

# Stress Spillover in Early Marriage: The Role of Self-Regulatory Depletion

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Stressful experiences external to a marriage (e.g., work stress, finances) are often associated with poor relationship functioning and lowered marital satisfaction, a phenomenon called stress spillover. To date, however, little attention has been devoted to understanding the specific mechanisms through which stress may lead to maladaptive relationship patterns. Drawing from theories of self-regulatory depletion, it was predicted that coping with external stress is an effortful process that consumes spouses' regulatory resources, leaving spouses with less energy to effectively respond to their relationship issues. The current study relied on a sample of newly married couples to examine whether self-regulatory depletion may account for the link between external stress and relationship well-being. Couples were asked to complete a 14-day daily diary that assessed their daily stress, their state of self-regulatory depletion, their marital behaviors, and their daily marital appraisals. Within-person analyses revealed that, on average, couples experienced stress spillover, such that on days when their stress was higher than usual they reported enacting more negative behaviors toward their partner and endorsed less positive appraisals of the relationship. Further analyses confirmed that self-regulatory depletion accounted for a majority of these spillover effects. These findings suggest that even happy couples may find it difficult to engage in adaptive relationship processes under conditions of stress.

*Keywords:* stress, marital quality, relationship maintenance, depletion

Some fragile relationships survive forever because they never encounter a relationship-toxic environment and some very strong relationships dissolve—not because they weren't close or committed or loving—but because fate . . . put their relationship in harm's way.

—Ellen Berscheid (1999, p. 265).

When asked to explain the success or failure of their relationships, individuals rarely acknowledge the role the relationship context may have played in shaping those outcomes (Berscheid, Lopes, Ammazalorso, & Langenfeld, 2001). Rather, it is a common belief in Western society that successful marriages result when both partners “work” at the relationship by engaging in active efforts to behave and think in relationship-promotive ways (Levine & Markman, 2001). In other words, as long as partners are committed enough and work hard enough, the marriage should survive. Yet, as the above quote elegantly asserts, this perspective overlooks the important reality that some environmental contexts render it more difficult for spouses to effectively maintain a happy and healthy relationship. When the marital context contains numerous stressful life events, such as work stress or financial strains, marriages often suffer. For instance, stressors originating in domains external to the marriage predict increases in maladaptive

relationship behaviors and decreases in marital satisfaction, a phenomenon referred to as *stress spillover* (e.g., Randall & Bodenmann, 2009).

Although it has been well established that relationships falter under conditions of stress, the mechanisms underlying these stress spillover effects are less clear. In other words, why do stressors external and presumably unrelated to relationships negatively influence behaviors and thoughts within relationships? To address this question, the current article adopts the perspective that even the most motivated spouses may find it difficult to behave in a relationship-promoting manner if they do not also possess the energy and resources necessary for engaging in those acts. Drawing from theories of self-regulation, it is argued that stressful environments should hinder efforts to engage in constructive relationship functioning by draining spouses' self-regulatory resources, thus leaving spouses with less energy to manage relationship issues (Baumeister, 2002). In this way, stress may reduce spouses' capacity to respond well to those issues, despite strong desires to preserve the marriage.

Accordingly, the goal of the current study was to examine whether self-regulatory depletion accounts for the link between stress and relationship well-being. To this end, the remainder of the introduction is divided into three sections. The first section more thoroughly reviews research linking external stress to relationship behaviors and appraisals. Next, the role self-regulatory depletion may play in this process is explored. Though some prior work has speculated that depletion may account for stress spillover effects (e.g., Neff & Karney, 2009), to date there have been no direct empirical tests of this possible mechanism. The final section describes a daily diary study designed to evaluate these ideas by examining the within-person associations between daily stressors, self-regulatory depletion, and relationship quality in a sample of newly married couples.

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### Stress and Marital Quality: Spillover Effects

Growing research indicates that external stress may render spouses less likely to respond to and interact with their partner in adaptive, relationship-enhancing ways. For instance, increases in stress have been shown to impede effective communication between spouses. In one of the few studies manipulating spouses' levels of stress, couples' interactions were observed before and after couples engaged in a stress induction task. Following this stress task, couples exhibited a 40% decrease in the quality of their communication (Bodenmann & Shantinath, 2004). Moreover, daily diary research has demonstrated that tensions between partners are more likely to occur on days when spouses experienced tension at work (Bolger, DeLongis, Kessler, & Wethington, 1989). Specifically, negatively arousing workdays have been linked with more withdrawn behavior in the home (Repetti, 1989; Schulz, Cowan, Cowan, & Brennan, 2004). Conditions of high stress also appear to diminish spouses' propensity for engaging in forgiving responses to a partner's transgressions (Neff & Karney, 2004, 2009). One study examining stress and attributions at eight assessments over a 4-year period revealed that when spouses were experiencing higher levels of stress than normal, they were more likely to rely on a maladaptive attributional style, viewing the partner as blameworthy for negative marital behaviors. Conversely, at times when stress was lower, these same spouses were more likely to excuse any transgressions and give the partner the "benefit of the doubt" (Neff & Karney, 2004).

In addition to affecting relationship behaviors, the experience of external stressors has also been associated with lowered marital appraisals. For instance, between-subjects comparisons of couples experiencing high versus low levels of external stress indicate that those facing greater stress exhibit steeper declines in marital satisfaction during the early years of marriage, as well as higher rates of marital dissolution (Bahr, 1979; Conger, Rueter, & Elder, 1999). Furthermore, daily diary research suggests that increases in daily work stress are associated with less accepting views of family members (Crouter, Bumpas, Head, & McHale, 2001). Similarly, longitudinal work examining changes in acute stress and marital satisfaction over a 4-year period has revealed that individuals are less satisfied with their relationships during times of greater stress (Karney, Story, & Bradbury, 2005; Neff & Karney, 2004). Together, these findings highlight how stress may shape and constrain the nature of spouses' behaviors and appraisals within the relationship.

