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Small (but meaningful?) differences:

The cumulative impact of gender on health for husbands and wives

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Small (but meaningful?) differences:

The cumulative impact of gender on health for husbands and wives

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Dedication

To my loving husband Andrew Oldham, who has patiently helped me in any and every way possible through the dissertation process. Andrew, you are a part of everything I do and accomplish. Even on the worse day in our marriage, I know my protective factors far outweigh my risk factors. I am so thankful God brought you into my life.

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Small (but meaningful?) differences:

The cumulative impact of gender on health for husbands and wives

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The *cumulative risk model* is used to explain the coexistence of small gender differences and large health disparities between husbands and wives. Specifically, the current model incorporates conflict (a *risk factor*), support (a *protective factor*), and coping (a moderator of the conflict-stress link) to predict cortisol slopes for newlywed husbands and wives. One hundred and seventy-two couples completed both global and daily measures of protective factors (empathy, responsiveness, and perceived support), risk factors (withdrawal, loyalty, self-silencing, and negativity), and coping (self-distraction, substance use, emotional support, and rumination). For the six days that participants provided daily reports of these constructs, participants also provided waking and evening saliva samples for later determination of salivary cortisol levels.

I hypothesized that men would incur more protective factors than would women, and that these protective factors would be associated with steeper cortisol slopes (i.e., healthy cortisol slopes.) Further, I hypothesized that women would incur more cumulative risks than would men, and that these risks would be associated flatter cortisol

slopes (i.e., unhealthy cortisol slopes). Finally, I hypothesized that the association between cumulative risk and cortisol slopes would be moderated by coping, such that theoretically-effective coping strategies would blunt the impact of cumulative risks whereas ineffective coping strategies would exacerbate the impact of cumulative risks.

Support for these hypotheses was mixed. Women did incur fewer cumulative protective factors than did men; however, there were no gender differences in cumulative risks for this highly satisfied newlywed sample. The impact of both cumulative protection and cumulative risk on cortisol slopes differed for men and women. Coping moderated the impact of cumulative risk on daily cortisol slopes, but again these patterns were different for men and women. Future work must continue to isolate gender differences in relationship processes to understand resulting health implications. With further refinement, the proposed model can provide a more holistic explanation of gendered health disparities, and perhaps identify ways that women and men can experience more equivalent health benefits from romantic relationships.

Table of Contents

Introduction 1
Method 24
Results 36
Discussion 63
Footnotes 89
Tables 91
Figures 107
Appendixes 114
Appendix A: Perceived Support 114
Appendix B: Global Empathy 115
Appendix C: Demand-withdraw 116
Appendix D: Self-silencing 117
Appendix E: Accommodation 119
Appendix F: Negativity and Hostility 120
Appendix G: Abbreviated COPE 121
Appendix H: Stress Rumination Response Scale 123
Appendix I: Daily Diary 124
References 126
Vita 147

List of Tables

Table 1: Summary of Constructs 91

Table 2: Correlations and Descriptive Statistics for Diary Variables 93

Table 3: Correlations and Descriptive Statistics for Global Variables 95

Table 4: Raw Means for Cortisol by Diary Day for Men and Women 97

Table 5: Gender Differences in Daily Protection, Risks, and Coping 98

Table 6: Gender Differences in Global Protection, Risks, and Coping 99

Table 7: Controls for Cortisol Models 100

Table 8: Full Cortisol Model for Daily Constructs 101

Table 9: Full Cortisol Model for Global Constructs 103

Table 10: Summary of Hypotheses 105

List of Figures

Figure 1: Cumulative Risk Model 107

Figure 2: Men's and Women's Cortisol Slopes Predicted by Daily Cumulative Risk and Emotional Support 108

Figure 3: Men's and Women's Cortisol Slopes Predicted by Daily Cumulative Risk and Rumination 109

Figure 4: Cortisol Slopes Predicted by Global Cumulative Risk and Rumination 110

Figure 5: Men's and Women's Cortisol Slopes Predicted by Global Cumulative Risk and Rumination 111

Figure 6: Men's and Women's Cortisol Slopes Predicted by Global Cumulative Risk and Substance Use 112

Figure 7: Men's and Women's Cortisol Slopes Predicted by Daily Cumulative Protection and Relationship Satisfaction 113

Introduction

An interesting gender gap exists between husbands' and wives' mortality rates. Whereas men's mortality rates decrease by 250% when they enter into a heterosexual marriage, women's mortality rates decrease by only 50% (for a review, see Ross, Mirowsky, & Goldstein, 1990). This health disparity is particularly surprising considering the small differences between men and women across a variety of relationship-specific processes, including managing conflict and providing support (Dindia & Canary, 2006). How do seemingly negligible gender differences in relationship behaviors translate into substantial inequitable health outcomes? I propose the *cumulative risk model* (e.g., Rutter, 1979) best explains this inconsistency.

According to the cumulative risk model, *risk factors* (i.e., stressors) and *protective factors* (i.e., support) accumulate and work in tandem to create larger outcomes than would be expected by a single risk or protective factor (e.g., Rutter, 1979). The more risk factors individuals incur that are not counterbalanced by protective factors, the more likely individuals are to experience negative outcomes (and vice-versa). Specific to the current project, the accumulation of risk factors and protective factors creates varying levels of physiological stress for individuals, with risk factors increasing physiological stress and protective factors decreasing physiological stress (Cochrane, 1988). Importantly, the physiological stress created by a risk factor is most pronounced when the risk factor occurs frequently or is not properly managed, resulting in prolonged activation of physiological systems (McEwen, 1998). As such, risk factor-associated physiological stress should be moderated by coping. Effective coping strategies should blunt the

impact of a risk factor on cumulative stress by preventing the risk factor from reoccurring or by decreasing the time individuals experience stress resulting from the risk. In contrast, ineffective coping strategies should amplify the impact of a risk factor on cumulative stress (see Figure 1).

The goal of the current project is to test this proposed model by assessing a number of protective factors, risk factors, and coping strategies known to (1) differ by gender, and (2) have health implications. Before explaining the project in more detail, I review the literature pertaining to gendered protective, risk, and coping factors. Because gendered health disparities are most pronounced in low quality marriages (Mills, Grasmick, Morgan, & Wenk, 1992), I first discuss a set of protective factors and a set of risk factors which contribute to relationship quality: *social support* related constructs and *conflict* related constructs (Caughlin & Huston, 2006). I then discuss gendered *coping* strategies, which I propose moderate the link between risk factors and cumulative stress (McEwen, 1998). For each of these constructs (support, conflict, and coping), I include a discussion of how they are linked to physiological stress. Ultimately, I use the cumulative risk model to test whether the amalgamation of these small but perhaps meaningful gender differences work together to affect husbands and wives daily physiological stress levels.

Protective Factors: Support-Related Constructs

Having someone to help manage the stressors of everyday life (i.e., a social support provider) is one of the most profound *protective factors* associated with marriage (Gove et al., 1990). In the context of marriage, *social support* refers to interactions and

tangible resources spouses provide to help their partners cope with stressful events *external* to the relationship (Wills & Fegan, 2006). Indeed, spousal support can buffer against acute and chronic stressors individuals encounter *outside* of their relationships as well as directly improve married individuals' overall health (see Cohen & Wills, 1985, for a review). Traditionally, researchers have described wives as being better overall support providers relative to their husbands (Belle, 1982). A more nuanced examination of the social support literature, however, suggests that gender differences primarily exist in two areas: (a) perceptions of support received from spouses, and (b) effectiveness of social support spouses actually provide (e.g., Neff & Karney, 2005; Vanfossen, 1981). Each of these areas has unique associations with physical health.

Perceptions of spousal social support. Belle (1982) proposed that a support gap exists such that women provide more support than they receive in marriage. Although the differences are small, women do *report* providing more support for husbands than husbands report providing for wives; this pattern is true across a variety of support types including emotional support, tangible support, informational support, and esteem support (Mickelson, Claffey, & Williams, 2006; Vanfossen, 1981). In fact, men and women agree that women provide more social support to their spouses than their spouses provide to them (Vinokur & Vinokur-Kaplan, 1990). This evidence for the support gap, however, relies exclusively on self-reports. Studies that utilize behavioral observations and daily diaries find few sex differences in the amount of support spouses provide to each other (e.g., Cutrona et al., 1997; Neff & Karney, 2005; Pasch, Bradbury, & Davila, 1997; Roberts et al., 2002).

One reason that gender similarities in spousal support provision coexist with differences in men's and women's *perceptions* of spousal support may be that women desire more support than they receive from their spouses whereas men's desired and received support correspond (Xu & Burleson, 2001). Continually desiring more support likely decreases women's reports of perceived spousal support. Differences in the effectiveness of the support men and women provide may also create discrepancies between actual and self-reported support. If women provide more effective support than do men (as I will suggest below), both men and women may perceive women as providing more support (or men providing less support) than they are actually providing. Regardless, it is clear that gender differences only exist in perceptions of spousal support and not in actual spousal support enacted.

Although the support gap exists only in perceptions, this gap is not inconsequential. The health benefits associated with perceived support are greater than the benefits of actual received support (e.g., Henderson, 1981). In fact, most of the work linking social support to health has relied on measures of perceived support (e.g., Kasl & Cobb, 1980; Glaser, Kiecolt-Glaser, Bonneau, & Malarkey, 1992). Specific to the context of marriage, perceptions of support have been linked to improved immune functioning (Levy, Herberman, Whiteside, & Sanzo, 1990) and adjustment to a cardiac event (Helgeson, 1993). The gap between the support women desire versus the support they receive may also affect women's health by reducing spousal support satisfaction. Lower satisfaction with spousal support is associated with greater cortisol responses to conflict for women but not men (Heffner et al., 2004), whereas support satisfaction

predicts lower blood pressure for both men and women (Carels, Blumenthal, & Sherwood, 1998).

Effectiveness of social support. Considerable evidence suggests that women display better social support skills than do men outside the marriage context. For example, women score higher than do men on a scale of emotional empathy that measures appreciating others' feelings, responding to emotions with emotion, and being willing to interact with others in crises (Mehrabian & Epstein, 1972). Women also take another's perspective more easily, feel more adept at providing support, and spend more time providing support than do men (George, Carroll, Kersnick, & Calderon, 1998). Consistent with these differences, women are rated by their friends as offering better quality help than are men. Behavioral observations offer further support for women's greater support skills relative to men; women spend more time looking at their partners during interactions than do men (Sarason et al., 1985). Further, women are rated higher than men on five different support measures: nonverbal behavior, vocal quality, global effectiveness, quality of the interaction, and quality of problem solving displayed (Sarason et al., 1985).

In the context of marriage, preliminary evidence indicates that husbands and wives also differ in the effectiveness of the support they provide each other. First, wives are more empathetic than their husbands (Mirgain & Cordova, 2007). Second, women are more responsive to their husbands' stress than men are to their wives' stress (Neff & Karney, 2005). For example, the amount of support women provide is associated with the severity of their spouses' problems. The same is not true for men. Also, women

provide more spousal support on days when their husbands are more stressed. In contrast, on days when their wives are more stressed husbands' support and negativity increase (Neff & Karney, 2005). In short, women are better able to identify and appropriately address their partners' needs.

Most of the work linking support effectiveness to health has focused on the impact of different types of support. For example, emotional support is a particularly strong predictor of health outcomes (e.g., Seeman et al., 1994). Unfortunately, the literature linking more nuanced aspects of support (e.g., empathy and responsiveness) to physiological functioning is limited. It is possible, however, that support effectiveness could explain why husbands, but not wives, benefit from spousal support. Specifically, one study found that when individuals received support from a romantic partner during an acute stressor, men experienced decreases in cortisol, whereas women did not (Kirschbaum et al., 1995). In another study, husbands who confided in their spouses were less likely to be re-hospitalized following a heart attack than were wives who confided in their husbands (Helgeson, 1991). The proposed project will add to this dearth of literature by investigating whether support effectiveness is in fact linked with physiological stress.

Risk Factors: Conflict Related Constructs

In contrast to the benefits associated with protective factors, marital risk factors create considerable health consequences for the romantically involved. One of the most commonly studied romantic relationship risks is conflict (e.g., Loving, Heffner, & Kiecolt-Glaser, 2006). This research emphasis is warranted; if handled incorrectly,

conflict creates considerable risks for relationship partners, impacting relationship well-being and satisfaction (e.g., Heavey, Layne, & Christensen, 1993). Importantly, there are established gender differences in how men and women manage conflict. Specifically, men and women differ in their use of withdrawal, accommodation, and negativity (e.g., Christensen & Heavey, 1990; Rusbult, Johnson, & Morrow, 1986; White, 1989). Each of these conflict behaviors is associated with increases in physiological stress.

Withdrawal. The consequences of being withdrawn from during couple interactions have received extensive empirical scrutiny. Withdrawal tends to follow a request for change by one spouse, or what is commonly referred to as a 'demand' (e.g., I wish you would not belittle me in front of your friends). In other words, this *demand-withdraw interaction pattern* occurs when one relationship partner initiates a conversation about a relationship problem and the other person avoids the issue by withdrawing from the conversation, either emotionally (e.g., by tuning out the initiating partner) or physically (e.g., by leaving the room; Christensen & Heavey, 1990). Although less pronounced in highly affectionate couples, demand-withdraw is linked with declines in marital satisfaction (Caughlin & Huston, 2002).

Women are more likely to initiate conversations than are men, whereas men are more likely to withdraw from conversations than are women (Christensen & Heavey, 1990). This gendered pattern emerges in studies using multiple methodologies, including self-reports and behavioral observations (e.g., Caughlin & Vangelisti, 1999; Eldridge, Sevier, Jones, Atkins, & Christensen, 2007). In an early study on demand-withdraw, non-distressed and distressed couples completed self-reports about their communication

with their romantic partners (Christensen & Shenk, 1991). Participants, regardless of marital quality, reported wife-demand/husband-withdraw more frequently than husband-demand/wife-withdraw. In another study, couples engaged in a conversation about a topic of continual disagreement; behavioral coding of these interactions revealed that women were more likely than men to *criticize* (i.e., bring up a concern), whereas men were more likely than women to *stonewall* (i.e., withdraw from the conversation; Gottman & Levenson, 1999).

In acute settings, the demand-withdraw interaction pattern has a greater impact on women's physiological stress than on men's physiological stress (e.g, Kiecolt-Glaser et al., 1996). In a newlywed sample, women experienced more physiological stress (including higher levels of cortisol, epinephrine, and norepinephrine) in reaction to wife-demand/husband-withdraw behavior than did men (Kiecolt-Glaser et al., 1996). In the elderly sample, in which demand-withdraw interactions were assessed using both self-reports and observational coding, women's increases in cortisol were associated with reported, but not observed, levels of wife-demand/husband-withdraw; men's cortisol, however, was not affected by wife-demand/husband-withdraw (Heffner et al., 2006).

Although the wife-demand/husband-withdraw interaction pattern clearly has negative outcomes, some evidence suggests that being withdrawn from, regardless of gender, has physiological consequences (Denton et al., 2001). Cardiovascular measures taken during an interview about demand-withdraw behaviors indicated that both husbands and wives experience increased heart rate and blood pressure when their spouses withdrew from conversations. This increased physiological activation is

particularly pronounced for husbands who commonly initiate discussions about problems in the relationship (Denton et al., 2001). In short, it seems that being withdrawn from, regardless of who initiates the conflict, is physiologically stressing.

Accommodation. Although women are more likely to initiate discussions about relationship issues, they tend to do so in ways that maintain feelings of togetherness. In both dating and married samples, women appear uniquely motivated to use conflict discussions to benefit the relationship. First, compared to men, women are more likely to support a partner and to endure the conflict situation with hope of improvement (i.e., *loyalty*; Rusbult, Johnson, & Morrow, 1986). For instance, women are more likely than are men to say nothing when their feelings are hurt, but to instead simply forgive their partners. Second, women are more likely than men to use unassertive and cooperative behaviors during conflict. These behaviors aim to comfort the partner and resolve the problem whereas men are more likely than women to use competitive behaviors, which create a clear winner and loser (Greeff & de Bruyne, 2000). In short, women manage conflict using language that prioritizes and promotes the continuation of the relationship (Rusbult et al., 1986).

There is also some evidence of gender differences in *self-silencing* (i.e., refraining from expressing an opinion in attempt to avoid conflict or harming the relationship; Jack, 1991). Self-silencing differs from other forms of accommodation in that it requires a consistent pattern of self-sacrifice. Although the construct was originally created to explain women's depression rates (Jack & Dill, 1992), there is not conclusive evidence that women self-silence more than do men. In fact, some studies have found that men are

more likely than women to self-silence (Grattch, Bassett, & Attra, 1995) whereas other studies find no gender differences (Spratt, Sherman, & Gilroy, 1998). When studies do find that men self-silence more than do women, it is likely caused by the different ways men and women interpret the items used to measure self-silencing (Remen, Chambless, & Rodebaugh, 2002). More specifically, some argue that for men the self-silence measure taps a way to avoid intimacy and maintain independence (similar to withdrawal) whereas for women the self-silence measure taps an act of self-sacrifice (Remen, Chambless, & Rodebaugh, 2002). Considering these interpretations, it is perhaps unsurprising that women incur more negative consequences, including lowered relationship satisfaction, when they self-silence (Harper & Welsh, 2008).

Although there are no studies that directly assess the physiological stress associated with accommodation, preliminary evidence indicates that women's suppression of their own needs may be costly. For example, stress responses, as indexed by cortisol levels, increased during conflict interactions when individuals agreed with their partners, approved of their partners' comments, or accepted responsibility for the conflict; cortisol remained elevated well after the conflict concluded (Robles, Shaffer, Malarkey, & Kiecolt-Glaser, 2006). Further, self-silencing has been linked to higher mortality rates for women (Eaker, et al., 2007). Although self-silencing has not been linked to physiological stress, per se, these increases in mortality suggest that this behavior is somehow impacting physiological functioning.

Negativity. Not only are men typically less concerned with maintaining closeness during conflict, they also tend to be more negative during conflict, particularly

when they are dissatisfied in a relationship. For example, men in unhappy relationships use more coercive behavior than their wives, including manipulating their partners (e.g., via guilt) by demanding that their partners behave in a certain way (White, 1989). Further, husbands are more hostile when discussing areas in which their wives desire change than when discussing their own issues; this pattern is not true for wives (Newton & Sanford, 2003). That is, husbands make more openly antagonistic and oppositional remarks as well as more frequently combat their partners' ideas than do their wives.

It should be noted that conclusions about men's greater use of negativity are not without controversy, as some evidence indicates that negativity may not differ between women and men (e.g., Heavey et al., 1993). Discrepancies concerning gendered expressions of negativity are likely attributed to how negative behaviors are conceptualized. Gender differences are often not detected when operational definitions of conflict negativity include the expression of hurt and sadness. Because women are more likely than men to express hurt and sadness (Mirgain & Cordova, 2007), including these emotions may counter men's greater use of other negative behaviors such as hostility.

Although gender differences in the use of negativity are tenuous, gender differences in the impact of negativity are unequivocal; women are more adversely affected by negative marital interactions than are men (Gaelick, Bodenhausen, & Wyer, 1985; Huston & Vangelisti, 1991). In general, negativity is associated with increases in physiological stress. When individuals complain, criticize, disagree, or deny responsibility, their partners' blood pressure increases (Ewart, Taylor, Kraemer, & Agras,

1991). The presence of negativity in conflict has also been linked to deficiencies in immune functioning (Kiecolt-Glaser et al., 1993), poorer endocrine functioning (Malarkey, Kiecolt-Glaser, Pearl, & Glaser, 1994), and delayed wound healing (Kiecolt-Glaser et al., 2005) for women *and* men. Similar to other aspects of conflict, however, physiological responses resulting from interacting with a negative partner are stronger and longer in duration for women than for men (e.g., Ewart et al., 1991; Kiecolt-Glaser et al., 1993; Malarkey et al., 1994). In fact, sometimes the physiology-negativity link is only present for women (Kiecolt-Glaser, Glaser, Cacioppo, & MacCallum, 1997).

Moderator: Coping with Relationship Stressors

Above, I have reviewed protective and risk factors in romantic relationships, which ultimately affect physiological stress. Protective factors decrease physiological stress whereas risk factors increase physiological stress. Importantly, I argue that the link between risk factors and cumulative stress can be amplified or muted depending on the effectiveness of coping strategies individuals utilize to manage stressors (Cochrane, 1988; Lazarus & Folkman, 1987). That is, the stress created by a risk factor impacts physiological stress most markedly when the risk factor occurs frequently or is not properly managed, resulting in prolonged activation of physiological systems (McEwen, 1998). Using coping strategies (e.g., seeking emotional support from friends and family) should blunt the impact of marital risk factors by preventing the risk factor from reoccurring or by decreasing the length of time individuals experience stress resulting from the risk factor. In contrast, ineffective coping strategies (e.g., substance use) should amplify the impact of marital risk factors because the risk factor is not directly addressed

and thus remains a stressor for the individual. In short, how men and women utilize resources *external to the relationship* (e.g., other friends or intra-individual mechanisms) to help cope with stressors *internal* to the relationship (i.e., risk factors) impacts men's and women's allostatic load (see Figure 1).

Men and women differ in how they cope with relationship stressors. According to a meta-analysis of 50 empirical studies, there are three sex-typed coping strategies used to manage relationship stressors: distraction, seeking emotional support, and rumination (Tamres, Janicki, & Helgeson, 2002). Other coping strategies, including active problem solving, planning, and seeking instrumental support, are used equally as often by men and women. Because the main emphasis of the current paper is the cumulative impact of gender on physical health, this review only focuses on coping strategies that differ by gender.

Distraction. Distraction involves diverting attention away from a stressor by engaging in either healthy activities (e.g., exercising) or harmful activities (e.g., alcohol consumption; Tamres et al., 2002). For example, individuals might distract themselves from marital frustrations by learning a new hobby. Typically, distraction is broken into two categories: self-distraction (any behavior individuals engage in to take their mind of a stressor; e.g., sleeping or working), and substance use (any substance consumed to take individuals' minds off a stressor; e.g., alcohol). Although results are inconclusive, Tamres and colleagues' (2002) meta-analysis suggests that men are more likely than are women to self-distract and use substances when coping with relationship stressors (e.g., Choo, Levine, & Hatfield, 1996; Park & Levenson, 2002). Interestingly, distraction is

less clearly sex-typed than emotional support and rumination; several studies report no sex differences in the use of distraction strategies (Butler & Nolen-Hoeksema, 1994; Feldman, Fisher, Ransom, & Dimiceli, 1995; Sullivan, Tripp, & Santor, 2000). Tamres and colleagues (2002) attribute contradictory findings about gender differences in distraction to women's tendency to use *all* coping strategies more frequently than men. Thus, although men prefer distraction over other coping strategies, they do not necessarily use distraction more frequently than do women.

