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A Threat Vs. Challenge View of Conflict in Romantic Relationships

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A THREAT VS. CHALLENGE VIEW OF CONFLICT IN ROMANTIC RELATIONSHIPS

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ABSTRACT

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This research examined romantic partners' stress reactivity to relationship conflict through the lens of a threat vs. challenge perspective. We assessed the DHEA-S to cortisol ratio (anabolic balance) as an index of 330 newlywed partners' threat or challenge orientations to a conflict discussion with their spouse and then examined whether these orientations were predicted by their attachment styles. Consistent with predictions, anxious attachment predicted lower anabolic balance trajectories, compared to secure attachment. Results were decomposed into DHEA-S and cortisol components. DHEA-S levels were found to be more congruent with challenge, while cortisol levels were more congruent with threat.

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CHAPTER 1

INTRODUCTION

All couples experience conflict at some point in their romantic relationships, and it is often assumed that partners are threatened when faced with relationship conflict. The view that conflict represents a relationship threat is pervasive in research on close relationships. In particular, relationship conflict is thought to represent an attachment threat because it can raise the possibility that one's partner will not be responsive or that he or she may abandon the relationship (see Pietromonaco, Greenwood, & Barrett, 2004 and Simpson & Rholes, 1994). However, this view of relationship conflict as a threat may be incomplete because it does not take into account the possibility that some people may respond to conflict in a more positive, approach-oriented manner, showing responses characterized by challenge. The present work seeks to extend our understanding of couples' conflictual interactions by taking into account the extent to which individual partners show physiological responses consistent with threat, challenge, or both. This work draws on the threat versus challenge model of stress and attachment theory to address predictions about individual differences in how people respond to relationship conflict.

Threat Versus Challenge

According to the threat versus challenge model of stress response (Blascovich & Mendes, 2000; Blascovich & Tomaka, 1996), challenge responses are physiologically benign and occur when a person's perceptions of his or her available resources for coping with a stressor exceed his or her perceptions of the demands of the stressor. In contrast, threat responses are physiologically adverse and occur when a person's perceived

resources for coping with a stressor do not meet the perceived demands of the stressor. However, neither challenge nor threat responses to a stressor will be evoked when the disparity between one's perceptions of his or her own resources and of the demands associated with the stressor are extreme (i.e., are not evaluative of the person's worth, abilities, etc.). For example, Michael Jordan would not experience challenge in a game of one-on-one basketball against a middle schooler, nor would the middle schooler feel threat.

Resource and demand appraisals may be conscious or non-conscious and may involve cognitive processes, affective processes, or both. For example, when facing a stressor, a given person may consciously recall his or her strategies for dealing with similar stressors in the past and compare the effectiveness of each strategy. Encountering the stressor might also evoke a negative mood state, which might, in turn, negatively bias the person's perceptions of available resources for coping with the stressor (e.g., Salovey & Birnbaum 1989). Nevertheless, when activated, challenge and threat responses to a stressor are indicated by different patterns in major physiological systems, including but not limited to the cardiovascular (e.g., Blascovich & Tomaka, 1996) and endocrine systems (e.g., Mendes, Gray, Mendoza-Denton, Major, & Epel, 2007).

Most studies examining threat versus challenge have focused on cardiovascular patterns. This work has shown that challenge responses are characterized by increased cardiac reactivity (increased heart rate, cardiac output, etc.) and decreased vascular resistance (vasodilation), which occur when participants' appraisals of the demands of an active task (one which requires participants to engage in active coping rather than passive coping) do not exceed their resource appraisals. By contrast, threat responses are

characterized by moderate cardiac reactivity and increased vascular resistance, which occur when participants' demand appraisals exceed their resource appraisals (e.g., Blascovich & Tomaka, 1996; Tomaka, Blascovich, Kelsey, & Leitteh, 1993; Tomaka, Blascovich, Kibler, & Ernst, 1997).

Threat/Challenge Assessed via Anabolic and Catabolic Hormones

More recently, researchers have begun to examine threat versus challenge patterns using hormonal markers, and in particular, they have contrasted catabolic hormones (e.g., cortisol) with anabolic hormones (e.g., dehydroepiandrosterone, or DHEA). The catabolic hormone, cortisol, has been linked to a variety of negative health outcomes such as heart disease, osteoporosis, Type II diabetes, immune depression, and neuronal cell death (Goosens & Sapolsky, 2007). In contrast, anabolic hormones have been associated with beneficial health outcomes and more effective coping (Epel, McEwen, & Ickovics, 1998). Both DHEA and cortisol are end products released by the hypothalamic-pituitary-adrenal (HPA) axis. Catabolic hormones like cortisol facilitate the breakdown of metabolic molecules, such as protein in muscle, in order to release and mobilize energy (Epel et al., 1998); they are associated with the fight-or-flight response to stress that is characteristic of the sympathetic nervous system. In contrast, DHEA-S (a metabolite of DHEA—terms which are used interchangeably hereafter), has been implicated in several studies as an indicator of decreased susceptibility to negative emotion, as well as a possible antagonist against cortisol (e.g., Kroboth, et al., 2003; Mendes et al., 2007). Anabolic hormones are indicative of parasympathetic nervous system activity; they "…counter arousal and increase relaxation, digestion and energy storage, and healing processes, such as promoting protein synthesis" (Epel et al., 1998, p. 304). It is possible

that the balance between levels of anabolic and catabolic hormones (referred to as anabolic balance) may reveal more about people's reactivity to stress than either type alone (Epel et al., 1998). For instance, DHEA-S has been hypothesized to have beneficial effects, partly because DHEA-S acts as an antagonist to cortisol, offsetting its negative effects, and because it is a precursor to the release of sex hormones (Kroboth et al., 2003; Mendes et al., 2007).

One recent study has examined the balance between DHEA-S and cortisol to index threat versus challenge responses (Mendes et al., 2007). In this work, participants who were higher in implicit racial bias were more likely to exhibit a threat response in anticipation of being interviewed by someone of a different race, compared to those lower in racial bias, who were more likely to show a challenge response. Here, challenge and threat responses were indicated by anabolic balance, the ratio of anabolic to catabolic hormones—specifically, DHEA-S and cortisol, respectively. The present study draws on this work by using anabolic balance to examine the extent to which marital partners show threat versus challenge responses before, during, and after a discussion of a major area of conflict in their relationship.

Attachment Theory

The present work draws on attachment theory to make predictions about which individuals will be most likely to respond to relationship conflict as a threat or challenge. Bowlby's original attachment theory (1969, 1973, 1980) suggested that infants form internal working models of their relationship with a caregiver. These internal working models, which consist of expectations and beliefs about the attachment relationship, are assumed to reflect regularities in individuals' experiences with a caregiver and to guide

how individuals behave. In particular, Bowlby proposed that infants are most likely to engage in attachment behaviors (e.g., seek physical contact, engage in prolonged protest, or ignore the caregiver) when they are faced with a threat from the environment (Bowlby, 1980); in other words, he assumed that threat activates the attachment system, and as a consequence, triggers attachment behaviors. Precisely which behaviors infants engage in will depend on their expectations and beliefs about how the caregiver will respond.

Individual differences in attachment styles, and presumably in the underlying internal working models, were first identified in work by Ainsworth and her colleagues (Ainsworth, Blehar, Waters, & Wall, 1978). This work has shown that, when an infant is faced with the potentially threatening situation of being left with a stranger (i.e., in the Strange Situation), the infant responds to the mother's return in one of three ways that presumably reflect the type of maternal care the infant has received in the past. If the caregiver (or 'attachment figure') has proven responsive in the past, the child's attachment system develops such that he or she relies on the support of the attachment figure to regulate his or her own affect and arousal. Infants who demonstrate this reliance by reconciling easily with their mother are thought to have a 'Secure' attachment style. In contrast, infants who seek reconciliation but also protest have an 'Anxious-Ambivalent' attachment style, and those who avoid their mother have an 'Avoidant' style.

In pioneering work, Hazan and Shaver (1987) suggested that attachment patterns might also be evident in adult romantic relationships. Just as children who experience a threat engage in attachment behaviors (seeking proximity, protesting, clinging, withdrawing) with caregivers, adults who experience a threat also may engage in similar

behaviors with their romantic partner. The precise nature of the behavior (e.g., seeking proximity, protesting) is thought to vary with individual differences in attachment styles. Like children, adults vary in the extent to which their attachment style is characterized by security or insecurity. The general assumption is that adults' romantic attachment styles are derived, in part, from their earlier attachment style with a caregiver, although attachment styles are likely to shift, to some extent, with new experiences (e.g., with peers, teachers, romantic partners).

Whereas parent-child attachment is typically measured by coding infants' behavior in the Strange Situation and assigning each child to an attachment category (i.e., secure, anxious-ambivalent, or avoidant), adult attachment is typically measured using self-reports that are scored along two continuous dimensions: attachment anxiety and attachment avoidance (Fraley, Waller, & Brennan, 2000). Individuals who score low on both of these dimensions are considered to have a secure attachment style, whereas those who score high on either or both of these dimensions are thought to have insecure styles. When the two dimensions are crossed, the resulting quadrants represent four prototypical attachment styles: secure, dismissing, preoccupied, and fearful (Bartholomew & Horowitz, 1991; see Figure 1). Individuals exemplifying the secure style are low on both attachment avoidance and attachment anxiety; they are comfortable being close to and relying on significant others without excessive concern about being abandoned by them. Individuals who are dismissing (high avoidance, low anxiety) tend to avoid becoming too close to or relying on significant others; in contrast, preoccupied individuals (high anxiety, low avoidance) desire extreme closeness and worry about being abandoned by a

partner. Lastly, fearful individuals (high anxiety, high avoidance) both desire and fear closeness to significant others.

As adult attachment theory has evolved, attachment styles have been found to predict different strategies for coping with stressful or threatening events (Kobak & Seery, 1988; Mikulincer, & Florian, 1998). This growing body of evidence suggests that one's attachment style may be an important predictor of one's physiological reactivity to such events (see Diamond, 2001; Sbarra & Hazan, 2008).

Physiological Response to Relationship Threat and Attachment

Although couples' conflict interactions have not been examined from a challenge versus threat perspective thus far, prior studies of couple members' reactions to conflict have found that partners show stress-related physiological responses before and during conflictual interactions. One index of stress response that is common to these studies is cortisol (e.g., Kiecolt-Glaser, Glaser, Cacioppo, & MacCallum, 1997; Kiecolt-Glaser et al., 1996; Loving, Heffner, Kiecolt-Glaser, Glaser, & Malarkey, 2004). Greater cortisol reactivity is associated with more negative patterns of behavior in couples' conflict discussions (Kiecolt-Glaser, et al., 1997; Kiecolt-Glaser, et al., 1996), which is consistent with a threat-based view of conflict interaction.

Further work has shown that individuals' attachment styles are associated with their patterns of cortisol reactivity and recovery (i.e., return to baseline level) when discussing a conflict with their romantic partner (Powers, Pietromonaco, Gunlicks, & Sayer, 2006). Dating partners who were more secure showed less cortisol reactivity to conflict in their relationships and their cortisol levels recovered more quickly afterward, compared to those with more insecure styles. Specifically, women higher in avoidance

had higher cortisol levels in anticipation of a relationship conflict than did women lower in avoidance; men higher in attachment anxiety showed a steeper increase in anticipatory cortisol levels and were slower to recover after a relationship conflict with their partner. In related work, Laurent and Powers (2007) found that men's attachment avoidance and emotional temperament (assessed using subscales of distress, fearfulness and anger) interacted to predict their own and their female dating partners' cortisol levels during conflict. Men's cortisol levels were highest during conflict when they were high in avoidance and low in emotionality, while women's cortisol levels were highest when their partners were low in avoidance and high in emotionality.

Current Research

It is apparent that cortisol levels reflect stress responses specific to relationship threat. However, other hormones that indicate a more approach-oriented, challenge response to stressors—such as DHEA-S—have not been examined in the context of couples' conflictual interactions. The overall aim of the current research was to apply a challenge versus threat model to better understand variations in how couples react during conflict interactions. Specifically, we theorized that the balance between cortisol and DHEA-S would provide more precise information about whether a given relationship partner was reacting physiologically to a conflict more as a threat or more as a challenge.

Below, we describe our research which applied the threat versus challenge perspective to the study of conflict in romantic relationships. We examined couple members' cortisol and DHEA-S levels in response to conflict, allowing us to investigate the links between individuals' attachment styles and their threat or challenge orientations within the context of a conflictual interaction.

We predicted that partners with more secure attachment styles would exhibit a higher DHEA-S to cortisol ratio (indicating challenge) in response to relationship conflict and that partners with more insecure attachment styles would exhibit a lower DHEA-S to cortisol ratio (indicating threat) in response to relationship conflict. We also examined participants' self-reported threat versus challenge appraisals before conflict to determine the extent to these perceptions are related to attachment style, and the extent to which they are related to physiological patterns. We expected that more insecurely attached individuals would experience greater subjective distress in anticipation of and during the conflict interaction. However, we did not expect that these subjective perceptions would be strong predictors of participants' physiological responses to conflict because self-reports often are poorly correlated with physiological indicators such as cortisol (see Dickerson & Kemeny, 2004).

CHAPTER 2

METHOD

Participants

This study was conducted using a sub-sample of 165 couples (330 individuals) from a larger longitudinal study of heterosexual newlywed couples in progress at the University of Massachusetts, Amherst. We estimated that this sample size would be adequate, given the statistical power achieved in prior work (Powers et al., 2006). One hundred fifty nine newly-married couples were identified from marriage licenses filed in several municipalities in Western Massachusetts and invited to participate via mail and phone. In addition, to identify and recruit couples who lived in the local area but were married elsewhere, two couples were recruited through flyers posted at places of business in several communities in the recruitment area, three couples were recruited though a classified advertisement placed on the Western Mass section of the popular website, Craigslist.org, and one couple was recruited through a referral by another couple who had already participated in the study. To be eligible for participation in the study, we required that both partners were in their first marriage, that they were between the ages of 18 and 50 years old, that neither had any children, and that they were able to participate within seven months after the date of their marriage. We also screened the respondents for endocrine disorders in order to ensure that participants had relatively normal hormone levels. In the event that either member of a couple had an endocrine disorder (e.g., diabetes, Cushing's disease), we informed them that they were not eligible to participate.