### The Role of Self-Regulatory Depletion in Stress Spillover

Though prior work has established that stress often hinders adaptive relationship functioning, this still begs the question of why external stress can prevent spouses from engaging in the maintenance efforts that are so important for relationships. Explaining this phenomenon may involve recognizing that doing the right thing in one's relationship is a difficult process. Research has shown that enacting the types of behaviors that are beneficial for relationships (e.g., responding with kindness when your partner criticizes you) is not automatic and requires greater effort compared with more impulsive, self-centered behaviors (Rusbult, Yovetich, & Verette, 1996; Yovetich &

Rusbult, 1994). Indeed, the expression of relationship-promoting behaviors is often described as a two-step process in which partners first must exert self-control to inhibit impulsive inclinations to act in self-promotive ways and then make the decision to engage in more positive, relationship-promoting behaviors (Rusbult et al., 1996).

Unfortunately, theories of self-regulatory depletion (e.g., Baumeister, 2002) argue that self-control is a limited resource that can become depleted through use, making further acts of self-control more difficult. In fact, self-regulatory resources are often compared to a muscle; just as a muscle can become fatigued after exertion, our self-regulatory capabilities can be weakened after use (Muraven, Tice, & Baumeister, 1998). Thus, if relationship-promoting behaviors require effort and self-regulation (Finkel & Campbell, 2001; Rusbult et al., 1996), spouses may find it more difficult to engage in positive relationship functioning at times when their regulatory resources are being divided among several effortful acts. Supporting this idea, self-regulatory depletion has been associated with a host of negative interpersonal behaviors, from less accommodating responses to relationship conflict (Finkel & Campbell, 2001) to increases in intimate partner violence (Finkel, DeWall, Slotter, Oaten, & Foshee, 2009).

In this way, theories of self-regulatory depletion may provide insight regarding a possible mechanism by which the experience of external stress impairs spouses' capacity to enact relationship-promotive behaviors. Prior work has shown that coping with stressors requires the use of self-control to manage the negative emotions and arousal that result from stress (Hancock & Warm, 1989; Schonpflug, 1983). As coping with stressful events consumes spouses' self-regulatory resources, this coping should leave spouses with less energy to effectively navigate their interactions with a partner. Together, this research suggests that spouses facing high levels of external stress may find themselves in a state of self-regulatory depletion that both increases the likelihood of destructive behaviors within the relationship and decreases marital satisfaction.

### Overview of the Current Study

To clarify the mechanisms of stress spillover effects, newlywed couples provided information on their external stress, self-regulatory depletion, specific relationship behaviors, and marital appraisals as part of a 14-day daily diary task. The use of a fairly homogeneous sample of newlywed couples ensured that all couples were at a similar marital duration and that the motivation to maintain the relationship should be strong and fairly uniform across spouses (Bradbury, 1998).

Analyses of these data addressed two specific questions. First, do fluctuations in daily stress predict corresponding changes in spouses' relationship functioning? Consistent with prior work (e.g., Neff & Karney, 2004), the current study derived an index of stress spillover by examining the within-person association between spouses' daily external stress and daily marital behaviors and appraisals across the 14 diary days. It was predicted that, on average, spouses would exhibit significant stress spillover, such that on days when spouses experienced higher than usual levels of stress, they would report enacting more negative and fewer positive behaviors toward their spouse, controlling for how negatively their partner behaved toward them. In addition, on days of greater

stress, spouses also were expected to report less positive appraisals of the marital relationship.

Second, does self-regulatory depletion mediate stress spillover effects? Further analyses examining the within-person association between daily stress and self-regulatory depletion were expected to reveal that increases in daily stress would be associated with greater feelings of depletion, and this depletion would account for the lowered marital quality experienced on high-stress days. In other words, spouses were expected to have difficulty engaging in pro-relationship behaviors and relationship appraisals if they did not also possess the energy and resources necessary for enacting those behaviors and appraisals.

## Method

### Participants

The current study relied on a sample of newlywed couples participating in a broader study of marriage. Couples were recruited using several methods. First, advertisements were placed in community newspapers and with local wedding vendors (e.g., bridal shops, floral shops, etc.) and premarital counselors. Second, advertisements were placed on websites such as *theknot.com* and the social networking site *Facebook*. Couples were screened in a telephone interview to determine whether they met the following eligibility requirements: (a) this was the first marriage for each partner, (b) the couple had been married less than 6 months, and (c) neither spouse had any children. The final sample consisted of 171 couples.

On average, husbands were 29.1 ( $SD = 5.3$ ) years old and had received 16.0 ( $SD = 2.3$ ) years of education. Seventy-seven percent were employed full-time, and 14% were full-time students. Seventy-seven percent of husbands identified themselves as White, 15.8% as Hispanic/Latino, 2.3% as African American, and 1.8% as Asian American. Wives averaged 27.2 ( $SD = 4.9$ ) years old and had received 16.3 ( $SD = 1.9$ ) years of education. Sixty-eight percent were employed full-time, and 13.5% were full-time students. Seventy-five percent of wives identified themselves as White, 15.2% as Hispanic/Latino, 3.5% as African American, and 2.3% as Asian American. The median combined income of couples was \$60,000.

### Procedure

Within the first 6 months of their marriage, couples were asked to complete a 14-day daily diary task. Spouses were given the option to complete the diaries online or to complete them using a paper version. Spouses opting to complete their diaries online were given a participant identification number which they used to log on to a website every evening to complete their diaries. Spouses who chose the paper version were given all 14 days of the paper diaries along with a set of prestamped envelopes. They were instructed to independently fill out one diary each night before going to bed and to send the diary in the mail the next morning. Couples were paid \$30 for completing this part of the study.

Overall, 165 couples (96%) participated in the daily diary portion of the study. Seventy-three percent of participants elected to complete their diaries online, and the remaining 27% chose the paper diary option. Eighty percent (129 husbands, 133

wives) of spouses completed all 14 nights of the diary. Ninety-nine percent (160 husbands, 163 wives) of participants provided at least 3 days of diary data. In all, husbands completed a total of 2,144 diary days, and wives completed a total of 2,174 diary days. The time stamp of those spouses completing their diaries online and the postmarks of each paper diary day returned were checked to confirm spouses' compliance with the diary instructions. A total of 81% (3,511) of diary days were returned with the correct time stamp and postmark. There were no differences between spouses completing their diaries online and those choosing the paper diary in the number of days completed or their compliance. Spouses completing all 14 nights of the diary did not differ from spouses providing less data in their average external stress, depletion, relationship behaviors or marital appraisals over the diary days. Notably, because data were examined through growth curve modeling, participants who did not provide all 14 days of data could be included in the analyses. Thus, results reported are based on data from all 165 couples that completed the diary.

