Article

JSPR

Daily interpersonal coping strategies: Implications for self-reported well-being and cortisol

Journal of Social and Personal Relationships
2015, Vol. 32(5) 687–706

DOI: 10.1177/0265407514542726
spr.sagepub.com
SAGE

Kira S. Birditt[1], Michael R. Nevitt[1], and David M. Almeida[2]

Abstract

An important pathway by which relationships influence health may involve how people cope with interpersonal tensions. This study examined whether same day and previous day avoidance and engagement in arguments are differentially associated with self-reported well-being (emotional and physical) and diurnal cortisol patterns. Participants from Wave 2 of the National Study of Daily Experiences ($N = 1{,}512$; aged 33–84, 57% women) completed daily phone interviews for eight consecutive days and provided useable saliva samples that were assayed for cortisol for four of those days at specific times: waking, 30 min after waking, before lunch, and at bedtime. Multilevel models revealed same day arguments were associated with lower well-being (higher negative affect and lower positive affect) than same day avoidance or no tension. In contrast, previous day avoidance was associated with lower next day well-being (higher negative affect and more physical symptoms) and higher next day cortisol than having no interpersonal tension the previous day. Arguments have greater same day consequences for well-being, whereas avoided arguments have greater next day consequences, which may indicate delayed effects of avoidance.

Keywords

Arguments, avoidance, cortisol, daily diary, interpersonal tensions

[1] University of Michigan, USA
[2] Pennsylvania State University, USA

Corresponding author:
Kira S. Birditt, Life Course Development Program, The Institute for Social Research, University of Michigan, 426 Thompson St, Ann Arbor, MI 48104, USA.
Email: kirasb@umich.edu

Interpersonal tensions (i.e., problems and irritations in relationships) are the most frequently experienced type of daily stressor. They predict greater self-reported distress and physical symptoms compared to other daily stressors, such as work deadlines and home repair (Almeida, 2005; Bolger, Delongis, Kessler, & Schilling, 1989). Indeed, problematic relationships are associated with long-term physical and psychological health problems, including cardiovascular disease, decreased functional health, and depression (Kiecolt-Glaser & Newton, 2001; Uchino, 2004). An important pathway by which relationships influence health may involve how people cope with interpersonal tensions (Taylor, Repetti, & Seeman, 1997). When faced with potentially tense interpersonal interactions, individuals will most likely avoid confrontations rather than engage in confrontations or arguments (Birditt, Fingerman, & Almeida, 2005). These two ways of coping with interpersonal tensions (avoiding vs. engaging in arguments) may differentially predict daily well-being and physiological stress.

The majority of studies on coping strategies in interpersonal relationships and their implications for well-being have been conducted in the laboratory (Heffner, Kiecolt-Glaser, Loving, Glaser, & Malarkey, 2004; Kiecolt-Glaser et al., 1997; Laurent & Powers, 2006; Robles, Shaffer, Malarkey, & Kiecolt-Glaser, 2006). We know little about how individuals cope with naturally occurring interpersonal tensions experienced on a daily basis or the implications of these coping strategies for psychological well-being, physical well-being, or physiological stress. The present study examined daily engagement and avoidance of arguments and their associations with daily self-reported well-being and diurnal cortisol.

Theoretical framework

The exposure–reactivity model provides a framework for understanding coping with daily interpersonal tensions and their implications for well-being and physiological stress (Almeida, 2005). According to this model, there are variations in the types of problems people are exposed to as well as how they react to problems. Exposure and reactivity to daily stressors influence psychological well-being and physiological systems (Almeida, 2005; Bolger & Zuckerman, 1995). Exposure refers to whether or not people experience an interpersonal tension. This construct refers to whether or not the interaction occurred and not how the person reacted to the interaction.

Reactivity refers to coping strategies used as well as the implications of those coping strategies for well-being and physiological systems. Coping strategies are often defined in terms of whether they are passive or active (Folkman, Lazarus, Pimley, & Novacek, 1987; Lazarus, 1999). Avoidance of arguments is passive and involves not confronting the stressor directly, such as accepting the situation as it is, reappraising the situation, and doing nothing (Birditt et al., 2005; Blanchard-Fields, Stein, & Watson, 2004). Engaging in arguments is active and involves directly confronting the person regarding the problem. How individuals react to tensions may affect physical or psychological well-being. Well-being comprises psychological and physical dimensions. This study includes self-reported assessments of psychological and physical well-being (positive affect, negative affect, and physical symptoms).