Demographics. The mean age of wives in our sample was 28 years old (*SD* = 4.6), and 29 years for husbands (*SD* = 5.1). Eight percent of wives had received a high

school diploma or GED, 49% had a bachelor's degree, and 33% had an advanced degree. Nineteen percent of husbands had completed high school, 49% had a bachelor's degree, and 18% had an advanced degree. Of the wives, 91.5% identified their race/ethnicity as white, 0.6% as Black, 0.6% as American-Indian, 2.4% as Asian, and 3.6% as Hispanic; the remaining 1.3% did not provide this information. Of the husbands, 96.4% identified their race/ethnicity as white, 0.6% as Black, 1.2% as American-Indian, and 1.8% as Hispanic.

Procedure

Sessions were conducted during the evening hours, between 4 p.m. and 10 p.m., in order to control for the diurnal rhythm of cortisol (Dickmeis, 2009; Dorn, Lucke, Loucks, & Berga, 2007). Sessions lasted approximately three hours and participants were not allowed to eat or drink anything but water during the session in order to avoid contamination of saliva samples. (Saliva samples were assayed for cortisol and DHEA-S; this procedure is explained in more detail in the sections that follow.) At the beginning of each study session, a trained experimenter described the tasks that participants would perform during the session and gave participants the opportunity to ask questions. Afterward, participants gave their informed consent to participate in the study, then completed questionnaires privately (away from their partners). First, they completed a standard measure of attachment [the Experiences in Close Relationships Questionnaire (ECR); Brennan et al., 1998] on a computer and provided saliva samples by passively drooling though straws into vials. Participants were then asked to identify three topics of unresolved conflict in their relationship and to rate the intensity of each on a 7-point scale; "1 – Not at all intense" to "7 – Extremely intense." For each couple's conflict

discussion, the experimenter chose a topic that both partners had listed and that had the highest combined intensity rating, when possible. Otherwise, the assistant chose a topic that had the highest intensity rating or chose a topic randomly, if two were tied. Next, the experimenter informed the couple of the upcoming conflict discussion to invoke their anticipatory stress response (though they were already informed that they would have such a discussion at the beginning of the session, when they consented to participate) and had them complete more questionnaires on the computer, including a self-report threat/challenge orientation measure. Participants each provided another saliva sample 15 minutes after they were reminded about the impending conflict interaction. Immediately afterward, the experimenter took the couple to a private room with three small, but visible, video cameras and asked them to try to resolve the conflict topic chosen for them over the next 15 minutes. Ten, thirty, and sixty minutes after the conflict discussion ended, an assistant collected saliva samples from each partner, in order to assess stress recovery.[1] At the session's conclusion participants were asked to return to the private room to discuss the positive aspects of their relationships in order to end the session on a positive note. Finally, the experimenter debriefed, thanked, and paid each participant $50.

Measures

Attachment style. In order to assess attachment styles, participants completed a version of the Experiences in Close Relationships Questionnaire (ECR; Brennan et al., 1998) that was revised to refer to the participants' current marital relationship. This questionnaire includes items that measure attachment anxiety (husbands' α = .86, wives' α = .92) and attachment avoidance (husbands' α = .87, wives' α = .85), which are rated

on a 7-point scale from "1 – Disagree Strongly" to "7 – Agree Strongly" (see Appendix A for the complete list of items included in this scale). Scores for the anxiety and avoidance dimensions were moderately correlated for men, $r(165) = .292$, $p < .001$, and for women, $r(165) = .397$, $p < .001$.

Threat/challenge orientation: Physiological. In order to assess couples' physiological response to conflict, samples of their saliva were collected, frozen in a -80° C freezer, and shipped on dry ice to Salimetrics, LLC, to be assayed for cortisol and DHEA-S content. Cortisol appears in saliva approximately 15 minutes after a stressor occurs; therefore, collection of the samples was timed to take this lag into account. Samples were collected after partners had been in the lab working quietly and separately for about 30 minutes (lab baseline), 15 minutes after receiving detailed instructions regarding the conflict interaction (anticipation of stressor), 10 minutes after the end of the conflict discussion (reflecting stress during the interaction) and 30 and 60 minutes post discussion (recovery period). In addition, to obtain a baseline outside of the lab, a home saliva sample was collected on a different day (approximately one week after the experimental session) at approximately the same time of day that the participants provided their first saliva sample in the lab.

Threat/challenge orientation: Self-report. Couples' self-reported threat and challenge orientations to conflict were assessed in order to determine the degree to which their reports were related to their attachment styles. This information was intended to provide converging evidence for the idea that attachment theory could be used to make predictions about which individuals would be most likely to physiologically respond to relationship conflict as a threat or challenge. We adapted two items from Tomaka et al

(1993) to assess cognitive appraisals of the demands of the conflict interaction ("How stressful do you expect the upcoming conflict interaction to be?") as well as their available resources for coping with the conflict ("How able are you to cope with the conflict interaction?"). Participants responded to these items on 7-point scales from "1 - Not at all stressful" to "7 - Extremely stressful" (for the demands scale) and "1 - Not at all able" to "7 - Extremely able" (for the resources scale).[2]

CHAPTER 3

RESULTS

Attachment and Physiological Response to Relationship Conflict

Data preparation. The distributions for cortisol and DHEA-S were positively skewed; thus, we performed a base-10 logarithmic transformation on these scores to normalize them. We then removed (treated as missing) outliers that were more than three standard deviations from the mean-transformed scores for these data. Next, we created an index for anabolic balance by raising these scores to the 10th power (to transform them back) and dividing the DHEA-S score for each sample by the corresponding cortisol score. The distribution of these scores was also skewed, so we performed a base-10 logarithmic transformation on them as well. We used the log base-10 transformed anabolic balance (DHEA-S divided by cortisol) as the outcome variable in the analyses described below.

Unconditional models. We used multilevel modeling statistical techniques via the Hierarchical Linear Modeling, Version 7 computer program (HLM 7.00; Raudenbush & Bryk, 2011) to analyze the data. Multilevel modeling lends itself well to the analysis of dyadic data because it compensates for the interdependent nature of couples' responses by simultaneously estimating partners' trajectory parameters, utilizing information about the associations between partners' scores and individuals' repeated measures to more precisely estimate standard errors for these parameters. Scatterplots of the anabolic balance over time for each participant revealed that the trends appeared to be non-linear. Therefore, we fitted and compared models that contained linear and quadratic terms. Initially, we fit unconditional models to the data (i.e., those which contained none of our

predictors), to which we could later add our predictors (husbands' and wives' attachment anxiety and avoidance scores) and controls (medications that might influence hormone levels). Fitting these unconditional models yields information about the overall mean anabolic balance levels for husbands and wives at the end of the conflict discussion (where the time variable was centered) and the average trajectories of those levels over time. We began by comparing a linear model to a curvilinear model that contained a quadratic term. Adding the quadratic term significantly improved the fit of the model $\chi^2(13) = 826.07$, $p < .01$. Thus, we retained the quadratic model for further analyses.

The level 1 model. The level 1 structure of the unconditional model is shown below:

$Y_{ij} = \beta_{f1j}$(female intercept) + β_{f2j}(female linear) + β_{f3j}(female quadratic) + β_{m4j}(male intercept) + β_{m5j}(male linear) + β_{m6j}(male quadratic) + r_{ij}

Here, Y_{ij} is the log base-10 anabolic balance level for the i^{th} person in the j^{th} couple, which is estimated by β_{f1j}, the wife's mean hormone level at the end of the conflict discussion (also known as the intercept); β_{f2j}, the wife's rate of hormone change (the conditional or instantaneous slope) at that time point; and β_{f3j}, the wife's change in slope or "acceleration" over the entire trajectory; plus measurement error for that individual, r_{ij}. β_{m4j}, β_{m5j}, and β_{m6j} represent the husband's intercept, instantaneous slope, and acceleration, respectively.

The level 2 model. The level 2 model is represented by the following equations:

$\beta_{f1j} = \gamma_{10} + \upsilon_{1j}$

$\beta_{f2j} = \gamma_{20} + \upsilon_{2j}$

$\beta_{f3j} = \gamma_{30} + \upsilon_{3j}$

$\beta_{m4j} = \gamma_{40} + \upsilon_{4j}$

$\beta_{m5j} = \gamma_{50} + \upsilon_{5j}$

$\beta_{m6j} = \gamma_{60} + \upsilon_{6j}$

where the intercepts, instantaneous slopes, and accelerations (trajectory parameters) for both members of couple *j* are each estimated by γ's (the overall means for all wives' and husbands' hormone trajectory parameters), plus measurement errors, υ's. When we fit the model to the data, both levels were estimated simultaneously via full maximum likelihood. There was variance at level 1 of the model ($\sigma^2 = 0.02$) and significant variance in trajectory parameters at level 2 (all *ps* < .01) of the model, indicating that there was variability in husbands' and wives' anabolic balance trajectory parameters around the overall mean and verifying that there would be variance left to explain by including attachment scores in the model.

Medication controls. Next, we added small groups (consisting of three to four medications) of dichotomous medication control variables (coded as "1" if a given participant was taking a medication, "0" if he or she was not) to all level 2 equations, one group at a time. Each of these groups of medications is hypothesized to have one or more ties to pathways that influence the functioning of the HPA-axis or cortisol (Granger, Kapelewski, Fortunato, & Hibel, 2009). After each group was added, we trimmed the model to retain only those medications that significantly predicted each trajectory parameter, starting with the parameters of the highest order—wives' and husbands' acceleration parameter—and working down to the parameters of the lowest order, the intercepts. If a medication variable significantly predicted the husbands' or wives' higher order parameter, it was retained in the equation for that parameter, as well as in the

equations for all lower order parameters. The final set of control medications is shown in Table 1 and includes hormonal contraceptives, benzodiazepines, Sudafed, dry mouth medication, and anti-smoking medications for wives and depression (or anxiety) medications, bronchodilators, antacids, and narcotics for husbands.

Attachment and anabolic balance. Finally, we added the attachment predictors to the model, including attachment avoidance, anxiety, and a multiplicative term representing the avoidance by anxiety interaction for both wives and husbands. We added all of these to our level 2 equations for both husbands and wives because avoidance and anxiety may interact to predict physiological responses. We also wished to examine the effects of participants' attachment while controlling for their partners' attachment. Wives' and husbands' attachment characteristics are shown in Table 1. The final model for wives is shown in Table 2 and the final model for husbands is shown in Table 3.

We predicted that more secure wives would show a higher anabolic balance (DHEA-S to cortisol ratio) in reaction to the conflict, compared to more insecure wives. Consistent with this hypothesis, wives' self-reported anxiety significantly predicted the instantaneous slope of their trajectory at the end of the discussion, $t(154) = 1.97$, $p = .05$. Wives who were low in attachment anxiety (more secure) showed an anabolic balance trajectory that rose across the beginning of the study session, and decreased after the conflict discussion, in contrast with more anxiously attached wives (see Figure 2).

We also predicted that more secure husbands would show a higher anabolic balance in reaction to the conflict, compared to more insecure husbands. Again, consistent with this hypothesis, husbands' self-reported anxiety significantly predicted

the acceleration (curvature) across their trajectory, $t(155) = 2.20$, $p = .03$, such that husbands who were low in attachment anxiety (more secure) showed an anabolic balance trajectory that increased but decelerated as the session progressed, compared to more anxiously attached husbands (see Figure 3). Neither participants' self-reported attachment avoidance nor their anxiety by avoidance interaction term significantly predicted their anabolic balance.

Partner attachment. The partner's attachment style scores were included primarily as control variables, and therefore we did not make predictions about how they might contribute to individuals' physiological responses. Nevertheless, to present a more complete picture, we report the findings for partner effects in predicting individuals' own physiological patterns.

For wives, the interaction between their husbands' anxious and avoidant attachment marginally predicted their acceleration in anabolic balance, $t(156) = 1.70$, $p = .09$. When wives' had partners with a dismissing attachment style, their anabolic balance trajectory rose across the beginning of the study session, and decreased after the conflict discussion, compared to those with secure, preoccupied, or fearful partners, whose anabolic balance increased more steadily throughout the session (see Figure 4).

For husbands, wives' attachment anxiety significantly predicted their instantaneous slope, $t(154) = 2.33$, $p = .02$, and marginally predicted the acceleration of husbands' anabolic balance, $t(155) = 1.76$, $p = .08$. However, the interaction between wives' anxiety and avoidance also significantly predicted the instantaneous slope of husbands' anabolic balance at the end of the discussion, $t(154) = -2.52$, $p = .01$. When husbands had partners with a secure attachment style, their anabolic balance trajectory

rose across the beginning of the study session, and decreased after the conflict discussion, compared to those with dismissing, preoccupied, or fearful partners, whose anabolic balance increased more steadily throughout the session (see Figure 5).

Attachment, DHEA-S, and cortisol. In order to decompose the relative contributions of DHEA-S and cortisol to the findings for anabolic balance, as well as their unique effects, we fit two additional models using procedures that were identical to those used for the model described here, with the following distinctions: (1) we included DHEA-S as the outcome variable in one model and cortisol as the outcome in the other, and (2) we re-tested the groups of medication controls variables for each model using the same procedure described in the section on medication controls. The final models predicting DHEA-S for wives and husbands are shown in Tables 4 and 5, respectively, and the final models predicting cortisol for wives and husbands are shown in Tables 6 and 7, respectively.

DHEA-S compared to anabolic balance. Wives' anxiety did not significantly predict their instantaneous slopes for DHEA-S as they did for anabolic balance. For husbands, attachment anxiety significantly predicted acceleration in husbands' DHEA-S trajectories, $t(155) = 2.15$, $p = .03$, as it did for anabolic balance, such that more secure husbands' DHEA-S trajectories rose in anticipation of the conflict and declined afterward, whereas more anxious husbands trajectories were more stable (see Figure 6).