### Materials

**Daily stressful life circumstances.** To assess spouses' daily stress, the diary presented participants with nine events likely to occur in the daily lives of young couples and asked that they indicate whether any of the events had occurred that day. These items were taken from measures of daily stress used in prior diary research (Bolger, DeLongis, Kessler, & Schilling, 1989). Events were chosen that would not be a likely consequence of marital satisfaction or marital distress. Thus, the measure taps only stressors that are external to the marriage. Examples of items are, "received poor evaluation or feedback at work or school," "a lot to do at work or at school," "problems with transportation," "sickness or injury," and "argument with friends." A composite stress score was computed for each spouse on each day by summing the number of stressors reported, with higher scores indicating greater stress.

**Daily self-regulatory depletion.** Three items were taken from measures of depletion used in prior research (Finkel & Campbell, 2001) to assess daily self-regulatory depletion. All depletion items were assessed on a 7-point Likert scale ranging from 1 (*I didn't feel this way at all*) to 7 (*I felt this way a lot*). These items are, "I felt preoccupied with things other than my marriage," "I felt tired," and "I exerted a lot of 'willpower' to get through the workday." An average depletion score was computed for each spouse on each day, with higher scores indicating greater depletion. The internal consistency of the measure was high across days, ranging between .70 and .83 for husbands and between .66 and .83 for wives.

**Daily relationship behaviors.** To assess the positive and negative relationship behaviors exchanged between partners, spouses were presented with a checklist of relationship behaviors and asked to indicate whether they engaged in any of the behaviors that day. Four items assessed negative behaviors (e.g., "You showed anger or impatience toward your spouse," "You criticized/blamed your spouse"), and five items assessed positive behaviors (e.g., "You listened to or comforted spouse," "You tried to make your spouse feel loved"). Summed composite scores were created for both positive and negative behaviors for each spouse on each day,

with higher scores indicating a greater number of behaviors reported.

**Daily marital appraisals.** Three items modified from the Kansas Marital Satisfaction Scale (Schumm, Paff-Bergen, Hatch, & Obiorah, 1986) were used to measure daily appraisals of the relationship. These questions are, “How satisfied are you with your partner today?” “How satisfied are you with your relationship with your partner today?” and, “How satisfied are you with your marriage today?” Participants responded to all items on a 7-point Likert scale ranging from 1 (*very unsatisfied*) to 7 (*very satisfied*). A summed composite score was created for each spouse on each day, with higher scores indicating more positive appraisals. The internal consistency of the measure was high across days, ranging between .93 and .98 for both spouses.

## Data Analysis

In order to examine stress spillover effects, as well as potential mediators of these effects, a within-person approach was adopted. Within-person analyses allowed us to examine whether changes in a spouse’s stress were associated with changes in the spouse’s marital behaviors and appraisals, controlling for spouses’ idiosyncratic tendencies to view their relationship and their stress more or less favorably. This approach also allowed us to examine whether daily changes in levels of self-regulatory depletion may account for these effects. Due to the three-level nested structure of these data (e.g., daily observations are nested within persons and persons are nested within dyad), multilevel modeling analyses were conducted using Hierarchical Linear Modeling (HLM; Bryk & Raudenbush, 1992). To account for the interdependence present within the data, we followed procedures described by Laurenceau and Bolger (2005) for analyzing daily diary data from couples, which are based on recommendations by Raudenbush, Brennan, and Barnett (1995). Specifically, when examining spillover effects, husbands’ and wives’ effects were estimated simultaneously, and dummy variables were used to nest husband and wife data within each couple. Tests for mediation, however, were more complex. As all variables were measured at the within-person level, our primary hypotheses required tests of lower level mediation (also known as  $1 \rightarrow 1 \rightarrow 1$  mediation) in which standard mediation equations are modified to include the covariance between the random effects. Currently, there is some debate regarding the most appropriate method for estimating lower level mediation with random effects in multilevel models. Thus, to provide the most comprehensive analysis of this issue, we utilized two different analytic strategies. Below, we briefly review these two methods but direct the reader to the original sources for more detailed explanations.

First, we followed procedures outlined by Kenny, Korchmaros, and Bolger (2003). Using this piecemeal approach, the effects of  $X$  on  $M$  and  $Y$  are estimated separately, and then  $X$  and  $M$  are entered to simultaneously predict  $Y$ . The sample covariance of the slope estimates is then calculated. One advantage of this approach is that it allows for parameters describing husbands’ and wives’ data to be estimated simultaneously to control for the nonindependence of couple data. However, though this approach reveals the percent of the overall effect of  $X$  on  $Y$ , which is mediated by  $M$ , it does not provide a significance test of the indirect effect.

Second, we followed procedures outlined by Bauer, Preacher, and Gil (2006). In this approach, the entire mediation model is estimated within a single equation through the use of indicator variables. Thus, this method allows for the direct estimation of the covariance of random effects. It also provides a significance test of the indirect effect. Unfortunately, this approach is not ideal for modeling daily diary data from couples (i.e., three-level nested data) because due to the complexity of model, husbands’ and wives’ parameters are not able to be estimated simultaneously, but rather must be estimated in separate analyses.

## Results

### Descriptive Statistics and Correlations

Table 1 presents descriptive statistics for all measures. Not surprisingly, these newlywed couples generally maintained positive views of the marriage and exchanged more positive than negative behaviors with their partner across the diary days. Spouses also reported low to moderate levels of stress and self-regulatory depletion. However, as seen in the final column of Table 1, spouses did exhibit notable variability across the diary days on all of these variables. In fact, the amount of within-person variability present in the current study was consistent with the amount of variability seen on similar measures in prior diary research (e.g., Gleason, Iida, Shrout, & Bolger, 2008). To test for possible gender differences on any of the variables, paired-sample  $t$  tests were conducted. Wives experienced significantly greater stress,  $t(160) = -2.13, p = .04$ , and self-regulatory depletion,  $t(160) = -3.65, p < .001$ , as well as reported enacting more negative behaviors,  $t(160) = -2.05, p = .04$ , than did husbands across the diary days. Also, husbands reported enacting more positive behaviors toward their wives,  $t(160) = 2.05, p = .04$ .