According to the exposure–reactivity model, there are several biological pathways that may account for links between stress and health. One of the most significant pathways is the hypothalamic–pituitary–adrenal (HPA) axis (Friedman, Karlamangla, Almeida, & Seeman, 2012) which is responsible for the physiological stress response (Sapolsky, Romero, & Munck, 2000; Selye, 1979). Activation of the HPA axis is functional in response to acute challenges because it mobilizes energy for immediate use, in an effort to bring the body back to homeostasis, but chronic activation of the system is associated with a multitude of physical and mental health problems (McEwen, 2003; McEwen & Seeman, 1999). The present study thus includes an assessment of cortisol which is a primary indicator of activity in this system. After a stressful stimulus is perceived, the hypothalamus releases corticotropin-releasing hormone, which stimulates the anterior pituitary to release adrenocorticotropic hormone (ACTH). ACTH, in turn, stimulates the adrenal cortex to release glucocorticoids, which in humans consists primarily of cortisol.

Cortisol has a normal diurnal rhythm which begins to increase before waking, reaches a peak level at about 30 min after waking (cortisol awakening response [CAR]) and steadily declines thereafter until bedtime (daily decline [DEC]; Fries, Dettenborn, & Kirshbaum, 2009; Pruessner et al., 1997). Higher cortisol levels are associated with greater negative emotion (e.g., anger, stress, and anxiety) and poorer well-being (Adam, Hawkley, Kudielka, & Cacioppo, 2006; Evans et al., 2007; Marin, Martin, Blackwell, Stetler, & Miller, 2007). It is important to consider the CAR, DEC, and overall daily levels because the CAR has been shown not to correlate with daytime cortisol activity (Edwards, Evans, Hucklebridge, & Clow, 2001; Schmidt-Reinwald et al., 1999), indicating that the CAR and daytime cortisol secretion might be subject to different regulatory influences and thus influenced by different variables (Clow, Thorn, Evans, & Hucklebridge, 2004). In this study, we consider the overall cortisol level, the CAR, and the DEC.

Coping with interpersonal tensions: Implications for well-being and cortisol

Engaging in arguments versus avoiding arguments may differentially predict daily well-being and physiological stress. Studies of arguments and avoidance have typically not compared these two types of coping strategies and/or have been conducted in the laboratory. Arguments are associated with lower self-reported well-being. Individuals who report engaging in arguments report greater daily negative affect (Charles, Piazza, Luong, & Almeida, 2009), and couples who engage in conflict in the laboratory report greater negative affect (Heffner et al., 2004). Findings regarding cortisol are less consistent. Some laboratory studies show that conflict is associated with increased cortisol (Heffner et al., 2004; Kiecolt-Glaser et al., 1997; Robles et al., 2006), whereas others have found no link between arguments and cortisol (Fehm-Wolfsdorf, Groth, Kaiser, & Hahlweg, 1999; Malarkey, Kiecolt-Glaser, Pearl, & Glaser, 1994).

Avoidance often predicts lower well-being and altered cortisol but studies have not compared it with engaging in overt arguments. Greater use of conflict avoidance is associated with lower self-reported well-being compared to nonavoidance days (days without

tensions or days with an argument) in the context of daily interpersonal tensions (Charles et al., 2009). Avoidance is also associated with lower well-being (compared to less use of avoidance) in daily marital tensions (Papp, Goeke-Morey, & Cummings, 2007) and workplace tensions (Friedman, Tidd, Currall, & Tsai, 2000). Similarly, greater use of repressive coping and problem avoidance is associated with higher cortisol levels (Brown et al., 1996; O'Donnell, Badrick, Kumari, & Steptoe, 2008).

The association between arguments, avoidance, well-being, and cortisol may vary depending on whether we consider same day or previous day coping strategies. Although arguments may be initially upsetting, they may lead to better problem resolution and well-being than avoidance, which may be associated with poorer long-term well-being. Studies of coping with stress conclude that avoidance is beneficial for well-being in the short term but harmful over the long term (Suls & Fletcher, 1985; Turner-Cobb & Steptoe, 1996). The same may be true when considering interpersonal coping strategies and their implications for well-being and cortisol.