The health outcomes associated with distraction differ across studies (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Consistent with seminal work (i.e., Folkman et al., 1986), a series of studies by Holahan and colleagues (e.g., 1985, 2004, 2005) suggest that distraction is associated with negative psychological and physiological outcomes (e.g., depression and cardio vascular consequences). In contrast, some studies have found distraction to be beneficial to individuals' well-being, reducing self-reports of stress, blood pressure, and depression (Glynn et al., 2002; Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008).

Discrepant findings concerning the effectiveness of distraction have at least three plausible explanations. First, the effectiveness of distraction likely depends on the specific nature of the distracting activity in which a person engages. Using substances to distract from a stressor undoubtedly has harmful health implications (Hollahan et al., 2004). By contrast, more positive distracters, such as reasonable amounts of exercise, benefit health. Second, stressors in which individuals can do nothing to improve a situation are managed best when people distract themselves from the stressor (e.g.,

Nolen-Hoekseman, & Morrow, 1991). Stressors that can be reduced, however, are handled better when using more active forms of coping. Finally, distraction is effective in the short-term, but not the long-term (Ayduk & Kross, 2008). Specifically, immediately following a stressor, distraction is more effective than rumination. Long-term, however, distraction is not as effective as other coping strategies such as self-distancing (i.e., viewing the stressor from an outside perspective; Ayduk & Kross, 2008).

Seeking Emotional Support. Whereas *providing* emotional support involves expressing love, empathy, and concern (Cutrona et al., 1994), *seeking* emotional support involves expressing distress in order to receive validation or sympathy from social network members (Carver, Scheier, & Weintraub, 1989). For example, individuals may express to friends their frustration about an unsupportive partner for the sole purpose of being comforted. Although men and women equally value emotional support (Burleson, 1997), women are more likely than are men to seek emotional support when coping with *romantic stressors* (Tamres et al., 2002). Evidence for gender differences in seeking emotional support exists across multiple relationship stressors that span the developmental course of relationships (e.g., Lutzky & Knight, 1994; Sigmon, Stanton, & Snyder, 1995). Specific to the current project, gender differences in emotional support sought when coping with marital stressors, such as managing dual careers and coping with the transition into parenthood, are well-documented (Alexander, Feeney, Hohaus, & Noller, 2001; Schnittger & Bird, 1990).

Emotional support is a particularly strong predictor of well-being (Erickson, 1993). In cancer populations, seeking emotional support improves immune functioning

(Levy et al., 1990). In healthy adult populations, seeking emotional support lowers levels of stress hormones (Seeman et al., 1994). Taken together, these health outcomes suggest that seeking emotional support effectively reduces the physiological impact of stressors. Although there is mixed evidence regarding gender equity in the benefits derived from seeking emotional support (e.g., Seeman et al., 1994), most of the work on the emotional support-health link finds health benefits for both men and women (e.g., Levy et al., 1990).

Rumination. Another sex-typed coping strategy, rumination, involves repetitive self-reflection over negative emotions created by a stressor (Morrow & Nolen-Hoeksema, 1990; Nolen-Hoeksema, 1991). When individuals ruminate they do not attempt to resolve the instigating problem; instead, they focus on the negative consequences created by the problem. For example, ruminating over a conflict with a romantic partner could involve continually recalling sad emotions elicited by a partners' hostility. Women are more likely than men to ruminate over stressful events (Butler & Nolen-Hoeksema, 1994), particularly when the event involves a romantic relationship (Kiecolt-Glaser et al., 1996). Gender differences in rumination occur in response to a number of marital stressors, including conflict (Bowman, 1990) and loss of a spouse (Nolen-Hoeksema, Parker, & Larson, 1994).

Rumination has serious psychological and physiological consequences (Nolen-Hoeksema & Morrow, 1991). Most of the literature linking rumination to health has focused on the association between rumination and depression (Bodnar & Kiecolt-Glaser, 1994). In fact, Nolen-Hoeksema (1987) proposed that women's relatively high

depression rates are best explained by women's greater propinquity to ruminate, which interferes with concentration, prevents instrumental behaviors, amplifies depression, and leads to negative interpretations of neutral events. Further, recent work suggests that rumination is also associated with physiological consequences. In general, the physiological impact of a stressor is prolonged through 'perseverative' cognition (i.e., worry and rumination), which affects endocrine, cardiovascular, and immunological functioning (Brosschot et al., 2006). Specifically, ruminating over negative affect is associated with elevations in blood pressure (Ayduk & Kross, 2008; Glynn, Christenfeld, & Gerin, 2007). The impact of rumination on physiological outcomes is particularly harmful when the stressor is emotional (Glynn, Christenfeld, & Gerin, 2002). As such, women's tendency to ruminate over relationship stressors, which are typically emotional, results in particularly deleterious health outcomes.

Summary

In sum, men and women differ in the number of protective and risk factors they incur in marriage. The impact of risk factors is moderated by gendered coping strategies. Interestingly, *all* of the support-related protective factors with known gender differences benefit men, not women. Men are more likely than women to perceive higher levels of support and to encounter more effective support. In contrast, *all* of the conflict-related risk factors that differ by gender harm women, not men. Women are more likely than men to be withdrawn from, to accommodate, and to be recipients of negativity. Whether it be because of their partners' behaviors (i.e., withdrawal or negativity) or their own behaviors (i.e., accommodation), women appear to bear the brunt of conflict-related risk

factors. In short, although each of these gender differences is small, the cumulative impact is remarkably gendered. Because the gender differences in the cumulative impact of these factors is more striking than the gender differences within the individual predictors, I propose that to truly understand why we see larger differences in husbands' and wives' health outcomes it is necessary to use a cumulative model that incorporates co-occurring risk and protective factors.

The cumulative perspective has notable advantages compared to using individual risk and protective factors, including improved predictive ability of interaction effects (Burchinal et al., 2000), a more accurate reflection of exposure to co-occurring factors (Everhart, Fiese, & Smyth, 2008), parsimony (Corapci, 2008), and minimized issues of collinearity (Corapci, 2008). Despite these advantages, the cumulative approach has seldom been utilized (Flouri, 2008), particularly in the context of romantic relationships (c.f., Rauer, Karney, Garvan, & Hou, 2009). Importantly, the cumulative risk perspective proposes that the number of risk factors an individual encounters is more important than the impact of any specific risk factor (e.g., Rutter, 1979). As a result, a cumulative model assumes equifinality, or that different risk factors are equally weighted and can create the same consequences (Rauer, et al., 2009). Specific to the proposed study, this means that regardless of which particular conflict-related or support-related event occurs, the impact on physiological stress will be similar.

It is also important to note that although there has been extensive work linking each of these individual behaviors to acute physiological responses, more chronic health implications associated with relationship events have not been considered. To address

this gap in the literature, the current study used *daily* levels of cortisol as the health outcome. Cortisol is a hormone that is released by the body's stress responding system, the hypothalamic–pituitary–adrenal (HPA) axis. Cortisol typically fluctuates in a diurnal pattern, peaking in the morning and declining steadily, and steeply, throughout the day barring a temporary spike around lunch (Kirschbaum & Hellhammer, 1989). Individuals experiencing chronic levels of stress, however, have flatter cortisol slopes because stressed individuals begin with lower levels of cortisol in the morning and experience higher cortisol in the evenings than do individuals with healthy cortisol responses (Miller, Chen, & Zhou, 2007). Although cortisol is not the only physiological marker relevant to physiological stress and allostatic load, it can be measured noninvasively in couples' homes, making it an ideal biological marker for this investigation (Loving, Heffner, & Kiecolt-Glaser, 2006). Cortisol also impacts a number of other physiological systems, including the central nervous system, metabolic system, and immune system (Sapolsky, Romero, & Munck, 2000). Understanding the impact of cumulative risk and cumulative protective factors on chronic cortisol is particularly important because the health consequences associated with cortisol are not caused by momentary changes in cortisol, but rather prolonged cortisol increases (Sapolsky et al., 2000). Although it is assumed that the changes in acute cortisol found in past studies would translate into chronic dysregulation, this idea has yet to be tested.

To determine the cumulative impact of marital protective and risk factors on husbands' and wives' health, the current study examined how *both* global and daily measures of risk and protective factors covaried with daily cortisol slopes. Specifically,

newlywed couples participating in a larger study of the role of stress in the early years of marriage provided global measures of perceived support, empathy, withdrawal, loyalty, self-silencing, negativity, self-distraction, substance use, emotional support, and rumination. After completion of a laboratory task, participants provided 6 diary measures of these same constructs as well as cortisol samples in both the morning and evening (for theoretical reasons, perceived support was replaced with responsiveness). The use of daily and global measures of risk and protective factors was necessary for two reasons. First, perceptions of relationship behavior (i.e., which is captured using global measures) have different physiological consequences than enacted relationship behavior (i.e., which is captured using daily measures or observations; e.g., Heffner et al., 2006). Second, some protective factors, such as perceived support, cannot be measured using daily diaries. That is, perceived support, by definition, refers to more global perceptions of the availability of a spouse. As such, all of the hypotheses stated below will be tested separately using both global and daily measures of protective, risk, and coping constructs.

Based on the literature reviewed above, men seem to benefit more from cumulative protection than do women (e.g., Seeman et al., 1994). Both men and women perceive that men receive more spousal support than do women (e.g., Vinokur & Vinokur-Kaplan, 1990). Although men and women show similar levels of support enacted, perceived spousal support independent of support enacted is associated with reduced physiological stress (e.g., Levy et al., 1990). Further, preliminary work suggests that wives are more effective support providers than are husbands (e.g., Neff & Karney, 2005). The health implications associated with support effectiveness, however, are less

developed; still, support effectiveness should further reduce physiological stress. Consistent with this work, I hypothesize the following:

Hypothesis 1: Men will experience more global and daily protective factors than will women.

Hypothesis 2: The accumulation of global and daily protective factors will be associated with steeper cortisol slopes.

Additionally, women should experience more conflict-related risk factors than will men. Specifically, women are more likely than are men to be withdrawn from, to accommodate, and to experience hostility (e.g., Christensen & Heavey, 1990; Rusbult, Johnson, & Morrow, 1986; White, 1989). Each of these risk factors increases physiological stress (Ewart et al., 1991; Kiecolt-Glaser et al., 1996; Robles et al., 2006). Consistent with this extant work, I hypothesize the following:

Hypothesis 3: Women will experience more global and daily risk factors than will men.

Hypothesis 4: The accumulation of global and daily risk factors will be associated with flatter cortisol slopes.

It is difficult to predict whether men or women will use more theoretically-effective coping strategies overall. Men are more likely to use substances (e.g., substance abuse) to avoid a stressor, which is an ineffective and harmful strategy that likely increases men's physiological stress (e.g., Hollahan et al., 2004). At the same time, however, men are more likely to use other distracters, which in the short-term reduce the impact of a risk factor on physiological stress (Glynn et al., 2002). Further, women are

more likely to both ruminate and seek emotional support. Seeking emotional support is an effective coping strategy which should blunt the impact of relationship stressors (Levy et al., 1990; Penninx et al., 1998) whereas using rumination is an ineffective coping strategy which should amplify the impact of a stressor (Ayduk & Kross, 2008; Nolen-Hoeksema, 1991). As such, the proposed study seeks to answer the following research question:

Research question 1: Do men or women use more theoretically effective coping strategies?

Although evidence for gender differences in the use of effective coping is tenuous, the moderating impact of coping on physiological functioning is more certain. Consistent with the literature reviewed above, I expect the use of coping strategies to moderate the impact of risk factors on cortisol slopes. Effective coping (i.e., emotional support and self-distraction) will blunt the impact of a stressor whereas ineffective coping (i.e., rumination and substance use) will amplify the impact of a stressor.

Hypothesis 5: When individuals are experiencing high cumulative risk and using self-distraction, cortisol will decrease at a faster rate than when individuals are experiencing high cumulative risk and not using self-distraction.

Hypothesis 6: When individuals are experiencing high cumulative risk and using substances to distract themselves, cortisol will decrease at a slower rate than when individuals are experiencing high cumulative risk and not using substances to distract themselves.

Hypothesis 7: When individuals are experiencing high cumulative risk and using emotional support, cortisol will decrease at a faster rate than when individuals are experiencing high cumulative risk and not using emotional support.

Hypothesis 8: When individuals are experiencing high cumulative risk and ruminating, cortisol will decrease at a slower rate than when individuals are experiencing high cumulative risk and not ruminating.

On the surface, it might seem more parsimonious to consider the impact of cumulative coping. I chose, however, to look at coping strategies separately for two reasons. First, although cumulative models have been used to look at both positive and negative factors, past researchers have never incorporated positive and negative factors into a single score. Because coping strategies can be adaptive or maladaptive, representing them in a single score would not be appropriate. That is, because some coping strategies would blunt the impact of a stressor whereas other coping strategies would amplify the impact of the stressor, combining them into a single score would hide their effects. Second, as I mentioned previously, cumulative models assume equifinality, or that each variable creates the same consequences for the outcome of interest. Although I believe equifinality can be assumed for both risk and protective factors, I do not think this assumption can be extended to coping. There are clearly some coping strategies that are more harmful (e.g., rumination; Ayduk & Kross, 2008) or more beneficial (e.g., emotional social support; Seeman et al., 1994) than others.

Method

Design

The current study utilized the first wave of data collection from a larger 5-year investigation into the role of stress in the early years of marriage. The first wave of data collection includes an initial laboratory session followed by a daily diary component. Specifically, participants completed a battery of questionnaires, the contents of which are outlined below, prior to coming into the lab. During the lab session, couples engaged in standardized support and conflict interactions. For 14 days following their laboratory session, couples completed a daily diary in which they separately reported on interactions and any coping attempts that occurred over the prior 24 hours. Participants provided saliva samples upon waking and at 9:00 in the evening the first six days of the diary component of the study which were later assayed to determine salivary cortisol levels.

Participants

One-hundred seventy-two newlywed couples, all of whom were married for less than six months, in their first marriage, and did not have any children, were recruited from the greater Austin area via advertisements on Facebook and in local newspapers, churches, and venues frequented by brides. Participants were paid up to 115 dollars for participating in the first part of the study: 75 dollars for participating in the laboratory component of the study, 1 dollar for every survey completed by each couple member, a bonus of 2 dollars for completing all 28 surveys (14 per couple), and 10 dollars for providing the saliva samples for the determination of salivary cortisol levels.

Of the original 172 newlywed couples recruited for the study, 24 couples chose not to provide saliva samples. Further, saliva samples from 16 couples and 50 individuals were discarded prior to assay because individuals and/or couples reported one or more health conditions or other circumstance known to affect HPA axis functioning (i.e., 5 were pregnant, 9 were on medications that impact the HPA axis, 21 had anxiety, 15 had depression, 31 smoked, and 17 worked nightshifts). The resulting sample consisted of 82 couples and 50 individuals (N= 214; 106 men, 105 women) with eligible saliva samples. Importantly, participants who provided saliva samples did not differ from those who did not provide saliva samples in terms of relationship satisfaction (p = .87), age (p = .75), or income (p =.22). Participants who provided saliva samples also did not differ from the rest of the sample in the number of risk factors (p= .48) or protective factors (p = .46) the encountered, nor did they differ in the tendency to seek emotional support (p = .23) and use self-distraction (p = .48). Individuals who provided saliva samples were less likely to ruminate (p = .01) and use substances (p = .005) to cope. Individuals who provided saliva samples were also slightly more educated than those who did not provide them (p = .09).

On average, husbands (M = 28.97 years old, SD = 5.40) were slightly older than their wives (M = 27.22 years old, SD = 4.83, F (1,212) = 6.26, p = .01). The majority of the sample was white (74.8%; 3.3% African American; 16.8% Hispanic or Latino; 1.4% Asian American; and 3.7% marked “other”) and had a college education (55.6%; 18.2% completed high school; 10.3% had an associates or vocational degree; 12.1% had a master’s degree; and 2.8 had a doctoral degree). Couples were highly satisfied with their

relationships (*M*=5.10, *SD* =.34 on a scale from 1-7). The median income level for wives was between 20,001 and 25,000 USD (mode = 15,001 and 20,000 USD; 14.3%) and for husbands was between 25,001 and 30,000 USD (mode = over 50,001 USD; 27.5%).

Procedure

Laboratory session. Prior to their participation in the laboratory session, participants were mailed a battery of questionnaires that took approximately 1½ hrs to complete. In addition to measures not relevant to current analyses, participants completed global measures of perceived support, responsiveness, demand-withdraw, loyalty, self-silencing, hostility, self-distraction, substance use, emotional support, and rumination. Participants were instructed to complete this questionnaire alone, and to not discuss their answers with their partners.

Upon arriving at the laboratory, couples were greeted by the research assistant who collected their initial surveys (completed at home) and escorted them to an observation room. Once participants signed informed consent paperwork, they engaged in three different interaction tasks: a structured interview about their courtship, standardized conflict discussions, and standardized support discussions. Following completion of the laboratory session, participants were paid their initial 75 dollars for participation, thanked for their time, and instructed about the upcoming diary portion of the study to occur over the next 14 days. The researcher also gave the couples the dairies, envelopes, cortisol logs, plastic bags, mailing box, and salivettes (i.e., a piece of sterile dental cotton approximately 1-inch in length and .25 inches in diameter with an accompanying storage vial) necessary for the assessment of salivary cortisol.

Diaries

For the first 14 days following the initial laboratory session, participants completed a 2-page daily diary that assessed risk, protective, and coping factors. More specifically, the diaries assessed typical marriage behaviors (including perceived support, responsiveness, withdrawal, loyalty, self-silencing, and negativity) as well as coping strategies that participants used to manage stressors both internal and external to the marriage (including self-distraction, emotional support, and rumination; see Appendix I). The diaries also assessed typical stressors that individuals may have encountered that day. Surveys were completed at the end of each day in either a paper or online version (depending on participants' preferences). Paper surveys were placed in the mail the following morning in numbered envelopes provided by the researcher. Importantly, 74.13% of the online dairies were completed in the evening of the correct day; 81.26% of the online diaries were completed by noon of the day after; and 85.28% were completed by the evening the day after the target day.

To approximate an individuals' daily diurnal cortisol pattern, participants also provided two saliva samples on the first six diary days: one sample upon waking (average time provided = 8:17 a.m.) and one sample at 9:00 in the evening (average time provided = 9:59 p.m.). If participants knew they would not be able to provide their sample at 9:00 p.m. on a consistent bases (e.g., they always ate dinner at 8:30 p.m., or had social event from 7:00 p.m. - 10:00 p.m.), participants were asked to choose a time that was more appropriate for their schedule. Participants were asked to store these saliva samples in the refrigerator. Because cortisol is impacted by caloric intake, participants were asked

to not eat, drink, or brush their teeth for an hour prior to providing each sample. Further, participants were asked to note the number of alcoholic beverages they drank in the last 24 hours when they provided their evening sample. Participants completed a log that included the time and date they provided each saliva sample. In this log, participants noted any irregular circumstances that occurred around the time they provided the saliva sample (e.g., they brushed their teeth prior to the first sample). If participants did eat, drink, or brush their teeth an hour before providing saliva, their samples were not included in analysis (236 of the possible 2,568 samples, or 9.2% of the samples were excluded from analysis). On the morning of the seventh day, participants placed the plastic bag containing the saliva samples in a pre-stamped priority mail box provided by the researcher; these boxes were then mailed back to the UT campus. Of the possible 2,568 cortisol samples, 133 samples were returned with either no saliva, or insufficient saliva to determine cortisol levels (5.2% of the samples). After removing these saliva samples, there were 973 days for which participants provided both morning and evening samples that were eligible for analysis (an average of 4.55 days of cortisol per person).

We suspect participants were compliant in correctly providing saliva samples. When participants missed samples, they commonly indicated such in their logs. Further, participants included very detailed notes in their logs pertaining to each sampling time. Such compliance is consistent with other studies that rely on participants' self-assessment of cortisol data (e.g., Diamond, Hicks, & Otter-Henderson, 2008). Further, methodological studies of diary sampling in general suggest that participants are honest

and diligent about completing reports in a timely manner (Green, Rafaeli, Bolger, Shrout, & Reis, 2006).

Measures (see Table 1 for a summary)

Perceived support (initial survey). In order to assess partner perceptions of support received from spouses, participants completed a modified version of the Quality of Relationship Inventory (QRI; Peirce, 1994). The QRI consists of 7 items that assess individuals' perceptions that people in their lives would support them during a variety of different stressors (e.g., "To what extent could you turn to [*someone*] for advice about a problem?"). For the current study, the measure was adapted to assess perceptions of partner specific support (e.g., "To what extent can you count on *your partner* to listen to you when you are very angry at someone else?"). One item was deleted from the scale because it was not highly correlated with the other items ("If you wanted to go out and do something this weekend, how confident are you that your partner would be willing to do something with you?"). Participants were asked to indicate on a scale from 1 (not at all) to 4 (very much) the extent to which they can depend upon their partner for these different types of support (see Appendix A; $\alpha = .71$).

Responsiveness (daily diaries). Following the example of Neff and Karney (2005), spouses' responsiveness was assessed with two constructs: stressful life circumstances and partners' reports of spousal support. Stressful life circumstances were assessed by asking whether participants experienced nine different stressful events external to the marriage (e.g., "unexpected financial problems"). Spousal support was measured by participants' spouses' reports of whether or not they provided support to

their partners on that day. Specifically, spouses were asked whether they "listened to or comforted your spouse", "tried to make your spouse feel loved", or "helped your spouse with something important." Spouses checked a box to indicate whether or not the event occurred. HLM was then used to find the within-person correlation of the support that participants' partners reported providing and their own self-reports of stress; responsiveness is the only measure in the current study that relies on spouses' reports.

Empathy (initial survey and daily diary).

Daily diary. In the daily diary, one item was used to assess empathy. Participants checked a box to indicate whether their spouse "listened to or comforted you."

Initial survey. Global empathy was assessed using three items (see Appendix B; $\alpha = .81$). Participants were asked to indicate how often each of the following behaviors occurred on a scale ranging from 1 (not at all) to 4 (very much): "To what extent would you describe your partner as being empathetic when you discuss a problem you are having?", "To what extent does your partner really understand your emotions and feelings?", and "When you are talking to your partner about a stressful situation, to what extent are they actively listening to what you are saying?"

Withdrawal (initial survey and daily diary).

Daily diary. In the daily diary, one item was used to assess withdrawal (see Appendix C). Participants checked a box to indicate whether their "spouse withdrew from a conversation."

Initial survey. To assess participants' use of the demand-withdraw interaction pattern, participants completed a revised version of the Communication Patterns

Questionnaire (CPQ; Christensen & Sullaway, 1984). In order to improve the reliability of the scale, many of the original nine items that assessed multiple behaviors with a single item (e.g., did you nag, complain, or criticize while your partner avoided or became silent) were changed to measure one behavior for each spouse (e.g., "When my partner complains, I become silent"; J. Caughlin, Personal Communication, October 22, 2009). Two items of this revised CPQ were used to measure actor-demand/partner-withdraw behavior ("When I start a conversation, my spouse tries to avoid the conversation" and "When I complain, my partner becomes silent"). For each item, participants indicated how often they engaged in each behavior, ranging from 1 (I never do this) to 9 (I constantly do this*; r* = .19, p = .005)

Self-silencing (initial survey and daily diary).

