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When Receiving Help Hurts: Gender Differences in Diurnal Cortisol Responses to Spousal Support

Erin E. Crockett[1] and Lisa A. Neff[2]

Abstract

Wives are considered more effective support providers than are husbands. As support promotes healthy physiological functioning, husbands should derive greater health benefits from spousal support than do wives. Yet, a growing literature indicates that men are relatively insulated from the physiological consequences of marital interactions, suggesting that men may not reap the benefits that support can provide. To examine gender differences in physiological responses to spousal support, couples completed a 6-day diary task that assessed daily support exchanges and diurnal cortisol slopes. On days of greater spousal support, wives exhibited steeper cortisol slopes, whereas husbands exhibited flattened cortisol slopes. Furthermore, for husbands, the association between daily support and cortisol was moderated by problem-solving efficacy; the less efficacious husbands perceived their problem-solving abilities, the flatter their cortisol slopes on high support days. All results held controlling for daily stress and marital satisfaction. Thus, support may incur costs for husbands' health.

Keywords

social support, gender differences, cortisol, marriage

A widely accepted conclusion within the social support literature is that a "support gap" exists in marital relationships, such that wives are more effective support providers than are husbands (Belle, 1982; Cutrona, 1996). For instance, both husbands and wives report that wives are the more empathetic, affirming, and supportive partner within the marriage (Mirgain & Cordova, 2007; Vinokur & Vinokur-Kaplan, 1990). Furthermore, wives' support provision appears to be more responsive to the varying support needs of their partners. Studies comparing spouses' desired and experienced support indicate that wives are more skilled than husbands in adjusting the quantity of their support provision to match a partner's desired level of support (Xu & Burleson, 2001). Wives also have been shown to be more skilled in adjusting the timing of their support provision in response to their partner's changing needs and stressors over time (Cutrona, Shaffer, Wesner, & Gardner, 2007; Neff & Karney, 2005). Thus, marriage seems to provide richer social support resources to men than it provides to women (Cutrona, 1996).

Given that social support reduces neuroendocrine stress responses and enhances immune functioning (Taylor, 2007; Uchino, Cacioppo, & Kiecolt-Glaser, 1996), it logically follows that husbands should derive greater physiological health benefits from support exchanges in the marriage than do wives. Yet, a growing literature calls this inference into question. In their seminal review of the links between marital functioning and health, Kiecolt-Glaser and Newton (2001) found that husbands are less physiologically reactive to the emotional tenor of the marriage than are wives. For instance, studies assessing physiological changes during an observed marital conflict resolution task demonstrate that hostile behavior during conflict often predicts elevated levels of cortisol (i.e., a stress hormone secreted by the hypothalamic–pituitary–adrenal or HPA axis) and blood pressure in women but not in men (Ewart, Taylor, Kraemer, & Agras, 1991; Heffner et al., 2006). Similarly, wives in distressed marriages tend to report experiencing more health problems than do their husbands (Coyne et al., 2001; Levenson, Cartensen, & Gottman, 1993). To explain such findings, it has been argued that differences in men's and women's relational self-construals may influence their reactivity to the marital climate (Kiecolt-Glaser & Newton, 2001). As men tend to report lower levels of relational interdependence and thus are less influenced by their close, dyadic relationships than are women (Crockett, Loving, Le, & Korn, 2011; Gabriel & Gardner, 1999), husbands are more

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likely to be insulated from the physiological consequences of marital exchanges. To date, however, the literature on this "insulation hypothesis" has focused almost exclusively on gender differences in the impact of marital conflict for health outcomes, which raises the question of whether husbands may also exhibit an attenuated response to positive marital exchanges (Kiecolt-Glaser & Newton, 2001). In other words, might men's lessened sensitivity to the marital climate represent a double-edged sword that both protects men from the consequences of marital distress and prevents men from truly benefiting from positive marital events, such as the receipt of support?