Present study

Researchers have typically examined either avoidance or arguments rather than directly comparing them, and the majority of the research has been conducted in a laboratory environment. This study compares the effects of previous day and same day avoidance of arguments and engagement in arguments on daily well-being and cortisol. We compared three types of coping strategy days: avoidance of arguments, engagement in arguments, and both avoidance and engagement in arguments. We examined coping strategies used on the same day and the previous day to examine immediate and delayed effects of coping on well-being. We also tested associations between interpersonal coping and the overall level and rhythm of cortisol over the course of the day (CAR and DEC), although we did not make specific hypotheses about CAR and DEC due to the lack of research in this area. We tested the following hypotheses.

H1: Same day engagement in arguments will be associated with lower same day self-reported well-being and higher cortisol levels than same day avoidance of arguments or having no tension.

H2: Previous day avoidance of arguments will predict lower next day self-reported well-being and higher cortisol levels than previous day engagement in arguments or having no tension.

Method

Participants and procedure

Participants were from the Wave 2 of the National Study of Daily Experiences (Almeida, McGonagle, & King, 2009), which was conducted as part of the Midlife Development in the United States Survey (MIDUS). For eight consecutive nights, 2,022 participants, aged 33–84 (57% women) completed phone interviews. Participants completed an

Table 1. Sample description of the National Study of Daily Experiences II.

Variable	Total; $N = 2,022$	Provided saliva; $n = 1,735$	Did not provide saliva; $n = 287$	t	χ^2
	Means and standard deviations				
Age	56.24 (12.20)	56.39 (12.10)	55.34 (12.79)	−1.38	
Education	7.26 (2.53)	7.31 (2.51)	6.94 (2.64)	−2.25*	
Self-rated health[a]	3.56 (1.02)	3.59 (1.00)	3.41 (1.07)	−2.70*	
Number of children	2.58 (1.80)	2.60 (1.83)	2.46 (1.61)	−1.26	
	Percentages				
Women	57	56	62		3.15
White	84	86	71		40.51**
Black	12	10	23		42.62**
Married[b]	69	70	62		7.44**
Working or self-employed[c]	59	66	59		3.63
Has children	88	88	88		.01

[a]Self-rated health ranged from 1 (*poor*) to 5 (*excellent*).
[b]1% of sample missing marital status.
[c]8.9% of sample missing data on working status.
*$p < .05$; **$p < .01$.

average of 7.37 ($SD = 1.29$) daily interviews. A total of 69% of the sample completed all eight daily interviews (Table 1).

Home saliva collection kits were sent to participants a week before the study. The kits included 16 Salivette collection devices with small absorbent wads and an instruction sheet. For diary days 2 through 5, participants were asked to provide salivary samples 4 times a day: at waking, 30 min after waking, before lunch time, and at bedtime. After all tubes were prepared, participants mailed the samples to the MIDUS biological core at the University of Wisconsin where they were stored in a −60°C freezer for analysis. Salivettes were thawed and centrifuged at 3,000 r/min. The cortisol was measured with luminescence immunoassays (Immuno-Biological Laboratories, Hamburg, Germany); intraassay and interassay coefficients were below 5%. Salivary cortisol can be affected by pH levels; therefore, the samples were corrected if the values were outside the normal range (pH 4–9). Participants were asked not to eat for at least an hour before providing a sample and to avoid dairy products at least 20 min before providing saliva. Table 2 provides a description of the cortisol data. To examine whether participants adhered to the instructions with regard to recording the correct times of collection, approximately 25% of the respondents received a "smart box" to store their salivettes which contained a computer chip that recorded the time respondents opened and closed the box. The correlations between self-reported times and times obtained from the smart box ranged from .75 for the evening occasion to .95 for the morning occasion (Almeida, McGonagle, et al., 2009).

A total of 1,735 participants provided at least one saliva sample. Of these 1,735 participants, 76% provided saliva 4 times a day on all 4 days. Thus, a total of 6,326 days

Table 2. Description of cortisol data.