Daily diary. In the daily diary, one item was used to assess self-silencing. Participants checked a box to indicate whether they "did not express [their] feelings to avoid conflict."

Initial survey. To assess self-silencing, participants completed a shortened version of the Silencing of the Self Scale (STSS; Jack, 1991). The original STSS included 31 items to measure four subscales. The current study included 18 items from two of the subscales relevant to this investigation: silencing of the self and care as self-sacrifice. Silencing of the self was measured using items such as "I don't speak my feelings in my marriage when I know they will cause disagreement." Care as self-sacrifice was measured using items such as "Caring means putting the other person's needs in front of my own". For each item, participants indicated the extent to which they

agreed that the item described them, ranging from 1 (Do not at all agree) to 5 (Completely agree; see Appendix D; $\alpha = .80$ across the two subscales).

Loyalty (initial survey and daily diary).

Daily diary. In the daily diary, one item was used to assess loyalty (see Appendix A). Participants checked a box to indicate whether, in response to a marital stressor, they "gave [their] spouse the benefit of the doubt and forgot about the issue."

Initial survey. To assess global perceptions of loyalty, participants completed Rusbult's Accommodation Measure (Rusbult, Verette, Whitney, Slovik & Lipkus, 1991). The accommodation measure consists of 12 items that assess four different problem-solving patterns that differ on two dimensions: active vs. passive and constructive vs. destructive. Of particular importance to the current study, *Loyalty* is a passive and constructive strategy that is measured by asking participants if they would respond to three different problem situations by "giving their partner the benefit of the doubt and forgetting about it". For each item, participants indicated how often the behavior occurred, ranging from 1 (this never occurs) to 9 (this always occurs; see Appendix E; $\alpha = .83$).

Negativity (initial survey and daily diary).

Daily diary. In the daily diaries, negativity was measured using two items that ask whether (1) your "spouse criticized you" and (2) your "spouse showed anger or impatience toward you." Participants checked a box to indicate whether or not the event occurred ($r = .49$, $p < .001$).

Initial survey. Global negativity was assessed using two items. Participants indicated how often both of the following behaviors typically occur, on a scale ranging from 1 (this never occurs) to 9 (this always occurs): "When a conflict occurs, my partner is hostile towards me" and "when a conflict occurs, my partner is negative or critical of me" (see Appendix F; $\alpha = .80$).

Self-distraction and substance use (initial survey and daily diary).

Daily diary. In the daily diaries, participants were asked whether they used self-distraction to cope with stressors internal to their marriage ("I did something to keep my mind off the problem"). Participants checked a box to indicate whether or not the event occurred. Unfortunately, the diaries did not contain an item to assess distraction via substance use; however, participants did report the number of drinks they had that day.

Initial survey. Two subscales of the abbreviated COPE (Carver, 1997) were used to assess individuals' typical levels of the use of distraction: the two-item self-distraction subscale (e.g., "I go to the movies or watch TV to think about it less"; $\alpha = .64$), and a single item measure of substance use (i.e., "I drink alcohol or take other drugs in order to think about it less"). Participants were asked to reflect over the last six months and indicate how often they responded to a stressor in the way described. Participants replied on a scale from 1 (don't do this at all) to 4 (do this a lot; see Appendix G).

Emotional Support (initial survey and daily diary).

Daily diary. In the daily diaries, participants were asked whether they used emotional support to cope with stressors internal to their marriage ("I talked to a friend or

family member about the problem"). Participants checked a box to indicate whether or not the event occurred.

***Initial survey*.** The two-item emotional support subscale of the abbreviated COPE (Carver, 1997) was used to measure individuals' typical use of emotional support (e.g., "I get comfort and understanding from someone."). Participants were asked to reflect over the last six months and indicate how often they responded to a stressor in the way described. Participants replied on a scale from 1 (don't do this at all) to 4 (do this a lot; see Appendix G; α= .87).

Rumination (initial survey and daily diary).

Daily diary. In the daily diaries, participants indicated whether they used rumination to cope with stressors internal to their marriage (e.g., "I thought about how sad the problem made me"). Participants checked a box to indicate whether or not the event occurred.

***Initial survey*.** An abbreviated version of the Stress Response Ruminative Scale (SRRS; Alloy, et al., 2000) was used to assess individuals' typical levels of rumination. The original scale consists of 25 items that assess three different subscales: negative inferential style, hopelessness, and active coping. The proposed study utilized 8 items from the negative inferential style subscale (e.g., "I think about how the negative event will negatively affect my future"; α = .70). Participants were asked to reflect over the last six months and indicate how often they responded to a stressor in the way described. Participants replied on a scale from 1 (don't do this at all) to 4 (do this a lot; see Appendix H).

Cortisol. 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 SalimetricsLLC included to ensure reliability. The test had an average intra-assay coefficient of variation of 7.74% and an interassay coefficient of variation of 8.2%. 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). A differences score between morning and evening values of cortisol were used to index cortisol slope.

Results

Overall Analytical Plan

I conducted two different sets of statistical tests for each hypothesis: the first set of analyses focused on subjects' daily diary measures whereas the second set focused on subjects' global reports. Conducting two separate sets of analyses illuminated differences in the impact of stable versus daily occurrences of protective, risk, and coping factors on daily declines in cortisol. The initial step for both sets of analyses was to create the cumulative risk and cumulative protection variables. Next, I used multilevel modeling to assess gender differences in cumulative protection, cumulative risk, and cumulative coping. Finally, multilevel modeling was employed to test the impact of cumulative protective and cumulative risk factors on daily declines in cortisol as well the moderating impact of coping on cumulative risk.

Descriptive Statistics and Correlations

Diaries. Table 2 presents descriptive statistics for spouses' daily reports of protective, risk, and coping factors across the 6 diary days. As can be seen, the base rates for risk factors and coping strategies were quite low (an average of 125.25 diaries out of a possible 1270 indicated risk factors occurred, or 9.8% of all days; an average of 69.75 diaries out of a possible 1270 indicated use of coping strategies, or 5.5% of all days). These low rates of coping are not surprising; low levels of risk factors left spouses with few marital stressors with which to cope (860 diaries out of a possible 1270 reported having no marital stressor on a given day with which they needed to cope, or 67.7% of all days). In contrast, protective factors were reported with considerably higher frequency

(an average of 649.50 diaries out of a possible 1270 reported receiving protective factors, or 51.1%). This pattern of base rates for risk versus protective factors is typical for highly satisfied newlyweds (e.g., Neff & Karney, 2005). Although individuals were incurring few marital risk factors, they did report moderate levels of perceived stress (*M* = 2.35 on a 1-4 scale).

The correlation matrix for specific diary items is also presented in Table 2. Importantly, each risk factor (withdrawal, loyalty, self-silencing, and negativity) was correlated with other risk factors. The protective factors of empathy and responsiveness, however, were not correlated with each other. With the exception of substance use, coping strategies were also highly correlated with other coping strategies. Rumination and distraction were correlated with three of the four marital risk factors. Emotional support and substance use, however, were rarely associated with marital stressors.

Global. Table 3 presents descriptive statistics for global measures of protective, risk, and coping factors. Spouses reported high levels of protective factors, with means for both perceived support and empathy close to the maximum for their respective scales. Spouses reported relativity low levels of risk factors (below the scale's midpoint for all measures except self-silencing) and coping strategies (slightly above the midpoint for all coping strategies).

Correlations between global items are presented in Table 3. In contrast to the diary measures, global protective factors were correlated with each other. Risk factors, however, were not associated with each other. Instead, withdrawal was correlated with negativity but not self-silencing or loyalty. Further, loyalty and self-silencing were

correlated with each other. Although coping strategies were somewhat correlated with each other, global coping was not correlated with any of the global marital risk factors.

Cortisol slopes. A summary of morning and evening cortisol values is provided in Table 4. As is typical for daily cortisol patterns (Kirschbaum & Hellhammer, 1989), individuals' cortisol levels at the beginning of the day were considerably higher than at the end of the day (t (972) = 48.12, p = .02). Morning cortisol levels fluctuated considerably more than did evening levels (morning cortisol SD = .148; evening cortisol SD = .038; F (1,1294) = 889.08, p < .001).

As can be seen in Table 7, evening cortisol levels were correlated with the time of day the sample was provided; the values of cortisol were higher the earlier the sample was provided (b (765.10) = .073, SE = .026, p < .01). This pattern is consistent with the customary sharp drop in cortisol that occurs throughout the morning hours (Kirschbaum & Hellhammer, 1989). Unfortunately, there was considerable variability between participants in the time that they woke up and provided their morning samples, as well as the time that individuals provided their evening samples. As such, the time at which subjects provided each sample was included as a covariate in all analyses. Even when controlling for morning sampling time, there was a significant difference in morning values of cortisol provided before and after 10 a.m. (b (1116.17) = -.24, SD = .067, p < .001). Further, individuals' lowest point of cortisol secretion tends to occur around midnight (Anders, 1982). As a result, individuals who provided their morning samples after 10:00 in the morning or their evening sample after midnight were not included in the analysis testing the impact of cumulative protection, cumulative risk and coping

strategies on cortisol slopes (An additional 138 out of 1284 cortisol slopes were deleted, or 10.7% of all possible slopes). In the final sample used for analysis, there were 835 days of cortisol slopes (an average of 3.90 days per participant).

Creating Cumulative Variables

Daily diaries. To create cumulative risk and protection variables from the daily diary data, individual protective and risk factors were dummy coded to indicate whether or not each factor occurred within a given day (1 = yes, it did; 0 = no, it did not). The use of dichotomous variables is common when adopting a cumulative risk perspective (Sameroff et al., 1993; Seifer et al., 1996). Variables were then summed to create a cumulative score for each respective factor. Specifically, cumulative risk was created by combining the withdrawal, loyalty, self-silencing, and negativity measures. If individuals reported that their partner withdrew from them, they received a "1;" if not, a "0". The same method was followed for self-silencing and loyalty. For negativity, individuals received a "1" for answering yes to one or both of the following items: (1) your "spouse criticized you" and (2) your "spouse showed anger or impatience toward you." If participants answered 'no' to both items, they received a '0'. Although scores could have been created in such a way as to indicate whether participants indicated one or both of the negative interactions occurred, I decided to use a dichotomous outcome for negativity because (a) the use of a dichotomy is consistent with past work using cumulative totals (e.g., Sameroff et al., 1993), and (b) even small amounts of negativity are sufficient to negatively affect health outcomes (Kiecolt-Glaser et al., 2005). Thus, cumulative risk scores had a range of 0 to 4.

Cumulative protection was created by combining the empathy and responsiveness measures. Empathy was indicated when participants reported that their spouse "listened to or comforted [them]." If the participants answered 'no', the participants received a '0'; if the participant answered 'yes', the participants received a '1'. For responsiveness, HLM was used to find the within-person correlation of the support that participants' partners reported providing and their own self-reports of stress. If this correlation was positive, signifying that they had a 'responsive' partner, individuals received a '1'. If the correlation was '0' or negative, individuals received a '0'. Cumulative protection scores ranged from 0 to 2.

The cumulative coping score was created slightly differently. A '1' indicated the presence of a positive coping strategy (i.e., emotional support and use of self-distraction) whereas a '-1' indicated the presence of a negative coping strategy (i.e., rumination and substance use). Because substance use was measured by asking participants to report the number of drinks they consumed each day, a cutoff was necessary to differentiate between those who were using alcohol as a coping strategy compared to those who were, most likely, simply enjoying a drink. When examining the frequency distributions of drinks per day, 90% of the sample had 2 drinks or less per day. Although not a perfect solution, individuals having two or less drinks received a '0' for substance use whereas those who had more than two drinks received a '-1' for substance use. This dichotomy mirrors the health literature claim that 1-2 drinks per day constitutes 'light to moderate' drinking (Dufour, 1999). A '0' indicated the absence of both a positive and negative coping strategy. Cumulative coping scores ranged from -2 to 2.

Global measures. Global measures were predominately assessed on a continuous scale (i.e., not just 'yes' or 'no' items). To take advantage of the continuous measures, the global cumulative risk and protection scores were created differently than the diary scores. Consistent with Everhart and colleagues (2008), I first standardized all continuous variables (i.e., demand-withdraw, self-silencing, loyalty, negativity, perceived support, empathy, self-distraction, substance use, rumination, and emotional support), and then created the cumulative totals. Although dichotomizing scores is common when using a cumulative approach, standardizing scores retains the full range of each response and is accepted practice in the health literature (Everhart, et al., 2008; Whisman & McClelland, 2005).

Cumulative risk was created by combining the standardized scores for withdrawal, loyalty, self-silencing, and negativity, resulting in a cumulative risk score range of -5.07 to 6.18. Cumulative protection was created by combining perceived support and empathy, resulting in a cumulative protection score range of -9.27 to 1.73. To address the question regarding whether men or women used more effective coping (Research Question 1), standardized self-distraction, substance use, emotional support, and rumination scores were summed after reverse-coding the standardized scores for substance use and rumination. Cumulative coping scores ranged from -6.45 to 4.30.

Hypothesis Testing

This study contained three levels of nested data: days of cortisol slopes (level 1) were nested within individuals (level 2), and individuals were nested within dyad (level 3). Thus, independence of data points can only be assumed to exist from dyad to dyad.

To account for the dependency in the data, multilevel modeling (MLM) was conducted in SPSS. MLM simultaneously models the error involved with sampling observations at multiple levels, making it a preferred strategy to Ordinary Least Squares regression (Kenney, Kashy, & Cook, 2006). For all models, the time variable (representing the number of the diary day completed; 1 thru 6) was centered such that the first diary was coded as -2.5, the second diary was coded as -1.5, the third diary was coded as -.5, the fourth diary was coded as .5, the fifth diary was coded as 1.5, and the sixth diary was coded as 2.5. Gender was centered using effect coding such that men were -1 and women were +1.

Gender hypotheses for daily diary measures (Model 1). In order to test Hypotheses 1 and 3 and to address Research Question 1, three different multilevel models were created with daily cumulative protection (Hypothesis 1), daily cumulative risk (Hypothesis 3), and daily coping (Research Question 1) as the outcome variables. The same model was also used to test for gender differences in individual protective factors, risk factors, and coping strategies. For each model, gender was entered as the predictor variable and diary order (i.e., time) was entered as a control. The level 1 prototype model for the daily diary data is represented by the following equation:

Model 1.1 $Y_{ijk} = b_{0ij} + b_{1ij}(time)_{ijk} + e_{ijk.}$

In this equation, Y_{ijk} represents the cumulative protection score, cumulative risk score, or coping total for person *i* at time *k* within dyad *j*. Time represents the recoded diary 'day'. The average cumulative risk score, cumulative coping score, or coping total

for person *i* is indicated by b_{0ij}. This level 1 equation allows these scores for the six days to fluctuate across diary day.

The level 2 prototype equation for the daily diary measures was as follows:

Model 1.2 $b_{0ij} = \gamma_{00} + \gamma_{01}(\text{gender})_{ij} + U_{0ij.}$

In this equation, gender is a predictor of the level 1 intercept. The random effect, U_{0ij} indicates that there can be random variation in cortisol slopes within person across dyads. In order to account for the dependency of individuals nested within couples, covariance matrices were structured such that husbands' and wives' same day scores were allowed to correlate with each other; a first-order autoregressive pattern within person was used to account for the daily pattern of diary assessments (e.g., Gleason, et al., 2003).

Cumulative protection. Consistent with Hypothesis 1, husbands incurred significantly more daily protective factors from their spouses than did wives (*b* (713.12) = -.23, *SE* = .019, *p* < .001). The prototype model (Model 1) detailed above was also used to test for gender differences in each of the individual protective factors. There were no gender differences in empathy (*b* (681.84) = .019, *SE* = .014, *p* = .18). Women were, however, more responsive towards their partners than were men (*b* (125.65) = -.26, *SE* = .026, *p* < .001; see Table 5).

Cumulative risk. Contrary to Hypothesis 3, there was not a significant gender difference in the number of daily risks incurred by men and women (*b* (618.61) = -.012, *SE* = .018, *p* = .49). The prototype model detailed above (Model 1) was used to test for gender differences in each of the individual risk factors. Women were more likely to use

loyalty in response to marital stressors than were men (*b* (642.58) = .018, *SE* = .006, *p* = .003). In contrast, men were more likely to experience negativity from their wives than women were from their husbands (*b* (620.40) = -.028, *SE* = .009, *p* = .003). There were no gender differences in daily levels of self-silencing (*b* (651.31) = .003, *SE* = .008, *p* = .72) or withdrawal (*b* (662.16) = -.005, *SE* = .007, *p* = .47; see Table 5).

Cumulative coping. The prototype model (Model 1) was used to test for gender differences in cumulative coping (Research Question 1). There was no gender difference in daily levels of cumulative coping (*b* (562.95) = .005, *SE* = .01, *p* = .64). There were, however, significant gender differences in how frequently specific coping strategies were used to cope with marital stressors. Specifically, women were more likely than men to seek emotional support when they encountered a marital stressor (*b* (602.74) = .013, *SE* = .004, *p* = .003). Similarly, women were more likely than were men to ruminate about a marital stressor that had occurred that day (*b* (577.54) = .020, *SE* = .006, *p* = .001). Men were marginally more likely than women to self-distract from marital stressors that had occurred that day (*b* (578.31) = -.010, *SE* = .006, *p* = .10). Men also reported drinking more than did women (*b* (499.87) = -.023, *SE* = .006, *p* < .01; see Table 5).

Gender hypotheses for global measures (Model 2). In order to test Hypotheses 1 and 3 and to address Research Question 1, three different multilevel models were run with global cumulative risks (Hypothesis 1), global cumulative protection (Hypothesis 3), and global cumulative coping (Research Question 1) as the outcome variables. The same prototype model (Model 2) was also used to test for gender differences in individual protective factors, risk factors, and coping strategies. Unlike daily diary models,

however, global models did not have days nested within individuals; multilevel modeling was only required to account for the dependency of individuals nested within dyads. Gender was added as the predictor variable. In order to account for the dependency of individuals nested within couples, covariance matrices were structured such that husbands' and wives' same day scores were correlated with each other. The level 1 model was as follows:

Model 2.1 $Y_{ij} = b_{0i} + b_{1i}(\text{gender})_{ij} + e_{ij.}$

In this equation, Y_{ij} represents the cumulative protection score, cumulative risk score, or coping total for person *i* within dyad *j*. Time represents the recoded diary 'day'. The average cumulative risk score, cumulative coping score, or coping total for person *i* is indicated by b_{0i}. The random effect (i.e., e_{ij}) indicates that there can be random variation in cortisol slopes within person across dyads.

Cumulative protection. Consistent with Hypothesis 1, men received more global cumulative protection than did women (*b* (98.61) = -.28, *SE* = .11, *p* = .01). The same prototype model (Model 2) was used to assess gender differences in specific global protective factors (i.e., perceived support and empathy). Women provided more empathy to their husbands than men provided to their wives (*b* (105.14) = -.21, *SE* = .06, *p* = .001). Although not significant, inspection of the means indicates that differences in perceived support were in the hypothesized direction (*b* (97.89) = -.08, *SE* = .06, *p* = .18, see Table 6).

Cumulative risk. The analysis revealed a significant effect of gender on global cumulative risk. In contrast to Hypothesis 3, however, men incurred significantly more

risks than did women (*b* (114.32) = -.50, *SE* = .13, *p* = .001). In order to better understand this pattern, the prototype model detailed above (Model 2) was used to test for gender differences in each of the individual risk factors. Results revealed a marginal trend such that women were being withdrawn from more than were men (*b* (107.92) = .11, *SE* = .06, *p* = .07). Men, however, were incurring all other risk factors more frequently than were women. Specifically, men, compared to women, were more likely to self-silence during interactions (*b* (126.31) = -.34, *SE* = .06, *p* < .001), to show loyalty towards their partners (*b* (114.75) = -.13, *SE* = .07, *p* = .05), and marginally more likely to receive negativity from their partners (*b* (111.84) = -.11, *SE* = .06, *p* = .074; see Table 6).

Cumulative coping. To answer Research Question 1, analysis of global coping revealed that women used more effective coping strategies than did men (*b* (112.20) = .25, *SE* = .12, *p* = .039). This difference is primarily attributable to the fact that women sought more emotional support than did men (*b* (115.42) =.30, *SE* = .06, *p* < .001). There were no gender differences in global reports of men's and women's self-distraction (*b* (1222.09) = .03, *SE* = .06, *p* = .66), substance use (*b* (92.45) = -.01, *SE* = .05, *p* = .84), or rumination (*b* (112.66) = .07, *SE* = .07, *p* = .26; see Table 6).

Cortisol hypotheses for daily diary measures (Model 3). To assess the impact of cumulative risk and cumulative protection on cortisol, a series of multilevel models were tested with daily cortisol slopes as the outcome variable and cumulative protection (Hypothesis 2) and cumulative risk (Hypothesis 4) as the predictors. Interaction terms between each gendered coping strategy and cumulative risk were also added as predictor

variables (Hypotheses 5-8). Physiological variables known to impact cortisol, including alcohol consumption that day, body mass index (BMI), and birth control were included in the model as controls. I also controlled for the total number of stressors individuals encountered that day from sources external to the relationship, the diary day (i.e., time), the time of the morning sample (a.m. time), the time of the evening sample (p.m. time), and waking levels of cortisol each morning (i.e., analyses used residual change scores; Griffin, Murray, & Gonzalez, 1999).

The level 1 model for the daily diary data is represented by the following equation:

Model 3.1 $$Y_{ijk} = b_{0ij} + b_{1ij}(\text{time})_{ijk} + b_{2ij}(\text{a.m. time})_{ijk} + b_{3ij}(\text{p.m. time})_{ijk} + b_{4ij}(\text{waking cortisol})_{ijk} + b_{5ij}(\text{external stressors})_{ijk} + b_{6ij}(\text{cumulative risk})_{ijk} + b_{7ij}(\text{cumulative protection})_{ijk} + b_{8ij}(\text{substance use})_{ijk} + b_{9ij}(\text{self-distraction})_{ijk} + b_{10ij}(\text{emotional support})_{ijk} + b_{11ij}(\text{rumination})_{ijk} + b_{12ij}(\text{cumulative risk x substance use})_{ijk} + b_{13ij}(\text{cumulative risk x self-distraction})_{ijk} + b_{14ij}(\text{cumulative risk x emotional support})_{ijk} + b_{15ij}(\text{cumulative risk x rumination})_{ijk} + e_{ijk.}$$

In this equation, Y_{ijk} is the cortisol slope for person *i* at time *k* within dyad *j*. Time represents the time (i.e., day) of the diary (i.e., time 1- time 6). The average cortisol slope for person *i* is indicated by b_{0ij}. All variables in the model were grand mean centered to make coefficients easier to interpret. This level 1 equation allows cortisol slopes for the six days to fluctuate as a function of cumulative risk, cumulative protection, the interaction of each coping strategy and cumulative stress, the waking

values of cortisol each morning, the time of the morning sample, the time of the evening sample, and stressors that occurred that day external to the marriage.