Gender Differences in Physiological Responses to Social Support

Consistent with the insulation hypothesis, a closer look at the support literature provides some evidence for gender differences in the health benefits of spousal support. For instance, a study of newlywed couples revealed that wives who reported greater satisfaction with their partner's support exhibited smaller cortisol increases during a marital conflict discussion. For husbands, the association between spousal support satisfaction and cortisol responses was not significant (Heffner et al., 2004). Similarly, a study of cohabitating couples found that although higher levels of perceived partner support predicted a variety of physiological benefits for both men and women during a lab interaction task, men did not benefit from support to the same extent as did women (Grewen, Girdler, Amico, & Light, 2005).

However, men's lower relational interdependence may do more than just insulate men from the benefits of spousal support; it may also render them particularly vulnerable to the potential costs associated with support exchanges. Recent theories of social support argue that under some conditions support can serve to exacerbate psychological and physiological stress (Gleason, Iida, Shrout, & Bolger, 2008; Taylor et al., 2010). For instance, support can undermine individuals' confidence in their ability to manage their own stressors, resulting in lowered self-esteem and greater distress (Bolger, Zuckerman, & Kessler, 2000; Nadler, 1987). Importantly, because men are socialized to be independent problem solvers (Cross & Madson, 1997) and are perceived as more poorly adjusted when they cannot solve their own problems (Derlega, Wilson, & Chaikin, 1976), men may feel more threatened by support than do women. In fact, initial evidence supports this argument. Several recent experimental studies investigating the deleterious impact of support on cortisol responses during a speech task (e.g., a task with high evaluative concerns) found that support was more harmful for men than for women (Smith, Loving, Crockett, & Campbell, 2009; Taylor et al., 2010; but see also Kirschbaum, Klauer, Flilip, & Hellhammer, 1995).

Overview of the Current Study

In short, though preliminary findings indicate potential gender differences in physiological responses to support, this work is limited in two important ways. First, existing research primarily focuses on acute physiological responses assessed in laboratory designs. To our knowledge, no studies have examined whether spousal support exchanges may be associated with day-to-day physiological functioning. Thus, the first goal of the study was to extend prior work by examining potential gender differences in the within-person association between daily spousal support and diurnal cortisol slopes using a naturalistic daily diary task.

Diurnal cortisol slopes were chosen as an indicator of health functioning for several reasons. Cortisol typically exhibits a strong diurnal rhythm, as cortisol levels are at their peak during the early morning hours and then decline throughout the day. Growing research suggests that this strong diurnal pattern is not only a critical marker of healthy HPA-axis functioning but also a more robust predictor of health outcomes than absolute levels of cortisol (Adam & Kumari, 2009). For instance, flat diurnal cortisol slopes (e.g., a slower rate of decline in cortisol over the course of the day) have been linked to chronic and acute psychosocial stress (Adam, Hawkley, Kudielka, & Cacioppo, 2006), impaired immune functioning (Uchino et al., 1996), and even early mortality in cancer patients (Sephton, Sapolsky, Kraemer, & Spiegel, 2000). Consequently, flattened cortisol slopes are considered an important indicator of allostatic load (McEwen, 1998). Moreover, the HPA axis seems to be especially sensitive to social inputs such as social evaluative threat (Dickerson & Kemeny, 2004) and social support (Kirschbaum et al., 1995), making cortisol a particularly suitable marker of health for the current study. Finally, cortisol is optimal for the study of health functioning in everyday life as it can be assessed easily and noninvasively.

In the current study, it was predicted that whereas women may derive health benefits from spousal support, men may be more vulnerable to incurring health costs. Specifically, on days of greater spousal support, wives were expected to exhibit steeper cortisol slopes than average, whereas husbands were expected to exhibit flattened cortisol slopes.