	Time		Cortisol (nmol/l)		Natural log of cortisol values	
Collection time	*M*	*SD*	*M*	*SD*	*M*	*SD*
Wake	6:42 a.m.	76 min	15.76	10.11	2.55	.73
30 min	7:16 a.m.	77 min	22.47	13.45	2.92	.70
Lunch	12:38 p.m.	83 min	7.06	5.22	1.75	.68
Bedtime	10:28 p.m.	76 min	3.37	5.76	.65	1.01

Note. The total number of useable occasions = 19,781; number of people with at least one useable cortisol sample = 1,512. We removed the following errors from these data: (a) days in which 30-min samples were provided either less than 15 min or more than 60 min after waking, (b) days in which participants were awake for more than 20 hr or less than 12 hr, (c) days in which samples were above 120 nmol/l, (d) days in which participants' lunch scores were higher than their 30-min scores by 10 nmol/l, (e) days in which participants woke up before 4 a.m. or after 12 noon, (f) participants who did not follow instructions and provided saliva samples on nonsaliva sampling days, and (g) days in which participants did not record times of saliva sample collection.

(92%) included all four saliva samples. As shown in Table 1, participants who provided saliva reported better self-rated health, had more years of education, were more likely to be married, and were more likely to be White and less likely to be Black than those who did not provide saliva. It is important to note that although the differences were significant, they were not large.

Measures

Engagement and avoidance of arguments

Participants were asked two questions each day regarding interpersonal tensions, which included: (1) 'Did you have an argument or disagreement with anyone since we spoke yesterday?' and (2) 'Did anything happen that you could have argued about but you decided to let it pass in order to avoid a disagreement?' Responses to each item were coded as 0 (*no*) and 1 (*yes*). We categorized the previous day and the same day into one of four categories: 1 (*argument*), 2 (*avoidance*), 3 (*argue and avoid*), or 4 (*no interpersonal tension*).

Self-reported affect and physical symptoms

Participants were asked 13 negative affect and 13 positive affect items derived from the Positive and Negative Affect Schedule and a Nonspecific Psychological Distress Scale (Kessler et al., 2002; Watson, Clark, & Tellegen, 1988). Negative affect items included emotions such as feeling restless or fidgety, nervous, hopeless, ashamed, upset, angry, and frustrated. Positive affect items included feeling in good spirits, cheerful, extremely happy, calm and peaceful, active, and confident. Participants rated each item from 0 (*none of the time*) to 4 (*all of the time*). The negative and positive affect items were averaged to create two separate scales for each diary day. For negative affect, αs ranged from .83 to .85 and from .92 to .95 for positive affect. Participants indicated whether they

experienced a series of 28 physical symptoms (Charles, Piazza, Slwinski, Mogle, & Almeida, 2013). The symptoms included aches, pain, cold and flu symptoms, stomach problems, and others. We created an index that reflected the total number of symptoms reported each day.

Cortisol

The cortisol scores were transformed with the natural log transformation. Days in which the cortisol data had potential errors (e.g., out of range values and noncompliant times) were not included in the analysis and these errors are described in Table 2. A total of 1,512 of the participants had useable data (for reliability and validity of this protocol, see Almeida, McGonagle, et al., 2009).

Covariates

This study controls for factors that may lead to variations in interpersonal tensions, well-being, and cortisol, including gender (Almeida & Kessler, 1998), age (Almeida, Piazza, & Stawski, 2009; Birditt et al., 2005; Blanchard-Fields et al., 2004), self-rated physical health, education, race, negative affectivity (Almeida, 2005; Birditt, Cichy, & Almeida, 2011; Grzywacz, Almeida, Neupert, & Ettner, 2004; Steptoe et al., 2003), and proportion of days reporting arguments or avoidance. We included the proportion of days that respondents reported avoidance and arguments to examine within-person as well as between-person associations between coping strategies, daily self-reported well-being, and cortisol (Schlotz, Hellhammer, Schulz, & Stone, 2004; Thorn, Hucklebridge, Evans, & Clow, 2006).