Table 2 presents the within-spouse and between-spouse correlations for all measures. Average daily stress was significantly positively associated with self-regulatory depletion and negative relationship behaviors, such that spouses experiencing greater stress reported feeling greater depletion and exhibiting more negative behaviors toward their partner across the diary days. Average daily self-regulatory depletion also was significantly positively associated with negative relationship behaviors, such that spouses reporting greater levels of depletion tended to engage in more negative interactions with their partner. Overall, then, preliminary analyses indicated that all measures performed generally as expected. Nevertheless, these bivariate correlations do not address the within-subjects association between changes in stress and changes in marital processes. To examine the hypotheses of the current study, the following sections present results of analyses investigating these associations directly.

### Evidence for Stress Spillover: Is Stress Associated With Marital Behaviors and Appraisals?

The first goal of the study was to examine whether fluctuations in daily stressors were associated with corresponding changes in spouses’ marital behaviors and appraisals.

Table 1  
Descriptive Statistics

|   | <i>M</i> | <i>SD</i> | Mean within-person <i>SD</i><br>(within-person variability) |
|---|----------|-----------|---|
| Average daily stress                    |          |           |   |
| Husbands                                | .65      | .44       | .60   |
| Wives                                   | .74      | .41       | .65   |
| Average daily self-regulatory depletion |          |           |   |
| Husbands                                | 2.59     | .99       | 1.00  |
| Wives                                   | 2.95     | 1.00      | 1.20  |
| Average daily relationship appraisals   |          |           |   |
| Husbands                                | 6.20     | .82       | .63   |
| Wives                                   | 6.21     | .71       | .74   |
| Average daily positive behaviors        |          |           |   |
| Husbands                                | 2.24     | .93       | 1.00  |
| Wives                                   | 2.06     | .91       | .90   |
| Average daily negative behaviors        |          |           |   |
| Husbands                                | .30      | .35       | .49   |
| Wives                                   | .35      | .34       | .55   |

*Note.* Values are means and standard deviations. Average daily stress could range from 0 to 9. Average daily self-regulatory depletion and average daily relationship appraisals could range from 1 to 7. Average daily positive behaviors could range from 0 to 5, and average daily negative behaviors could range from 0 to 4.

**Stress spillover: marital behavior.** It was predicted that on days when spouses were experiencing greater levels of stress than usual, they would enact more negative and fewer positive behaviors toward their partner. To test these hypotheses, we examined the within-person association between changes in spouses' daily stress and changes in daily marital behaviors using the following HLM equation:

$$\begin{aligned} \text{Spouse's Marital Behavior} \\ = & \beta_{1j}(\text{husbands}) + \beta_{2j}(\text{wives}) + \beta_{3j}(\text{husbands' day}) \\ & + \beta_{4j}(\text{wives' day}) + \beta_{5j}(\text{husbands' own stress}) \\ & + \beta_{6j}(\text{wives' own stress}) + \text{error}, \end{aligned} \quad (1)$$

where spouse's behavior captures the total number of positive or negative behaviors exhibited on a given day. In this equation, day and stress were centered within-person for each spouse. Centering stress in this way allowed for the examination of whether being high or low in stress relative to the individual's own mean rating is associated with changes in their daily marital behaviors. In other words, this centering strategy controls for individual differences in the amount of stress experienced. Including day in the model controlled for the possibility that factors such as habituation could have influenced how spouses completed the diary materials over

time (Bolger, Davis, & Rafaeli, 2003). Thus,  $\beta_{5j}$  and  $\beta_{6j}$  represent the within-person association between changes in stress and changes in relationship behaviors over time, controlling for the spouse's average behavior as well as any linear changes in behavior over the diary days.

As seen in Table 3, results revealed that for both husbands and wives, increases in daily stressors predicted increases in the number of negative relationship behaviors reported, such that on days when spouses were experiencing greater stress than normal, they were more likely to enact negative relationship behaviors toward their partners. Further analyses were conducted to ensure results held when controlling for the partner's negative behaviors. In other words, we examined whether spouses were more likely to engage in negative behavior on days of greater stress, controlling for the number of negative behaviors that their partners enacted toward them that day. Results confirmed that spouses reported engaging in more negative behavior on days in which their partners enacted more negative behaviors toward them,  $\beta = .35$ ,  $SE = .03$ ,  $t(158) = 10.84$ ,  $p < .001$ , effect size  $r = .43$ , 95% CI [.30, .41] for husbands and  $\beta = .44$ ,  $SE = .04$ ,  $t(158) = 11.53$ ,  $p < .001$ , effect size  $r = .46$ , 95% CI [.36, .52] for wives. Including this control variable did not affect the reported spillover effects.

Turning to positive relationship behaviors, changes in daily stress were not associated with changes in positive behaviors for

Table 2  
Within-Spouse and Between-Spouse Correlations for Average Daily Diary Variables

|  | 1             | 2            | 3             | 4             | 5             |
|--|---------------|--------------|---------------|---------------|---------------|
| 1. Average daily stress                    | <b>.26***</b> | .55***       | -.08          | .16*          | .17*          |
| 2. Average daily self-regulatory depletion | .45***        | <b>.22**</b> | -.12          | .09           | .16*          |
| 3. Average daily relationship appraisals   | -.10          | -.08         | <b>.45***</b> | .25***        | -.40***       |
| 4. Average daily positive behaviors        | .12           | .02          | .40***        | <b>.31***</b> | .19*          |
| 5. Average daily negative behaviors        | .24**         | .18*         | -.36***       | .11           | <b>.53***</b> |