DHEA-S: Unique associations with own attachment. Wives' own attachment did not significantly predict their DHEAS-S trajectories. Husbands' own avoidant attachment significantly predicted their own instantaneous slopes in DHEA-S at the end of the discussion $t(155) = -2.17$, $p = .03$ and marginally predicted their acceleration

(curvature) across the trajectory $t(155) = -1.72$, $p = .09$. The DHEA-S trajectory for avoidant husbands rose more quickly in anticipation of the conflict and declined more quickly afterward, whereas more secure husbands had trajectories that were more stable (see Figure 7.

DHEA-S: Unique associations with the partner's attachment. For wives, partners' avoidance marginally predicted both the instantaneous slopes $t(156) = -1.74$, $p = .08$ and acceleration $t(156) = -1.92$, $p = .06$ in their DHEA-S trajectories. The trend was such that when their husbands were more avoidant, wives' DHEA-S trajectories rose in anticipation of the conflict and declined afterward, whereas wives with more secure husbands had trajectories that were more stable (see Figure 8). For husbands, the interaction between their wives' avoidant and anxious attachment marginally predicted their instantaneous slopes for their DHEA-S trajectories at the end of the discussion, $t(155) = -1.77$, $p = .08$. The trend was such that when their partners were secure, husbands' DHEA-S trajectories recovered more quickly after the conflict compared to those whose partners exhibited more insecure styles (see Figure 9).

Cortisol compared to anabolic balance. For cortisol, own attachment anxiety did not significantly predict acceleration in husbands' trajectories, $t(153) = -1.09$, $p = .28$, or in wives' instantaneous slopes $t(154) = -1.45$, $p = .15$, as it had for anabolic balance.

Cortisol: Unique associations with own attachment. Wives' cortisol acceleration was significantly predicted by their avoidant attachment $t(155) = 1.97$, $p = .05$, such that more secure wives' trajectories rose at lab entry, compared to their home baseline, and recovered quickly thereafter, whereas more avoidant wives' trajectories declined steadily across the session (see Figure 10). Wives' intercepts were marginally

predicted by the interaction between their own anxious and avoidant attachment $t(153) = 1.78$, $p = .08$, such that dismissing wives' cortisol was lower at the end of the discussion than secure, preoccupied, or fearful wives (see Figure 11).

Husbands' cortisol intercept at the end of the discussion was significantly predicted by their own avoidant attachment $t(153) = -2.50$, $p = .01$, such that more secure husbands evidenced higher cortisol levels than more avoidant husbands (see Figure 12).

Cortisol: Unique associations with the partner's attachment. Wives' instantaneous slope was marginally predicted by the interaction between their partners' anxiety and avoidance $t(154) = -1.88$, $p = .06$ and their intercept was marginally predicted by their partners' avoidance $t(153) = -1.89$, $p = .06$. The former interaction resulted in a pattern of trajectories where wives with preoccupied partners showed the greatest cortisol reactivity and slowest recovery, followed by those with secure partners, and those with fearful partners. Wives with dismissing partners exhibited cortisol trajectories that declined steadily throughout the session (see Figure 13).

In addition, wives' anxious attachment significantly predicted husbands' instantaneous slope $t(153) = -2.74$, $p = .01$ and acceleration $t(153) = -2.05$, $p = .04$, such that when wives were more anxious, husbands' cortisol trajectories increased from home to lab entry, then recovered more rapidly compared to husbands' whose wives were more secure (see Figure 14).

Self-Reported Threat/Challenge Orientation

Attachment Style as a Predictor. For purposes of convergent validity, we assessed whether couples' self-reported threat and challenge orientations to conflict were associated with their attachment styles. More insecurely-attached wives expected the

conflict interaction to be more stressful than did more securely-attached wives (anxious: r = .23, p = .01; avoidant: r = .28, p < .01); and felt less able to cope with the interaction (anxious: r = -.38, p < .01; avoidant: r = -.21, p = .03). More insecurely-attached husbands expected the conflict interaction to be more stressful than more securely-attached husbands (anxious: r = .20, p = .03; avoidant: r = .19, p = .05); however, only more anxiously-attached husbands felt less able to cope with the interaction (r = -.20, p = .04). The association for avoidant husbands was not significant, r = -.14, p = .15.

Physiological responses. In addition to assessing whether the threat/challenge self-report measures were related to attachment, we ran HLM models like those described in the previous section to determine whether these measures were related to couples' physiological responses to the conflict discussion.

Anabolic balance. Neither of the threat/challenge self-report measures was related to husbands' or wives' anabolic balance trajectories.

DHEA-S. Both measures were related to husbands' DHEA-S trajectories, but neither measure was related to wives' trajectories. Husbands who believed that the upcoming conflict discussion would be more stressful exhibited significantly lower levels of DHEA-S at the end of the discussion (the intercept) compared to husbands who believed that it would be less stressful $t(106) = -2.94$, $p < .01$ (see Figure 15). Husbands' beliefs about how well they would be able to cope with the conflict significantly predicted the instantaneous slope $t(107) = -2.25$, $p = .03$ and marginally predicted the intercept $t(106) = -1.84$, $p = .07$ of their DHEA-S trajectory. Feeling less able to cope was associated with higher levels of DHEA-S across the remainder of the session than was feeling more able to cope.

Cortisol. Both of the threat/challenge self-report measures marginally predicted cortisol trajectories for wives. Wives who believed that the upcoming conflict discussion would be more stressful exhibited a trend toward lower levels of cortisol at the end of the discussion compared to wives who believed that it would be less stressful $t(105) = -1.88$, $p = .06$. Wives' beliefs about how well they would be able to cope with the conflict also marginally predicted the acceleration (curvature) of their cortisol trajectory $t(107) = -1.67$, $p = .10$. Wives who felt more able to cope showed a trend in cortisol that increased at the end of the discussion and declined thereafter, whereas low coping wives' cortisol declined across the entire session.

Similar to wives, husbands who believed that the upcoming conflict discussion would be more stressful exhibited significantly lower levels of cortisol at the end of the discussion (the intercept) compared to husbands who believed that it would be less stressful $t(105) = -2.19$, $p = .03$.

CHAPTER 4

DISCUSSION

Bowlby's theory of attachment (1969, 1973, 1980), as well as extensions to adults (see Mikulincer & Shaver, 2007), suggest that internal working models of an adult attachment figure—such as a romantic partner—contain expectations about that partner's behavior and responsiveness toward us. It follows from this assumption that working models should shape our reactions to and perceptions of the demands inherent in negotiating a conflict with our partner. The current study is the first to examine the extent to which attachment style predicts physiological responses that may indicate threat (i.e., cortisol responses) or challenge (i.e., DHEAS) as well as self-reported perceptions of threat and challenge. Each of these will be discussed in turn.

Attachment Style and Physiological Threat/Challenge

In line with our hypothesis, husbands and wives whose self-reported attachment reflects low anxiety (more security) exhibited the expected anabolic balance trajectories in response to relationship conflict: trajectories rose before conflict and leveled afterward, indicating a challenge response. By comparison, those who reported more anxious attachment exhibited anabolic balance trajectories that rose steadily throughout the session, but did not level after conflict.[3] These findings are consistent with the limited literature examining individuals' anabolic balance in response to acute stressors (e.g., Mendes et al., 2007; Morgan et al., 2004) and the broader literature on threat and challenge (Blascovich & Tomaka, 1996; Epel et al., 1998). Furthermore, Mendes et al (2007) did not find that threat induced by a social stressor increased cortisol levels, but

rather that challenge increased DHEA-S levels, which is similar to our result for husbands.

Counter to our predictions, participants' avoidant attachment was not related to their anabolic balance trajectories. One possible explanation is that there was not enough variability in avoidance scores in our sample for us to detect an effect. Overall, attachment avoidance scores were low (M = 1.64 (0.62) for wives, and 1.87 (0.66) for husbands. However, this explanation does not seem adequate because, despite the fact that avoidance scores were low on average, avoidance was still associated in theoretically meaningful ways with subjective perceptions of threat and challenge. Another possibility is that avoidant participants did not fully engage with their partners in attempting to resolve the conflict, and as a result, their anabolic balance levels might not have been affected because they directed their attention away from the conflict or threat. According to the literature on threat/challenge, in order for an individual to have a threat or challenge reaction to a situation, it must be a motivated performance situation—or an active-coping situation—rather than a passive situation (Blascovich & Tomaka, 1996, p. 10-11). If avoidant individuals merely try to weather the storm of relationship conflict, they may not react to the same degree physiologically as those who are motivated to engage more in seeking a resolution with their partners. Indeed, more avoidantly attached individuals have been shown to turn their attention away from potentially threatening attachment relevant information as long as they have adequate cognitive resources to do so (e.g., Mikulincer, Birnbaum, Woddis, & Nachmias, 2000; Mikulincer, Gillath, & Shaver, 2002). Given that the couples in this study had been married no more

than seven months and that couples on average were very satisfied, avoidant individuals may have found it easy to disengage from the task.

Partner effects on anabolic balance seem best understood when decomposed into their DHEA-S and cortisol components. Interestingly, differences in wives' anabolic balance trajectories seemed to be driven primarily by changes in cortisol, while husbands' seemed to be driven by changes in DHEA-S. For example, husbands' attachment style marginally predicted both wives' anabolic balance trajectory (see Figure 4) and their cortisol trajectory (see Figure 12). In this case, perhaps cortisol indicated threat, such that wives were more threatened by an interaction with a preoccupied partner, less threatened by a secure partner, and less engaged with more avoidant partners. For husbands, their wives' attachment style significantly predicted their anabolic balance trajectory (see Figure 5) and marginally predicted their DHEA-S trajectory (see Figure 9). In this case, perhaps DHEA-S indicates challenge (keeping in mind that husbands were relatively secure, on average and their attachment was held constant at the mean), such that they were challenged by partners who were more secure or anxious and less engaged with more avoidant partners.

Attachment and DHEA-S Responses

Consistent with the idea that DHEA-S might indicate challenge, husbands' DHEA-S trajectories were predicted by their avoidance such that more avoidant husbands' reactivity and recovery were more steep than more secure husbands', peaking around anticipation, but secure husbands' trajectories seemed to be higher throughout the session, peaking during conflict. Perhaps DHEA-S indicated more challenge in this instance, in that more secure husbands were engaged in resolving the conflict with their

spouse, while avoidant husbands were not. Similarly, wives with avoidant partners exhibited at trend where their DHEA-S trajectories were steeper than those with more secure partners, peaking around anticipation, whereas those with secure partners had trajectories that were steadier throughout the rest of the session. Again, perhaps DHEA-S indicated more challenge in this instance, in that those with more secure partners were engaged in resolving the conflict with their spouse, while those with avoidant partners were not.

Attachment and Cortisol Responses

Consistent with the idea that cortisol might indicate threat, wives' cortisol levels were generally higher if they were more anxiously attached, compared to more secure wives (see Figure 11), and lower if they were more avoidantly attached (see Figure 10). Again, this latter finding might be due to lesser engagement in the conflict resolution with their partners. Similarly, husbands' higher avoidance also predicted lower cortisol levels compared to those who were more secure. By contrast, husbands exhibited greater cortisol reactivity and recovery when their partners were more anxious than when they were more secure, which may indicate a degree of threat (see Figure 14).

The results in the current study were different in some ways from those of Powers et al. (2006). For one, dating women who were more avoidant exhibited higher levels of cortisol than those who were more secure; however, we found practically the opposite for wives in the current study (see Figure 10). This difference could be due to the fact that wives in our sample were highly secure, on average, and that they were married. That is, 1) there is likely to be much more variability in avoidance scores in a population of dating women than in a population of married women and being more avoidant could

mean being more focused on actively trying to sidestep an altercation, and 2) wives, having no escape, may be more likely to simply disengage. Another possible explanation is that, since our participants knew that they would engage in a conflict discussion long before they entered the lab, avoidant wives would have had a greater opportunity to formulate a conflict avoidance strategy ahead of time. Dating men's cortisol levels depended partly on their partners' attachment styles, whereas our husbands' anabolic balance and DHEA-S (marginally) depended partly on their partners' attachment styles. Again, perhaps because our sample was highly secure, or because they were married, husbands felt challenged by partners who were more anxious, rather than threatened (as dating men might be), though perhaps more disengaged from conflict with dismissing partners. On the other hand, our finding that more secure husbands exhibited an anabolic balance trajectory that was more consistent with challenge compared to anxious husbands fits well with the finding that more anxious dating men exhibited higher levels of cortisol, indicating threat. More longitudinal research will need to be done to examine whether and when changes in responses to relational conflict emerge as adults transition from dating to marital relationships.

Attachment and Threat/Challenge Self-Report

Adult attachment theory and research suggest that individuals who are more avoidantly or anxiously attached to a partner will feel unsupported or fear being rejected by that partner, respectively (Bartholomew & Horowitz, 1991; Hazan & Shaver, 1987; for a review, see Mikulincer & Shaver, 2007). It follows that one should report feeling that a conflict with a partner will be more stressful and that he or she will feel less able to cope with that conflict than someone more securely attached. Our findings generally

were consistent with these predictions. We found that more anxiously and avoidantly-attached wives expected the conflict interaction to be more stressful than did more securely-attached wives and they also felt less able to cope with the interaction. Similarly, more anxiously and avoidantly-attached husbands expected the conflict interaction to be more stressful than more securely-attached husbands and more anxiously-attached husbands felt less able to cope with the interaction. One divergent finding, however, was that more avoidantly attached husbands did not report feeling less able to cope with the conflict than those who were less avoidant, but the absence of an effect could have occurred for a number of reasons. First, the responses to this question were not normally distributed (they were negatively skewed and could not be effectively transformed to account for it), which may have obscured the relationship, if one exists. Second, it is possible that being newly married afforded our couples a sense of optimism (and a ceiling effect), whereby most participants believed that they could cope with the conflict, even if they felt that it would be stressful. Third, it may be that avoidant men are more likely to deny their distress in the face of relationship conflict than are avoidant women. This idea is consistent with evidence showing that people with avoidant attachment styles report less affect intensity and emotionality in their interactions with others, as well as more denial of distress (Pietromonaco & Barrett, 1997). The latter work did not examine gender differences in these variables across relationship types, and it is possible that newly married avoidant men (but not women) are especially likely to downplay their distress. Gender role norms may play some part in this, as there may be some expectation that women mediate conflict in their romantic relationships. This

added feeling of responsibility could make it more difficult for them to distance themselves from or exacerbate the distress they feel in anticipation of a conflict.