The level 2 equation for the diary data was as follows:

Model 3.2 $b_{0ij} = \gamma_{00} + \gamma_{01}(\text{alcohol})_{ij} + \gamma_{02}(\text{bmi})_{ij} + \gamma_{03}(\text{birth control})_{ij} + \gamma_{04}(\text{gender})_{ij} + U_{0ij}$.

This second level equation treats the first level intercept as a function of the control variables. Control variables are included in the intercept because they should impact individuals' average cortisol levels, but not necessarily the way that cortisol changes between days. All control variables, with the exception of birth control (1 = using hormonal birth control and 0 = not using hormonal birth control) were grand mean centered. In order to account for the dependency of dyadic data, I again structured covariance matrices to allow husbands' and wives' same day measures to correlate; I also used a first-order autoregressive pattern within person to account for the daily diary design (e.g., Gleason et al., 2003). Although gender was not a predictor of interest in this particular analysis, I included gender as a control and allowed it to interact with every predictor in the model to test for between-person effects within the dyad (e.g., Gleason et al., 2003). If a gender interaction was significant, I also ran a no intercept model that estimated men's and women's daily cortisol slopes separately[1] (M. Gleason, Personal Communication, December 2, 2009). In order to better understand why the cumulative totals were impacting cortisol, I also ran the prototype model above (Model 3) with individual protective, risk, and coping factors entered as predictor variables.

Before running cumulative protection, cumulative risk, and coping models, I first ran a control model to determine whether control variables (gender, birth control use, diary day, external stress, alcohol use, morning cortisol level, BMI, time of morning sample, and time of evening sample) were significant predictors of cortisol slopes. Although gender ($p < .01$), birth control use ($p < .01$), morning values of cortisol ($p < .001$), BMI ($p = .04$), and evening sampling time ($p < .01$) were all significant, day of sampling, stress, alcohol use, and morning sampling time were not significant (see Table 7). To insure a conservative test, diary day and time of morning sampling was maintained in the model. All other non-significant controls were removed from subsequent models.

Full model. To determine the relative impact of cumulative risk, cumulative rumination, and coping strategies on cortisol slopes, I ran the full prototype model outlined above (i.e., Model 3; see Table 8 for results). There was a significant impact of distraction on residual change in cortisol such that individuals' cortisol slopes were flatter to the extent that they distracted themselves from marital stressors (b (757.42) = -.05, SE = .02, p = .04). There was also a marginal 2-way interaction between gender and cumulative protection (b (694.60) = .04, SE = .02, p = .09). Finally, there was a significant interaction between cumulative risk and gender (b (663.08) = .04, SE = .02, p = .05), but this interaction was qualified by two separate 3-way interactions. Specifically, there was a significant 3-way interaction between emotional support, cumulative risk, and gender (b (701.38) = .09, SE = .04, p = .01) and a marginal interaction between rumination, cumulative risk, and gender (b (703.97) = -.02, SE = .01,

p = .06). In order to better understand these interactions, I ran cumulative risk, cumulative protection, and coping models separately. Below I discuss the results of those models. Because interactions are not always significant in the individuals models, in my discussion below I also include the significance tests from the full model.

Cumulative protection. To determine whether cumulative protection was linked to individuals' cortisol slopes (Hypothesis 2), daily fluctuations in cumulative protection and the interaction between cumulative protection and gender were added to the control model. Contrary to Hypothesis 2, there was no association between cumulative protection and cortisol slopes. There was, however, a marginal gender by cumulative protection interaction (b (718.95) = .04, SE = .02, p = .10; b (694.60) = .04, SE = .02, p = .09 in the full model). To explore this marginal interaction, I ran a no intercept model that estimated simultaneously the impact of cumulative protection on husbands' and wives' cortisol slopes. Although the impact of cumulative protection was not significant for husbands or wives (p >.2), careful inspection of the coefficients suggests that cumulative protection had a negative impact on men's cortisol slopes (b (738.74) = -.04, SE = .03, p = .24) whereas cumulative protection had a positive impact on wives' cortisol slopes (b (711.15) = .04, SE = .03, p = .23). That is, men experienced flatter cortisol slopes as they received more cumulative protection whereas women experienced steeper cortisol slopes as they received more cumulative protection.

In order to determine whether any individual protective factor was associated with cortisol slopes, I ran a model in which individual protective factors (responsiveness and empathy) and the interaction of each protective factor with gender were entered into

Model 3 in lieu of cumulative protection. There was a significant empathy x gender interaction on cortisol slopes (*b* (748.03) = .04, *SE* = .02, *p* = .05). A no intercept model predicting simultaneously the impact of empathy on men and women revealed that there was a trend such that empathy was associated with flatter cortisol slopes for men (*b* (764.03) = -.04, *SE* = .028, *p* = .14) and steeper cortisol slopes for women (*b* (753.154) = .03, *SE* = .03, *p* = .21).

Cumulative risk. To test whether cumulative risk was linked to individuals' cortisol slopes (Hypothesis 4), cumulative risk and its interaction with gender were added to the control model. Inconsistent with Hypothesis 4, there was not a significant effect of cumulative risk on cortisol slopes (*b* (631.3) = -.01, *SE* = .02, *p* = .62). There was, however, a marginal gender by cumulative risk interaction, (*b* (635.75) = .03, *SE* = .02, *p* = .14). This same 2-way interaction is significant when entered into the full model (*b* (663.08) = .04, *SE* = .02, *p* = .05). To explore this marginal interaction, I ran a no intercept model that estimated cumulative risk simultaneously for husbands and wives. The impact of cumulative risk was marginally associated with husbands' (*b* (755.42) = -.04, *SE* = .03, *p* = .16) but not wives' (*b* (753.93) = .02, *SE* = .03, *p* = .49) cortisol slopes. That is, there was a trend for an increase in cumulative risk to be associated with flatter cortisol slopes for men, but there was no relationship between women's cumulative risk and cortisol slopes.

Next, to determine whether any individual risk factor was associated with cortisol slopes, each risk factor (withdraw, loyalty, self-silencing, and negativity), and the interaction of the risk factor with gender, were added to Model 3 in lieu of cumulative

risk. None of these risk factors, when entered individually or simultaneously, significantly predicted cortisol outcomes.

Coping strategies. In order to determine whether cumulative risk was moderated by coping strategies, daily fluctuations in self-distraction (Hypothesis 5), substance use (Hypothesis 6), emotional support (Hypothesis 7), rumination (Hypothesis 8), and their interactions with gender were entered as predictors of residual change in cortisol. Contrary to Hypothesis 5, there was a main effect of self-distraction, such that individuals' cortisol slopes were flatter to the extent that they used self-distraction to cope with marital stressors (*b* (770.73) = -.05, *SE* = .02, *p* = .05; *b* (757.42) = -.05, *SE* = .02, *p* = .04 in the full model). There were also two significant 3-way interactions: emotional support x cumulative risk x gender (*b* (721.00) = .107, *SE* = .035, *p* < .01; *b* (701.38) = .09, *SE* = .04, *p* = .01 in the full model; see Figure 2) and rumination x cumulative risk x gender (*b* (728.55) = -.02, *SE* = .01, *p* = .05; *b* (703.97) = -.02, *SE* = .01, *p* = .06 in the full model; see Figure 3).

Emotional support. In order to understand the 3-way interaction between emotional support, cumulative risk, and gender, a no intercept model was also used to estimate men's and women's cortisol slopes as a function of emotional support and the interaction of emotional support with cumulative risk. There was a significant interaction of emotional support and cumulative risk for men (*b* (707.59) = -.16, *SE* = .06, *p* = .01) and women (*b* (762.40) = .07, *SE* = .03, *p* = .01). In partial support of Hypothesis 7, women who experienced higher levels of cumulative risk experienced steeper cortisol slopes as a function of seeking more emotional support, whereas women with lower

levels of cumulative risk did not benefit from emotional support. The opposite trend was true for men; men who encountered more risks experienced flatter cortisol slopes the more they sought emotional support whereas those who encountered fewer risks experienced steeper cortisol slopes (see Figure 2).

Simple slopes analyses (Preacher, Curran, & Bauer, 2006) indicated that men's emotional support slopes at one standard deviation above and below the mean risk score were significantly different from zero (p = .06 and p = .01, respectively). Additionally, at one standard deviation above the mean on emotional support, men one standard deviation above and below the mean cumulative risk score had different cortisol slopes (p = .04). Further, at one standard deviation below the mean risk score, emotional support slopes for women were significantly different from zero (p < .01). Finally, at one standard deviation above the mean on emotional support, women one standard deviation above and below the mean cumulative risk score had different cortisol slopes (p < .01).

Rumination. In order to understand the 3-way interaction between rumination, cumulative risk, and gender, a no intercept model was used to estimate men's and women's cortisol slopes as a function of rumination and the interaction of rumination with cumulative risk. Neither the interaction (b (738.49) = -.01, SE = .02, p = .77) nor the main effect of rumination (b (714.54) = -.01, SE = .03, p = .83) was significant for women. The main effect of rumination was also not significant for men (b (756.69) = -.04, SE = .04, p = .36), but there was some evidence for an interaction between rumination and cumulative risk (b (718.17) = .03, SE = .03, p = .20). In contrast to Hypothesis 8, visual inspection of Figure 3 suggests that men who encountered more

risks had flatter cortisol slopes when they are used lower levels of rumination compared to higher levels of rumination. Simple slopes analyses (Preacher, et al., 2006) indicated that at one standard deviation above and the mean risk score, rumination slopes for men were significantly different from zero (p = .03). Furthermen one standard deviation above and below the mean cumulative risk score had different cortisol slopes (p = .04).

Cortisol hypotheses for global measures (Model 4). In order to test the impact of global measures of cumulative protection, cumulative risk, and coping on cortisol, I used MLM to average cortisol slopes (i.e., difference scores) across the 6 days to create a single global measure of cortisol slopes. In this model, averaged daily cortisol slope was the outcome variable; cumulative protection (Hypothesis 2), cumulative risk (Hypothesis 4), and the interaction terms between each gendered coping strategy and cumulative risk (Hypotheses 5-8) were the predictor variables. Physiological variables known to impact cortisol that were significant in the previous models, including BMI, and birth control, were added to the model.

The level 1 model for the global measures is represented by the following equation:

Model 4.1 $$Y_{ij} = b_{0i} + b_{1ij}(\text{time})_{ijk} + b_{2ij}(\text{a.m. time})_{ijk} + b_{3ij}(\text{p.m. time})_{ijk} + b_{4ij}(\text{waking cortisol})_{ijk} + e_{ij.}$$

Y_{ij} is the global (i.e., 6-day averaged) cortisol slope for person *i* within dyad *j*. The average of the global cortisol slope for person *i* is indicated by b_{0i}.

The level 2 equation for the global measures will be as follows:

Model 4.2 $b_{0ij} = \gamma_{00} + \gamma_{01}(\text{bmi})_{ij} + \gamma_{02}(\text{birth control})_{ij} + \gamma_{03}(\text{cumulative risk})_{ij} + \gamma_{04}(\text{cumulative protection})_{ij} + \gamma_{05}(\text{substance use})_{ij} + \gamma_{06}(\text{self-distraction})_{ij} + \gamma_{07}(\text{emotional support})_{ij} + \gamma_{08}(\text{rumination})_{ij} + \gamma_{09}(\text{cumulative risk x substance use})_{ij} + \gamma_{10}(\text{cumulative risk x self-distraction})_{ij} + \gamma_{11}(\text{cumulative risk x emotional support})_{ij} + \gamma_{12}(\text{cumulative risk x rumination})_{ij} + U_{0ij.}$

This second level equation states that the average global cortisol slope for person *i* in dyad *j* is predicted by cumulative protection, cumulative risk, coping strategies, the interaction of each coping strategy with cumulative risk, and the control variables.

In order to account for the dependency of individuals nested within couples, I structured covariance matrixes as described in the previous model (Model 3) and allowed gender to interact with every predictor in the model (e.g., Gleason et al., 2003). If the gender interaction was significant for any of the predictors, I ran a no intercept model that estimated men's and women's daily cortisol slopes separately[2] (M. Gleason, Personal Communication, December 2, 2009). Again, in order to better understand why the cumulative totals were impacting cortisol, I also ran the prototype model detailed above (Model 4) with individual protective, risk, and coping factors entered as predictor variables.

Full model. To determine the relative impact of global measures of cumulative protection, cumulative risk, and coping strategies on average cortisol slopes, I ran the full prototype model outlined above (Model 4; see Table 9 for results). There was a significant impact of rumination on average cortisol slopes (*b* (364.82) = -.010, *SE* =

.003, p = .03). This effect was qualified by a 2-way interaction with cumulative risk and rumination (b (334.71) = .003, SE = .001, p = .04). This 2-way interaction was qualified by a 3-way interaction between rumination, gender and cumulative risk (b (356.85) = -.003, SE = .002, p = .05). There was also a marginal 3-way interaction between cumulative risk, gender and substance use (b (407.33) = .003, SE = .002, p = .10). In order to better understand these interactions, I ran cumulative risk, cumulative protection, and coping models separately. Below I discuss the results of those models. Because interactions are not always significant in the individuals models, in my discussion below I also include the significance tests from the full model.

Cumulative protection. Contrary to Hypothesis 2, there was no significant effect of global measures of cumulative protection on average cortisol slopes. To determine the impact of specific protective factors on average cortisol slopes, empathy, perceived support, and the interaction of each of these with gender were added to Model 4 in lieu of cumulative protection. The perceived support X gender interaction (b (333.75) = .005, SE = .003, p = .10) and the empathy X gender interaction (b (333.75) = .005, SE = .003, p = .10) were both marginally significant.

To explore these effects further, I ran a no intercept model that estimated men's and women's coefficients simultaneously. For empathy, there was a trend such that husband's cortisol slopes were flatter as a function of receiving empathy from their partners (b (438.69) = -.0104, SE = .006, p = .08); there was no association between wives average cortisol slopes and empathy (b (362.56) = .004, SE = .006, p = .53). For perceived support, men's cortisol declined more rapidly as a function of perceiving

higher levels of support (*b* (323.17) = .011, *SE* = .005, *p* = .04); again, there was no association between perceived support and average cortisol slopes for women (*b* (357.04) = -.0008, *SE* = .006, *p* = .89).

Cumulative risk. To determine whether the global measure of cumulative risk was linked to individuals' cortisol slopes (Hypothesis 4), cumulative risk and its interaction with gender were added to the control model. Contrary to Hypothesis 4, there was no association between cumulative risk and cortisol slopes. To determine whether any specific global risk factor (withdrawal, loyalty, self-silencing, or negativity) affected average cortisol slopes, individual risk factors were entered into the prototype model (Model 4) as predictor variables. Withdrawal was significantly correlated with average cortisol slopes such that the more individuals were withdrawn from, the flatter their cortisol slopes (*b* (311.89) = -.007, *SE* = .003, *p* = .02). There was also a marginal trend for loyalty such that the more individuals used loyalty during conflict, the steeper their cortisol slopes (*b* (333.75) = .005, *SE* = .003, *p* = .10).

Coping strategies. In order to determine whether cumulative risk was moderated by coping strategies, global measures of self-distraction (Hypothesis 5), substance use (Hypothesis 6), emotional support (Hypothesis 7), rumination (Hypothesis 8), and their interactions with cumulative risk and gender were entered as predictors of residual change in average cortisol slopes. There was a significant effect of rumination on average cortisol slopes such that higher use of rumination was associated with flatter cortisol slopes (*b* (309.38) = -.007, *SE* = .003, *p* = .02; *b* (364.82) = -.010, *SE* = .003, *p* = .03 in the full model). This main effect of rumination, however, was qualified by a

significant 2-way interaction between rumination and cumulative risk (*b* (348.41) = .003, *SE* = .001, *p* = .04; *b* (334.71) = .003, *SE* = .001, *p* = .04 in the full model). Contrary to Hypothesis 8, rumination was associated with flatter cortisol slopes for individuals experiencing lower levels of cumulative risk (see Figure 4). As mentioned, in the full model this 2-way interaction was qualified by a 3-way interaction between rumination, gender and cumulative risk (*b* (356.85) = -.003, *SE* = .002, *p* = .05). There was also a marginal 3-way interaction between cumulative risk, gender and substance use (*b* (407.33) = .003, *SE* = .002, *p* = .10). Each of these effects is discussed more fully below.

Substance use. To better understand the 3-way interaction between substance use, cumulative risk, and gender, I ran a no intercept model that simultaneously estimated coefficients for husbands and wives. There was not a significant 2-way interaction between substance use and cumulative risk for wives (*b* (313.37) = .001, *SE* = .002, *p* = .56). There was, however, some evidence for a 2-way interaction between substance use and cumulative risk for husbands (*b* (442.41) = -.003, *SE* = .002, *p* = .19). Visual inspection of Figure 6 indicates that, consistent with Hypothesis 6, substance use was associated with flatter cortisol slopes for men experiencing higher levels of cumulative risk. In contrast, substance use was associated with steeper cortisol slopes men experiencing lower levels of cumulative risk (see Figure 6). Simple slopes analyses (Preacher, et al., 2006) indicated that substance use slopes for men were not significantly different from zero at one standard deviation above and below the mean risk score.

There was also a main effect for substance use on women's average cortisol slopes. In partial support of Hypothesis 6, the more women used substances to cope with marital stressors, the flatter their average cortisol slope (*b* (281.42) = -.011, *SE* = .005, *p* = .03).

Rumination. To better understand the 3-way interaction between rumination, cumulative risk, and gender, I ran a no intercept model that estimated men's and women's coefficients simultaneously. Neither rumination (*b* (348.77) = -.005, *SE* = .005, *p* = .30) nor the interaction between rumination and cumulative risk (*b* (322.24) = .001, *SE* = .002, *p* = .71) were significant for women. There was, however, a significant effect of rumination for men (*b* (364.62) = -.013, *SE* = .005, *p* = .01), which was qualified by a 2-way interaction of rumination and cumulative risk (*b* (349.01) = .006, *SE* = .002, *p* = .03). Visual inspection of Figure 5 indicates that the same pattern found 2-way interaction replicates for men, but not women. That is, in partial support of Hypothesis 8, rumination was associated with flatter cortisol slopes for men, but only for those experiencing fewer cumulative risks. Simple slopes analyses (Preacher, et al., 2006) indicated that rumination slopes were significant for men one standard deviation below the mean on cumulative risk ($p < .001$). At one standard deviation above the mean on rumination, men one standard deviation above and below the mean cumulative risk score had different cortisol slopes ($p = .01$).

Supplemental Analysis

Relationship Satisfaction. Relationship satisfaction, which is more central to women's compared to men's well-being, often moderates the gender differences between men's and women's health outcomes (Mills, Grasmick, Morgan, & Wenk, 1992). For

example, although married women overall report greater signs of physical distress than married men, in satisfied relationships these differences disappear (Levenson, Carstensen, & Gottman, 1993). Further, women in high quality marital relationships have stress profiles that are very similar to those of single women (Gallo, Troxel, Matthews, Kuller, & Sutton-Tyrrell, 2003). In order to determine whether cumulative risk and cumulative protection were moderated by relationship satisfaction, relationship satisfaction and its interaction with cumulative risk and cumulative protection were entered into prototype Model 3 and Model 4.

Although there was no relationship between relationship satisfaction and global measures of cumulative protection and cumulative risk, there was a significant 2-way interaction between daily cumulative protection and relationship satisfaction on cortisol slopes (b (652.68) = -.07, SE = .02, $p < .01$). This 2-way interaction was qualified by a significant 3-way interaction between gender, relationship satisfaction, and cumulative protection (b (603.68) = .06, SE = .03, p = .02). A no intercept model was run to predict men's and women's cortisol outcomes simultaneously. The interaction between relationship satisfaction and cumulative protection was not significant for women (b (645.21) = -.01, SE = .03, p = .77); however, there was a significant 2-way interaction between relationship satisfaction and cumulative protection for men (b (611.61) = -.12, SE = .04, $p < .01$). Visual inspection of Figure 7 indicates that when men were in low quality relationships, higher levels of cumulative protection were associated with steeper cortisol slopes. When men were in high quality relationships, however, the opposite was true; higher levels of cumulative protection were associated with flatter cortisol slopes

whereas lower levels of cumulative protection were associated with steeper cortisol slopes. Simple slopes analysis (Preacher, et al., 2006) indicated that relationship satisfaction slopes were significantly difference from zero for men one standard deviation below (p = .03) and above (p = .02) the mean on cumulative protection. There was no impact of the interaction between relationship satisfaction and daily cumulative protection on cortisol slopes.

Perceived stress. Models 3 and 4 outlined above used to predict the impact of both daily and global cumulative protection, cumulative risk, and coping on men's and women's cortisol slopes were also used to determine whether daily and global cumulative protection, cumulative risk, and coping were associated with daily fluctuations in perceived stress. Although there were no associations between global reports of cumulative protection, cumulative risk, and coping on perceived stress, there were associations between daily measures of these constructs and perceived stress. Specifically, daily reports of cumulative risk were positively associated with daily reports of perceived stress (b (797.21) =.10, SE = .04, p < .01). That is, the more cumulative risk individuals incurred in a day, the higher were their perceived levels of stress.

Self-silencing. As was previously explained, past studies have found that men and women interpret the items of the self-silencing scale differently (Remen, Chambless, & Rodebaugh, 2002): for men the self-silence measure can tap intimacy avoidance (similar to withdrawal) whereas for women the self-silence measure taps an act of self-sacrifice (Remen, Chambless, & Rodebaugh, 2002). To address this limitation, I determined whether or not individual's global reports of self-silencing were associated

with partner's global reports of withdrawal (the self-silencing measure was not used to assess daily self-silencing). The results of this bivariate correlation revealed that women's reports of withdrawal were highly correlated with their husbands' reports of self-silencing ($p < .007$). The same pattern, however, did not replicate for husbands.

To determine whether partners' reports of self-silencing were associated with individuals' cortisol slopes, I entered partners' global reports of self-silencing and the interaction of global self-silencing and gender into the prototype Model 4 outlined above for testing effects of global measures on cortisol outcomes. There was a marginal 2-way interaction between partners' reports of self-silencing and gender (b (363.46) = -.005, SE = .003, p = .07). A no intercept model used to estimate the relationship between self-silencing on cortisol for men and women revealed that there was a trend for partners' self-silencing to be associated with flatter cortisol slopes for women (b (377.76) = -.006, SE = .004, p = .10). There was no relationship between partners' self-silencing on men's cortisol (b (389.35) = .004, SE = .004, p = .32).

Because global reports of silencing do not appear to be a risk factor, at least for men, global cumulative risk was recalculated without self-silencing (i.e., with withdraw, loyalty, and negativity). Using Model 2 described above to test for gender differences in the new cumulative risk score revealed that there were no gender differences in cumulative risks when self-silencing is deleted from the cumulative risk total (b (212.00) = -.11, SE = .12, p = .34).