Second, though numerous theories suggest self-efficacy should moderate the effects of support (Gleason et al., 2008; Taylor et al., 2010), such that individuals who doubt their capabilities may be especially threatened by support receipt, this hypothesis has not been empirically tested. The second goal of the study was to examine whether problem-solving efficacy moderates the link between daily support and diurnal cortisol slopes. It was predicted that spouses who judge themselves to be inefficacious problem solvers would be more threatened by support, and thus would be especially likely to exhibit flattened cortisol slopes on high support days. In line with work suggesting that men may be more sensitive to efficacy threats than are women (Cross & Madson, 1997), it was also predicted that this moderation effect would be stronger for husbands than for wives.

Method

Participants

The current study drew from a sample of 171 newlywed couples participating in a broader study of marital development

over time. Couples were recruited through advertisements placed in community newspapers, bridal shops, and on social networking websites. Couples were screened in a telephone interview to determine whether this was the first marriage for each partner and whether the couple had been married less than 6 months. On average, husbands were 29.13 ($SD = 5.33$) years old and wives were 27.24 ($SD = 4.93$). Seventy-five percent of spouses were White.

Procedure

Within the first 6 months of their marriage, couples completed several tasks relevant to the current study. First, couples completed a packet of questionnaires that included self-report measures of global marital satisfaction, general health, and problem-solving efficacy. Next, couples were asked to complete a 6-day daily diary task that assessed spouses' daily stress and perceived support. Couples could choose from two methods for completing the diary. First, couples could opt to complete a paper version of the diary. In this case, each spouse was given all six nights of the diary along with a set of prestamped envelopes. Couples were instructed to independently fill out one diary each night before bed, and to drop that diary in the mail the next morning. Second, couples could choose to complete an online version of the diary. Husbands and wives were each given a website address and a unique code that allowed them to log into the study website. Again, couples were instructed to independently complete one diary each night before going to bed. Seventy-three percent of spouses chose to complete online diaries and 27% opted for the paper diary. Spouses completing the online diary did not differ from spouses completing the paper diary on any variable of interest.

Finally, as part of the diary task, couples also were asked to provide saliva samples twice daily on each of the six diary days in order to determine diurnal cortisol slopes. This assessment schedule was chosen in light of prior research indicating that change in cortisol values from morning to evening (e.g., change based on two data points) is reliably associated with health outcomes (Adam & Kumari, 2009). Each spouse was provided with 12 salivettes for saliva collection and was instructed to provide one sample upon waking and one sample in the evening before going to bed. All couples were encouraged to provide their evening samples at the same time each night. Mean collection times were 7:53 a.m. ($SD = 96$ min) and 10:05 p.m. ($SD = 95$ min). Because cortisol is impacted by caloric intake, participants were instructed to not eat, drink, or brush their teeth for an hour prior to providing each sample. At each collection time, participants recorded the time and date of the sample, as well as any irregular circumstances that occurred around the time they provided the sample (e.g., if they recently ate, drank, brushed their teeth, took medication, etc.). Participants included detailed notes for each sampling time, suggesting that they were highly compliant with the study protocol. Participants were asked to store their saliva vials in the refrigerator until the end of the diary period, when they returned the vials in a prestamped priority mail box provided by the researchers.

A total of 147 (86%) couples agreed to participate in the cortisol assessment portion of the study. Importantly, participants who provided saliva samples did not differ from those who did not provide samples in marital satisfaction or any demographic variables. Because the current sample was participating in a larger investigation in which typical exclusionary criteria for cortisol analyses were not relevant, participants were not initially screened for pertinent health conditions. Consequently, saliva samples from 80 individuals were discarded prior to assay because these individuals reported health conditions or other circumstances known to affect HPA axis functioning (i.e., 5 were pregnant, 9 were on medications that impact the HPA axis, 14 reported anxiety, 15 reported depression, 31 smoked, and 6 worked nightshifts). In addition, samples from 15 individuals could not be included in analyses because they did not provide body mass index (BMI) information (see below). Thus, 101 husbands and 98 wives provided eligible saliva samples. Of the possible 2,388 samples, 141 samples (5.90%) were returned with insufficient saliva to determine cortisol levels. If participants indicated that they did eat, drink, or brush their teeth an hour before providing saliva, their samples were not included in analyses. A total of 217 samples (9.09%) were excluded for this reason. After removing these saliva samples, there were 914 days for which participants provided both morning and evening samples that were eligible for analysis (an average of 4.59 days per person).