*Note.* Husbands' correlations are above the diagonal and wives' correlations are below. The diagonal (in bold) contains between-spouse correlations. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 3  
*Stress Spillover: Within-Person Associations Between Daily Stress and Marital Functioning*

|                                  | $\beta$ | SE  | <i>t</i> | Effect size <i>r</i> | 95% CI (LL, UL) |
|----------------------------------|---------|-----|----------|----------------------|-----------------|
| Daily negative marital behaviors |         |     |          |                      |                 |
| Husbands                         |         |     |          |                      |                 |
| Daily Stress                     | .05     | .02 | 2.72**   | .21                  | .01, .09        |
| Wives                            |         |     |          |                      |                 |
| Daily Stress                     | .09     | .02 | 4.57***  | .34                  | .05, .13        |
| Daily positive marital behaviors |         |     |          |                      |                 |
| Husbands                         |         |     |          |                      |                 |
| Daily Stress                     | .03     | .04 | .70      | .05                  | -.05, .11       |
| Wives                            |         |     |          |                      |                 |
| Daily Stress                     | .02     | .03 | .61      | .05                  | -.04, .08       |
| Daily marital appraisals         |         |     |          |                      |                 |
| Husbands                         |         |     |          |                      |                 |
| Daily Stress                     | -.09    | .04 | -2.53*   | .19                  | -.17, -.01      |
| Wives                            |         |     |          |                      |                 |
| Daily Stress                     | -.07    | .03 | -2.32*   | .18                  | -.13, -.01      |

Note. *df* = 163. All effects are reported as unstandardized regression coefficients. Effect size  $r = \sqrt{(t^2)/(t^2 + df)}$ ; from Snijders and Bosker, 1999. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

either spouse. As spillover effects were generally not found for positive behaviors, further analyses examining the potential mediating role of self-regulatory depletion were conducted for negative behaviors only.

**Stress spillover: marital appraisals.** It was also predicted that on days when spouses were experiencing greater levels of stress than usual, they would report less positive appraisals of the marriage. Thus, we examined the within-person association between changes in spouses' daily stress and changes in daily marital appraisals using the following HLM model:

$$\begin{aligned} \text{Daily Marital Appraisals} \\ = & \beta_{1j}(\text{husbands}) + \beta_{2j}(\text{wives}) + \beta_{3j}(\text{husbands' day}) \\ & + \beta_{4j}(\text{wives' day}) + \beta_{5j}(\text{husbands' own stress}) \\ & + \beta_{6j}(\text{wives' own stress}) + \text{error}, \end{aligned} \quad (2)$$

where day and stress were centered within-person for each spouse. Again, centering stress in this way allowed for the examination of whether being high or low in stress relative to the individual's own mean rating is associated with changes in daily marital appraisals. In this equation,  $\beta_{5j}$  and  $\beta_{6j}$  represent the within-person association between stress and appraisals, controlling for the spouse's average daily appraisal and any linear changes in appraisals over time. As seen in Table 3, results indicated that on days when spouses experienced greater levels of stress than usual, they reported less positive marital appraisals. Overall, then, results confirmed that these couples were experiencing significant stress spillover effects.

### Does Self-Regulatory Depletion Mediate Stress Spillover Effects?

The second goal of the study was to examine whether stress may interfere with effective relationship functioning by draining spouses of the self-regulatory resources necessary to navigate relationship issues.

**Self-regulatory depletion and marital behavior.** In order to examine whether self-regulatory depletion may account for the link between stress and marital behavior, we first followed steps outlined by Kenny et al. (2003). Using this approach, we first estimated the association between changes in daily stress and changes in self-regulatory depletion using the following equation:

$$\begin{aligned} \text{Daily Depletion} = & \beta_{1j}(\text{husbands}) + \beta_{2j}(\text{wives}) \\ & + \beta_{3j}(\text{husbands' day}) + \beta_{4j}(\text{wives' day}) \\ & + \beta_{5j}(\text{husbands' own stress}) \\ & + \beta_{6j}(\text{wives' own stress}) + \text{error}, \end{aligned} \quad (3)$$

where day and stress were centered within-person for each spouse. In this equation,  $\beta_{5j}$  and  $\beta_{6j}$  capture the within-person association between a spouse's daily depletion and daily stress, controlling for the spouse's average depletion and any linear changes in depletion over time. Results confirmed that on days when spouses were experiencing greater stress than normal, they also reported increased feelings of self-regulatory depletion,  $\beta_{5j} = .53$ ,  $SE = .05$ ,  $t(163) = 11.23$ ,  $p < .001$ , effect size  $r = .44$ , 95% CI [.43, .63] for husbands and  $\beta_{6j} = .69$ ,  $SE = .05$ ,  $t(163) = 13.11$ ,  $p < .001$ , effect size  $r = .51$ , 95% CI [.59, .79] for wives. Next, we estimated the effects of both self-regulatory depletion and stress on the expression of negative relationship behaviors as follows:

$$\begin{aligned} \text{Daily Negative Relationship Behaviors} \\ = & \beta_{1j}(\text{husbands}) + \beta_{2j}(\text{wives}) + \beta_{3j}(\text{husbands' day}) \\ & + \beta_{4j}(\text{wives' day}) + \beta_{5j}(\text{husbands' own stress}) \\ & + \beta_{6j}(\text{wives' own stress}) + \beta_{7j}(\text{husbands' own depletion}) \\ & + \beta_{8j}(\text{wives' own depletion}) + \text{error}, \end{aligned} \quad (4)$$

where day, stress, and depletion were centered within persons. As seen in Table 4 (see also Figure 1a), on days when spouses

Table 4  
*Self-Regulatory Depletion as a Mediator of Stress Spillover*

|                                  | $\beta$ | SE  | $t$      | Effect size $r$ | 95% CI (LL, UL) |
|----------------------------------|---------|-----|----------|-----------------|-----------------|
| Daily negative marital behaviors |         |     |          |                 |                 |
| Husbands                         |         |     |          |                 |                 |
| Self-regulatory depletion        | .04     | .01 | 3.05**   | .23             | .02, .06        |
| Stress                           | .03     | .02 | 1.36     | .11             | -.01, .07       |
| Wives                            |         |     |          |                 |                 |
| Self-regulatory depletion        | .03     | .01 | 2.08*    | .16             | .01, .05        |
| Stress                           | .08     | .02 | 3.70***  | .28             | .04, .12        |
| Daily marital appraisals         |         |     |          |                 |                 |
| Husbands                         |         |     |          |                 |                 |
| Self-regulatory depletion        | -.09    | .02 | -4.23*** | .31             | -.13, -.05      |
| Stress                           | -.04    | .04 | -1.17    | .09             | -.12, .04       |
| Wives                            |         |     |          |                 |                 |
| Self-regulatory depletion        | -.08    | .02 | -4.71*** | .35             | -.12, -.04      |
| Stress                           | -.02    | .03 | -.78     | .06             | -.08, .04       |