Threat/Challenge Self-Reports and Physiological Responses

Our self-report measures of challenge and threat were related to our physiological measures, but in ways that were inconsistent with our theory. Participants' feelings that the conflict would be more stressful and that they would be less able to cope were associated with lower cortisol levels. Husbands' feelings that they would be less able to cope were also associated with higher levels of DHEA-S. Some of this inconsistency may be due to the fact that our expected coping variable was highly skewed, as mentioned above. Consistent with our theory, husbands' expectations that the conflict discussion would be more stressful (indicating threat) were associated with lower levels of DHEA-S. Perhaps these inconsistencies arose because our self-report measure did not specifically assess individuals' perceptions of the demands of negotiating the conflict task, nor their resources to do so. The self-report assessment of threat and challenge in this context is something that could be improved upon in future studies.

Limitations

The data reported here are correlational and therefore we cannot determine whether a causal relationship exists between attachment style and either physiological or subjectively reported threat and challenge reactions. Although it seems unlikely that physiological stress responses in this particular interaction influenced self-reported attachment style, it is possible that recurring physiological patterns in the relationship might shape attachment-related beliefs and expectations. Another possibility is that other personality variables (e.g., neuroticism) could account for the associations observed here.

We reanalyzed the data controlling for emotionality (IPIP; Goldberg, 1999) neuroticism and the pattern of significant findings remained the same for anabolic balance and DHEA-S. For cortisol, the significant finding that wives' avoidant attachment predicted the curvature of their trajectory (shown in Figure 10) became marginal, and the marginal finding that husbands' avoidance predicted the intercept of wives' trajectory became significant. However, these differences do not eclipse the overall pattern of results.

One important aspect of peoples' appraisals of the demands of negotiating a conflict situation with a partner that was not addressed in this study is their perceptions of their partners' attachment. For example, if one perceives his or her partner as avoidant, he or she might expect the partner to be uncooperative or uncompromising in attempting to resolve a conflict. Therefore, he or she may perceive the demands of the situation to be higher than one who perceives his or her partner as secure. Perceptions of a partners' attachment may also interact with one's own attachment, predicting threat responses, challenge responses, or a lack of arousal. An anxious person who perceives his or her partner as avoidant may experience a threat response, due to fears of rejection and lack of partner engagement or support. By contrast, an avoidant person who perceives his or her partner as avoidant may feel no arousal at all, expecting the partner to sidestep the issue, and circumvent the conflict entirely. These factors should be examined in a future study.

Another shortcoming of this study is that it does not examine conflict behaviors associated with threat or challenge orientations, nor their consequences for relationship outcomes. It will be important to understand whether responding to relationship conflicts as threats also means behaving in ways that are hurtful to ones' partner or detrimental to the relationship.

Conclusions

Findings from this study contribute to relationship science by broadening knowledge and theory about the interplay between marital partners' attachment, appraisals of marital conflict, and physiological responses. Furthermore, the findings are a step forward in elucidating the conditions under which relationship partners cope with conflict in positive ways, fostering physiological thriving within the context of the relationship.

NOTES

[1] Throughout the session, participants also completed other measures that were not utilized in the present study and are, therefore, not mentioned here.

[2] This measure was added to the larger study after 52 couples had already participated; therefore, it was only completed by approximately 113 of the couples in the current study.

[3] One pattern in anabolic balance level that deserves mention is its tendency to increase across the study session, independent of the predictors. One might ask: if higher anabolic balance indexes a challenge response to stressors, then why does it increase over time, regardless of individuals' characteristics? It is possible that since cortisol exhibits a diurnal rhythm that decreases steadily throughout the day (Dickmeis, 2009; Dorn et al., 2007) but DHEA-S does not (Hucklebridge, Hussain, Evans, & Clow, 2005; Nieschlag et al., 1973), their divergence throughout the day results in increasing anabolic balance. If this is the case, then deviations from its generally upward trend are of primary interest in examining the effects of acute stressors, such as the conflict discussion task used in this study.

Table 1. Wives' and Husbands' Attachment Characteristics

	Anxiety		Avoidance	
	M	*SD*	*M*	*SD*
Wives (*n* = 165)	2.80	1.06	1.64	0.62
Husbands (*n* = 165)	2.54	0.81	1.87	0.66

Table 2. Final Estimation of Level 2 Predictors of Wives' Anabolic Balance Trajectory

Predictor	Estimate	*SE*	*t (df)*	*p*
Wives' intercept at end of discussion				
Mean	.799	.042	18.88 (151)	.000
Partner avoidance	.065	.050	1.32 (151)	.191
Partner anxiety	-.014	.038	-0.36 (151)	.718
Wives' avoidance	.014	.057	0.24 (151)	.813
Wives' anxiety	-.016	.031	-0.51 (151)	.609
Partner avoidance X anxiety	.003	.061	0.05 (151)	.960
Wives' avoidance X anxiety	-.044	.041	-1.06 (151)	.292
Hormonal contraceptive	-.370	.051	-7.22 (151)	.000
Benzodiazepine	.088	.134	0.66 (151)	.513
Sudafed	-.725	.222	-3.27 (151)	.001
Dry mouth medication	.613	.316	1.94 (151)	.054
Anti-smoking medication	.626	.315	1.99 (151)	.048
Wives' slope at end of discussion				
Mean	.097	.016	6.06 (154)	.000
Partner avoidance	-.019	.020	-0.95 (154)	.342
Partner anxiety	-.005	.015	-0.34 (154)	.732
Wives' avoidance	-.029	.023	-1.28 (154)	.202
Wives' anxiety	.024	.012	1.97 (154)	.051
Partner avoidance X anxiety	.034	.024	1.39 (154)	.168
Wives' avoidance X anxiety	-.003	.016	-0.18 (154)	.854
Hormonal contraceptive	-.049	.018	-2.76 (154)	.006
Benzodiazepine	-.096	.047	-2.04 (154)	.043
Wives' curvature across trajectory (acceleration)				
Mean	-.024	.014	-1.80 (156)	.074
Partner avoidance	-.027	.021	-1.28 (156)	.203
Partner anxiety	.006	.016	0.40 (156)	.691
Wives' avoidance	-.027	.024	-1.12 (156)	.266
Wives' anxiety	.014	.013	1.07 (156)	.285
Partner avoidance X anxiety	.044	.026	1.70 (156)	.091
Wives' avoidance X anxiety	.018	.017	1.04 (156)	.300

Table 3. Final Estimation of Level 2 Predictors of Husbands' Anabolic Balance Trajectory

Predictor	Estimate	*SE*	*t (df)*	*p*
Husbands' intercept at end of discussion				
Mean	.855	.028	30.03 (152)	.000
Husbands' avoidance	.041	.042	0.96 (152)	.340
Husbands' anxiety	-.051	.033	-1.54 (152)	.127
Partner avoidance	-.023	.049	-0.47 (152)	.640
Partner anxiety	.024	.028	0.88 (152)	.378
Husbands' avoidance X anxiety	.022	.053	0.42 (152)	.672
Partner avoidance X anxiety	-.006	.035	-0.18 (152)	.861
Anti-depression/anxiety	.207	.099	2.10 (152)	.038
Bronchodilator	-.093	.216	-0.43 (152)	.666
Antacid	-.469	.200	-2.35 (152)	.020
Narcotic	.078	.228	0.34 (152)	.734
Husbands' slope at end of discussion				
Mean	.139	.018	7.89 (154)	.000
Husbands' avoidance	-.017	.027	-0.64 (154)	.526
Husbands' anxiety	.017	.021	0.82 (154)	.413
Partner avoidance	.019	.031	0.63 (154)	.529
Partner anxiety	.040	.017	2.33 (154)	.021
Husbands' avoidance X anxiety	.011	.033	0.33 (154)	.742
Partner avoidance X anxiety	-.056	.022	-2.52 (154)	.013
Bronchodilator	.214	.139	1.54 (154)	.126
Narcotic	-.204	.092	-2.23 (154)	.027
Husbands' curvature across trajectory (acceleration)				
Mean	-.004	.016	-0.23 (155)	.816
Husbands' avoidance	-.017	.024	-0.72 (155)	.471
Husbands' anxiety	.040	.018	2.20 (155)	.029
Partner avoidance	-.011	.028	-0.40 (155)	.688
Partner anxiety	.027	.015	1.76 (155)	.080
Husbands' avoidance X anxiety	.008	.029	0.26 (155)	.799
Partner avoidance X anxiety	-.016	.020	-0.81 (155)	.418
Bronchodilator	.312	.126	2.48 (155)	.014

Table 4. Final Estimation of Level 2 Predictors of Wives' DHEA-S Trajectory

Predictor	Estimate	*SE*	*t (df)*	*p*
Wives' intercept at end of discussion				
Mean	-.536	.039	-13.92 (153)	.000
Partner avoidance	.011	.044	0.24 (153)	.811
Partner anxiety	.007	.035	0.20 (153)	.845
Wives' avoidance	-.012	.052	-0.22 (153)	.823
Wives' anxiety	.033	.028	1.15 (153)	.251
Partner avoidance X anxiety	-.056	.056	-1.01 (153)	.312
Wives' avoidance X anxiety	.004	.037	0.11 (153)	.911
Hormonal contraceptive	-.185	.048	-3.84 (153)	.001
Stimulants	.419	.130	3.21 (153)	.002
Flu vaccine	-.694	.311	-2.23 (153)	.027
Wives' slope at end of discussion				
Mean	-.041	.009	-4.47 (156)	.000
Partner avoidance	-.025	.014	-1.74 (156)	.083
Partner anxiety	-.017	.011	-1.58 (156)	.116
Wives' avoidance	.004	.016	0.25 (156)	.802
Wives' anxiety	.005	.009	0.55 (156)	.583
Partner avoidance X anxiety	-.008	.017	-0.43 (156)	.665
Wives' avoidance X anxiety	-.007	.012	-0.58 (156)	.561
Wives' curvature across trajectory (acceleration)				
Mean	-.060	.009	-6.32 (156)	.000
Partner avoidance	-.028	.014	-1.92 (156)	.057
Partner anxiety	-.013	.011	-1.18 (156)	.240
Wives' avoidance	.014	.017	0.84 (156)	.400
Wives' anxiety	.000	.009	-0.02 (156)	.985
Partner avoidance X anxiety	.026	.018	1.43 (156)	.156
Wives' avoidance X anxiety	-.012	.012	-0.98 (156)	.327

Table 5. Final Estimation of Level 2 Predictors of Husbands' DHEA-S Trajectory

Predictor	Estimate	*SE*	*t (df)*	*p*
Husbands' intercept at end of discussion				
Mean	-.400	.025	-16.14 (154)	.000
Husbands' avoidance	-.046	.037	-1.24 (154)	.219
Husbands' anxiety	-.013	.029	-0.46 (154)	.647
Partner avoidance	-.013	.043	-0.30 (154)	.765
Partner anxiety	.023	.024	0.94 (154)	.351
Husbands' avoidance X anxiety	.014	.046	0.30 (154)	.765
Partner avoidance X anxiety	.031	.031	1.01 (154)	.313
Antibiotic	.304	.148	2.06 (154)	.041
Antihypertensive	.081	.136	0.60 (154)	.552
Husbands' slope at end of discussion				
Mean	-.042	.012	-3.46 (155)	.000
Husbands' avoidance	-.040	.018	-2.17 (155)	.032
Husbands' anxiety	.016	.014	1.14 (155)	.258
Partner avoidance	.029	.021	1.36 (155)	.176
Partner anxiety	.009	.012	0.74 (155)	.459
Husbands' avoidance X anxiety	.013	.023	0.57 (155)	.572
Partner avoidance X anxiety	-.027	.015	-1.77 (155)	.079
Antihypertensive	-.031	.069	-0.46 (155)	.650
Husbands' curvature across trajectory (acceleration)				
Mean	-.063	.011	-5.67 (155)	.000
Husbands' avoidance	-.029	.017	-1.72 (155)	.088
Husbands' anxiety	.028	.013	2.15 (155)	.033
Partner avoidance	.011	.020	0.57 (155)	.572
Partner anxiety	.008	.011	0.69 (155)	.490
Husbands' avoidance X anxiety	.011	.021	0.53 (155)	.599
Partner avoidance X anxiety	-.006	.014	-0.40 (155)	.687
Antihypertensive	-.141	.062	-2.26 (155)	.026

Table 6. Final Estimation of Level 2 Predictors of Wives' Cortisol Trajectory

Predictor	Estimate	*SE*	*t (df)*	*p*
Wives' intercept at end of discussion				
Mean	-1.355	.030	-45.03 (153)	.000
Partner avoidance	-.070	.037	-1.89 (153)	.061
Partner anxiety	.027	.029	0.93 (153)	.355
Wives' avoidance	-.033	.043	-0.76 (153)	.449
Wives' anxiety	.032	.024	1.36 (153)	.177
Partner avoidance X anxiety	-.016	.046	-0.35 (153)	.728
Wives' avoidance X anxiety	.055	.031	1.78 (153)	.078
Hormonal contraceptive	.182	.033	5.52 (153)	.000
Benzodiazepine	.348	.112	3.10 (153)	.002
Sudafed	.502	.134	3.73 (153)	.000
Wives' slope at end of discussion				
Mean	-.132	.014	-9.22 (154)	.000
Partner avoidance	-.002	.018	-0.14 (154)	.892
Partner anxiety	-.011	.014	-0.83 (154)	.407
Wives' avoidance	.032	.021	1.56 (154)	.121
Wives' anxiety	-.016	.011	-1.45 (154)	.150
Partner avoidance X anxiety	-.041	.022	-1.88 (154)	.063
Wives' avoidance X anxiety	.000	.015	-0.01 (154)	.991
Hormonal contraceptive	.042	.016	2.72 (154)	.007
Benzodiazepine	.020	.055	0.36 (154)	.718
Wives' curvature across trajectory (acceleration)				
Mean	-.033	.012	-2.75 (155)	.007
Partner avoidance	.004	.018	0.21 (155)	.832
Partner anxiety	-.019	.014	-1.38 (155)	.169
Wives' avoidance	.041	.021	1.97 (155)	.051
Wives' anxiety	-.010	.011	-0.89 (155)	.377
Partner avoidance X anxiety	-.018	.022	-0.82 (155)	.412
Wives' avoidance X anxiety	-.024	.015	-1.59 (155)	.114
Benzodiazepine	-.108	.057	-1.90 (155)	.059