Measures

Health conditions: Exclusionary criteria. To assess cortisol relevant health conditions, spouses indicated whether they were currently diagnosed with depression or anxiety, smoked regularly or used tobacco products, or worked night shifts on a series of yes/no items. Spouses also were asked to list any medications they were currently taking. Consistent with prior work, this information was used to determine eligible saliva samples (Adam & Kumari, 2009).

Health conditions: Covariates. Spouses provided their age and their height and weight for BMI calculations. Consistent with prior work, age and BMI were included as covariates in all analyses due to their known biological relevance to cortisol levels (Adam & Kumari, 2009). Furthermore, as birth control use can influence cortisol levels (Kirschbaum, Kudielka, Gaab, Schommer, & Hellhammer, 1999), women were asked indicate whether they were currently using hormonal contraception. Finally, saliva collection times were included in all analyses due to the strong diurnal rhythms of cortisol (Adam & Kumari, 2009).

Global marital satisfaction. Spouses' global marital satisfaction was assessed using the 16-item version of the Couples Satisfaction Index (Funk & Rogge, 2007). Scores on this measure can range from 16 to 111, with higher scores indicating greater marital happiness. Internal consistency was high for both husbands (Cronbach's $\alpha = .94$) and wives (Cronbach's $\alpha = .95$).

Problem-solving efficacy. Spouses were asked to rate the extent to which they possessed each of the following abilities: problem-solving skills, time management skills, and the ability to manage stress. Participants responded to all items on a 9-point Likert-type scale (1 = *not at all characteristic*; 9 = *extremely characteristic*). An average score was created for each spouse, with higher scores indicating greater feelings of efficacy.

Daily spousal support. To assess daily support experiences, participants were asked to report whether their partner had engaged in any of four supportive behaviors (e.g., *your spouse listened to or comforted you*, *your spouse tried to make you feel loved*, *your spouse showed an interest in the events of your day*, and *your spouse helped you with something important*). Participants indicated whether or not the event had occurred that day (1 = *yes*; 0 = *no*). These items were taken from measures of daily support used in prior diary research (Neff & Karney, 2005). A summed composite score was created for each day, with higher scores indicating that spouses reported receiving more supportive behaviors from their partner.

Daily stress. To ensure that any association between cortisol slopes and support were not driven by a spurious association with spouses' levels of psychological stress (Gleason et al., 2008), spouses' daily stress was controlled for in all analyses. Spouses indicated how stressful their day was on a 7-point Likert-type scale (1 = *not at all stressful*; 7 = *extremely stressful*).

Diurnal cortisol slopes. Cortisol concentrations, reported in μg/dL (microleter per decileter), were determined via Salimetrics$_{LLC}$ expanded range high sensitivity salivary cortisol enzyme immunoassay kit for research. As per kit instructions, all samples were frozen at −20° C until assayed. Each participant's samples were assayed in duplicate (25 μg per well) in the same batch with high and low control samples provided by Salimetrics$_{LLC}$ included to ensure reliability. The test had an average intraassay coefficient of variation of 7.74% and an interassay coefficient of variation of 8.20%. The average of the two duplicate assays was used in all analyses. As is standard practice, obtained cortisol values were subjected to a natural log transformation before analysis to correct for positive skewness (e.g., Saxbe, Repetti, & Nishina, 2008). To create a daily index of spouses' cortisol slopes, the difference between morning and evening cortisol values were calculated.