Note.  $df = 163$ . All effects are reported as unstandardized regression coefficients. Effect size  $r = \sqrt{(t^2)/(t^2 + df)}$ ; from Snijders and Bosker, 1999.  
 \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

reported greater levels of self-regulatory depletion, they also reported enacting more negative behaviors toward their partner. Moreover, for husbands, the association between stress and negative behaviors was reduced to nonsignificance when including depletion in the model. Results from Equations 2, 3, and 4 were then used to calculate the percent variation of stress on negative behaviors that is accounted for by depletion according to procedures outlined by Kenny and colleagues (2003). Namely, the total effect was first estimated using the following equation:

$$c = c' + ab + \sigma_{ab}, \quad (5)$$

where  $c'$  represents the direct effect of daily stress on daily negative relationship behaviors,  $ab$  represents the indirect effect, and  $\sigma_{ab}$  represents the covariance of  $a$  and  $b$ .

Next, the percent variation of daily stress on daily negative relationship behaviors explained by daily depletion was calculated using the following:

$$(c - c')/c \quad (6)$$

The correlations between path  $a_j$  and path  $b_j$  coefficients were  $r = -.06$ ,  $p > .05$ , with a covariance of  $-.001$  for husbands, and  $r = .19$ ,  $p < .05$ , with a covariance of  $-.004$  for wives. Substituting estimates into Equations 5 and 6 revealed the percent variation of stress on negative behaviors explained by depletion to be 40% for husbands and 11% for wives (see Figure 1a).

Mediation effects were also examined using a second procedure outlined by Bauer et al. (2006). Namely, Bauer and colleagues (2006) provide an online spreadsheet (available at [www.quantpsy.org](http://www.quantpsy.org)) for calculating the indirect and total effects, 95% confidence intervals, standard errors, and significance test. For husbands, the average indirect effect was estimated to be  $-.001$ ,  $SE = .01$ ,  $p = .96$ , 95% CI  $[-.02, .02]$ , and the average total effect was estimated to be  $.05$ ,  $SE = .02$ ,  $p = .03$ , 95% CI  $[-.01, .10]$ . For wives, the average indirect effect was estimated to be  $-.001$ ,  $SE = .01$ ,  $p = .94$ , 95% CI  $[-.03, .03]$ , and the average total effect was estimated to be  $.10$ ,  $SE = .02$ ,  $p < .001$ , 95% CI  $[-.06, .15]$ . Thus, this procedure did not support the notion that depletion may account for the effects of stress on negative relationship

behaviors, because tests of the indirect effects failed to reach significance (see Figure 1b).

**Self-regulatory depletion and marital appraisals.** To examine whether self-regulatory depletion may account for the link between stress and marital appraisals, the following equation was used to estimate the effects of both self-regulatory depletion and stress on daily appraisals:

#### Daily Relationship Appraisals

$$\begin{aligned} &= \beta_{1j}(\text{husbands}) + \beta_{2j}(\text{wives}) + \beta_{3j}(\text{husbands' day}) \\ &+ \beta_{4j}(\text{wives' day}) + \beta_{5j}(\text{husbands' own stress}) \\ &+ \beta_{6j}(\text{wives' own stress}) + \beta_{7j}(\text{husbands' own depletion}) \\ &+ \beta_{8j}(\text{wives' own depletion}) + \text{error}, \end{aligned} \quad (7)$$

where day, stress, and depletion were centered within persons. As seen in the bottom half of Table 4, on days when spouses reported greater levels of self-regulatory depletion, they reported less favorable appraisals of the marriage. In addition, the association between stress and marital appraisals was reduced to nonsignificance for both spouses when including depletion in the model. Results from Equations 2, 3, and 7 were then used to calculate the percent variation of stress on marital appraisals that is accounted for by depletion (Kenny et al., 2003). The correlations between path  $a_j$  and path  $b_j$  coefficients were  $r = .02$ ,  $p > .05$ , with a covariance of  $.001$  for husbands and  $r = .08$ ,  $p > .05$ , with a covariance of  $.002$  for wives. Substituting estimates into Equations 5 and 6 revealed the percent variation of stress on marital appraisals explained by depletion to be 56% for husbands and 82% for wives (see Figure 1c).

Again, we also examined the mediating role of depletion using the previously described method outlined by Bauer et al. (2006). For husbands, the average indirect effect was estimated to be  $-.08$ ,  $SE = .02$ ,  $p < .001$ , 95% CI  $[-.12, -.04]$ , and the average total effect was estimated to be  $-.12$ ,  $SE = .04$ ,  $p < .001$ , 95% CI  $[-.20, -.05]$ . For wives, the average indirect effect was estimated to be  $-.08$ ,  $SE = .02$ ,  $p < .001$ , 95% CI  $[-.12, -.05]$ , and the

average total effect was estimated to be  $-.11$ ,  $SE = .04$ ,  $p < .001$ , 95% CI  $[-.18, -.04]$ . Because tests of the indirect effects were significant for both spouses, these results indicate that self-regulatory depletion accounts for the association between daily stress and daily marital appraisals (see Figure 1d).<sup>1</sup>

## Discussion

### Summary of Results

One challenge to maintaining a marriage involves navigating the stressful life events external to the relationship that often disrupt functioning within the relationship. Consistent with prior work demonstrating the powerful role external stressors may play in shaping relationship processes (e.g., Randall & Bodenmann, 2009), the current daily diary study found strong evidence for stress spillover effects. Within-subject analyses confirmed that on days in which spouses reported experiencing greater levels of stress than usual, they were more likely to enact negative behaviors toward their partners and to report less positive marital appraisals. Conversely, on days of lower stress, these same spouses exhibited more positive relationship functioning. The central goal of the study, however, was to examine a potential mechanism underlying these stress spillover effects. Specifically, it was proposed that stressful events should hinder adaptive relationship functioning by draining spouses of the self-regulatory resources needed to effectively respond to relationship issues. In this way, self-regulatory depletion may account for the link between stress and marital processes. Supporting this hypothesis, further analyses revealed that on days of greater stress, spouses reported greater levels of self-regulatory depletion, and this increase in depletion seemed to account for spouses' poor relationship functioning on high-stress days.