Discussion

Men and women differ in the extent to which they experience or enact a number of co-occurring protective, risk, and coping factors within the context of marriage. In order to determine the impact of these co-occurring factors on husbands' and wives' health, newlywed couples completed an initial survey that provided global measures of protective factors (perceived support and empathy), risk factors (withdrawal, loyalty, self-silencing, and negativity), and coping (self-distraction, substance use, emotional support, and rumination). Spouses also provided daily diary measures of these constructs (perceived support was replaced by responsiveness) for six days. Both global and daily measures of individual protective, risk, and coping factors were summed to create cumulative protection, cumulative risk, and cumulative coping totals. For the six days that participants provided daily reports of these constructs, they also provided waking and evening saliva samples for later determination of salivary cortisol levels. I hypothesized that men would incur more protective factors than would women, and that these protective factors would be associated with steeper declines in cortisol (i.e., healthy cortisol slopes.) Further, I hypothesized that women would incur more cumulative risks than would men, and that these risks would be associated with flatter cortisol slopes (i.e., unhealthy cortisol slopes). Finally, I hypothesized that the association between cumulative risk and cortisol slopes would be moderated by coping, such that theoretically-effective coping strategies would blunt the impact of cumulative risks whereas ineffective coping strategies would exacerbate the impact of cumulative risks. Support for these hypotheses was mixed (for a summary of results see Table 10).

Results and Rationale

Gender and cumulative protection. Consistent with past research (e.g., Mirgain & Cordova, 2007; Neff & Karney, 2005; Vinokur & Vinokur-Kaplan, 1990), I hypothesized that men would experience more global and daily protective factors than would women (Hypothesis 1). Indeed, men incurred significantly more protective factors than did women across both diary and global measures of cumulative protection. There were also gender differences in individual protective factors. Consistent with past work, women were more responsive to their spouses' stress than were men; women reported providing more support on the days when their spouses were more stressed (Neff & Karney, 2005). Men also received more global empathy from their spouses than did women (Mirgain & Cordova, 2007). Supporting the use of a cumulative model, gender was more strongly associated with cumulative protection than it was with any single protective factor. For example, in the current study the impact of gender on perceived support was marginal at best; however, when perceived support was combined with empathy to form a cumulative total, gender differences were significant. In short, combining these protective factors into a single score created a more stable estimate of the protection individuals gain from their spouses.

Cortisol and cumulative protection. In addition to gender differences in cumulative protection, I also hypothesized that global and daily cumulative protective factors would be associated with steeper (i.e., healthier; Kirschbaum & Hellhammer, 1989) cortisol slopes (Hypothesis 2). There was some evidence that cumulative protective factors were associated with steeper cortisol slopes. Whereas there was no

association between global measures of cumulative protection and cortisol slopes, there was a marginal interaction between *daily* measures of cumulative protection and gender such that cumulative protection was associated with steeper cortisol slopes for women, but flatter cortisol slopes for men. This 2-way interaction, however, must be considered in light of a significant 3-way interaction between relationship satisfaction, gender, and cumulative protection. Men who were low in relationship satisfaction experienced steeper cortisol slopes when they received higher levels of cumulative protection; it was only husbands who were high in relationship satisfaction that experienced flatter cortisol slopes as a function of higher levels of cumulative protection.

One possible interpretation of this 3-way interaction between gender, relationship satisfaction, and cumulative protection is that this result reflects a ceiling effect; men benefit substantially from relationship satisfaction, and therefore daily fluctuations in cumulative protection do not create additional benefit. Such an interpretation is consistent with Cutrona's (1996) findings that women rely on the number of supportive statements their partners make when evaluating marital interactions whereas men rely on global perceptions of relationship satisfaction when making judgments about their marital interactions. Similarly, in the current study global perceptions of relationship satisfaction may override daily occurrences of cumulative protection when predicting men's cortisol slopes.

Gender differences in cumulative risk. Based on extant work (e.g., Christensen & Heavey, 1990; Rusbult, Johnson, & Morrow, 1986; White, 1989), I hypothesized that women would experience more global and daily risk factors than would men (Hypothesis

3). Contrary to Hypothesis 3, women did not incur more global or daily cumulative risks than did men. In fact, when using global measures of cumulative risk, men incurred more cumulative risks. Follow-up analyses revealed that men's higher levels of global cumulative risk were attributable to men's higher reports of self-silencing. As previously discussed, men commonly interpret the self-silencing measure as a form of withdrawal (as opposed to self-sacrifice; Remen, Chambless, & Rodebaugh, 2002). Consistent with this notion, husbands' reports of self-silencing were significantly associated with wives' reports of his withdrawal. Wives' reports of self-silencing, however, were not associated with husbands' reports of her withdrawal. Further, there was marginal evidence that partners' reports of self-silencing were associated with flatter cortisol slopes for women, but not for men. Because self-silencing appears to tap husbands' withdrawal, self-silencing may not function as a risk factor for men. Instead, wives are at risk when their partners self-silence (i.e., withdraw). Indeed, when self-silencing was removed from global calculations of cumulative risk, gender differences in cumulative risk disappeared. As such, it is likely most accurate to conclude that there were no gender differences in the number of risk factors men and women reported. I will discuss this point more fully below after reviewing findings for the remaining individual risk factors.

There was evidence for gender differences in individual risk factors. First, as discussed previously, men reported higher levels of global self-silencing compared to women. Again, this is likely caused by measurement issues, raising important questions for future research. Specifically, future research needs to distinguish between intentions underlying the use of self-silencing in the marital interaction context: is an individual

avoiding the conversation (withdrawal), or is the individual protecting his or her partners' feelings (self-sacrifice)? These different intentions likely result in disparate health outcomes, especially given that the 'self-sacrifice' intention requires emotional suppression. Compared to men, women more frequently suppress emotions in order to benefit interaction partners' emotional states (i.e., emotion work), a phenomena that has been labeled *the third shift* (Hochschild, 1983). The suppression of emotions results in a plethora of negative physiological consequences (Gross & Levenson, 1983; Pennebaker & Traue, 1993). Consistent with this line of work, perhaps a better way to measure accommodation as a risk factor is via emotional suppression.

Second, consistent with past research on use of accommodating language during conflict (Rusbult, Johnson, & Morrow, 1986), women used loyalty on a *daily basis* more so than did men. Interestingly, women reported higher levels of loyalty in the diary measures whereas men reported greater *global* loyalty than did women. One possible explanation for this inconsistent pattern is that although women use loyalty more frequently than do men, they do not perceive themselves as being loyal. In other words, loyalty may be so embedded in women's conflict management style that they are not even aware it occurs until asked to report their day to day behaviors (i.e., it functions as 'invisible' loyalty, so to speak).

Third, consistent with past research, there was some evidence that men withdrew from their partners more than did women (e.g., Caughlin & Vangelisti, 1999; Eldridge, Sevier, Jones, Atkins, & Christensen, 2007); however, this pattern was found in global reports but not daily measures. There are at least two plausible explanations for the

differences in global relative to concurrent reports. First, wives, compared to husbands, may perceive more withdrawal regardless of day-to-day actual behaviors. Thus, the global reports reflect perceptual bias on the part of wives. Second, it may simply be the case that withdrawal does not occur frequently enough in a newlywed sample to have been captured in the 6 days of diaries. In other words, wives' global reports may be more accurate than the daily reports. Importantly, even if differences in withdrawal are only a matter of perception, they still have consequences, as evidenced by the effects on cortisol slopes (discussed more fully below).

Finally, men incurred more negativity from their spouses than vice-versa. Although some past research indicates that men are more negative towards their spouses than are women, such a pattern of results is not consistent across studies (e.g., Heavey et al., 1993). Earlier, I speculated that one reason for discrepant gender differences across studies was differing operational definitions of negativity. Specifically, studies that fail to find gender differences in negativity often include expressions of sadness and hurt as negative actions. Because women are more likely than men to express hurt and sadness (Mirgain & Cordova, 2007), including these emotions could counter men's greater use of other negative behaviors (e.g., hostility). In the current study, however, expressions of sadness or hurt were not included in the operational definition of negativity. Yet, wives were *still* more negative than husbands even when negativity was operationalized solely as criticism and hostility.

One reason wives were perceived by their partners as negative could reflect women's greater propensity to raise relationship concerns or request change (i.e., the

demand side of demand-withdraw; Gottman & Levenson, 1999). That is, perhaps when women were initiating conversations about relationship issues, their attempts were interpreted by men as hostile critiques. If this is the case, women are only perceived as being more hostile than men, but objectively they are not being more negative. Lending credence to this speculation, past work that found gender differences in negativity relied on objective ratings of behavior during conflict rather than subjective reports (e.g., Newton & Standford, 2003; White, 1989).

Alternatively, women in this highly satisfied newlywed sample may be more negative than men independent of requesting change, making negativity a larger risk factor for men compared to women. It is worth discussing this unexpected finding in more detail. The majority of past research that found men to be more negative than women was conducted on couples low in relationship satisfaction (e.g., White, 1989). When studies report variation in relationship satisfaction, gender trends for hostility and negativity are most pronounced in couples low in relationship satisfaction (e.g., Newton & Stanford, 2003). Taking these studies together, and in light of the findings in the current study, it remains possible that this gender pattern is reversed in highly satisfied couples.

In short, although there were gender differences in individual risk factors, these differences did not translate into gender differences in overall cumulative risk. The lack of gender differences in cumulative risk exists in part because differing gender patterns in individual risk factors offset one another when creating cumulative totals. That is, because men were more likely than women to withdraw, and women were more likely

than men to be negative, the net total was equivalent for men and women. Additionally, recall that the couples in this newlywed sample were generally highly satisfied with their marriages, resulting in very low base rates of risk factors. Such low base rates make between person differences (e.g., gender) harder to detect (Huberty, 1984).

Cortisol and cumulative risk. In addition to expecting gender differences in cumulative risk, I also hypothesized that global and daily cumulative risk would be associated with flatter cortisol slopes (Hypothesis 4). In contrast to steep cortisol slopes, flatter cortisol slopes are indicative of unhealthy diurnal cortisol rhythms and associated with poorer immune and cardiovascular functioning (Kirschbaum & Hellhammer, 1989). There was some evidence that cumulative risks were associated with flatter cortisol slopes. That is, when using the diary measure of cumulative risk, there was an interaction between cumulative risk and gender such that cumulative risk was associated with flatter cortisol slopes for men, but not women. No effects were found when using global measures of cumulative risk.

The fact that cumulative risk did not impact women's cortisol slopes contradicts a large body of past laboratory-based research documenting that risk factors in marriage have more negative physiological consequences for women compared to men (e.g., Ewart et al., 1991; Kiecolt-Glaser et al., 1993; Malarkey et al., 1994). Supplemental analyses provided evidence that cumulative risk totals were associated with daily fluctuations in perceived stress for both men and women, indicating that the cumulative risk measure was tapping into risk factors that both men and women subjectively experienced as stressful. Although perceived stress often does not correlate with physiological stress

(Fehm-Wolfsdorf et al., 1999), it seems reasonable to expect that the association between cumulative risk and cortisol slopes would prevail for women as it did for men. It could be that different risk factors in cumulative risk totals benefit women. For example, there was some evidence that daily fluctuations in loyalty, which was one risk factor women encountered more frequently than men, was *positively* associated with steeper cortisol declines. As a result, for women *theoretical* risks may not uniformly represent *actual* risks. Another possibility is that in highly satisfied romantic relationships such as those represented in the current study's newlywed sample, women are resilient to lower levels of risk. Future research should determine whether gender differences in the impact of cumulative risk on cortisol slopes replicate in samples where women are incurring higher levels of cumulative risk.

Although global measures of cumulative risk were not associated with changes in cortisol, there was a significant negative association between global measures of withdrawal and cortisol slopes. The association between withdrawal and cortisol slopes is consistent with the finding that being withdrawn from is physiologically costly (e.g., Kiecolt-Glaser et al., 1996). The present analyses indicate that for withdrawal, acute, laboratory-assessed alterations in cortisol may translate to alterations of daily rhythms of cortisol, which have more substantial implications for health than acute salivary cortisol responses (Sapolsky et al., 2000). Recall that husbands were marginally more likely to withdraw from conversations than were wives; withdrawal was the only individual risk factor associated with negative changes in cortisol. In other words, the risk factor that

has the most substantial consequences for cortisol is experienced more frequently by women compared to men, even in this newlywed sample.

Gender differences in cumulative coping. The current study was the first of its kind to assess whether men or women collectively use more theoretically effective coping strategies (i.e., cumulative coping; Research Question 1). Results were inconclusive. For global reports of cumulative coping, women reported using more effective coping strategies than did men, with emotional support contributing disproportionately to this gender difference. When using diary measures of cumulative coping, however, there were no gender differences in the effectiveness of men's and women's coping strategies.

Despite the lack of gender differences in daily measures of cumulative coping, there were gender differences for individual daily coping measures: consistent with past work (Tamres, Janicki, & Helgeson, 2002), women were more likely to ruminate and to seek emotional support than were men. Because rumination was classified as a harmful coping strategy and seeking emotional support was classified as an effective coping strategy, the two offset each other when calculating daily cumulative coping. There were no gender differences in self-distraction in either global or diary measures. There were also no gender differences in substance use in global measures. This finding is not altogether surprising. Of the coping strategies investigated in the current research, distraction has the weakest association with gender; several studies report no sex differences in the use of distraction strategies (Butler & Nolen-Hoeksema, 1994; Feldman, Fisher, Ransom, & Dimiceli, 1995; Sullivan, Tripp, & Santor, 2000). As was mentioned previously, Tamres and colleagues (2002) suggest these null findings results

from women's greater use of all coping strategies relative to men. Although men may use distraction more frequently than other coping strategies, their overall levels of distraction are still lower than women's.

In order to more accurately address whether men or women use more effective coping strategies, two things must be addressed in future research. First, the current study only used sex-typed coping strategies to create cumulative coping totals. Future research should assess all coping strategies as opposed to those which past research found to differ by gender. Small gender difference in other coping strategies, that perhaps are otherwise marginal at best, could contribute to gender differences in cumulative coping effectiveness. Perhaps more importantly, future research must determine whether coping strategies previously labeled "effective" and "harmful" function similarly for men and women, a topic I will address next.

Moderating role of coping on cortisol.

Self-distraction. I expected that when individuals were experiencing high cumulative risk and using self-distraction, cortisol would decrease at a faster rate than when individuals were experiencing high cumulative risk and not using self-distraction (Hypothesis 5). This hypothesis was not supported when using either diary or global measures of self-distraction. In fact, when using diary measures of self-distraction, the use of self-distraction was associated with flatter cortisol slopes. It is possible that the declines in cortisol result from the marital stressors encountered that led to the use of self-distraction, not the use of self-distraction per se. Recall that individuals only responded to coping items in the diary if they did in fact experience a marital stressor that

day (otherwise participants indicated that they did not experience a stressor). As such, coping was confounded with the experience of a marital stressor. Regardless, it is clear that the use of self-distraction was not blunting the impact of these stressors.

Because there was no evidence that self-distraction was associated with steeper cortisol slopes, it begs the question of whether or not distraction really is an adaptive coping strategy. As mentioned previously, the health outcomes associated with distraction differ across studies (e.g., Folkman et al., 1986; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Earlier I speculated that discrepant findings could result from the specific nature of the distracting activity in which a person engages, with substance use being particularly harmful (Hollahan et al., 2004). In contrast to these speculations, even when substance use was analyzed separately from other distracting activities, distraction did not benefit health either in the short term (daily) or more long term (averaged cortisol slopes).

Wegner's (1994) concept of ironic processes may help explain why distraction is not benefiting individuals' health. Specifically, the harder an individual tries to ignore something, the more likely the suppressed topic becomes the focus of the individual's attention (e.g., the white bear experiment; Wegner, Schneider, Carter & White, 1987). In the same way, distraction may fail to take individuals' minds off the stressor and instead paradoxically make thoughts of the stressor more frequent. To further complicate the situation, distracters become known as *not the marital stressor*, and thus engaging in similar activities at a later time may actually remind the individual of the marital stressor (Wegner, 1989). If these ironic processes are at work when individuals use self-

distraction, it is not surprising that self-distraction is associated with flatter cortisol slopes.

Substance use. I also hypothesized that when individuals were experiencing high cumulative risk and using substances to distract themselves, cortisol would decrease at a slower rate than when individuals were experiencing high cumulative risk and not using substances to distract themselves (Hypothesis 6). Although there was no evidence of this moderation effect in diary reports of substance use, there was some evidence to support this hypothesis when using global measures of substance use. More specifically, there was a marginal 3-way interaction between substance use, cumulative risk, and gender. Men who were using substances to distract themselves and experiencing high risk factors experienced flatter cortisol slopes. Although cumulative risk and substance use did not interact to predict cortisol slopes for women, there was a main effect such that using substances to cope was associated with flatter cortisol slopes for women.

It is interesting that the interaction between cumulative risk and substance use only appeared when using global measures of substance use. This pattern of results is consistent with the idea that using substances to cope impacts physical health after habitual use (i.e., global) but not in the immediate short term (i.e., daily measures; Ayduk & Kross, 2008). In the short term, substance use succeeds at getting individuals' minds off of stressors. In the long term, however, using substances to cope has negative consequences, particularly for men who are experiencing high levels of risk. Notably, in moderation, the use of substances to cope did not negatively impact men's health. In small doses, substance use led to steeper cortisol slopes for men.

Emotional support. Consistent with past research on the positive effects of emotional support (e.g., Levy et al., 1990), I hypothesized that when individuals experienced high cumulative risks and used emotional support, cortisol would decrease at a faster rate than when individuals experienced high cumulative risks and did not use emotional support (Hypothesis 7). This moderating effect was not found when using global measures of cumulative risk and emotional support, but analysis of daily measures of these constructs offered partial support for this hypothesis. Specifically, there was a 3-way interaction between cumulative risk, emotional support, and gender such that women who incurred high levels of cumulative risk experienced steeper cortisol slopes when they had higher levels of emotional support. Men, however, who incurred high levels of cumulative risk experienced flatter cortisol slopes when they had higher levels of emotional support.

For men, the negative physiological consequences associated with seeking emotional support may be due to normative pressures men encounter to avoid seeking emotional support (Burleson, Holmstrom, & Gilstrap, 2005). For example, when men do seek emotional support from other men they are perceived as more poorly adjusted (Derlega, Wilson, & Chaikin, 1976) and less likable (Collins & Miller, 1994). Considering the negative stereotypes associated with seeking emotional support for men, it is not surprising that using emotional support comes with physiological consequences. Indeed, in experimental work, when men but not women receive support from someone to whom they are closer, they experience *more* physiological stress (Smith, Loving, Crockett, & Campbell, 2009).

For women, this pattern of findings highlights the double-edged sword of the emotional support context. On the one hand, consistent with past research, women incurring high levels of cumulative risk benefit from seeking emotional support (Levy et al., 1990). On the other hand, for women incurring low or average levels of cumulative risk experienced negative physiological consequences when seeking emotional support. This pattern is consistent with Seeman and McEwen's (1996) argument that emotion work accompanying women's larger social networks reduces the benefits of emotional support (e.g., Kessler, McLeod, & Wethington, 1985). That is, "caring for others" in social networks increases physiological stress (Seeman & McEwen, 1996). The 3-way interaction for women suggests that when women incur high levels of cumulative risk, women are the benefactors of emotional support; however, when women are not in pressing need of that support (i.e., under lower levels of cumulative risk), the cost of caring for others overshadows the benefits of receiving support.

Rumination. Finally, I expected that when individuals were experiencing high levels of cumulative risk and using rumination, cortisol would decrease at a slower rate than when individuals were experiencing high cumulative risks and not ruminating (Hypothesis 8). There was mixed support for this hypothesis, but only for men. Although there was a 3-way interaction between daily measures of cumulative risk, rumination, and gender, men experiencing high levels of cumulative risk actually experienced steeper cortisol slopes when they were ruminating compared to when they were not ruminating. When using global measures of rumination, there was also a 3-way interaction between cumulative risk, rumination, and gender. In partial support of

Hypothesis 8, frequent use of rumination was associated with flatter cortisol slopes compared to less frequent use of rumination; however, this was only true for individuals experiencing low or moderate levels of cumulative risk. Cortisol slopes for men in the high risk condition did not change as a function of rumination use.

The fact that rumination was not associated with cortisol slopes for women was surprising, and stands in sharp contrast to past work (Nolen-Hoeksema & Morrow, 1991). That is, the prevailing explanation for the higher levels of depression in women relative to men focuses on the idea that women ruminate more than do men (Brosschot et al., 2006; Nolen-Hoeksema, 1987). It is possible that this lack of association for women reflects a sample-selection bias in that individuals who were diagnosed with depression (and likely used higher levels of rumination) were excluded from participation. Their exclusion was necessary because of the impact depression has on HPA functioning, but may have resulted in a restriction of range in overall reports of rumination (40 out of 623 diaries women reported using rumination).

Perhaps the most surprising finding is that daily rumination was associated with steeper cortisol slopes for men in the high risk condition. In other words, the use of rumination improved men's diurnal cortisol rhythms. Careful scrutiny of the diary rumination item may shed light on this surprising finding. In effort to keep the daily diary brief, rumination was assessed with only as single diary item: "I thought about how sad the problem made me." This item does not tap into the worry or self-blame aspects of rumination. Instead, it tapped into the tendency to think about the emotional component of the event. For women, reflection of negative emotions may be tied with self-blame

and worry (i.e., the destructive dimensions of rumination). For men, however, reflection on negative emotions may serve as a form of mental processing or reflection (i.e., the opposite of distraction). This possibility certainly raises interesting questions for future research. For example, could men, who typically distract themselves from stressors, receive physiological benefits from reflection about a stressor? Further, how does reflection over emotions differ for men and women, and how are these differences tied to physiological outcomes? Certainly, answers to these questions will provide invaluable insight into the moderating role of rumination on men's and women's physiological outcomes.

Summary of results for women. Women incurred fewer cumulative protective factors than did men. And, as expected, wives' cumulative protection was associated with steeper cortisol slopes (husbands results are summarized below). Women's cumulative risk totals were lower than expected in this sample of highly satisfied newlyweds. Further, there were no gender differences in cumulative risk, and cumulative risk was not associated with declines in women's diurnal salivary cortisol. For women who incurred more cumulative risks, the use of emotional support buffered against the negative impact of those risks, whereas the use of self-distraction and substance use were associated with flatter cortisol slopes.

Summary of results for men. Although men incurred more protective factors than did women, protective factors were associated with steeper cortisol slopes for men who were low, but not high, in relationship satisfaction. In contrast to women, men's cumulative risk was associated with flatter cortisol slopes. The use of emotional support

was associated with flatter cortisol slopes, but only for men who incurred more, versus less, cumulative risks. In general, both self-distraction and substance use were associated with flatter cortisol slopes for men, but there was some evidence that the limited use of substances to cope improved cortisol slopes for men. In contrast, rumination was beneficial to men's cortisol slopes on a day-to-day basis, but global reports of rumination was associated with flatter slopes for individuals incurring lower levels of risk.