Data Analysis

Examining spouses' physiological reactivity to spousal support, as well as potential moderators of that reactivity, requires both within-subject and between-subjects analyses. Due to the three-level nested structure of the data, multilevel modeling analyses were conducted using hierarchical linear modeling (HLM; Bryk & Raudenbush, 1992). To account for this interdependence in the data, we followed procedures described by Laurenceau and Bolger (2005) for analyzing daily diary data from couples. Specifically, husbands' and wives' effects were estimated simultaneously for all analyses and dummy variables were used to nest husband and wife data within each couple. This approach allows for straightforward tests of gender differences in coefficients of interest (a $1-df$ χ^2 test).

Table 1. Means and Standard Deviations.

	Husbands		Wives	
Scale	*M*	*SD*	*M*	*SD*
General Marital Satisfaction	99.27	10.45	100.87	9.37
Average Daily Support	2.08	0.86	2.21	0.84
Average Daily Stress	2.23	0.72	2.32	0.62
Average Raw Waking Cortisol	0.30	0.17	0.26	0.13
Average Raw Evening Cortisol	0.05	0.04	0.05	0.04

Note. Marital satisfaction scores could range from 16 to 111. Support scores could range from 0 to 4 and stress scores could range from 0 to 5. Raw cortisol levels (measured in μg/dL) typically range from <.01 to 1.3 in women and <.01 to .7 in men. Waking levels of cortisol are generally higher than evening levels of cortisol, as cortisol levels peak 30 min after waking and steadily decline throughout the day (Kirschbaum & Hellhammer, 1989).

Results

Preliminary Analyses

Table 1 presents descriptive statistics for all measures. On average, couples reported high marital satisfaction and moderate levels of daily stress and daily spousal support. Consistent with normal daily cortisol patterns (Kirschbaum & Hellhammer, 1989), morning cortisol levels were considerably higher than evening cortisol levels for husbands, $t(82) = 31.57$, $p < .001$, 95% confidence interval (CI) [1.74, 1.98] and for wives, $t(79) = 34.86$, $p < .001$, 95% CI [1.69, 1.90]. Evening cortisol levels were negatively associated with evening sample time, such that cortisol levels were higher the earlier the sample was provided ($r = -.20$, $p = .04$ for husbands; $r = -.32$, $p < .001$ for wives); there were no associations between morning sample time and morning cortisol levels ($r = .05$, $p = .63$ for husbands; $r = .07$, $p = .49$ for wives). To examine for possible gender differences on all variables, paired sample *t* tests were conducted. Consistent with some earlier findings (see Kirschbaum & Hellhammer, 1989, for a review), men had higher morning cortisol values than did women, $t(80) = 2.21$, $p = .03$, 95% CI [0.01, 0.25].

Does the Association Between Daily Support and Diurnal Cortisol Slopes Differ for Husbands and Wives?

The first goal of the study was to examine whether husbands and wives differ in their cortisol reactivity to spousal support. To test this, we modeled the within-person association between fluctuations in daily support and fluctuations in daily cortisol slopes using the following HLM equation,

$$\begin{aligned}\text{Daily Cortisol Slope} = {} & \beta_0(\text{Wives}) + \beta_1(\text{Husbands}) \\ & + \beta_2(\text{Wives' Diary Day}) + \beta_3(\text{Husbands' Diary Day}) \\ & + \beta_4(\text{Wives' Stress}) + \beta_5(\text{Husbands' Stress}) \\ & + \beta_6(\text{Wives' A.M. Sampling Time}) \\ & + \beta_7(\text{Husbands' A.M. Sampling Time}) \\ & + \beta_8(\text{Wives' P.M. Sampling Time}) \\ & + \beta_9(\text{Husbands' P.M. Sampling Time}) \\ & + \beta_{10}(\text{Wives' A.M. Cortisol Level}) \\ & + \beta_{11}(\text{Husbands' A.M. Cortisol Level}) \\ & + \beta_{12}(\text{Wives' Perceived Support}) \\ & + \beta_{13}(\text{Husbands' Perceived Support}) + \text{error} \end{aligned} \quad (1a)$$