It is important to note that in light of current debates regarding the most appropriate method for testing lower-level meditation effects in multilevel models, we relied on two different analytic strategies for testing the meditational role of self-regulatory depletion. Both methods of analysis indicated that self-regulatory depletion accounted for a significant amount of the effect of daily stress on marital appraisals. However, the two methods yielded slightly different results regarding whether depletion accounted for a significant amount of the effect of daily stress on the expression of negative marital behaviors. It is not entirely clear why the results were somewhat inconsistent in the case of negative behaviors, because the two methodological approaches differ in a number of ways (e.g., piecemeal vs. single equation approach, methods of handling interdependence of couple data). Nonetheless, as the majority of the mediation analyses were supportive of hypotheses, the overall pattern of results seem consistent with the idea that even newlywed couples, who generally exhibit good marital functioning, may find it difficult to inhibit negative thoughts and behaviors at times when they are depleted by conditions of stress.

Interestingly, increases in daily stress were not associated with changes in the frequency of positive relationship behaviors reported, suggesting that perhaps the inhibition of negative behaviors may have required greater self-control than the expression of positive behaviors. Notably, research on self-regulation indicates that although self-regulatory depletion hinders the expression of effortful behaviors, it does not interfere with the expression of

behaviors that are more habitual or automatic in nature (Neal, Wood, & Quinn, 2006). Thus, if a response tendency becomes habitual over the course of an extended relationship, depletion may not affect the expression of that behavior within the relationship (Rusbult et al., 1996). As the current study relied on a sample of newlyweds still in the "honeymoon period" of the marriage, it is possible that the positive behaviors assessed had become more automatic and thus, less difficult for spouses to enact, rendering those behaviors immune to depletion effects.

Overall, these results provide valuable insight into why relationship maintenance processes can wax and wane over time, even within initially happy and healthy relationships. To date, most research identifying the kinds of relationship processes associated with successful marital outcomes has remained relatively silent regarding when and how those processes may break down over time. An understanding of the influence of stress and depletion on marital functioning helps to address this question. When spouses encounter periods of high external stress, their self-regulatory capabilities may become depleted, which in turn interferes with spouses' capacity to engage in relationship-promotive behaviors. Consequently, marital quality may decline. If the stress subsides, however, and spouses can again devote their full self-regulatory resources toward effectively managing any relationship issues, then the marriage has an opportunity to recover from the harmful effects of stress.

Importantly, prolonged or repeated exposure to high levels of stress should have more lasting detrimental effects on the relationship, as in this case spouses would be denied the opportunity to replenish their self-regulatory resources. As the current study only examined fluctuating daily stressors, future work is needed to explore whether stressors that are more chronic in nature may place spouses in a persistent state of self-regulatory depletion. For instance, prior work has shown that the presence of chronic stressors (e.g., poor neighborhood conditions) not only predicts poor marital functioning, but also tends to exacerbate the effects of acute stressors on marital quality (Karney et al., 2005). Based on

<sup>1</sup> We also examined for potential stress crossover effects, or whether spouses' stress may predict the partner's self-regulatory depletion and marital functioning, above and beyond the influence of the partner's own stress levels. From a theoretical standpoint, we did not expect to see a strong main effect of spouses' stress on their partner's depletion. Rather, we predicted that the partner's own level of stress would be an important moderator of stress crossover effects. In other words, spouses' stress may be particularly taxing for the partner's self-regulatory resources on days in which partners also must contend with their own high levels of stress. If partners must divide their self-regulatory resources between coping with their own stress and responding to their spouses' stress, this could result in greater feelings of depletion. However, if partners have little stress of their own, they could devote all of their self-regulatory resources toward aiding and supporting the partner and thus should exhibit lower levels of depletion. Unfortunately, the interaction of husbands' and wives' daily stress did not predict depletion or marital functioning for either spouse. However, one stress crossover effect did emerge. On days in which wives reported higher levels of stress than usual, husbands reported less positive appraisals of the relationship,  $\beta = -.06$ ,  $SE = .03$ ,  $t(160) = -2.04$ ,  $p = .04$ , 95% CI  $[-.12, -.01]$ . Mediation analyses (using the Kenny et al., 2003 method) revealed that wives' stress remained a significant predictor of husbands' daily appraisals when both wives' stress and husbands' depletion were included simultaneously in the model. Furthermore, 17% of the variation of wives' stress on husbands' daily appraisals was explained by husbands' depletion.