Table 7. Final Estimation of Level 2 Predictors of Husbands' Cortisol Trajectory

Predictor	Estimate	*SE*	*t (df)*	*p*
Husbands' intercept at end of discussion				
Mean	-1.255	.027	-47.24 (153)	.000
Husbands' avoidance	-.101	.040	-2.50 (153)	.014
Husbands' anxiety	.049	.031	1.58 (153)	.116
Partner avoidance	-.002	.047	-0.03 (153)	.974
Partner anxiety	.001	.026	0.02 (153)	.981
Husbands' avoidance X anxiety	-.006	.050	-0.13 (153)	.897
Partner avoidance X anxiety	.051	.034	1.49 (153)	.138
Bronchodilator	-.168	.204	-0.82 (153)	.413
Antacid	.527	.240	2.20 (153)	.030
Anti-convulsant	-.425	.244	-1.74 (153)	.084
Husbands' slope at end of discussion				
Mean	-.174	.013	-13.55 (153)	.000
Husbands' avoidance	-.019	.019	-0.99 (153)	.325
Husbands' anxiety	.005	.015	0.35 (153)	.730
Partner avoidance	.011	.022	0.48 (153)	.635
Partner anxiety	-.035	.013	-2.74 (153)	.007
Husbands' avoidance X anxiety	-.003	.024	-0.13 (153)	.897
Partner avoidance X anxiety	.020	.016	1.20 (153)	.231
Bronchodilator	-.257	.102	-2.51 (153)	.013
Antacid	-.374	.120	-3.11 (153)	.002
Anti-convulsant	.220	.122	1.80 (153)	.074
Husbands' curvature across trajectory (acceleration)				
Mean	-.061	.012	-5.19 (153)	.000
Husbands' avoidance	.000	.018	-0.02 (153)	.988
Husbands' anxiety	-.015	.014	-1.09 (153)	.279
Partner avoidance	.025	.021	1.23 (153)	.222
Partner anxiety	-.024	.012	-2.05 (153)	.042
Husbands' avoidance X anxiety	.005	.022	0.23 (153)	.816
Partner avoidance X anxiety	.000	.015	-0.03 (153)	.976
Bronchodilator	-.234	.094	-2.50 (153)	.013
Antacid	-.385	.110	-3.49 (153)	.000
Anti-convulsant	.306	.112	2.73 (153)	.007

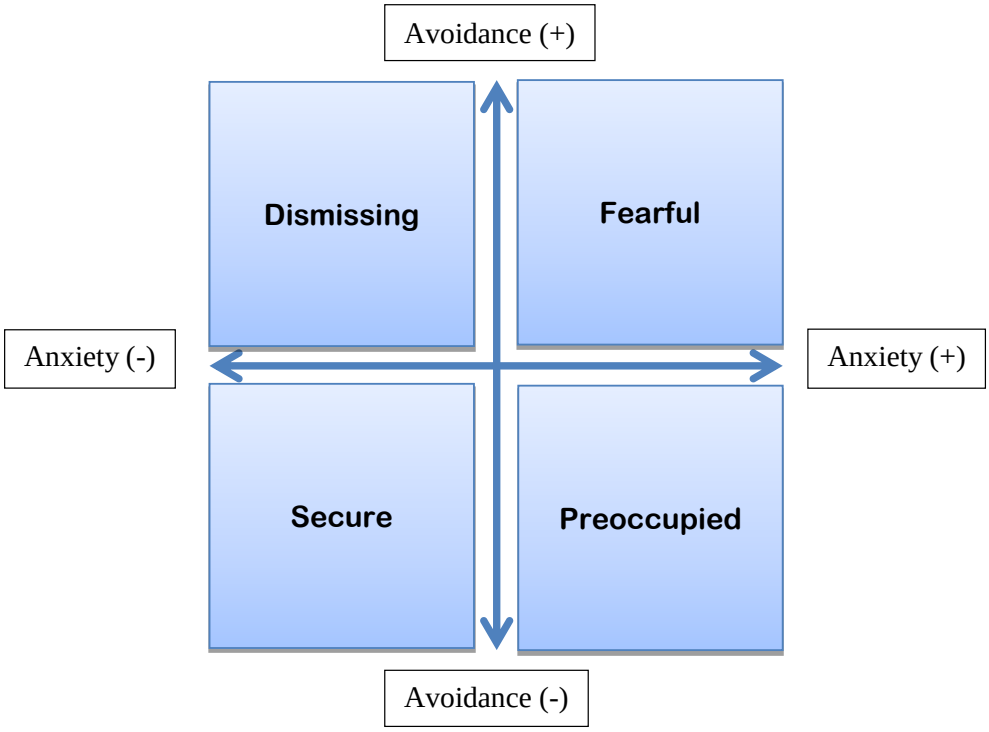

Figure 1. Adult attachment dimensions and prototypes.

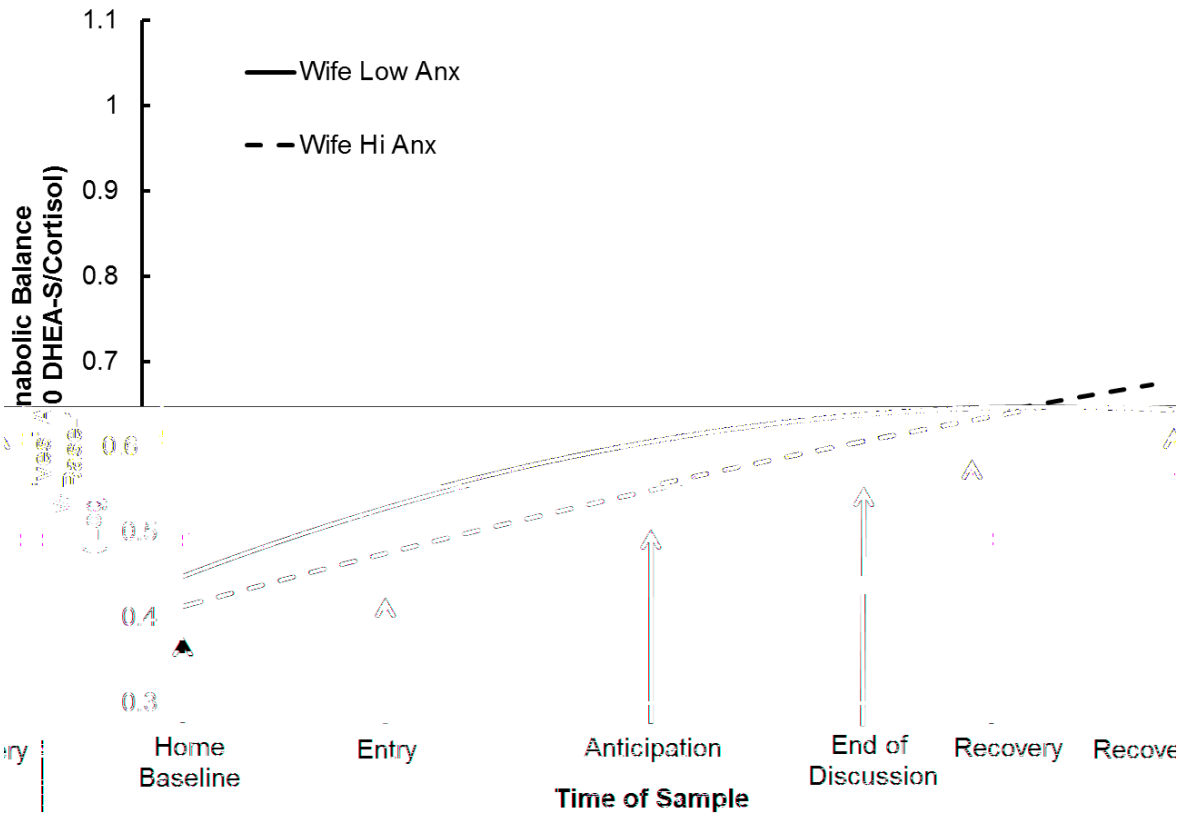

Figure 2. Wives' anxious attachment significantly predicted the instantaneous slope of their anabolic balance trajectory at the end of a conflict discussion with their husbands. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

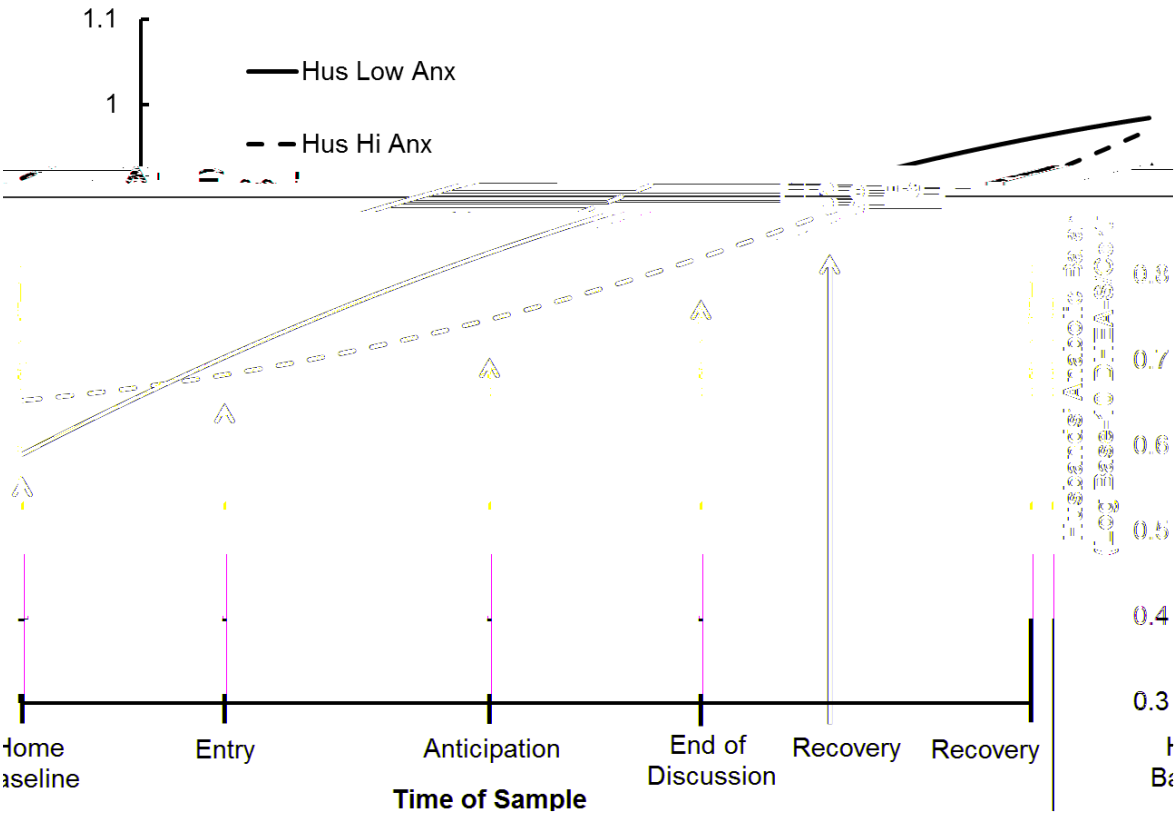

Figure 3. Husbands' anxious attachment significantly predicted their anabolic balance trajectory curvature in response to conflict with their wives. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

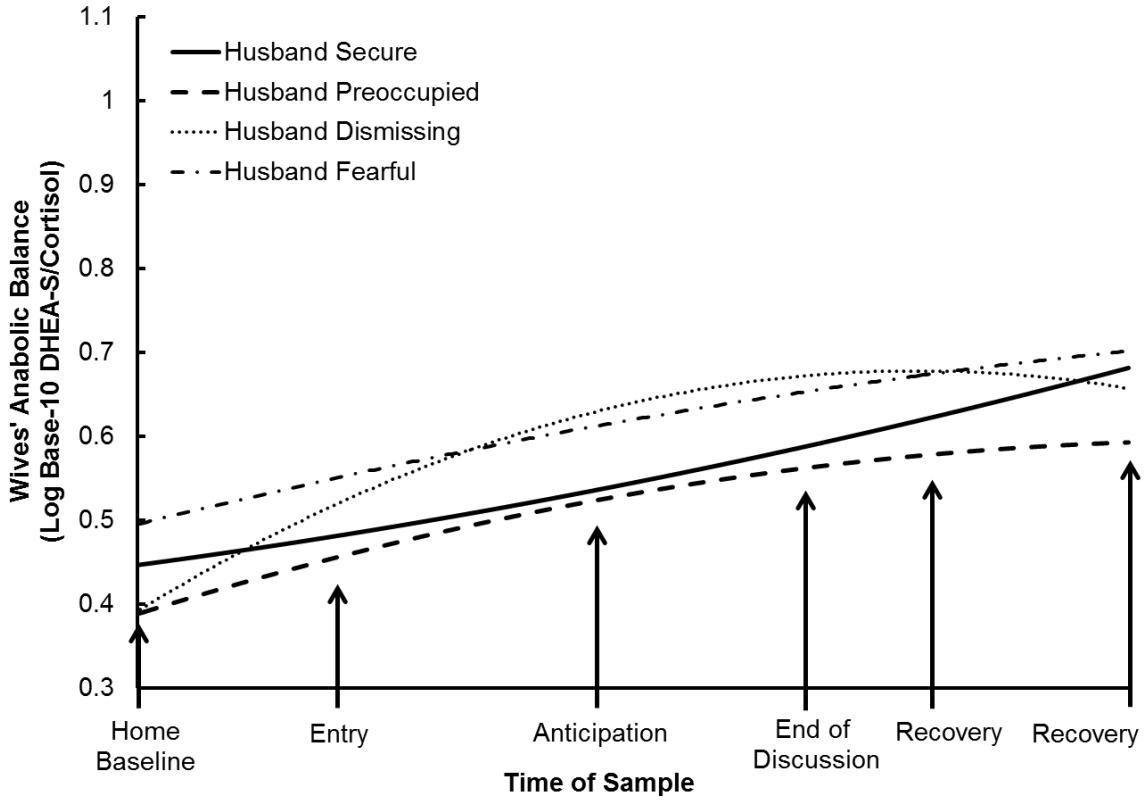

Figure 4. Wives' anabolic balance trajectory curvature in response to a conflict with their husbands was significantly predicted by the interaction between their husbands' avoidant and anxious attachment. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