where diary day, stress, morning saliva collection time, evening saliva collection time, morning cortisol level, and support were centered within persons for each spouse. Importantly, centering support in this way allowed for the examination of whether reporting more or less support on a given day relative to the spouse's own mean level of perceived support was associated with corresponding changes in the spouse's daily cortisol slope. In other words, this centering strategy accounts for individual differences in the amount of support perceived across the diary days. Furthermore, in order to control for the impact age, BMI, and wives' use of birth control may have on cortisol levels, these variables were added to the between subjects level of the HLM analyses according to the following equations:

$$\begin{aligned}&\beta_0(\text{Wives' Average Cortisol Slope}) \\ &\quad = \gamma_{00} + \gamma_{01}(\text{Wives' Age}) + \gamma_{02}(\text{Wives' BMI}) \\ &\quad + \gamma_{03}(\text{Wives' Birth Control}) + \text{error},\end{aligned} \quad (1b)$$

$$\begin{aligned}&\beta_1(\text{Husbands' Average Cortisol Slope}) \\ &\quad = \gamma_{10} + \gamma_{11}(\text{Husbands' Age}) \\ &\quad + \gamma_{12}(\text{Husbands' BMI}) + \text{error}.\end{aligned} \quad (1c)$$

where age and BMI were centered around the sample mean. In this model, β_0 and β_1 represent an estimate of the average cortisol slope an individual exhibited across the diary days. β_{12} and β_{13} represent the primary parameters of interest. These parameters capture the within-person association between a spouse's daily perceived support and a spouse's daily cortisol slope, controlling for all other parameters in the model. A positive coefficient would indicate that spouses are exhibiting steeper cortisol slopes on days of greater support. A negative coefficient would indicate that spouses are exhibiting flatter cortisol slopes on high support days.

As seen in Table 2, on days when wives reported receiving more spousal support than usual, they exhibited steeper cortisol slopes compared to typical support days, controlling for the amount of stress they experienced that day. Conversely, the opposite trend emerged for husbands, such that on days when husbands reported receiving greater spousal support than usual, they tended to exhibit flatter cortisol slopes compared to typical support days, again controlling for their daily stress levels. The χ^2 test of this gender difference (i.e., the difference between β_{12} and β_{13}) was significant, $\chi^2(1) = 8.96$, $p = .003$. As the coefficients for men and women were in the opposite direction, these results are consistent with the notion that husbands not only derive fewer health benefits from spousal support than do wives but also may be more vulnerable to the costs associated with support.

Further analyses were conducted to examine whether marital satisfaction moderated these effects. To do this, satisfaction was added to the between-subjects level of the model to predict the intercept, or a spouse's average cortisol slope across the diary days (i.e., β_0 and β_1), as well as the covariation between daily support and daily cortisol slopes (i.e., β_{12} and β_{13}). Marital satisfaction did not predict the intercept for either spouse, $\beta = .003$, $SE = .01$, $t(70) = 0.55$, $p = .58$, 95% CI [−0.02, 0.01] for husbands and $\beta = -.001$, $SE = .007$, $t(69) = -0.04$, $p = .97$, 95% CI [−0.01, 0.01] for wives, nor did it moderate the association between support and cortisol slopes for husbands, $\beta = -.001$, $SE = .002$, $t(72) = -0.29$, $p = .77$, 95% CI [−0.01, 0.003], or wives, $\beta = .002$, $SE = .002$, $t(72) = 0\ .99$, $p = .33$, 95% CI [−0.002, 0.01]. All previous results held when including satisfaction in the model.

Is the Association Between Daily Support and Daily Cortisol Slopes Moderated by Problem-Solving Efficacy?