Gender was coded as 0 (*man*) or 1 (*woman*). Age was a continuous variable. Self-rated health included how well the participant rated his or her overall health from 1 (*poor*) to 5 (*excellent*). Education included 12 categories in which 1 = *no school*, 6 = *1 to 2 years of college*, and 12 = *PhD*. Race was coded as 1 (*White*) or 0 (*not White*). Negative affectivity included 6 items, which asked participants to report the extent to which they had experienced negative emotions in the past 30 days such as afraid, jittery, and irritable. Participants rated each item from 1 (*all of the time*) to 5 (*none of the time*). Items were recoded so that higher scores reflected greater negative affectivity, and the items were averaged to create a score. We created the proportion of days engaged in arguments and proportion of days avoided arguments by summing the total number of days these types of coping strategies were reported and dividing by the number of completed daily interviews.

The cortisol analyses included a series of covariates associated with cortisol (Stawski, Cichy, Piazza, & Almeida, 2013). Smoking included a combination of two variables: the number of cigarettes smoked during the 8-day diary period and whether the participant reported being a regular smoker (0 = *nonsmoker* and 1 = *smoker*). Participants reported whether they were taking any of the following medications: steroid inhaler, steroid medications, cortisone, birth control pills, other hormones, antidepressants, and anxiety medications (0 = *no medication* and 1 = *at least one medication*). Wake time was defined as

the time the first cortisol measurement was taken in military time. The weekend variable was coded as 0 (*Monday through Friday*) or 1 (*Saturday or Sunday*).

Analysis strategy

Because the data include multiple nonindependent observations for each respondent (e.g., multiple reports of daily well-being and multiple within day cortisol assessments), we used multilevel models (SAS PROC MIXED) to analyze the data. Multilevel models are ideal especially when the data are nested and unbalanced (e.g., unequal numbers of observations per respondent).

Two-level multilevel models were used to examine self-reported well-being variables in which participants were the upper level and the diary days (e.g., 1, 2 through 8) were the lower level. The predictors included coping strategy dummy variables reflecting the strategies used on the previous day and the same day. For each of these coping variables, the three types of coping strategies (avoidance, arguments, and both arguments and avoidance) were compared to a dummy variable referring to a no tension day. In addition, all possible pairwise comparisons of means were estimated between coping strategy types. *T*-tests were used to assess the significance of those differences with a Tukey adjustment for the increased familywise error due to multiple comparisons. Covariates included gender, age, self-rated health, education, race, negative affectivity, proportion of days avoided arguments, and proportion of days engaged in arguments. All continuous covariates were grand mean centered, and all categorical covariates were effect coded (−1, 1) before entering them in the models. An example equation is provided below.

$$\begin{aligned}\text{Positive affect}_{it} = {} & b_0 + b_{1di}(\text{same-day argument}) + b_{2di}(\text{same-day avoidance}) \\ & + b_{3di}(\text{same day both argument and avoidance}) \\ & + b_{4dt-i}(\text{previous-day argument}) + b_{5d-1i}(\text{previous-day avoidance}) \\ & + b_{6d-1i}(\text{previous day both argument and avoidance}) \\ & + b_{7i} \text{ through } b_{14i}(\text{individual-level covariates}) + u_i + e_{di}\end{aligned}$$

where "positive affect" is person i's positive affect on day d, b_0 is the predicted value of positive affect when all of the predictors equal zero, b_{2di} through b_{6di} are the coefficients for coping strategy types used by person i on same day d and previous day $d-1$, b_7 through b_{14} are the coefficients for person i's covariates, u_i is the between-person covariance, and e_{di} is the within-person and random residual covariance.

Three-level piecewise multilevel models were estimated to assess whether cortisol rhythms varied by coping strategies. The lowest level referred to the cortisol measurement within day, the second level referred to the day, and the upper level referred to the participant (Stawski et al., 2011). These types of models allow for the examination of variability in cortisol within day, between days, and between individuals. Piecewise models captured the within-day patterns of cortisol with two predictors (i.e., pieces) that represented the CAR (time difference between waking and 30 min collection) and the DEC (time difference between 30 min collection and bedtime collection) centered on the 30-min collection. This model allowed us to examine whether the overall level of cortisol as well as the diurnal pattern of cortisol varied by coping strategies used on the same

day and the previous day. Traditional models used time as a variable, but a linear time variable does not capture the fact that cortisol increases in the morning and then declines (Hruschka, Kohrt, & Worthman, 2005).