In short, the current findings offer mixed support for the theoretically-derived hypotheses outlined in the introduction. It is important to note that the current sample provides a conservative test for this hypothesis; this was a highly satisfied newlywed sample, experiencing low base rates of risk factors and considerably higher risk factors. It is likely that had these couples been more established in their relationships, the results for risk and coping may have more closely aligned with the hypotheses derived from past research. Given the novel means by which these hypotheses were tested (i.e., assessing both global and daily reports and daily cortisol rhythms), however, these inconsistencies point to interesting avenues for theory building and future research. I discuss this point more fully below.

Theoretical implications

The results from the current study have several important theoretical implications. First, the differential pattern of results for individual factors versus cumulative factors highlights the need to simultaneously assess and analyze co-occurring risk, protective, and coping factors when considering gender differences in relationship-associated health outcomes. In several instances, as discussed in detail below, effects were found with

cumulative totals but not individual factors, arguing that in some cases the use of such designs is necessary. With further refinement, the current model can help to illuminate the relative magnitude of health outcomes associated with risk compared to protective factors in marriage (e.g., Finch, Okun, Pool, & Ruehlman, 1999), which can only be done when risk and protective factors are considered concurrently. It is through a holistic understanding of how all these factors work in tandem that will allow for successfully designed interventions that ultimately decrease the health disparities between husbands and wives.

Although cumulative models are advantageous, the current study identifies conditions that drastically alter their utility. Specifically, cumulative totals are only appropriate if all individual factors that comprise the total function similarly. For example, cumulative totals worked well for protective factors because the pattern of results for both gender differences and cortisol outcomes were similar across *individual* protective factors. In such cases, cumulative totals allow for a parsimonious model that more accurately captures the magnitude of the impact. Cumulative totals, however, are less effective when the individual components of the total do not function similarly. In the current study, cumulative risk did not differ by gender or predict cortisol slopes consistently in part because of contrasting patterns of results within individual risk factors. Specifically, women were more likely than men to be negative towards their partners; however, men were marginally more likely than women to withdraw from their partners. These effects neutralized each other to result in no gender differences in cumulative risk. Similarly, global measures of loyalty contributed marginally to steeper

cortisol slopes whereas global measures of withdrawal contributed to flatter cortisol slopes. Once again, the two individual factors offset each other, resulting in no impact of global measures of cumulative risk on cortisol slopes. These findings highlight the need to determine whether or not variables are functioning similarly prior to creating cumulative totals in order to bolster rather than hide effects.

Additionally, the current results raise the question of whether research on acute cortisol reactions extends to diurnal cortisol rhythms. That is, all variables classified as risk factors and protective factors for the current study were classified *a priori* as such based on the impact they have been shown to have on acute physiological reactions (e.g., laboratory paradigms). Many of the variables, however, did not impact daily cortisol rhythms in the same way they have been shown to impact acute cortisol responses. The results for negativity provide perhaps the best illustration of this difference. Negativity is consistently and somewhat strongly associated with acute increases in cortisol and blood pressure (Ewart et al., 1991; Malarkey, Kiecolt-Glaser, Pearl, & Glaser, 1994). In the words of Ewart and colleagues (1991) "not being nasty matters more than being nice". There was no evidence, however, that global negativity or daily measures of negativity were associated with daily cortisol slopes. If this finding indeed replicates in future studies, it calls into question whether or not the alteration in endocrine functioning caused by "being nasty" matters similarly across acute and chronic settings (Loving & Huston, in press).

Finally, the decision to use daily fluctuations in cortisol deserves some discussion. Using daily cortisol slopes is relatively new to the area of relationships research. Apart

from the current study, few lines of research have made use of romantic couples' daily cortisol slopes. As a notable exception to this, Saxbe, Repetti, and colleagues have published three different papers based on a sample of 30 couples who provided cortisol samples four times a day for three days (Saxbe & Repetti, 2010a; 2010b; Saxbe, Repetti, & Nishina, 2008). In contrast to the current study, Saxbe and colleagues' do not attempt to predict daily changes in cortisol diurnal rhythms, but instead combine cortisol measurements across multiple days to create a single cortisol slope for each individual (e.g., Saxbe & Repetti, 2010a). One advantage of this approach is the higher number of cortisol samples per person approximates a more stable prediction of diurnal rhythms that is theoretically more resistant to outside factors that alter cortisol levels (e.g., caloric intake). Although such an approach sheds light on how global constructs are associated with cortisol rhythms, it limits researchers' ability to assess within person fluctuations in daily cortisol. Based on the findings of the current study, those fluctuations are meaningful. Daily fluctuations consistently yielded stronger results compared to the average cortisol slopes created across the six diary days.

Limitations and strengths

The present findings, as well as their implications, must be considered in light of the study's limitations and strengths. First, as is true any time research is conducted outside of the laboratory, researchers have little control over how and when participants provide saliva samples. This is not inconsequential, as it led to a number of saliva samples that could not be used in the current study's analyses. Specifically, close to 15% of the samples were provided too late in the day to be used. Further, many participants

did not leave the cotton in their mouths long enough to have adequate saliva to assay. Additionally, I cannot be certain that individuals were in fact providing samples at the right time of day. Consistent with past methodological studies on the accuracy of diary reports, however, we suspect participants were honest about when they provided their samples (Green, et al., 2006). Finally, the current study was hindered by the homogenous sample of newlyweds. Although this sample provided a more conservative test for the theory, it limited our ability to study risk factors because so few individuals reported that risk factors occurred.

Perhaps the most notable strength of the current study was the large number of couples who provided saliva samples for later determination of cortisol levels. Much of the work in the physiological literature has been limited by relatively small sample sizes that decrease power and severely diminish researchers' power to detect effects. The relatively large sample size of the current study not only improved power, but also decreased error variance. That is, rather than ignore or attempt to statistically control for conditions associated with cortisol (e.g., anxiety and depression), the larger sample size allowed me to discard such individuals, creating a 'cleaner' dataset. An additional strength of the current study is the measurement of both global and daily measures of all protective, risk, and coping factors. Having different types of measures made it possible to determine the relative impact of perceptions of behaviors compared to actual behaviors enacted. Finally, the current study utilized a physiological measure that was noninvasive and has known consequences for long term health outcomes (Sapolsky, Romero, & Munck, 2000). That is, in contrast to acute changes in cortisol, alterations of diurnal

cortisol rhythms ultimately impair the functioning of different biological systems (Sapolsky et al., 2000).

Future research

The findings of the current study raise a number of avenues for future research. Although changing, psychologists have historically overemphasized gender differences and masked gender similarities (Dindia & Canary, 2006). Many assumed gender differences did not replicate in the current study, and, in some cases, results were opposite than what was expected. Future research must continue to distinguish gender differences from gender similarities. For example, much work is still needed to determine what accommodation really is, how it should best be measured, and ultimately how or if it differs as a function of gender. Further, gender differences in negativity seem, at best, tenuous. Additional research should focus on what types of negativity occur in relationships, and ultimately whether men actually incur more negativity than women. Such research on gender differences and similarities will allow for more accurate calculations of cumulative risk.

Once gender differences are accurately isolated, future research should continue to establish health consequences of specific relationship behaviors. In some respects, conflict researchers have successfully isolated specific differences between men and women and subsequently determined the health implications of these differences (e.g., demand-withdraw). Importantly, much work remains to be done. For example, how does accommodation, operationalized as emotional suppression, predict cortisol slopes? The way accommodation was measured in this dissertation offers at best inconsistent

cortisol predictions. More specific research questions will increase our knowledge about how gender differences in these constructs contribute to physical health.

To determine whether these constructs differ as a function of gender, as well as whether or not they impact daily diurnal cortisol patterns, the current study must be replicated in samples where couples have been married for longer periods of time. No doubt, as marriage progresses, there will be a rise in the number of risk factors individuals encounter. Such variation is necessary to detect reliable patterns. Further, longitudinal work that follows these couples over their relationships' progressions will be able to address not only how different risk and protective factors cumulate over multiple individual factors, but also how they accumulate over time. It logically follows that with time and repetitive use of protective, risk, and coping constructs, the impact on health will become more pronounced.

Future research should also test alternative configurations of the current model. Specifically, although risk and protective factors contribute to physiological indicators of stress, physiological stress also contributes to risk and protective factors. That is, when stressed, individuals engage in more conflict and less support (Randall & Bodenmann, 2009). In that sense, a cyclical model likely better captures couples' real-world experiences, and, by default, would be better able to detect gendered health outcomes.

Although the future directions for research outlined above offer a sequential process that will lead to a deeper understanding of relationship contributions to men's and women's physical health, it is also necessary to acknowledge that many of the health consequences men and women incur in romantic relationships result from correlates of

biological sex, rather than biological sex per se. That is, 'gender differences' between men and women often result from a third underlying variable (Vangelisti, 1997). For instance, femininity, a psychological construct that covaries with biological sex, predicts seeking and receiving emotional support (Reevy & Maslack, 2001), managing conflict using language that promotes closeness (Rusbult et al., 1986), and providing spousal support (Butler, Giordano, & Neren, 1985) better than does biological sex. Because third variables do not always differentiate men and women (e.g., men can have high levels of femininity), not all men and all women will accumulate the same risk and protective factors; instead, there will be within-sex differences in women's and men's physiological indicators of stress. As such, identifying third variables that could explain differences between men's and women's conflict, support, and coping will provide a more accurate portrayal of how individuals' health is affected by relationship processes.

Two specific third variables correlated with biological sex warrant further scrutiny in the discussion of health disparities associated with romantic relationships: responsibility felt for the relationship and interdependence type. First, women assume more responsibility for their relationships, which preliminary research suggests is costly (Baucom et al., 1990; Faulkner, Davey, & Davey, 2005; Fincham & Linfield, 1997). For example, the responsibility women feel for the emotional tone of the relationship partially explains their higher levels of rumination (Nolen-Hoeksema & Jackson, 2001). It logically follows that responsibility felt for the relationship would be associated with cortisol slopes more strongly than biological sex. Second, men and women have different self-construals, or orientations towards their social worlds. Specifically, men tend to

identify with a large group of people (i.e., collective interdependence) whereas women identify with a specific individual (i.e., relational interdependence; Gabriel & Gardner, 1999). Past work has linked concepts related to these self-construals to gendered relationship processes including initiation of a conversation (Caughlin & Vangelisti, 2000) and loyalty during conflict (Sinclair & Fehr, 2005). Past research has also linked relational interdependence, in particular, to coping processes (Crockett, Loving, Le, & Korn, in press). As such, individuals high in relational interdependence, as opposed to women per se, may incur more risk and fewer protective factors in marriage.

Conclusion

In sum, when individuals enter into marriage, they encounter a slew of protective factors associated with positive physiological outcomes, but these benefits are balanced by risk factors. The current study suggests that the accumulation of protective and risk factors occurs in a complex fashion and functions differently for men and women. Further, coping moderates the impact of cumulative risk factors on individuals' diurnal cortisol slopes, but again does so differently for men and women. Future work must continue to isolate gender differences in relationship processes to best elucidate how close relationships affect men's and women's health similarly and differently. With further refinement, the proposed model can explain gendered health disparities, and perhaps identify ways that women and men can experience more equal health benefits from romantic relationships.

Footnotes

[1] No intercept version of Model 3

Level 1: $Y_{ijk} = b_{0ij} + b_{1ij}(\text{time})_{ijk} + b_{2ij}(\text{a.m. time})_{ijk} + b_{3ij}(\text{p.m. time})_{ijk} + b_{4ij}(\text{waking cortisol})_{ijk} + b_{5ij}(\text{external stressors})_{ijk} + b_{6ij}(\text{husband})_{ijk} + b_{7ij}(\text{wife})_{ij} + b_{8ij}(\text{cumulative risk x wife})_{ijk} + b_{9ij}(\text{cumulative risk x husband})_{ijk} + b_{10ij}(\text{cumulative protection x wife})_{ijk} + b_{11ij}(\text{cumulative protection x husband})_{ijk} + b_{12ij}(\text{substance use x wife})_{ijk} + b_{13ij}(\text{substance use x husband})_{ijk} + b_{14ij}(\text{self-distraction x wife})_{ijk} + b_{15ij}(\text{self-distraction x husband})_{ijk} + b_{16ij}(\text{emotional support x wife})_{ijk} + b_{17ij}(\text{emotional support x husband})_{ijk} + b_{18ij}(\text{rumination x wife})_{ijk} + b_{19ij}(\text{rumination x husband})_{ijk} + b_{20ij}(\text{cumulative risk x substance use x wife})_{ijk} + \gamma_{21}(\text{cumulative risk x substance use x husband})_{ijk} + b_{22ij}(\text{cumulative risk x self-distraction x wife})_{ijk} + b_{23ij}(\text{cumulative risk x self-distraction x husband})_{ijk} + b_{24ij}(\text{cumulative risk x emotional support x wife})_{ijk} + b_{25ij}(\text{cumulative risk x emotional support x husband})_{ijk} + b_{26ij}(\text{cumulative risk x rumination x wife})_{ijk} + b_{27ij}(\text{cumulative risk x rumination x husband})_{ijk} + e_{ijk.}$

Level 2: $b_{0ij} = \gamma_{00} + \gamma_{01}(\text{alcohol})_{ij} + \gamma_{02}(\text{bmi})_{ij} + \gamma_{03}(\text{birth control})_{ij} + \gamma_{04}(\text{gender})_{ij} + U_{0ij}.$

[2] No intercept version of Model 4

Level 1: $Y_{ij} = b_{0i} + b_{1ij}(\text{time})_{ijk} + b_{2ij}(\text{a.m. time})_{ijk} + b_{3ij}(\text{p.m. time})_{ijk} + b_{4ij}(\text{waking cortisol})_{ijk} + e_{ij.}$

Level 2: $b_{0ij} = \gamma_{00} + \gamma_{01}(\text{bmi})_{ij} + \gamma_{02}(\text{birth control})_{ij} + \gamma_{03}(\text{husband})_{ij} + \gamma_{04}(\text{wife})_{ij} + \gamma_{05}(\text{cumulative risk x wife})_{ij} + \gamma_{06}(\text{cumulative risk x husband})_{ij} + \gamma_{07}(\text{cumulative protection x wife})_{ij} + \gamma_{08}(\text{cumulative protection x husband})_{ij} + \gamma_{09}(\text{substance use x wife})_{ij} + \gamma_{10}(\text{substance use x husband})_{ij} + \gamma_{11}(\text{self-distraction x wife})_{ij} + \gamma_{12}(\text{self-distraction x husband})_{ij} + \gamma_{13}(\text{emotional support x wife})_{ij} + \gamma_{14}(\text{emotional support x husband})_{ij} + \gamma_{15}(\text{rumination x wife})_{ij} + \gamma_{16}(\text{rumination x husband})_{ij} + \gamma_{17}(\text{cumulative risk x substance use x wife})_{ij} + \gamma_{18}(\text{cumulative risk x substance use x husband})_{ij} + \gamma_{19}(\text{cumulative risk x self-distraction x wife})_{ij} + \gamma_{20}(\text{cumulative risk x self-distraction x husband})_{ij} + \gamma_{21}(\text{cumulative risk x emotional support x wife})_{ij} + \gamma_{22}(\text{cumulative risk x emotional support x husband})_{ij} + \gamma_{23}(\text{cumulative risk x rumination x wife})_{ij} + \gamma_{24}(\text{cumulative risk x rumination x husband})_{ij} + U_{0ij.}$

Table 1

Summary of Constructs

	Cumulative Total	Construct	Sample Item
Daily Constructs	Protection	Empathy	Spouse listened to or comforted you.
		Responsiveness	Correlations between individuals stress checklist and spouses reports of support provided.*
	Risk	Withdrawal	Spouse withdrew from a conversation.
		Loyalty	I gave my spouse the benefit of the doubt and forgot about the issue.
		Self-silencing	You did not express your feelings to avoid conflict.
		Negativity	Spouse criticized you.
	Coping	Self-distraction	I did something to keep my mind off the problem.
		Substance use	Number of drinks per day.*
		Emotional Support	I talked to a friend or family member about how I felt.
		Rumination	I thought about how sad the problem made me.

Note: * Indicates a description of the measure is used instead of an actual sample item.

Table 1 (continued)

	Cumulative Total	Construct	Sample Item
Global Constructs	Protection	Empathy	To what extent does your partner really understand your emotions and feeling?
		Perceived Support	To what extent could you turn to your partner for help with a problem?
	Risk	Withdrawal	When I start a conversation, my spouse tries to avoid the conversation.
		Loyalty	When my partner yells at me or speaks to me in a raised voice I give my partner the benefit of the doubt and forget about it.
		Self-silencing	I don't speak my feelings in my marriage when I know they will cause disagreement.
		Negativity	When a conflict occurs, my partner is hostile towards me.
	Coping	Self-distraction	I go to movies or watch TV, to think about it less.
		Substance use	I drink alcohol or take drugs, in order to think about it less.
		Emotional Support	I get emotional support from others.
		Rumination	I think about how things like this always happen to me.

Table 2

Correlations and Descriptive Statistics for Diary Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Empathy	–											
2. Responsiveness	-.01	–										
3. Withdraw	-.05	-.05	–									
4. Loyalty	.00	-.03	.08*	–								
5. Self-silencing	.02	.00	.11*	.18*	–							
6. Negativity	-.02	-.01	.27*	.14**	.24**	–						
7. Self-distraction	-.00	.06*	.13**	.05	.22**	.14**	–					
8. Substance use	-.01	-.09**	.00	-.04	-.02	-.05	.04	–				
9. Emotional Support	-.01	-.06*	.04	.06*	.05	.05	.15**	.05	–			
10. Rumination	.00	-.07*	.15**	.02	.22**	.15**	.19**	-.05	.20**	–		
11. Cortisol Slopes	.07*	.02	.04	-.02	-.02	-.01	-.09**	-.05	-.02	-.04	–	
12. Sex[a]	.04	.12**	-.57**	.08**	.01	-.07**	-.05	-.07*	.09**	.09**	-.08*	–

Table 2 (continued)

M	.48	.59	.07	.05	.08	.19	.04	.11	.02	.05	1.8	-.02
SD	.50	.57	.26	.23	.27	.39	.21	.31	.21	.15	.26	1.0
Count[b]	615	741	91	69	100	241	56	137	29	57	n/a	n/a

Note. [a]Sex: 1 = *Woman*, -1 = *Man*; [b]Count: The number of diaries in which the event occurred; ***p* < .05; ****p* < .01; *N* =1270

Table 3

Correlations and Descriptive Statistics for Global Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Empathy	–											
2. Perceived Support	.68**	–										
3. Withdraw	-.37**	-.23**	–									
4. Loyalty	.07	.07	-.04	–								
5. Self-silencing	.08	.07	.04	.19*	–							
6. Negativity	-.32**	-.35**	.15*	-.06	.08	–						
7. Self-distraction	-.00	-.01	.01	.06	.03	-.06	–					
8. Substance use	-.05	-.12	.12	.02	-.01	.01	.24**	–				
9. Emotional Support	.20**	.22**	-.06	-.06	-.15*	-.09	.18**	-.04	–			
10. Rumination	-.12	-.13	.15*	-.09	-.03	.05	.13	.20**	.17*	–		
11. Cortisol Slopes	.12	.13	-.13	.09	.07	.04	-.04	-.12	.06	-.07	–	
12. Sex[a]	-.22**	-.09	.12	-.13	-.39**	-.11	.02	.00	.30**	.07	-.09	–

Table 3 (continued)

M	3.42	3.77	3.07	4.10	2.67	3.02	2.70	1.30	2.95	2.31	1.81	-.02
SD	.59	.31	2.64	1.88	.48	1.87	.77	.61	.75	.50	.51	1.00
Range	(1.3,4)	(2,4)	(1,8)	(1,9)	(1.3,4.4)	(1,7.5)	(.5,4)	(1,4)	(1,4)	(1.1,3.7)	(-.9,3.8)	(-1,1)

Note. [a]Sex: 1 = *Woman*, -1 = *Man*; *****$p < .05$; ******$p < .01$; $N = 214$

Table 4

Raw Means for Cortisol (µg/dL) by Diary Day for Men and Women

Diary Day	Men a.m.	Men p.m.	Women a.m.	Women p.m.
1	.31	.05	.27	.05
2	.30	.05	.26	.04
3	.31	.05	.26	.05
4	.31	.04	.26	.05
5	.29	.05	.27	.04
6	.29	.06	.24	.05
M	.30	.05	.26	.05
SD	.17	.04	.13	.04
Range	(.02,.96)	(.01,.46)	(.02,.72)	(.01,.33)

Note. N =214

Table 5

Gender Differences in Daily Protection, Risks, and Coping

	Men *M (SD)*	Women *M (SD)*	*B*	*SE*	*df*	*t*	*p*
Empathy	.47 (.50)	.50 (.50)	.02	.01	681.84	1.33	.18
Responsiveness	.96 (.19)	.45 (.50)	-.26	.03	125.65	-10.15	.00
Cumulative Protection	1.43 (.55)	.96 (.70)	-.23	.02	713.12	-12.46	.00
Withdrawal	.08 (.26)	.07 (.25)	-.01	.01	663.16	-.72	.47
Loyalty	.04 (.19)	.07 (.26)	.02	.01	642.58	2.94	.00
Self-silencing	.08 (.26)	.08 (.27)	.00	.01	651.31	.36	.72
Negativity	.22 (.41)	.16 (.37)	-.03	.01	620.40	-2.94	.00
Cumulative risk	.41 (.67)	.38 (.61)	-.01	.02	618.61	-.70	.49
Self-distraction	.05 (.23)	.03 (.18)	-.01	.01	578.31	-1.67	.10
Substance use	-.13 (.33)	-.08 (.28)	-.02	.01	499.87	-3.86	.00
Emotional Support	.01 (.10)	.04 (.19)	.01	.00	602.75	2.99	.00
Rumination	.03 (.16)	.06 (.25)	.02	.01	680.07	3.49	.00
Cumulative Coping	-.09 (.44)	-.08 (.41)	.01	.01	562.95	.47	.64