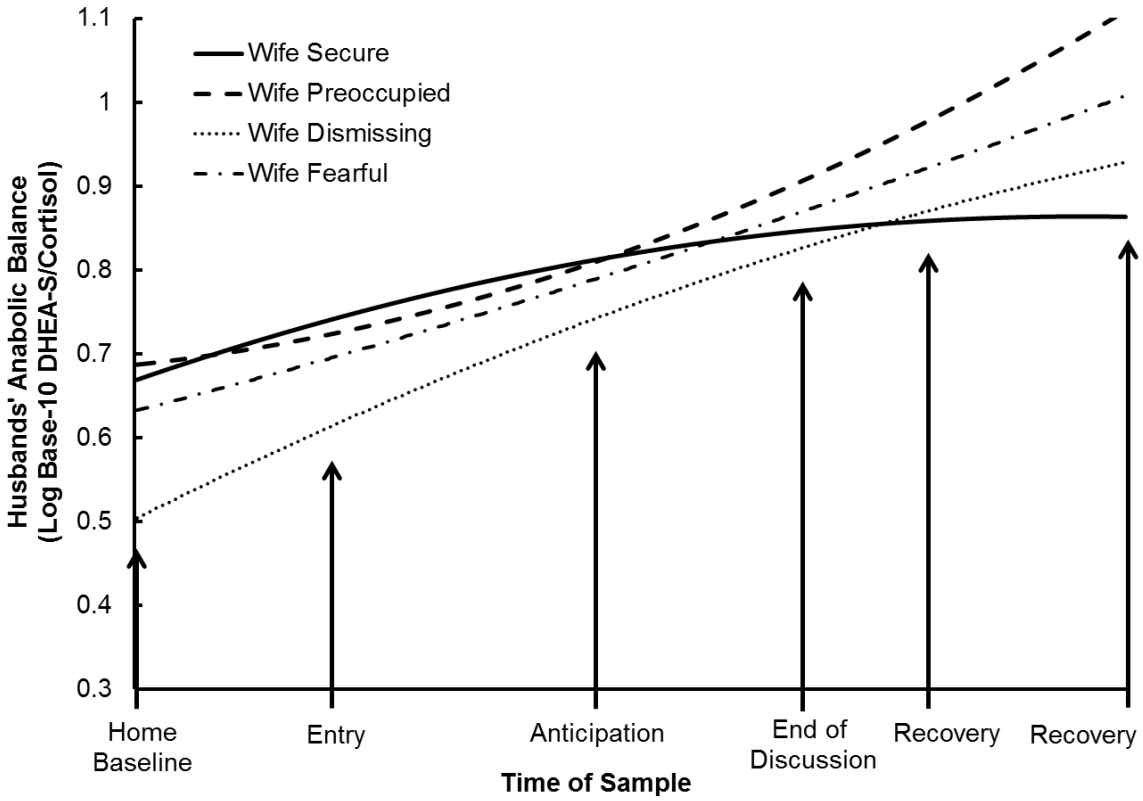

Figure 5. The instantaneous slope of husbands' anabolic balance trajectory at the end of a conflict discussion was significantly predicted by the interaction between wives' avoidant and anxious attachment. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

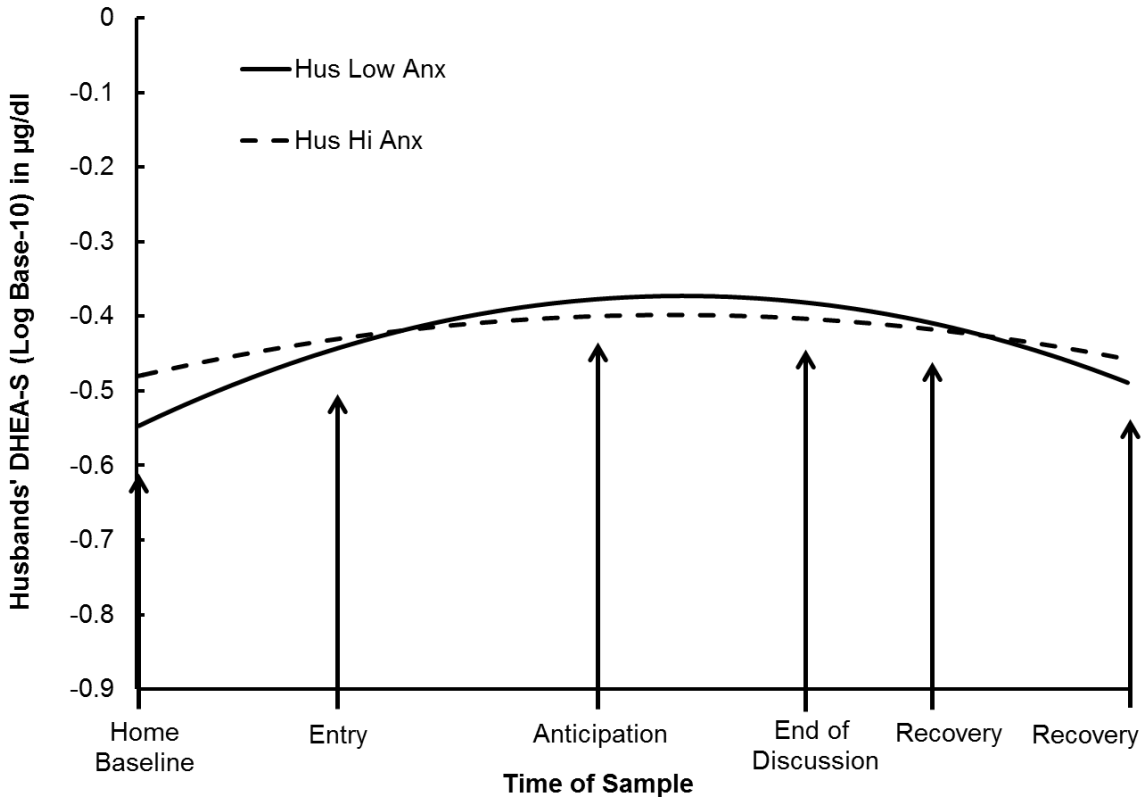

Figure 6. Husbands' anxious attachment significantly predicted their DHEA-S trajectory curvature in response to a conflict discussion with their wives. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

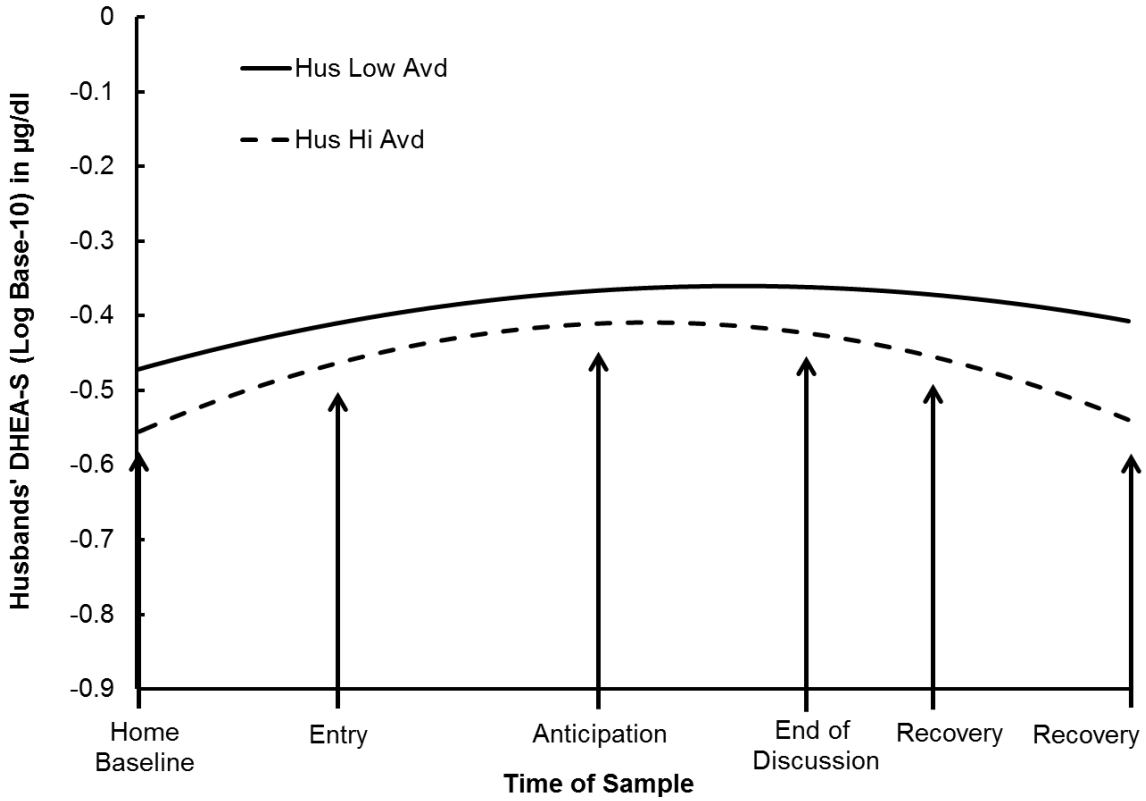

Figure 7. Husbands' avoidant attachment significantly predicted the instantaneous slope of their DHEA-S trajectory at the end of a conflict discussion with their wives. Husbands' DHEA-S trajectory curvature was also moderately predicted by their avoidant attachment; both effects are shown. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

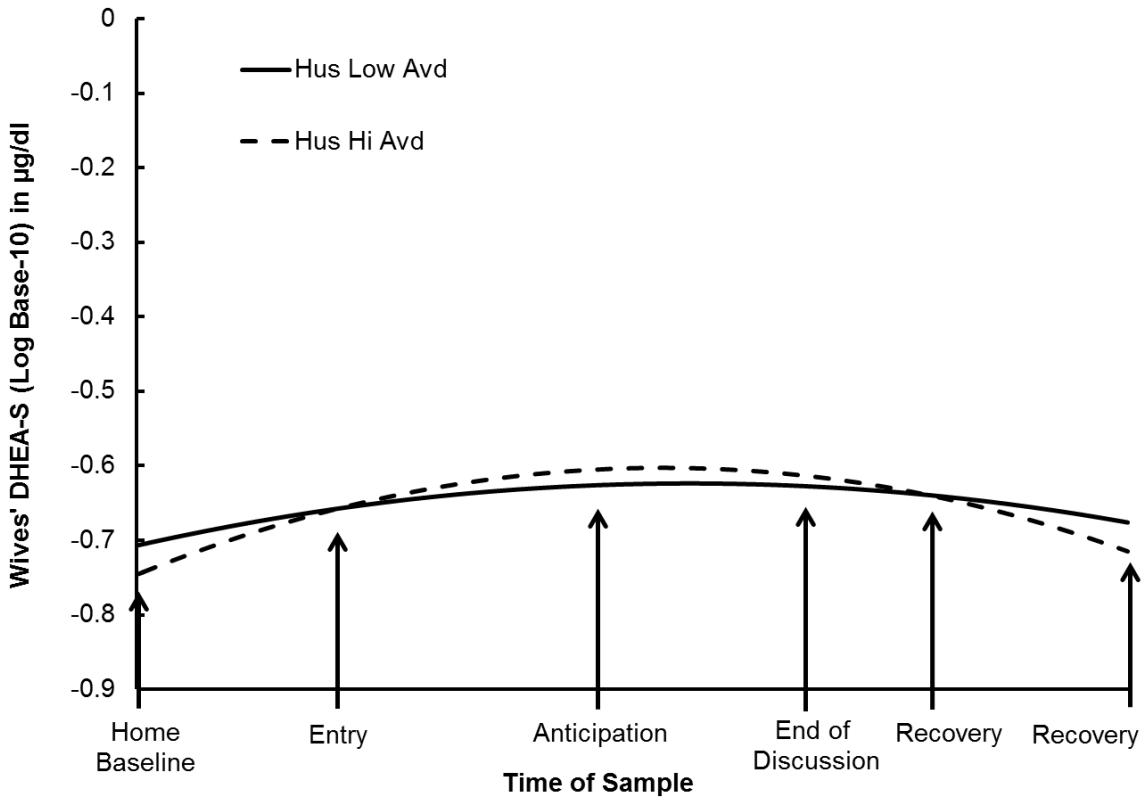

Figure 8. The instantaneous slope of wives' DHEA-S trajectory at the end of a conflict discussion with their husbands and the overall trajectory curvature were marginally predicted by their husbands' avoidant attachment. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