Several models were estimated to determine which model had the best fit including random intercepts and pieces. The model with the best fit included a random intercept and two random slopes for CAR and DEC between participants and a random DEC slope within participant across days. In this model, the cortisol levels of person i on day d at occasion o are regressed on CAR (Piece 1), DEC (Piece 2), the coping strategies used on the same and previous day, and the interactions between the pieces (CAR and DEC) and the coping strategy variables. Models were estimated in two steps: Model 1 included all main effects, and Model 2 included main effects and interactions. Model 1 allowed for an examination of whether the overall level of cortisol varied by coping, and Model 2 allowed for an assessment of whether the pattern of cortisol over the course of the day (CAR and DEC) varied by coping. An example equation for the piecewise model is provided below.

$$\begin{aligned}\text{Cortisol}_{odi} = {} & b_0 + b_{1di}(\text{same day argument}) + b_{2di}(\text{same day avoidance}) \\ & + b_{3di}(\text{same day both argument and avoidance}) \\ & + b_{4d-1i}(\text{previous day argument}) + b_{5d-1i}(\text{previous day avoidance}) \\ & + b_{6d-1i}(\text{previous day both argument and avoidance}) + b_{7odi}(\text{CAR}) \\ & + b_{8odi}(\text{DEC}) + b_9 \text{ through } b_{11}(\text{same day tension types}_{di} \times \text{CAR}_{odi}) \\ & + b_{12} \text{ through } b_{14}(\text{previous day tension types}_{di} \times \text{CAR}_{odi}) \\ & + b_{15} \text{ through } b_{17}(\text{same day tension types}_{di} \times \text{DEC}_{odi}) \\ & + b_{18} \text{ through } b_{20}(\text{previous day tension types}_{d-1i} \times \text{DEC}_{odi}) \\ & + b_{21i} \text{ through } b_{32i}(\text{individual-level covariates}) + b_{33di}(\text{wake time}) \\ & + v_{00i}, v_{10i}, \text{and } v_{20i}(\text{Level 3 variance components}) \\ & + u_{1di}(\text{Level 2 variance component}) + e_{odi}(\text{Level 1 residual variance})\end{aligned}$$

where "cortisol" is person i's cortisol level on day d, occasion o, b_0 is the predicted value of cortisol when all of the predictors equal zero, b_{1di} through b_{6d-1i} are the coefficients for coping strategy types used by person i on same day d and previous day $d-1$, b_{7odi} CAR reflects the rate of change between the first sample (wake) and the second sample (30 min after wake) as a function of the amount of time that elapsed between them, b_{8odi} DEC reflects the rate of decline in cortisol through the day as a function of the amount of time that elapsed between second (30 min after wake) and fourth (bedtime) sample, b_9 through b_{14} reflects the interaction between CAR and tension type on the same and previous day, b_{15} through b_{20} reflects the interaction between DEC and tension type on the same and previous days, b_{21} through b_{32} are the coefficients for person i's covariates, b_{33di} reflects the coefficient for wake time, v_{00i}, v_{10i}, and v_{20i} are the Level 3 variance components that reflect between person differences in the intercept, CAR, and linear DEC parameters, u_{1di} is the within-person between-day Level 2 variance component for the linear DEC parameter, and e_{odi} is the Level 1 residual variance between occasions within day and within person.

All continuous covariates were centered, and all categorical covariates were effect coded (1 and −1) before entering them in the models. Due to the large number of covariates (13 covariates) as well as predictors and interactions in the cortisol models, only covariates with $p < .10$ were retained in the cortisol analyses. Including covariates that are not significantly associated with the outcome can lead to problems with model estimation (Rovine, von Eye, & Wood, 1988). Final cortisol models controlled for wake time, smoking, medication, weekend collection, gender, self-rated health, age, and proportion of avoidance days.

Results

Results are presented in three sections. First, we present a description of the study variables. Next, we show associations among same day coping strategies, well-being, and cortisol. Finally, we present associations among previous day coping strategies and next day well-being and cortisol.

Description of the data

Participants reported an average of 1.75 ($SD = 1.77$) interpersonal tensions with a range from 0 to 12 tensions across the eight diary days. Participants were most likely to report avoidance days (59% of participants), followed by argument days (36% of participants), and lastly days in which they reported both arguments and avoidance (11% of participants). Only 27% of the participants reported having no interpersonal tensions across all eight diary days.