The second goal of the study was to examine whether the association between daily support and daily cortisol slopes is moderated by feelings of problem-solving efficacy. To test this hypothesis, problem-solving efficacy was added to the between-subjects level of the previous model to predict the intercept (i.e., β_0 and β_1) as well as the covariation between daily support and daily cortisol slopes (i.e., β_{12} and β_{13}). Although problem-solving efficacy did not emerge as a significant moderator for wives, $\beta = .01$, $SE = .02$, $t(72) = 0.45$, $p = .65$, 95% CI [−0.03, 0.04], it was a significant moderator for husbands, $\beta = .04$, $SE = .02$, $t(72) = 2.08$, $p = .04$, 95% CI [0.001, 0.07]. Simple slope analyses confirmed that husbands who viewed themselves as less efficacious problem solvers were especially likely to exhibit flatter cortisol slopes on days of greater spousal support, controlling for their daily stress, $\beta = -.10$, $SE = .03$, $t(72) = -2.77$, $p = .007$, 95% CI [−.17, −.03]. Among highly efficacious husbands, support was not significantly associated with cortisol slopes, $\beta = -.01$, $SE = .04$, $t(72) = -0.33$, $p = .74$, 95% CI [−0.10, 0.07]. These findings suggest that spousal support may be particularly threatening for men who doubt their problem-solving capabilities.

Discussion

Though it has been argued that men are relatively insulated from the physiological consequences of marital interactions (Kiecolt-Glaser & Newton, 2001), this insulation hypothesis

Table 2. Within-Person Association Between Daily Support and Daily Cortisol Slopes.

	β	*SE*	*t*	95% confidence interval	
				LL	UL
Husbands					
Intercept (average daily cortisol slope)	1.99	.17			
Intercept × BMI	0.00	.01	0.19	−0.013	0.017
Intercept × Age	−0.02	.01	−1.76+	−0.031	−0.001
Diary day	−0.03	.02	−1.61	−0.063	0.001
A.M. time	−0.19	.54	−0.34	−1.085	0.715
P.M. time	1.08	.49	2.20*	0.259	1.891
Morning cortisol	.98	.06	17.16***	0.882	1.026
Daily stress	−0.02	.04	−0.52	−0.077	0.040
Daily support	−0.06	.04	−1.70+	−0.119	−0.001
Wives					
Intercept (average daily cortisol slope)	1.80	.19	9.52		
Intercept × Birth Control	−0.06	.08	−0.76	−0.199	0.074
Intercept × BMI	0.02	.01	3.29**	0.010	0.031
Intercept × Age	−0.01	.01	−1.17	−0.023	0.004
Diary day	0.02	.01	1.61	−0.000	0.039
A.M. time	0.28	.47	0.61	−0.500	1.068
P.M. time	0.71	.53	1.34	−0.178	1.605
Morning cortisol	0.95	.04	22.25**	0.882	1.026
Daily stress	0.01	.02	0.41	−0.029	0.048
Daily support	0.04	.02	2.18*	0.010	0.076

Note. All effects are reported as unstandardized coefficients. $df = 73$.
$+p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.

has not been adequately tested in the context of positive marital exchanges. The current study addressed this gap by examining whether husbands and wives differentially benefit from daily support exchanges within the marriage. Results from a daily diary task revealed that on days of greater spousal support, wives exhibited steeper cortisol slopes than average, whereas husbands tended to exhibit flattened cortisol slopes. Furthermore, and consistent with theories suggesting that support can threaten self-efficacy (Bolger et al., 2000), the association between daily support and cortisol was moderated by problem-solving efficacy for husbands, but not for wives. The less efficacious husbands perceived their problem-solving abilities, the flatter their cortisol slopes on high support days. All results held controlling for daily stress and overall marital satisfaction. As flat diurnal cortisol slopes predict a host of adverse health outcomes (McEwen, 1998), these results suggest that men are not simply insulated from the benefits of support exchanges, but actually may be particularly susceptible to the costs of support.

