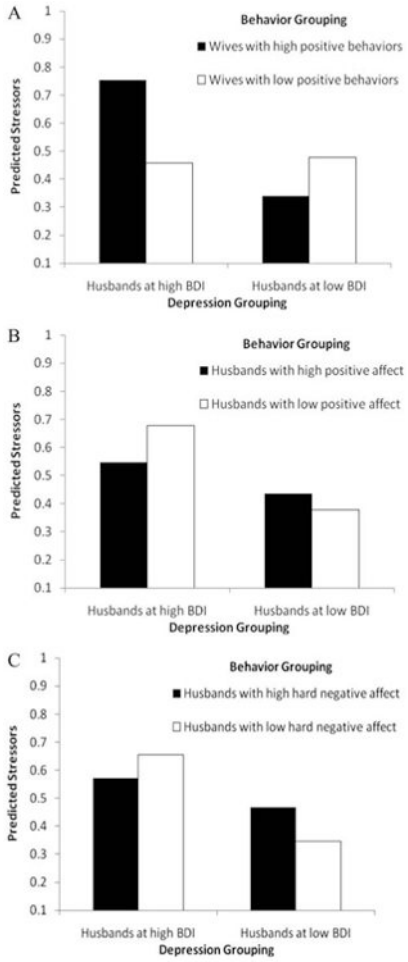

Figure 1.

Displays of all significant interactions between behaviors, depressive symptoms and future stressors. Wives' positive support behaviors when providing support moderated the relationship between husbands' depressive symptoms and his future life stressors, (A) while husbands' positive affect (B) and anger and contempt during husbands' problem-solving topics (C) moderated the relationship between husbands' depressive symptoms and his subsequent stressors.

Table 1

Correlations Between Depressive Symptoms and Marital Satisfaction Across All Eight Time Points, for Husbands and for Wives

	Time point							
Gender	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Husbands	−.29***	−.36***	−.38***	−.14	−.46***	−.31***	−.51***	−.20
Wives	−.32***	−40***	−.31***	−.23**	−.28**	−.28**	−.38***	−.24*

*$p < .05$.

**$p < .01$.

***$p < 001$.