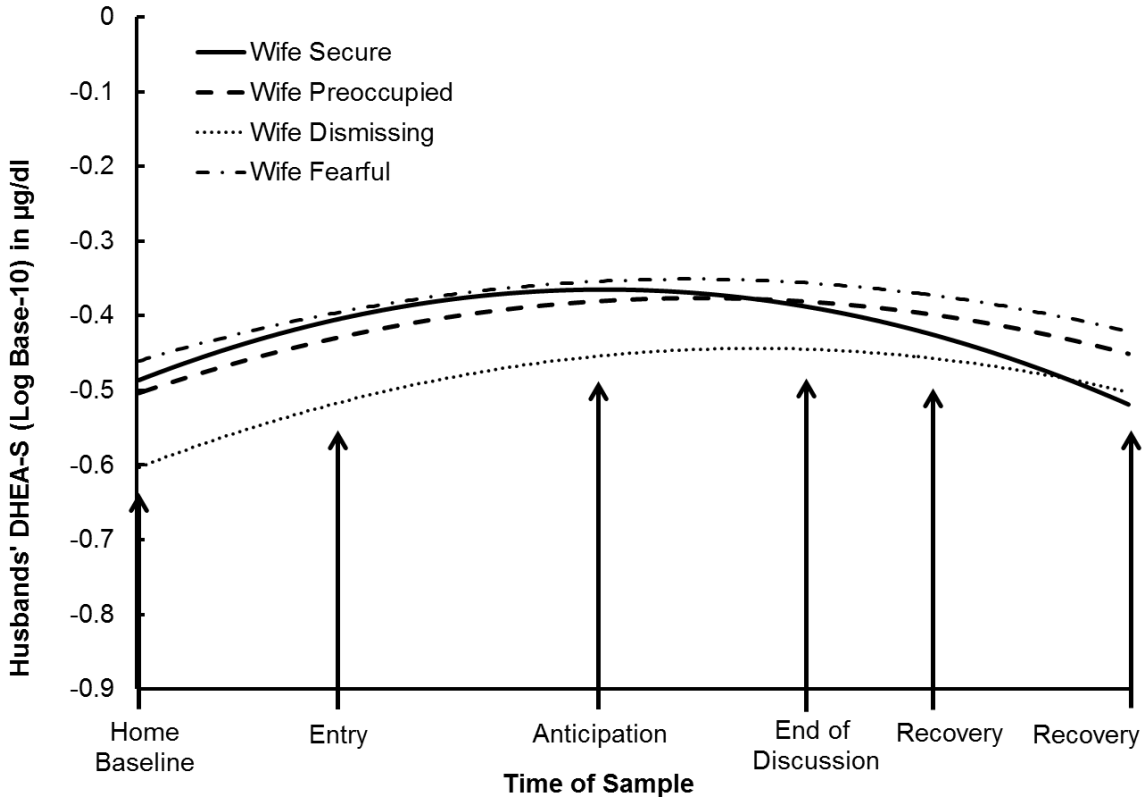

Figure 9. The instantaneous slope of husbands' DHEA-S trajectory at the end of a conflict discussion with their wives was marginally predicted by interaction between their wives' avoidant and anxious attachment. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

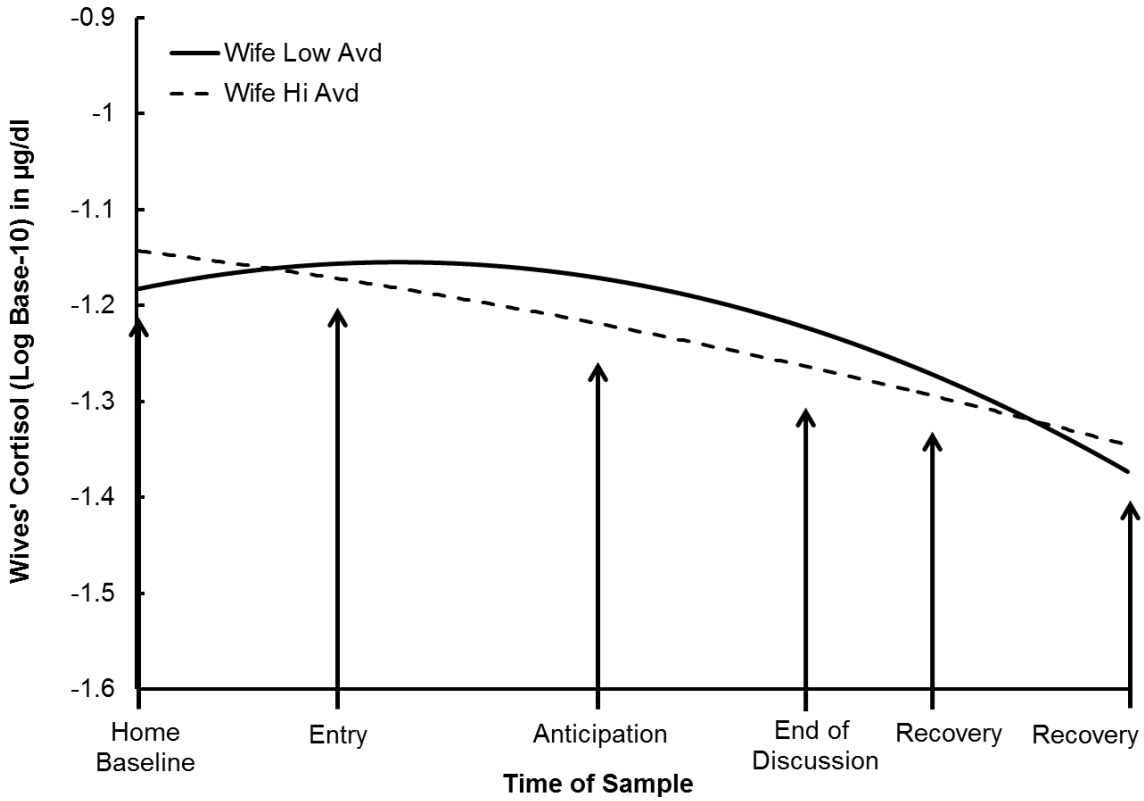

Figure 10. Wives' avoidant attachment significantly predicted their cortisol trajectory curvature in response to a conflict discussion with their husbands. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

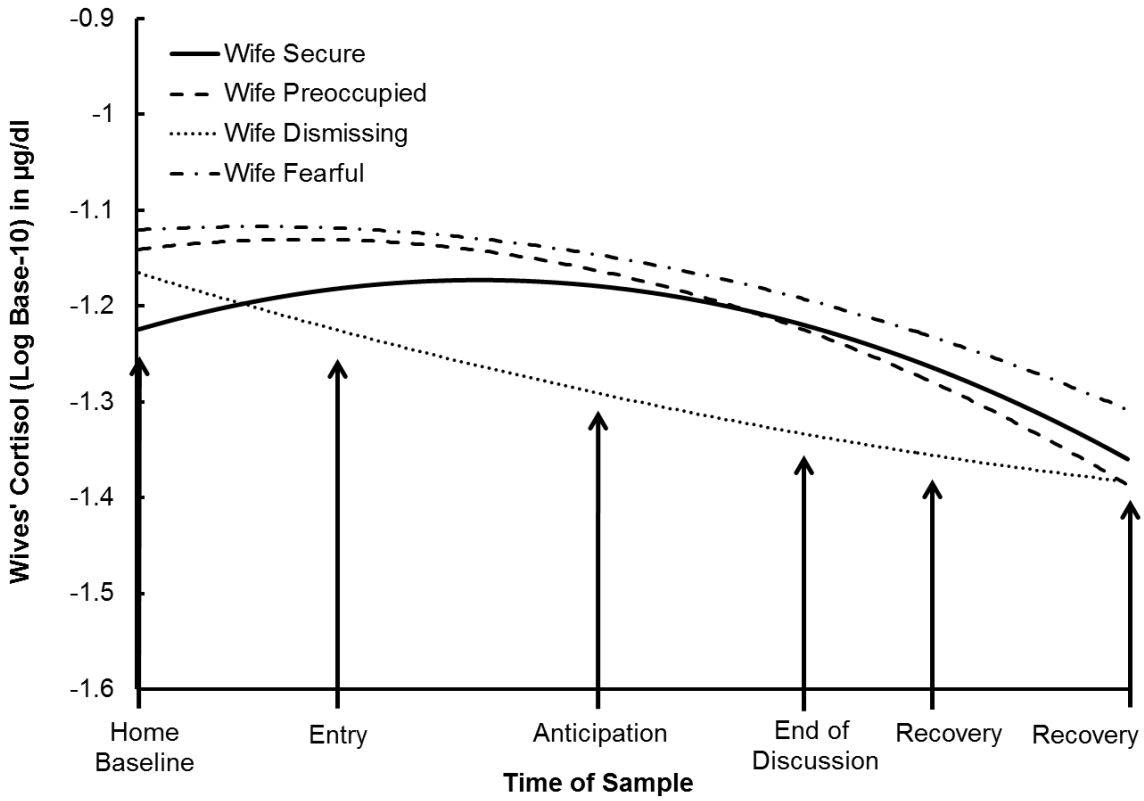

Figure 11. Wives' mean cortisol level at the end of a conflict discussion with their husbands was marginally predicted by interaction between their own avoidant and anxious attachment. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

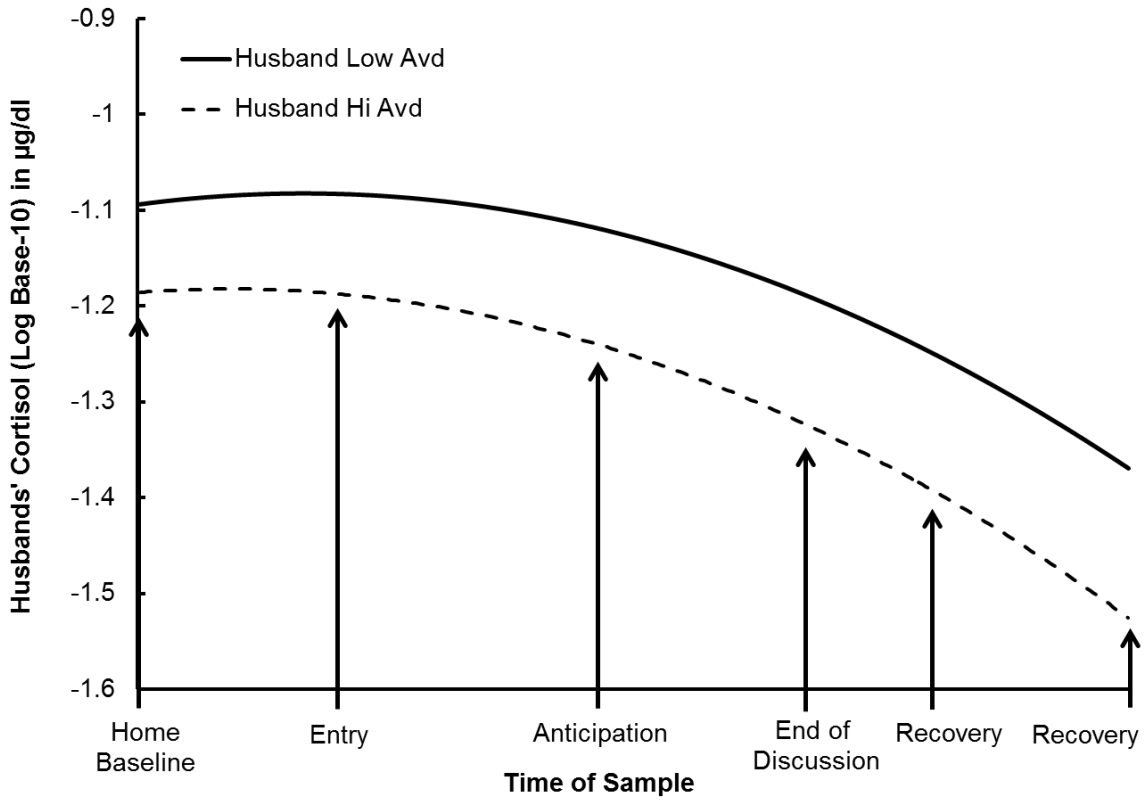

Figure 12. Husbands' mean cortisol level at the end of a conflict discussion with their wives was significantly predicted by their own avoidant attachment. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

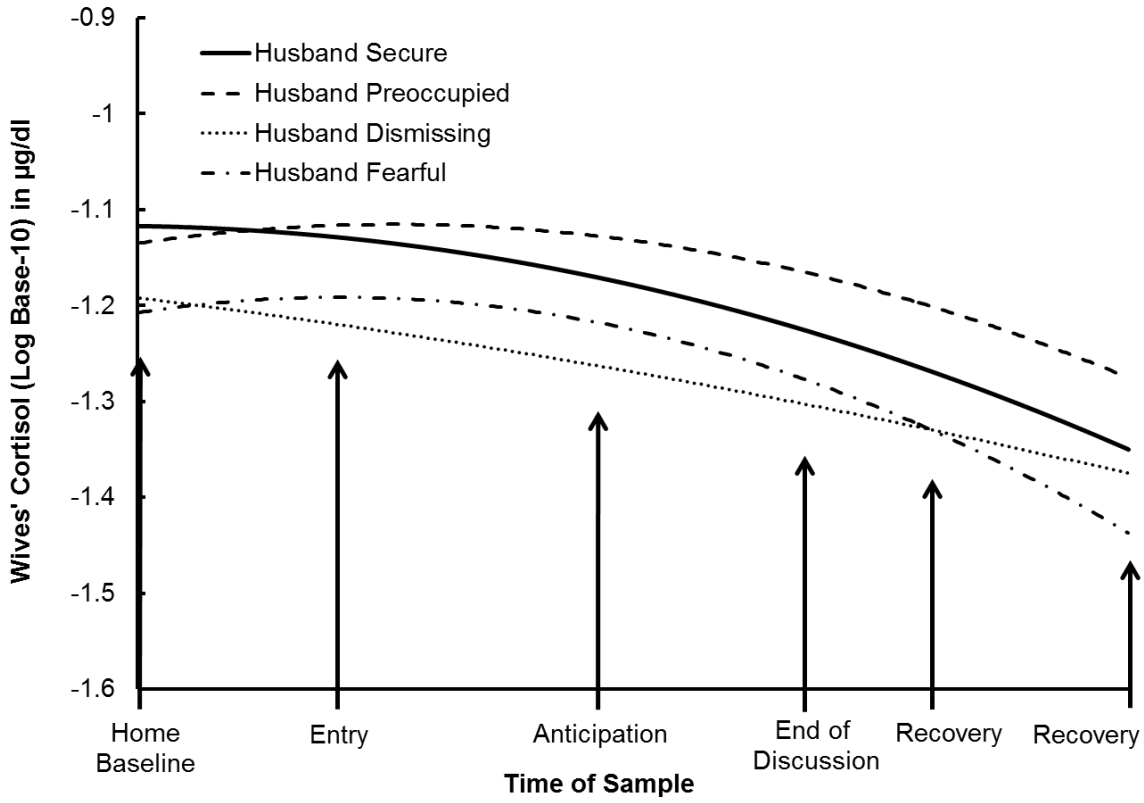

Figure 13. Wives' mean cortisol level and instantaneous slope of their cortisol trajectory at the end of a conflict discussion with their husbands was marginally predicted by the interaction between their husbands' avoidant and anxious attachment. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