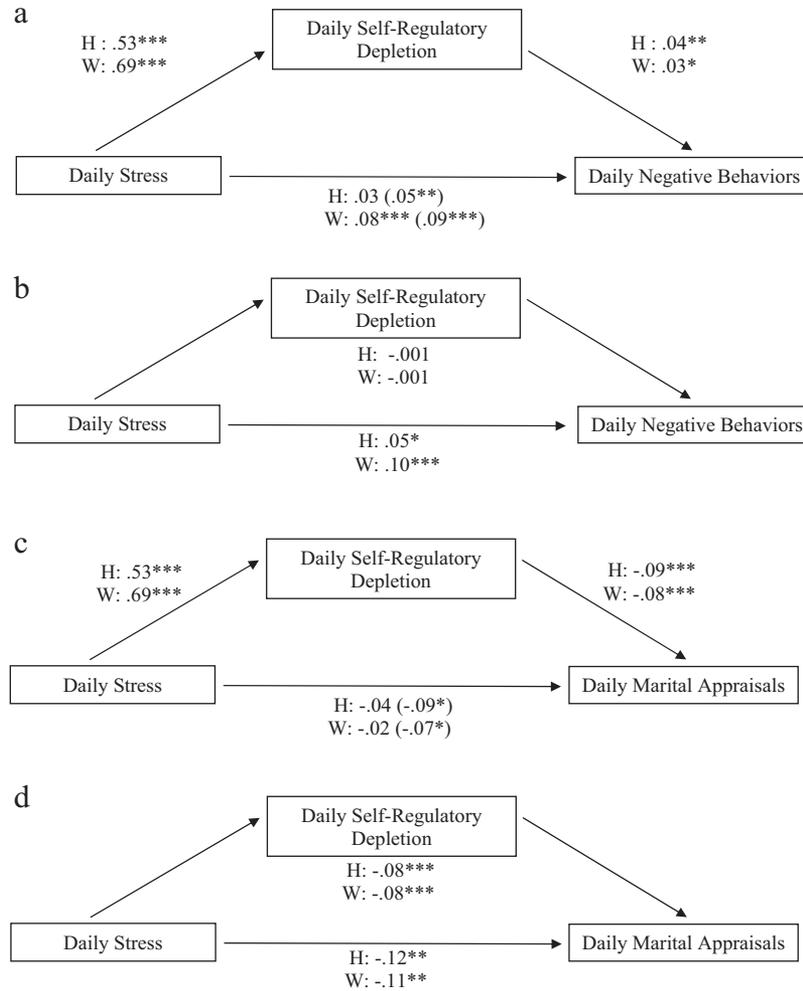


Figure 1. Models testing for mediation using procedures outlined by Kenny et al. (2003; a and c), and Bauer et al. (2006; b and d). For the latter procedure, effects listed inside the figures are indirect effects, whereas effects listed outside of the figures are total effects. H effects reflect husbands' data, and W effects reflect wives' data. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

the current findings, it seems reasonable to speculate that dividing one's self-regulatory resources between coping with chronic and acute stressors would be particularly taxing, thereby rendering spouses even less capable of thinking and behaving in a relationship-promotive manner.

### Strengths and Limitations of the Study

Our confidence in the results of this study is supported by a number of strengths in the methodology and design. Foremost among these was our use of multiple analytical approaches that served to limit the possibility of third variables influencing the results. Most importantly, within-subject analyses were used to examine the associations between stress, depletion, and relationship quality. Therefore, we could estimate the association between changes in stress and changes in relationship functioning while controlling for spouses' idiosyncratic tendencies to view their stress and their relationships more or less favorably over the course

of the diary. Moreover, to assess daily stress, we used a checklist of stressful events, which provides an estimate of each individual's exposure to stress independent of their subjective ratings of the negativity of the event. A checklist format helps to limit the possibility that third variables, such as general negative affectivity, influenced the results. A final strength of our study was the use of a fairly homogenous sample. Relying on a sample of uniformly happy newlywed couples reduces the likelihood that our effects result from uncontrolled differences such as marital duration and also provides a more conservative test of our hypotheses.

Despite these strengths, several factors nevertheless limit interpretations of the current results. First, the data reported are correlational, and thus we are unable to make strong causal inferences. For instance, these data cannot rule out the possibility that the nature of spouses' marriages may have led to changes in the amount of depletion and external stress experienced. Though in principle lagged analyses could be conducted to help clarify issues

of causality, the use of such an analytic strategy is theoretically questionable in the current study. As previously noted, theories of self-regulation liken the experience of self-regulatory depletion to muscle fatigue. Just as a muscle can become fatigued after exertion, our self-regulatory capabilities can become weakened after engaging in acts of self-control, making it difficult to engage in subsequent acts of self-control. However, the theory also argues that just as resting a muscle can restore physical strength, resting our self-regulatory “muscle” can replenish our self-regulatory capabilities (Baumeister, 2002). For instance, it has been suggested that sleep may be sufficient for restoring regulatory capabilities (Baumeister & Heatherton, 1996). Thus, although coping with today’s acute stress should have immediate effects on self-regulatory depletion and marital functioning, it may not predict future levels of depletion and marital functioning. For this reason, significant lagged effects were not expected and in fact were not found in the current study. Nonetheless, there is strong reason to believe that the links between stress and marital quality are reciprocal in nature. Prior work has provided evidence for spillover in both directions, such that stress can spill over to affect marital quality and marital issues can spill over to affect other areas of one’s life (e.g., Bolger, DeLongis, Kessler, & Wethington, 1989). Thus, future research should examine whether poor marital relations may deplete individuals, leaving them more vulnerable to difficulties in coping with other life stressors.

A second limitation of the study is the restricted quantity of data that could be gathered with the daily diary design. Such a design necessitates that measures be short and easy to complete in order to prevent participant attrition. Though the use of a stress checklist can help to reduce self-report biases, it may also have missed important events in spouses’ daily lives and thus may represent a conservative estimate of spouses’ levels of daily stress. Likewise, the checklist of daily positive and negative behaviors likely did not capture the full gamut of marital behaviors that were exchanged each day. More comprehensive stress and behavior measures likely would have provided stronger results and potentially revealed a link between daily stress and the expression of positive marital behaviors. Nevertheless, the fact that a significant association between stress and negative marital behaviors was found even with these restrictive measures bolsters our confidence in the results reported.

Though also an important strength, a final limitation involves the use of a relatively homogenous sample of couples. For instance, the current sample was comprised of primarily White, highly educated couples. Thus, generalizations to other samples should be made with caution. The current sample also was highly satisfied in the marriage. For less satisfied couples, who may not have the same motivation to perceive the relationship positively, stress may have an even stronger effect on relationship functioning. However, the fact that stress was associated with spouses’ relationship functioning even in this conservative sample of happy couples not only serves to enhance our confidence in these findings, but also attests to the fact that even among the happiest of couples, external stress may strain relationship well-being.

## Conclusions

Traditionally, theories and research on relationship maintenance have focused on identifying the characteristics of individuals (e.g.,

personality traits) and their relationships (e.g., commitment, relationship happiness) that predict more constructive forms of relationship functioning. In other words, much of the existing literature suggests that adaptive relationship processes are a consequence of factors situated within the dyad. The current study broadens this perspective by highlighting how stressful environments can deplete spouses of the energy and resources necessary to engage in relationship-promoting behaviors and effectively maintain happy and healthy relationships. In this way, and as Berscheid (1999) once noted, even loving relationships can unravel if placed in a toxic setting.

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