Note. N=1270

Table 6

Gender Differences in Global Protection, Risks, and Coping Constructs

	Men's *M (SD)*	Women's *M (SD)*	*B*	*SE*	*df*	*t*	*p*
Empathy	3.55 (.53)	3.29 (.62)	-.21	.06	105.14	-3.43	.00
Perceived Support	3.80 (.29)	3.74 (.32)	-.08	.06	97.89	-1.35	.18
Cumulative Protection	.31 (1.67)	-.32 (1.95)	-.29	.101	98.61	-2.63	.01
Withdrawal	2.91 (1.32)	3.24 (1.31)	.11	.06	107.93	1.81	.07
Loyalty	4.34 (1.93)	3.85 (1.80)	-.13	.07	114.76	-1.96	.05
Self-silencing	2.86 (.43)	2.48 (.47)	-.38	.06	126.31	-6.34	.00
Negativity	3.22 (1.96)	2.82 (1.77)	-.11	.06	111.84	-1.80	.07
Cumulative risk	.49 (2.23)	-.51 (2.00)	-.50	.14	114.32	-3.75	.00
Self-distraction	2.68 (.82)	2.70 (.72)	.03	.06	122.09	.44	.66
Substance use	1.30 (.63)	1.30 (.59)	-.01	.05	92.45	-.20	.85
Emotional Support	2.73 (.72)	3.17 (.71)	.30	.06	115.42	4.75	.00
Rumination	2.28 (.50)	2.35 (.50)	.07	.01	112.66	1.12	.26
Cumulative Coping	-.24 (1.93)	.25 (1.92)	.25	.12	112.202	2.09	.04

Note. N=214

Table 7
Controls for Cortisol Models

	B	*SE*	*Df*	*t*	*p*
Intercept	1.89	.04	179.93	47.94	.00
Gender	.08	.03	482.47	2.76	.01
Birth Control	-.19	.07	450.15	-2.74	.01
Diary Day (Time)	-.01	.01	354.21	-.57	.57
Stressful Events	-.00	.02	749.00	-.10	.92
Number of Drinks	-.02	.02	699.10	-.87	.39
Morning Cortisol	.54	.02	779.58	26.60	.00
Body Mass Index	.06	.03	282.95	2.05	.04
A.M. Sampling Time	-.04	.16	705.08	-.22	.83
P.M. Sampling Time	.07	.03	765.10	2.82	.01

Note. N=1270

Table 8
Full Cortisol Model for Daily Constructs

		B	*SE*	*df*	*t*	*p*
Control Variables	Intercept	1.91	.04	200.27	45.90	.00
	Gender	.09	.03	485.24	2.76	.01
	Birth Control	-.20	.07	432.75	-2.84	.01
	Diary Day (Time)	-.01	.01	345.11	-.67	.51
	Morning Cortisol	.54	.02	740.25	26.24	.00
	Body Mass Index	.06	.03	264.61	2.03	.04
	A.M. Sampling Time	-.05	.16	673.83	-.32	.75
	P.M. Sampling Time	.06	.03	731.04	2.30	.02
Main Effects	Cumulative Protection	-.00	.02	698.39	-.01	.99
	Cumulative Risk	-.01	.02	648.67	-.42	.68
	Cumulative Risk x Gender	.04	.02	663.08	1.97	.05
	Cumulative Protection x Gender	.04	.02	694.60	1.70	.09
	Self-distraction	-.05	.03	745.96	-1.96	.05
	Substance use	-.03	.03	723.17	-1.03	.30
	Emotional Support	-.02	.03	712.73	-.52	.60
	Rumination	.02	.02	570.08	.81	.47
Coping x CR	Self-distraction x CR	-.00	.02	714.63	-.25	.80
	Substance use x CR	.01	.03	685.34	.28	.78
	Emotional Support x CR	-.05	.03	720.62	-1.42	.16
	Rumination x CR	.01	.01	617.88	.83	.41

Table 8 (continued)

		B	*SE*	*df*	*t*	*p*
Coping x CR x Gender	Self-distraction x CR x Gender	-.00	.01	693.90	-.21	.84
	Substance use x CR x Gender	-.00	.03	687.35	-.12	.90
	Emotional Support x CR x Gender	.09	.04	701.38	2.48	.01
	Rumination x CR x Gender	-.02	.01	703.97	-1.92	.06

Note. CR = Cumulative Risk, *N*=1270

Table 9
Full Cortisol Model for Global Constructs

		B	*SE*	*df*	*t*	*p*
Controls	Intercept	.23	.004	204.23	51.61	.00
	Gender	-.005	.004	473.96	-1.26	.21
	Birth Control	.006	.008	389.58	.67	.50
	Diary Day (Time)	-.0001	.001	447.45	-.11	.91
	Morning Cortisol	.133	.003	808.73	51.74	.00
	Body Mass Index	.001	.003	175.68	.45	.65
	A.M. Sampling Time	-.031	.021	695.61	-1.49	.14
	P.M. Sampling Time	.005	.003	765.06	1.75	.08
Main Effects	Cumulative Protection	.002	.002	258.64	1.04	.30
	Cumulative Risk	.002	.002	378.24	.97	.33
	Cumulative Risk x Gender	.000	.002	370.99	.19	.85
	Cumulative Protection x Gender	-.001	.002	345.18	-.47	.64
	Self-distraction	.002	.003	338.47	.59	.55
	Substance use	-.003	.003	286.57	-.91	.36
	Emotional Support	-.001	.003	397.78	-.16	.88
	Rumination	-.010	.003	364.82	-2.94	.00
Coping x CR	Self-distraction x CR	-.001	.002	439.86	-.47	.64
	Substance use x CR	.005	.002	367.88	.34	.74
	Emotional Support x CR	-.001	.001	323.07	-.31	.76
	Rumination x CR	.003	.001	334.71	2.02	.04

Table 9 (continued)

		B	*SE*	*df*	*t*	*p*
Coping x CR x Gender	Self-distraction x CR x Gender	-.001	.002	375.04	-.56	.57
	Substance use x CR x Gender	.003	.002	407.33	1.66	.10
	Emotional Support x CR x Gender	-.001	.002	344.21	-.31	.76
	Rumination x CR x Gender	-.003	.002	356.85	-1.93	.05

Note. CR = Cumulative Risk,

N=1270

Table 10
Summary of Hypothesis and Evidence

Hypothesis	Support Daily	Support Global
Hypothesis 1: Men will experience more protective factors than will women.	*Supported*; men did incur more protective factors than did women. Men also had more responsive partners than did women.	*Supported*; men did incur more protective factors than did women. Men also received more empathy than did women.
Hypothesis 2: Cumulative protective factors will be associated with steeper cortisol slopes.	*Partially supported*; there was an interaction between cumulative risk and gender. Cumulative protection was associated with steeper cortisol slopes for women, but flatter cortisol slopes for men. The same pattern exists for empathy.	*Not supported;* there was no association between global measures of cumulative protection and cortisol slopes.
Hypothesis 3: Women will experience more risk factors than will men.	*Not supported*; there were no gender differences in the number of risk factors men and women acquired. Women were more likely than men to use loyalty, whereas men were more likely than women to incur negativity from their spouse.	*Not supported*; there were no gender differences in the number of risk factors men and women acquired. Women were more likely than men to be withdrawn from. Men were more likely than women to use loyalty.
Hypothesis 4: Cumulative risk factors will be associated with flatter cortisol slopes.	*Partially supported*; there was an interaction between cumulative risk and gender. Cumulative risk was associated with slower declines in cortisol for men, not women.	*Not supported;* Withdrawal was associated with flatter cortisol slopes. There was some evidence that loyalty was associated with steeper cortisol slopes.
Research question 1: Do men or women use more effective coping strategies?	There were no differences in the effectiveness of men's and women's coping strategies. Women were more likely to both ruminate and seek emotional support than were men.	Women reported using more effective coping strategies than did men. This effect seems to be driven by women's greater use of emotional support.

Table 10 (continued)

Hypothesis	Support Daily	Support Global
Hypothesis 5: When individuals are experiencing high cumulative risk and using self-distraction, cortisol will decrease at a faster rate than when individuals are experiencing high cumulative risk and not using self-distracters.	*Not supported*; there was no interaction between cumulative risk and self-distraction. In fact, there was some evidence that the use of self-distractors was associated with flatter cortisol slopes.	*Not supported;* there was no interaction between cumulative risk and self-distraction.
Hypothesis 6: When individuals are experiencing high cumulative risk and using substances to cope, cortisol will decrease at a slower rate than when individuals are experiencing high cumulative risk and not using substances to cope.	*Not supported;* there was no interaction between cumulative risk and substance use.	*Partially supported;* there was a marginal 3-way interaction between substance use, cumulative risk, and gender. Men who were using substances to cope and had high risk factors experienced flatter cortisol slopes.
Hypothesis 7: When individuals are experiencing high cumulative risk and using emotional support, cortisol will decrease at a faster rate than when individuals are experiencing high cumulative risk and not using emotional support.	*Partially supported;* there was a 3-way interaction between cumulative risk, emotional support, and gender. Women with high cumulative risk had steeper cortisol slopes when seeking emotional support. Men with high cumulative risk had flatter cortisol slopes when seeking emotional support.	*Not supported;* there was no interaction between cumulative risk and emotional support.
Hypothesis 8: When individuals are experiencing high cumulative risk and ruminating, cortisol will decrease at a slower rate than when individuals are experiencing high cumulative risk and not ruminating.	*Not supported;* there was a 3-way interaction between cumulative risk, rumination, and gender; however, men experiencing high risks had steeper cortisol slopes when using low levels of rumination.	*Partially supported;* there was a 3-way interaction between cumulative risk, rumination, and gender. Rumination was associated with flatter cortisol slopes for men in the low risk condition.

Figure 1

Cumulative Risk Model

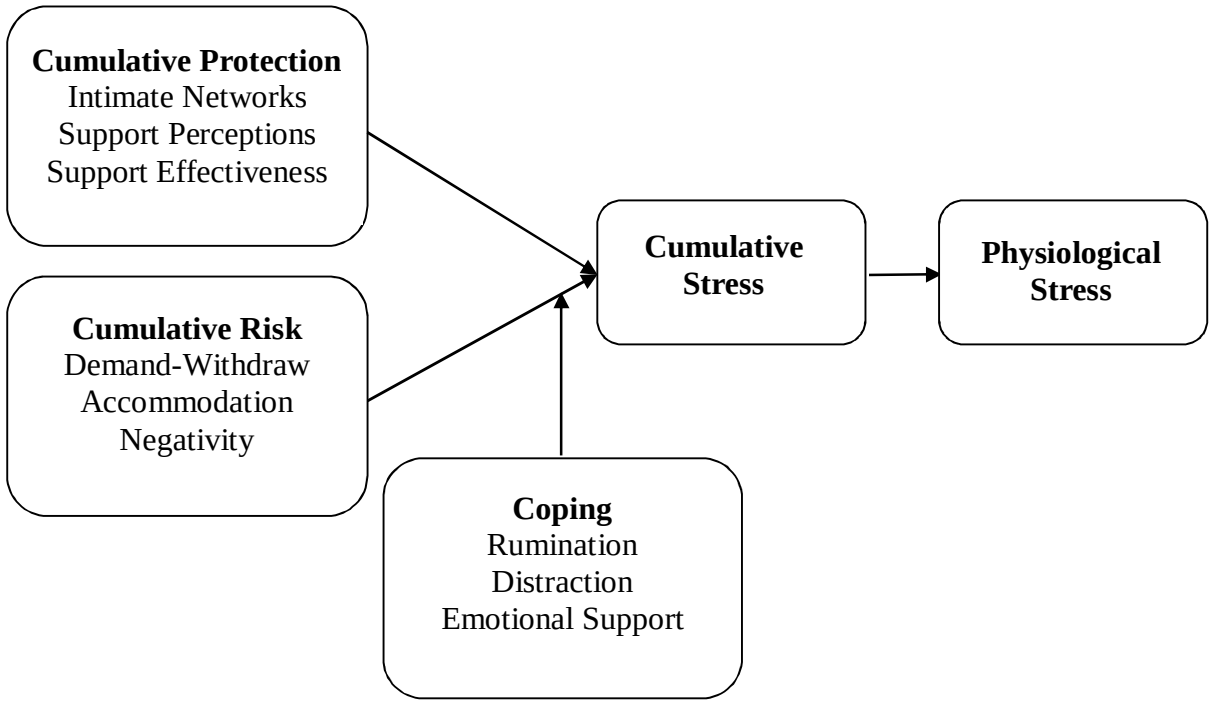
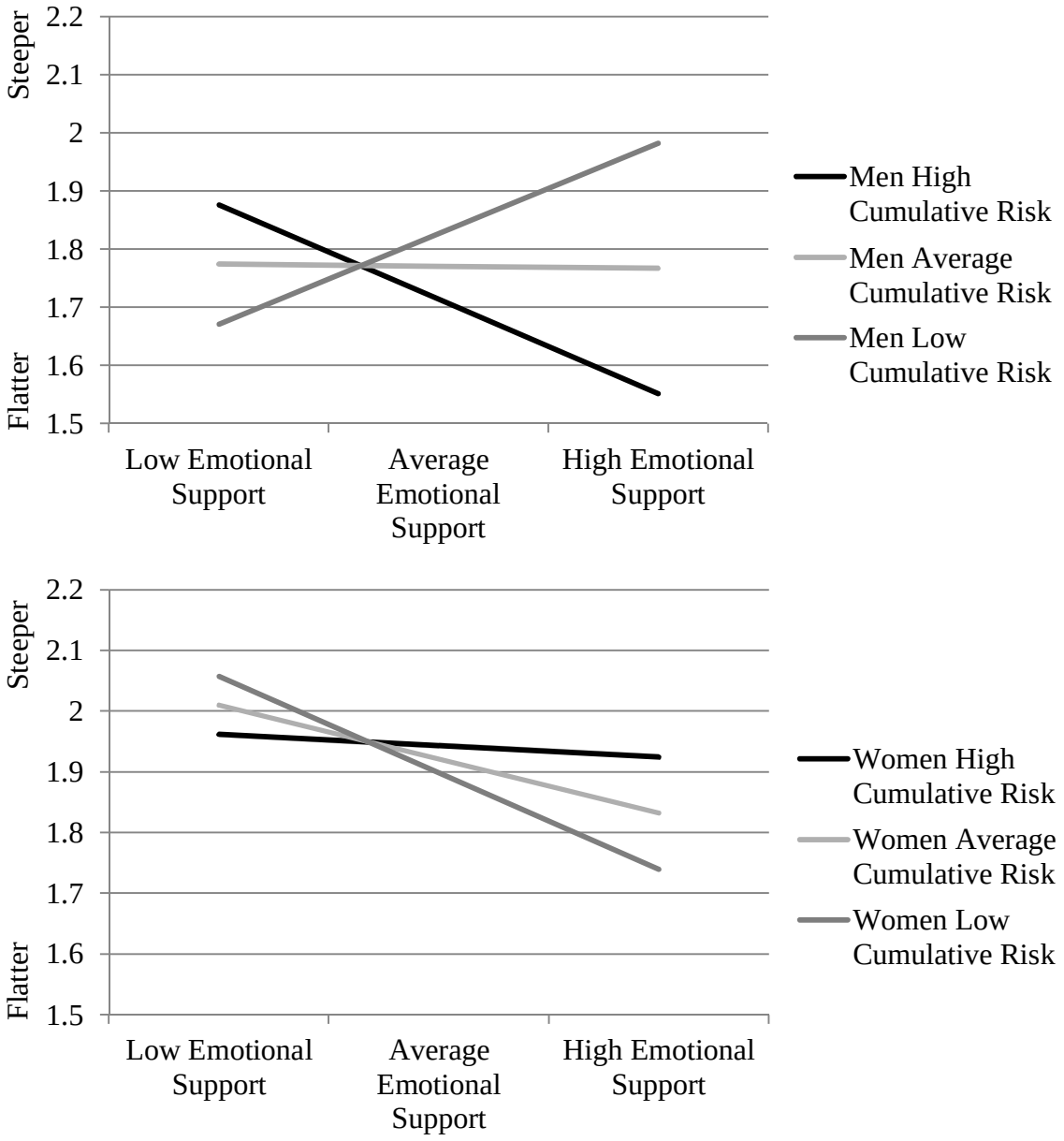


Figure 2

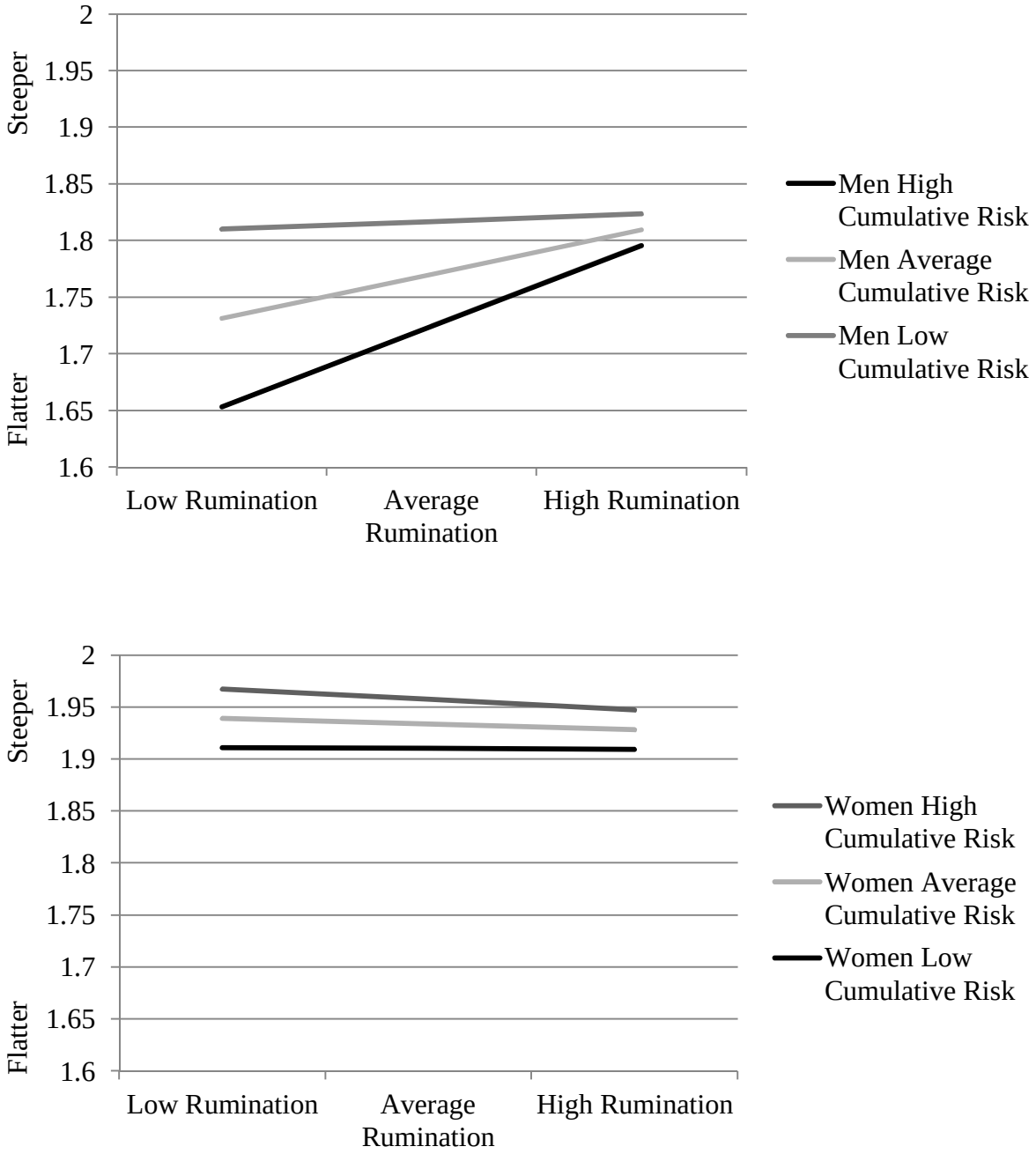
Men's and Women's Cortisol Slopes Predicted by Daily Cumulative Risk and Emotional Support



Note: Flatter slopes are indicative of unhealthy cortisol responses whereas steeper slopes are indicative of healthy cortisol responses.

Figure 3

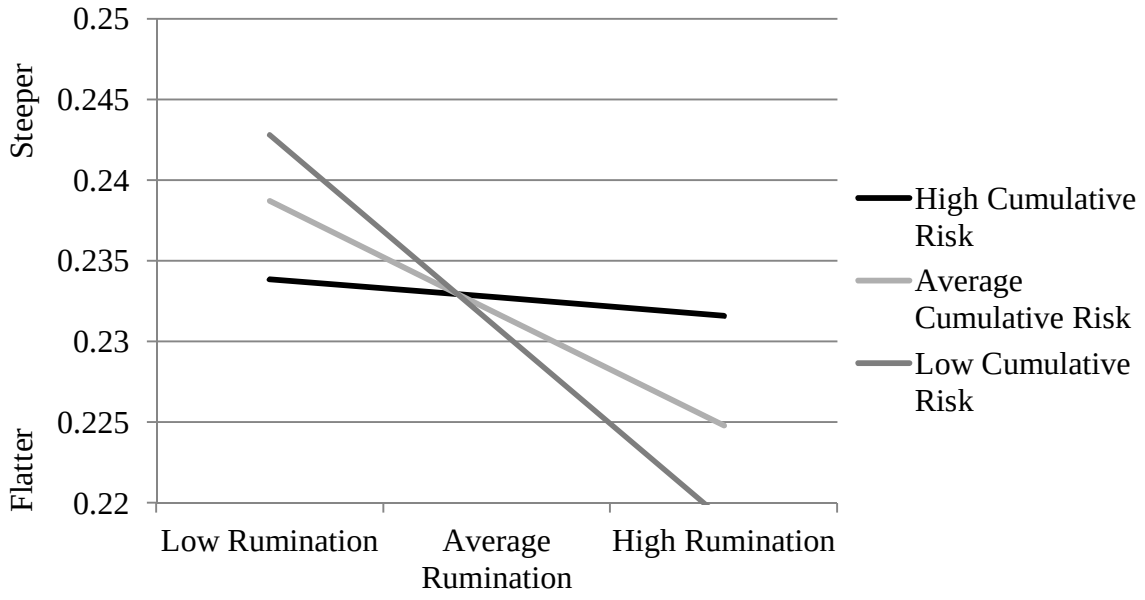
Men's and Women's Cortisol Slopes Predicted by Daily Cumulative Risk and Rumination



Note: Flatter slopes are indicative of unhealthy cortisol responses whereas steeper slopes are indicative of healthy cortisol responses.