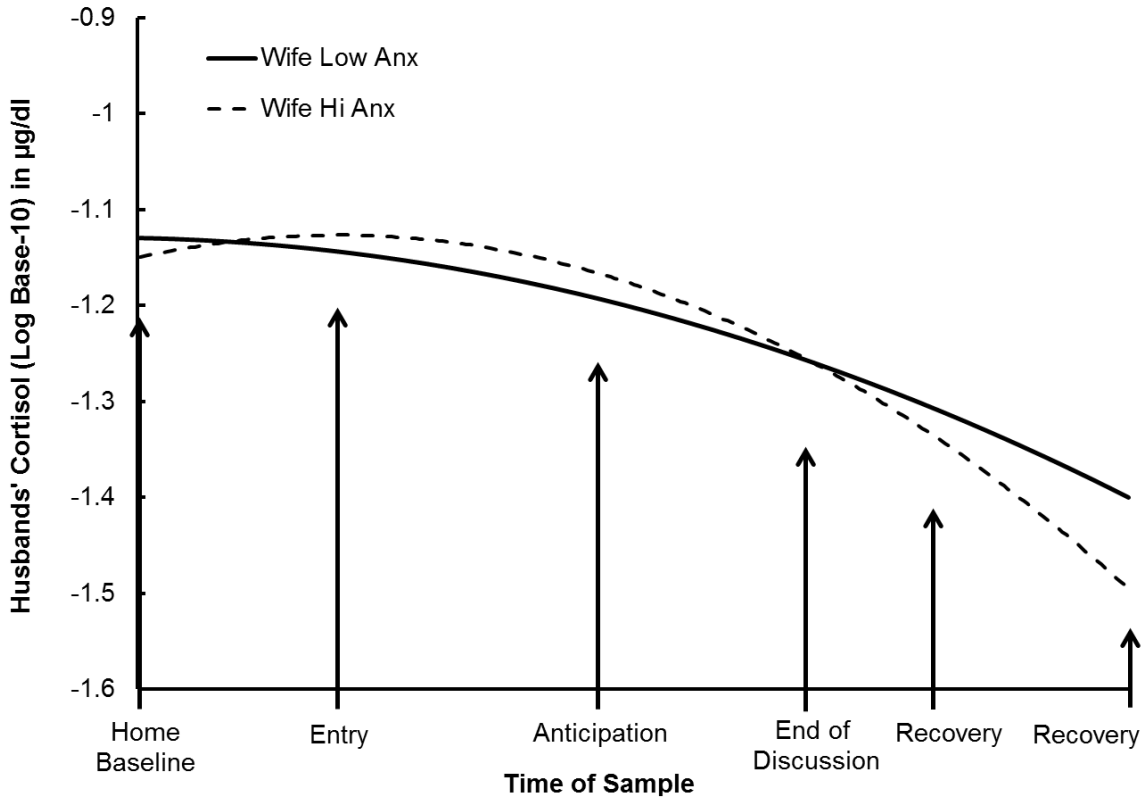

Figure 14. The instantaneous slope of husbands' cortisol at the end of a conflict discussion with their wives and their overall cortisol trajectory curvature was significantly predicted by their wives' anxious attachment. Prototypical high and low attachment values are graphed at one standard deviation above and below the mean, respectively.

APPENDIX

REVISED EXPERIENCES IN CLOSE RELATIONSHIPS SCALE

Avoidance Items:

1. I prefer not to show my partner how I feel deep down.

3. I am very comfortable being close to my partner. (R)

5. Just when my partner starts to get close to me I find myself pulling away.

7. I get uncomfortable when my partner wants to be very close.

9. I don't feel comfortable opening up to my partner.

11. I want to get close to my partner, but I keep pulling back.

13. I am nervous when my partner gets too close to me.

15. I feel comfortable sharing my private thoughts and feelings with my partner. (R)

17. I try to avoid getting too close to my partner.

19. I find it relatively easy to get close to my partner. (R)

21. I find it difficult to allow myself to depend on my partner.

23. I prefer not to be too close to my partner.

25. I tell my partner just about everything. (R)

27. I usually discuss my problems and concerns with my partner. (R)

29. I feel comfortable depending on my partner. (R)

31. I don't mind asking my partner for comfort, advice, or help. (R)

33. It helps to turn to my partner in times of need. (R)

35. I turn to my partner for many things, including comfort and reassurance. (R)

Anxiety Items:

2. I worry about being abandoned.

4. I worry a lot about my relationship.

6. I worry that my partner won't care about me as much as I care about him or her.

8. I worry a fair amount about losing my partner.

10. I often wish that my partner's feelings for me were as strong as my feelings for him/her.

12. I often want to merge completely with my partner, and this sometimes scares him/her away.

14. I worry about being alone.

16. My desire to be very close sometimes scares my partner away.

18. I need a lot of reassurance that I am loved by my partner.

20. Sometimes I feel that I force my partner to show more feeling, more commitment.

22. I do not often worry about being abandoned. (R)

24. If I can't get my partner to show interest in me, I get upset or angry.

26. I find that my partner doesn't want to get as close as I would like.

28. When I'm not involved in a relationship, I feel somewhat anxious and insecure.

30. I get frustrated when my partner is not around as much as I would like.

32. I get frustrated if my partner is not available when I need him/her.

34. When my partner disapproves of me, I feel really bad about myself.

36. I resent it when my partner spends time away from me.

BIBLIOGRAPHY

Ainsworth, M. S., Blehar, M. C., & Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation.* Hillsdale, NJ: Erlbaum.

Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61*, 226-244.

Blascovich, J. & Mendes, W. B. (2000). Challenge and threat appraisals: The role of affective cues. In Forgas, J. (Ed.). *Feeling and thinking: The role of affect in social cognition.* Cambridge University Press, Paris, 59-82.

Blascovich, J., &Tomaka, I. (1996). The biopsychosocial model of arousal regulation. *Advances in Experimental Social Psychology*, *28,* 1-51.

Bowlby, J. (1969). Attachment and loss: Vol. 1. Attachment. New York: Basic Books.

Bowlby, J. (1973). Attachment and loss: Vol. 2. Separation: Anxiety and anger. New York: Basic Books.

Bowlby, J. (1980). Attachment and loss: Vol. 3. Loss: Sadness and depression. New York: Basic Books.

Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46-76). New York: Guilford Press.

Cavallo, J., Fitzsimons, G., & Holmes, J. (2009). Taking chances in the face of threat: Romantic risk regulation and approach motivation. *Personality and Social Psychology Bulletin*, *35*(6), 737-751.

Diamond, L. (2001). Contributions of psychophysiology to research on adult attachment: Review and recommendations. *Personality and Social Psychology Review, 5*(4), 276-295.

Dickerson, S. S., & Kemeny, M. E. (2004). Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin*, *130*, 355–391.

Dickmeis, T. (2009). Glucocorticoids and the circadian clock. *Journal of Endocrinology*, *200*(1), 3-22.

Dorn, L., Lucke, J., Loucks, T., & Berga, S. (2007). Salivary cortisol reflects serum cortisol: analysis of circadian profiles. *Annals of Clinical Biochemistry*, *44*(3), 281-284.

Epel, E., McEwen, B., & Ickovics, J. (1998). Embodying psychological thriving: Physical thriving in response to stress. *Journal of Social Issues*, *54*, 301-322.

Fraley, R. C., Waller, N. G., & Brennan, K. A. (2000). An item response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology*, *78*, 350-365.

Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality Psychology in Europe*, Vol. 7 (pp. 7-28). Tilburg, The Netherlands: Tilburg University Press.

Goosens, K., & Sapolsky, R. (2007). Stress and glucocorticoid contributions to normal and pathological aging. *Brain aging: Models, methods, and mechanisms* (pp. 305-322). Boca Raton, FL US: CRC Press.

Granger, D. A., Kapelewski, C. H., Fortunato, C. K., & Hibel, L. C. (2009). Medication effects on salivary cortisol: Tactics and strategy to minimize impact in behavioral and developmental science. *Psychoneuroendocrinology*, *34*(10), 1437-1448.

Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology*, *52*(3), 511-524.

Hucklebridge, F., Hussain, T., Evans, P., & Clow, A. (2005). The diurnal patterns of the adrenal steroids cortisol and dehydroepiandrosterone (DHEA) in relation to awakening. *Psychoneuroendocrinology*, *30*(1), 51-57.

Kiecolt-Glaser, J., Glaser, R., Cacioppo, J., & MacCallum, R. (1997). Marital conflict in older adults: Endocrinological and immunological correlates. *Psychosomatic Medicine*, *59*(4), 339-349.

Kiecolt-Glaser, J. K., Newton, T., Cacioppo, J. T., MacCallum, R. C., Glaser, R., & Malarkey, W. B. (1996). Marital conflict and endocrine function: Are men really more physiologically affected than women? *Journal of Consulting and Clinical Psychology*, *64*(2), 324-332.

Kobak, R., & Sceery, A. (1988). Attachment in late adolescence: Working models, affect regulation, and representations of self and others. *Child Development*, *59*(1), 135-146.

Kroboth, P. D., Amico, J. A., Stone, R. A., Folan, M., Frye, R. F., Kroboth, F. J., et al. (2003). Influence of DHEA administration on 24-hour cortisol concentrations. *Journal of Clinical Psychopharmacology, 23*(1), 96-99.

Laurent, H., & Powers, S. (2007). Emotion regulation in emerging adult couples: Temperament, attachment, and HPA response to conflict. *Biological Psychology, 76*(1-2), 61-71.

Loving, T., Heffner, K., Kiecolt-Glaser, J., Glaser, R., & Malarkey, W. (2004). Stress hormone changes and marital conflict: Spouses' relative power makes a difference. *Journal of Marriage and Family, 66*(3), 595-612.

Mendes, W. B., Gray, H. M., Mendoza-Denton, R., Major, B., & Epel, E. S. (2007). Why egalitarianism might be good for your health: Physiological thriving during stressful intergroup encounters. *Psychological Science*, *18*(11), 991-998.

Mikulincer, M., Birbaum, G., Woddis, D., & Nachmias O. (2000). Stress and accessibility of proximity-related thoughts: Exploring the normative and intraindividual components of attachment theory. *Journal of Personality and Social Psychology, 78,* 509-523.

Mikulincer, M., & Florian, V. (1998). The relationship between adult attachment styles and emotional and cognitive reactions to stressful events. *Attachment theory and close relationships* (pp. 143-165). New York, NY US: Guilford Press.

Mikulincer, M., Gillath, O. &Shaver, P. R. (2002). Activation of the attachment system in adulthood: Threat-related primes increase the accessibility of mental representations of attachment figures. *Journal of Personality and Social Psychology, 93,* 991-895.

Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure, dynamics, and change*. New York: Guilford Press.

Morgan, C. A., Southwick, S., Hazlett, G., Hoyt, G., Zimolo, Z., & Charney, D. (2004). Relationships among plasma dehydroepiandrosterone sulfate and cortisol levels, symptoms of dissociation, and objective performance in humans exposed to acute stress. *Archives of General Psychiatry, 61*(8), 819-825.

Nieschlag, E., Loriaux, D. L., Ruder, H. J., Zucker, I. R., Kirschner, M. A., & Lipsett, M. B. (1973). The secretion of dehydroepiandrosterone and dehydroepiandrosterone sulphate in man. *The Journal of Endocrinology, 57*(1), 123-34.

Pietromonaco, P. R., & Feldman Barrett, L. (1997). Working models of attachment and daily social interactions. *Journal of Personality and Social Psychology, 73*(6), 1409-1423.

Pietromonaco, P. R., Greenwood, D., & Feldman Barrett, L. (2004). Conflict in adult close relationships: An attachment perspective. In W. S. Rholes & J. A. Simpson (Eds.), *Adult attachment: New directions and emerging issues* (pp. 267–299). New York: Guilford Press.

Powers, S. I., Pietromonaco, P. R., Gunlicks, M., & Sayer, A. (2006). Dating couples' attachment styles and patterns of cortisol reactivity and recovery in response to a relationship conflict. *Journal of Personality and Social Psychology*, *90*(4), 613-628.

Raudenbush, S.W. & Bryk, A.S. (2011). HLM 7 for Windows [Computer software]. Lincolnwood, IL: Scientific Software International, Inc.

Salovey, P., & Birnbaum, D. (1989). Influence of mood on health-relevant cognitions. *Journal of Personality and Social Psychology*, *57*(3), 539-551.

Sbarra, D., & Hazan, C. (2008). Coregulation, dysregulation, self-regulation: An integrative analysis and empirical agenda for understanding adult attachment, separation, loss, and recovery. *Personality and Social Psychology Review*, *12*(2), 141-167.

Simpson, J. A., Oriña, M. M., & Ickes, W. (2003). When accuracy hurts, and when it helps: A test of the empathic accuracy model in marital interactions. *Journal of Personality and Social Psychology*, *85*, 881–893.

Simpson, J., & Rholes, W. (1994). Stress and secure base relationships in adulthood. *Attachment processes in adulthood* (pp. 181-204). London England: Jessica Kingsley Publishers.

Tomaka, J., Blascovich, J., Kelsey, R.M., & Leitteh, C.L. (1993). Subjective, physiological, and behavioral effects of threat and challenge appraisal. *Journal of Personality and Social Psychology*, *65*, 248-260.

Tomaka, J., Blascovich, J., Kibler, J., & Ernst, J. (1997). Cognitive and physiological antecedents of threat and challenge appraisal. *Journal of Personality and Social Psychology*, *73*(1), 63-72.