Notably, these findings dovetail nicely with other recent work examining spouses' physiological recovery from stressful workdays as a function of marital satisfaction. Saxbe, Repetti, and Nishina (2008) found greater marital satisfaction predicted a steeper cortisol slope on busier work days for women, but a flatter cortisol slope on stressful work days for men. In other words, greater marital satisfaction amplified women's recovery and hindered men's recovery from stressful work experiences. The current results offer additional insight into this previous work by suggesting that perhaps gender differences in sensitivity to support exchanges underlie these effects. Overall, then, growing research paints a picture in which positive marital processes can sometimes be helpful for women's physiological functioning, but harmful for men's physiological functioning.

Yet, these results raise an intriguing question. If men derive fewer benefits from support exchanges, why do men seem to gain a greater overall health benefit from marriage compared to women (Ross, Mirowsky, & Goldsteen, 1990)? Answering this question may require taking a cumulative risk model (Rutter, 1979) approach to understanding health outcomes in marriage. This approach argues that the number of risk factors present can predict outcomes more effectively than the presence or absence of any one specific risk factor. Consequently, as support exchanges represent one piece of the larger marital climate, the harmful effects of support may be counterbalanced by other benefits marriage can provide to men. For instance, compared to single men, married men eat healthier foods, take better care of themselves, get prompt medical attention and are less likely to engage in ''risky behaviors'' (McPherson, 1983; Umberson, 1987). Moreover, as previously reviewed, men are less physiologically sensitive to the presence of conflict in the marriage than are women (Kiecolt-Glaser & Newton, 2001). Nonetheless, the current findings contribute to the larger literature on marriage and health not only by identifying one area in which ''traditional'' gender benefits fail to emerge but also by highlighting the merits of examining the possible independent effects of positive and negative marital aspects on physiological functioning.

Strengths and Limitations

The study contained several notable strengths in its design which served to enhance our confidence in the results. Foremost among these strengths was the use of methodologies that limit the possibility of third variables influencing the results. For instance, within-subject analyses allowed for the estimation of the association between fluctuations in daily support and fluctuations in daily cortisol slopes, controlling for spouses' stable tendencies to view their support in a particular manner, as well as for spouses' average daily cortisol slopes. As an additional precaution, all analyses controlled for several factors known to influence spouses' support perceptions and cortisol levels (e.g., daily stress and marital quality). Finally, it is noteworthy that the current study assessed diurnal cortisol slopes over a 6-day period. Traditionally, most research on martial functioning and cortisol responses has examined acute cortisol changes in a laboratory setting. However, given that diurnal cortisol slopes are more strongly implicated in the dysregulation of immune function than acute cortisol responses to specific events (Adam & Kumari, 2009), the current study provides particularly compelling evidence that daily support exchanges may play an important role in determining husbands' and wives' health.

Although an important strength, the use of a naturalistic diary task to examine day-to-day physiological functioning was also a limiting factor as all data reported are correlational. Though in principle lagged analyses could help clarify issues of causality, having only 6 days of diary data reduces the power to detect small to medium effects. Not surprisingly, when examining whether today's support predicted the next day's cortisol slopes, the effects trended in the hypothesized directions for both husbands and wives ($ps < .12$) but did not reach conventional significance levels. Future research examining the influence of support exchanges on health outcomes may want to assess physiological functioning across a longer time span in order to increase confidence in presumed causal directions.

Conclusions

Overall, these results extend the existing literature on marital functioning and health by highlighting the associations between positive marital interactions and health outcomes. Though prior work has found that men incur fewer physiological costs from marital conflict, the current study indicates that men also may reap fewer benefits from marital support. Put another way, it seems wives may surpass their husbands in both the costs and the benefits gleaned from marriage.

Declaration of Conflicting Interests

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