Figure 4

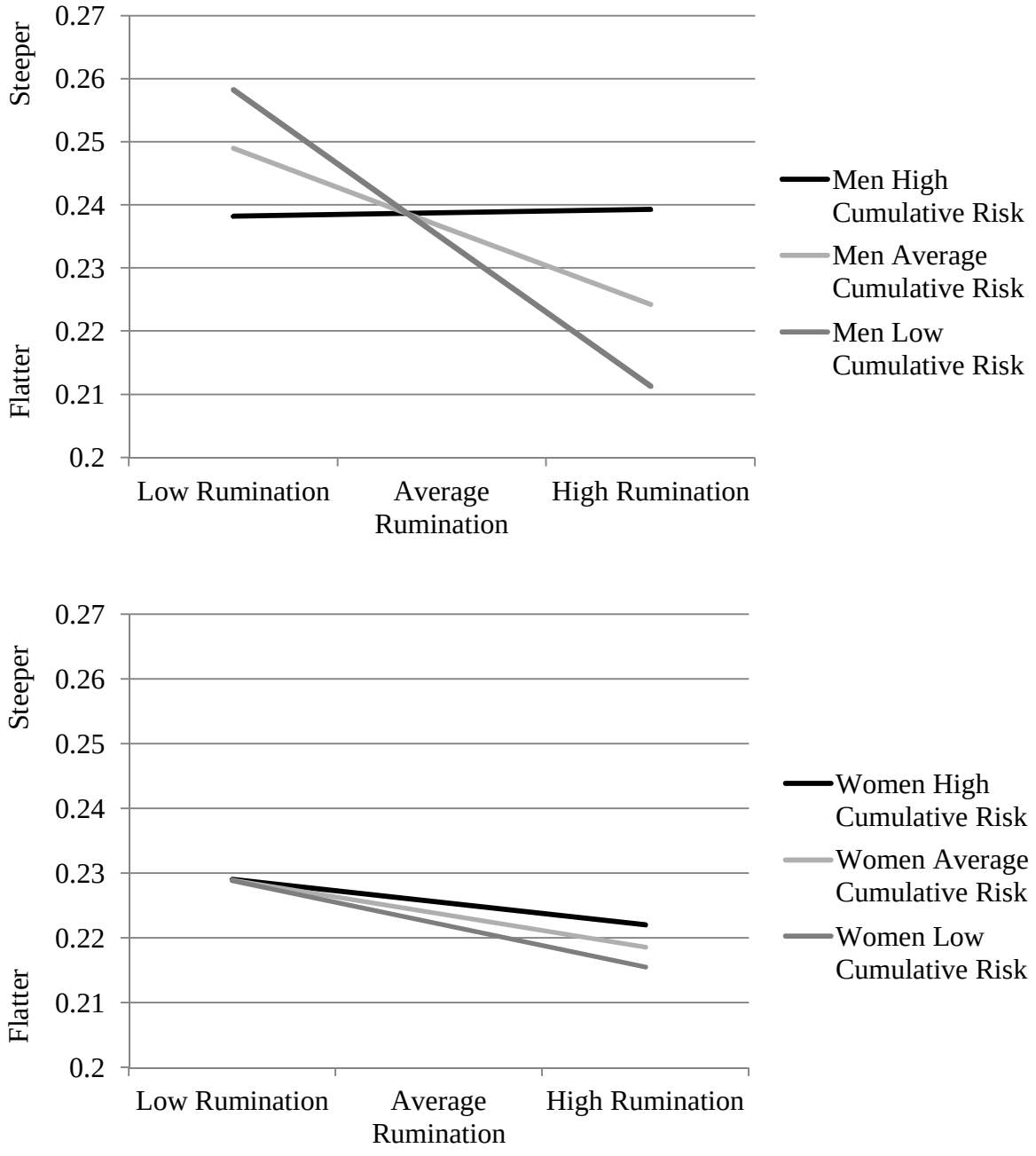
Cortisol Slopes Predicted by Global Cumulative Risk and Rumination



Note: Flatter slopes are indicative of unhealthy cortisol responses whereas steeper slopes are indicative of healthy cortisol responses.

Figure 5

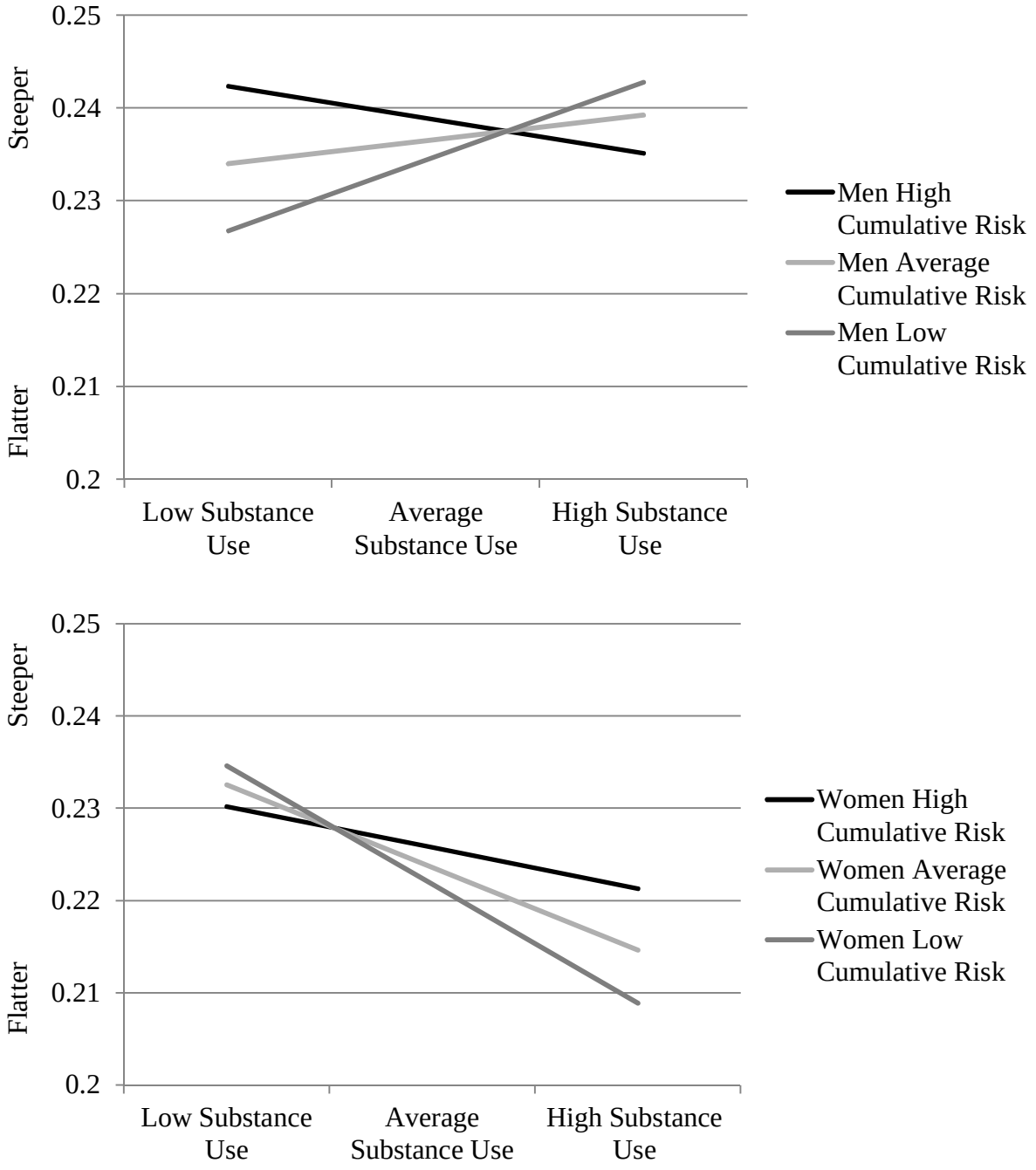
Men's and Women's Cortisol Slopes Predicted by Global Cumulative Risk and Rumination



Note: Flatter slopes are indicative of unhealthy cortisol responses whereas steeper slopes are indicative of healthy cortisol responses.

Figure 6

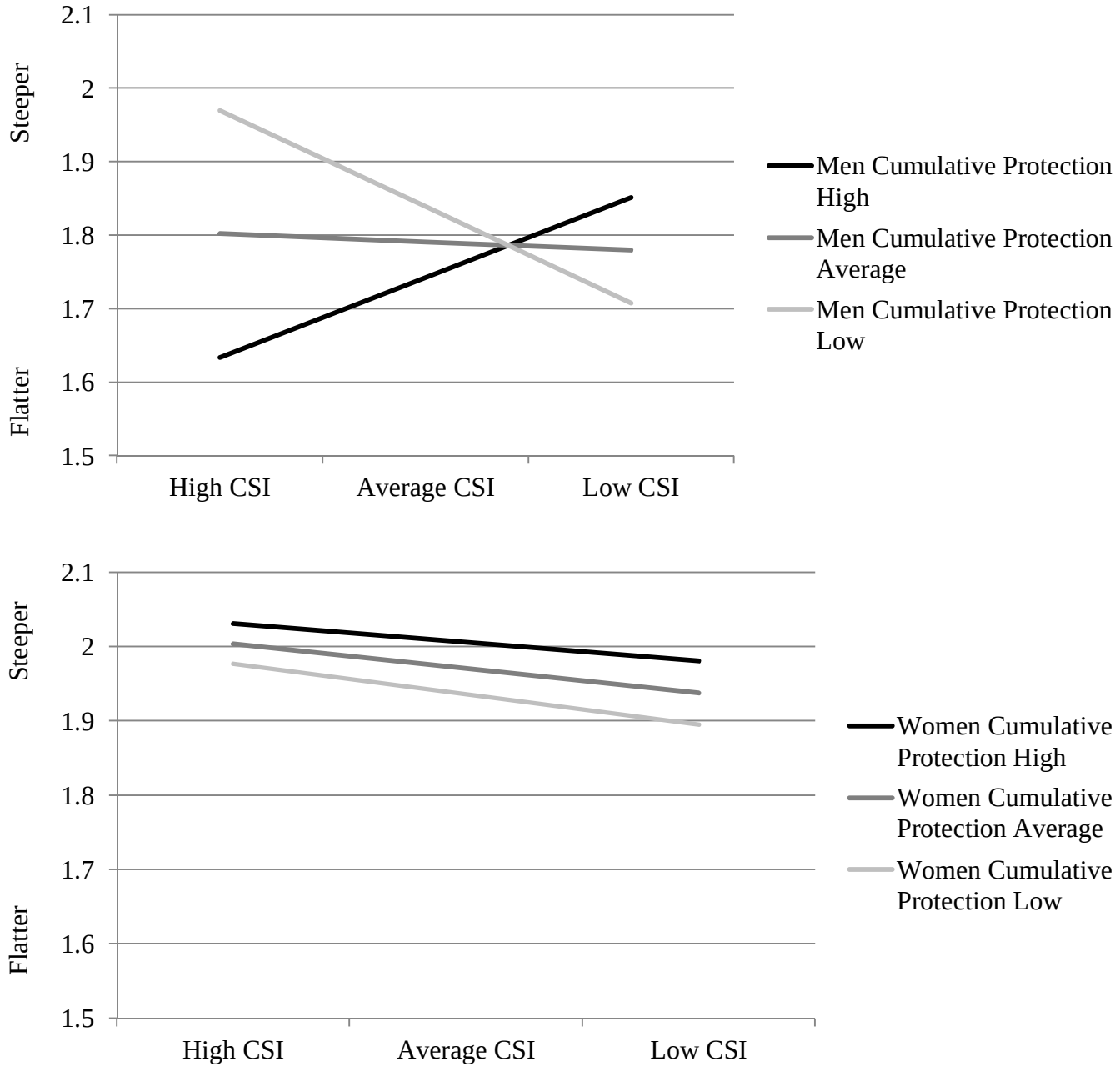
Men's and Women's Cortisol Slopes Predicted by Global Cumulative Risk and Substance use



Note: Flatter slopes are indicative of unhealthy cortisol responses whereas steeper slopes are indicative of healthy cortisol responses.

Table 7

Men and Women's Cortisol Slopes Predicted by Daily Cumulative Protection and Relationship Satisfaction



Note: Flatter slopes are indicative of unhealthy cortisol responses whereas steeper slopes are indicative of healthy cortisol responses.

Appendix A

Perceived Support

Please use the scale below to answer the following questions about your relationship with your partner.

1	2	3	4
Not at all			Very Much

1. To what extent could you turn to your partner for advice about problems?

2. To what extent could you turn to your partner for help with a problem?

3. To what extent can you count on your partner to give you honest feedback, even if you might not want to hear it?

4. To what extent can you count on your partner to help you if a family member very close to you died?

5. If you wanted to go out and do something this evening, how confident are you that your partner would be willing to do something with you?

6. To what extent can you count on your partner to listen to you when you are very angry at someone else?

7. To what extent can you really count on your partner to distract you from your worries when you feel under stress?

Appendix B

Global Empathy

Please use the scale below to answer the following questions about your relationship with your partner.

1	2	3	4
Not at all			Very Much

1. To what extent would you describe your partner as being empathetic when you discuss a problem you are having?

2. To what extent does your partner really understand your emotions and feelings?

3. When you are talking to your partner about a stressful situation, to what extent are they actively listening to what you are saying?

Appendix C

Demand-Withdraw

All relationships have problems now and then. Please read each of these statements concerning the way you react to problems in your relationship, and indicate the degree to which you engage in each response using the following scale. If you engage in the behavior sometimes, record a "4" in the blank next to the statement; if you never engage in the behavior, record a "0" and so on. You can use the same number more than once.

0	1	2	3	4	5	6	7	8
I Never Do This		I Seldom Do This		I Sometimes Do This		I Frequently Do This		I Constantly Do This

1. When my partner starts a conversation with me, I try to avoid the conversation.
2. When I start a conversation, my spouse tries to avoid the conversation
3. When my partner criticizes me, I defend myself.
4. When I criticize my partner, my partner defends him/herself.
5. Both my partner and I try to discuss problems.
6. Both my partner and I express our feelings to each other.
7. Both my partner and I suggest possible solutions and compromise
8. When I complain, my partner becomes silent.
9. When my partner complains, I become silent.

Appendix D

Self-Silencing

Please indicate the extent to which you agree or disagree that each of the following statements describes your behavior in your marriage.

1	2	3	4	5
Strongly Agree				Strong Disagree

1. I think it is best to put myself first because my spouse will not look out for me.
2. I don't speak my feelings in my marriage when I know they will cause disagreement.
3. Caring means putting my spouse's needs in front of my own.
4. Considering my needs to be as important as my spouses' is selfish.
5. When my partner's needs and feeling conflict with my own, I always state mine clearly.
6. In my marriage, my responsibility is to make the other person happy.
7. Caring means choosing to do what my spouse wants, even when I want to do something different.
8. In order to feel good about myself, I need to feel independent and self-sufficient.
9. One of the worst things I can do is to be selfish.
10. Instead of risking confrontations in my marriage, I would rather not rock the boat.
11. I speak my feelings with my partner, even when it leads to problems or disagreements.
12. When my partner's needs or opinions conflict with mine, rather than asserting my own point of view I usually end up agreeing with him/her.
13. When it looks as though certain of my needs can't be met in my marriage, I usually realize that they weren't very important anyway.

14. Doing something just for myself is selfish.

15. I rarely express my anger at my spouse.

16. I think it's better to keep my feeling to myself when they conflict with my partner's.

17. In my marriage I don't usually care what we do, as long as my spouse is happy.

18. I try to bury my feelings when I think they will cause trouble in my marriage.

Appendix E

Accommodation

All relationships have problems now and then. Please read each of these statements concerning the way you react to problems in your relationship, and indicate the degree to which you engage in each response using the following scale. If you engage in the behavior sometimes, record a "4" in the blank next to the statement; if you never engage in the behavior, record a "0" and so on. You can use the same number more than once.

0	1	2	3	4	5	6	7	8
This Never Occurs		This Seldom Occurs		This Sometimes Occurs		This Frequently Occurs		This Constantly Occurs

When my partner is angry with me and ignores me for a while:

I talk to him/her about what's going on.

I give my partner the benefit of the doubt and forget about it.

I consider breaking up.

I ignore the whole thing and try to spend less time with my partner

When my partner is rude and inconsiderate with me:

I talk to him/her about what's going on.

I give my partner the benefit of the doubt and forget about it.

I consider breaking up.

I ignore the whole thing and try to spend less time with my partner

When my partner yells at me or speaks to me in a raised voice:

I talk to him/her about what's going on.

I give my partner the benefit of the doubt and forget about it.

I consider breaking up.

I ignore the whole thing and try to spend less time with my partner

Appendix F

Negativity and Hostility

All relationships have problems now and then. Please read each of these statements concerning the way you react to problems in your relationship, and indicate the degree to which you engage in each response using the following scale. If you engage in the behavior sometimes, record a "4" in the blank next to the statement; if you never engage in the behavior, record a "0" and so on. You can use the same number more than once.

0	1	2	3	4	5	6	7	8
I Never Do This		I Seldom Do This		I Sometimes Do This		I Frequently Do This		I Constantly Do This

1. When a conflict occurs, my partner is hostile towards me.

2. When a conflict occurs, my partner is negative or critical of me

Appendix G

Abbreviated COPE

We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. Think about the stressors you have faced during the **PAST SIX MONTHS**. Please indicate what you have ***generally*** done and felt when you experienced stressful events during this time. Obviously, different events bring out somewhat different responses, but think about what you *usually* have done in the past six months when you have been under a lot of stress.

1	2	3	4
Don't do this at all			Do this a lot

1. I take additional action to try to get rid of the problem.
2. I try to come up with a strategy about what to do.
3. I look for something good in what is happening.
4. I refuse to believe that it has happened.
5. I give up the attempt to get what I want.
6. I get emotional support from others.
7. I get help and advice from other people.
8. I criticize myself.
9. I turn to work or other substitute activities to take my mind off things.
10. I concentrate my efforts on doing something about it.
11. I make a plan of action.
12. I try to see it in a different light, to make it seem more positive.
13. I pretend that it hasn't really happened.
14. I just give up trying to reach my goal.
15. I just give up trying to reach my goal.

16. I get comfort and understanding from someone.

17. I try to seek advice or help from others about what to do.

18. I go to movies or watch TV, to think about it less.

19. I do what has to be done, one step at a time.

20. I think hard about what steps to take.

21. I learn something from the experience.

22. I act as though it hasn't even happened.

23. I admit to myself that I can't deal with it, and quit trying.

24. I blame myself for things that happened.

25. I daydream about things other than this.

26. I take direct action to get around the problem.

27. I think about how I might best handle the problem.

28. I try to grow as a person as a result of the experience.

29. I say to myself "this isn't real."

30. I reduce the amount of effort I'm putting into solving the problem.

31. I sleep more than usual.

32. I take action to try and make the situation better.

33. I think about the causes of the stressor.

34. I accept the reality of the fact that the event has happened.

35. I learn to live with it.

36. I give up trying to deal with it.

37. I drink alcohol or take drugs in order to think about it less.

Appendix H

Stress Rumination Response Scale

We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. Think about the stressors you have faced during the **PAST SIX MONTHS**. Please indicate what you have ***generally*** done and felt when you experienced stressful events during this time. Obviously, different events bring out somewhat different responses, but think about what you *usually* have done in the past six months when you have been under a lot of stress.

1	2	3	4
Don't do this at all			Do this a lot

1. I think about how the negative event will negatively affect my future.

2. I think about how the stressful event is all my fault.

3. I ruminate about how the stressor will affect other areas of my life.

4. I think that the cause of the event will lead to additional stressful events in my life.

5. I think about how things like this always happen to me.

6. I think about how important the stressful event is to me.

7. I think about the causes of the stressor.

8. I think about what the occurrence of the event means about me.

9. I think the event means that I will be unable to cope with events in the future.

Appendix I

Daily Diary

Please indicate whether any of the following events occurred to you within the last 24 hours: (You may mark more than one event.)

- **O** A lot of household chores
- **O** Unexpected financial problems
- **O** A lot to do at work or at school
- **O** Argument with someone at work or at school
- **O** Received poor evaluation or feedback at work or at school
- **O** Problems with transportation
- **O** Sickness or injury
- **O** Argument with family or in-laws
- **O** Argument with friends

Thinking of the past 24 hours, please indicate the extent to which each of the following statements applied to you:

	I didn't feel this way at all						I felt this way a lot
I felt overwhelmed with work/school	**O**	**O**	**O**	**O**	**O**	**O**	**O**
I felt preoccupied with things other than my marriage	**O**	**O**	**O**	**O**	**O**	**O**	**O**
I felt tired	**O**	**O**	**O**	**O**	**O**	**O**	**O**
I exerted a lot of "willpower" to get through the workday	**O**	**O**	**O**	**O**	**O**	**O**	**O**

Please indicate whether any of the following events occurred to you within the last 24 hours: (You may mark more than one event.)

- **O** You were unable to spend time with spouse
- **O** Spouse said something that made you feel loved
- **O** You had an argument with spouse
- **O** Spouse showed an interest in the events of your day
- **O** You had to care or look after spouse
- **O** You enjoyed a leisure activity with spouse
- **O** Spouse listened to or comforted you.
- **O** Spouse let you down or broke a promise
- **O** Spouse criticized you
- **O** Spouse withdrew from a conversation
- **O** You shared physical intimacy with spouse
- **O** Spouse helped you out with something important
- **O** Spouse showed anger or impatience toward you
- **O** You showed an interest in the events of your spouse's day
- **O** You listened to or comforted spouse
- **O** You criticized/blamed your spouse
- **O** You let your spouse down or broke a promise
- **O** You tried to make your spouse feel loved
- **O** You helped spouse with something important
- **O** You showed anger or impatience toward your spouse
- **O** You did not express your feelings to avoid conflict

Please indicate whether you used any of the following strategies to deal with your **NON-MARITAL** stressors and problems today (You may choose more than one strategy).

- **O** I made a plan of action to try and work through the problem
- **O** I decided that this is a situation/issue that I'll just have to accept
- **O** I decided to distract myself/ act as though the problem didn't happen
- **O** I gave up on trying to change the problem
- **O** I thought about why I always react this way
- **O** I talked to someone about how I feel
- **O** I did not experience any non-marital stressors today

Please indicate whether you used any of the following strategies to deal with your **MARITAL** stressors and problems today (You may choose more than one strategy).

- **O** I talked to my partner and tried to work through the problem with him/her
- **O** I sulked and avoided talking to my spouse for awhile
- **O** I gave my spouse the benefit of the doubt and forgot about the issue
- **O** I began to think about ending the relationship
- **O** I did something to keep my mind off the problem
- **O** I talked to a friend or family member about how I felt
- **O** I thought about how sad the problem made me
- **O** I did not experience any marital stressors today

How much time (in hours) did you spend with your spouse in the past 24 hours (not counting sleeping)?_____

Thinking about **the past 24 hours**, how satisfied were you with…	Not at all satisfied / Extremely satisfied **1 2 3 4 5 6 7**
… your sex life?	**O O O O O O O**
… the way your spouse contributed to household chores?	**O O O O O O O**
… how your spouse supported you?	**O O O O O O O**
… the amount of time the two of you spent together?	**O O O O O O O**
… the way the two of you resolved disagreements?	**O O O O O O O**
… your conversations with your spouse?	**O O O O O O O**
… how affectionate your spouse was?	**O O O O O O O**
… your spouse's mood?	**O O O O O O O**
… how dependable your spouse was?	**O O O O O O O**

	Not at all satisfied / Extremely satisfied **1 2 3 4 5 6 7**
How satisfied were you with your partner today?	**O O O O O O O**
How satisfied were you with your relationship with your partner today?	**O O O O O O O**
How satisfied were you with your marriage today?	**O O O O O O O**

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