On average, participants provided their first saliva samples at 6:42 a.m. and their last saliva sample at 10:28 p.m. (Table 2). The cortisol samples fit the normal rhythm with the highest levels at the 30 min after waking collection and the lowest at bedtime.

Self-reported well-being and cortisol as a function of same day arguments and avoidance of arguments

Positive and negative affect varied by coping strategies used on the same day (Tables 3 and 4; Figure 1). The pairwise comparisons of same day coping strategies revealed that, as we predicted, participants reported lower positive affect and higher negative affect on days in which they engaged in arguments compared to days in which they avoided arguments or had no tension.

Same day coping strategies were associated with daily physical symptoms (Tables 3 and 4; Figure 1). Pairwise comparisons of same day coping strategies with Tukey adjustments revealed that consistent with our hypothesis, argument days and avoidance days were associated with more physical symptoms than nontension days. However, inconsistent with our predictions, there was no difference between arguments and avoidance when predicting physical symptoms.

Cortisol analyses revealed that in Model 1 (the main effect model) there were no main effects of same day tensions (Table 5). Thus, unlike we predicted, same day coping strategies were not associated with overall cortisol levels on the same day. Model 2

Table 3. Multilevel models examining well-being as a function of coping strategies used on the same day and the previous day.

	Positive affect		Negative affect		Physical symptoms	
Predictor	*b*	*SE*	*b*	*SE*	*b*	*SE*
Intercept	2.85	.02**	.16	.01	1.64	.06**
Same day argument	−.19	.02**	.21	.01**	.24	.05**
Same day avoidance	−.08	.01**	.09	.01**	.18	.04**
Same day both	−.26	.04**	.32	.02**	.12	.11
Same day no tension	—		—		—	
Previous day argument	−.02	.02	.02	.01*	.02	.05
Previous day avoidance	−.02	.01	.02	.01**	.11	.04**
Previous day both	−.04	.03	.08	.02**	.34	.09**
Previous day no tension	—		—		—	
Gender	.01	.02	.01	.01	.20	.04**
Age	.01	.00**	−.00	.00	.01	.00**
Self-rated health	.15	.02**	−.03	.00**	−.53	.04**
Education	−.03	.01**	−.00	.00	−.03	.02
Black	.10	.04**	.01	.01	−.04	.06
Negative affectivity	−.40	.03**	.18	.01**	.79	.08**
Proportion of days argued	−.27	.14**	.10	.04*	.59	.35
Proportion of days avoided	−.48	.11**	.25	.04**	1.75	.29**
Covariance parameters						
Between participants	.37	.01**	.03	.00**	2.41	.09**
Within participants/residual	.14	.00**	.04	.00**	1.30	.02**
−2 log likelihood	15,034.9		−1,027.8		39,523.6	

*$p < .05$.; **$p < .01$.

Table 4. Estimated means and standard errors of self-reported well-being by same and previous day coping strategies.

	Positive affect		Negative affect		Physical symptoms	
Strategy type	*M*	*SE*	*M*	*SE*	*M*	*SE*
Same day argument	2.58	$.02^{a}$	.39	$.01^{a}$	2.02	$.06^{a}$
Same day avoidance	2.70	$.02^{b}$	.27	$.01^{b}$	1.96	$.06^{a}$
Same day both	2.52	$.04^{a,c}$	.49	$.02^{c}$	1.90	$.12^{a,b}$
Same day no tension	2.77	$.02^{d}$	.18	$.01^{d}$	1.78	$.05^{b}$
Previous day argument	2.64	$.02^{a}$	.32	$.01^{a,b}$	1.82	$.07^{a,c}$
Previous day avoidance	2.64	$.02^{a}$	.32	$.01^{b}$	1.91	$.06^{a,b}$
Previous day both	2.62	$.03^{a}$	.38	$.02^{c}$	2.14	$.10^{b}$
Previous day no tension	2.66	$.02^{a}$	.30	$.01^{d}$	1.81	$.05^{c}$

Note. Means in the same column that do not share superscripts are significantly different after Tukey's adjustments ($p < .05$).

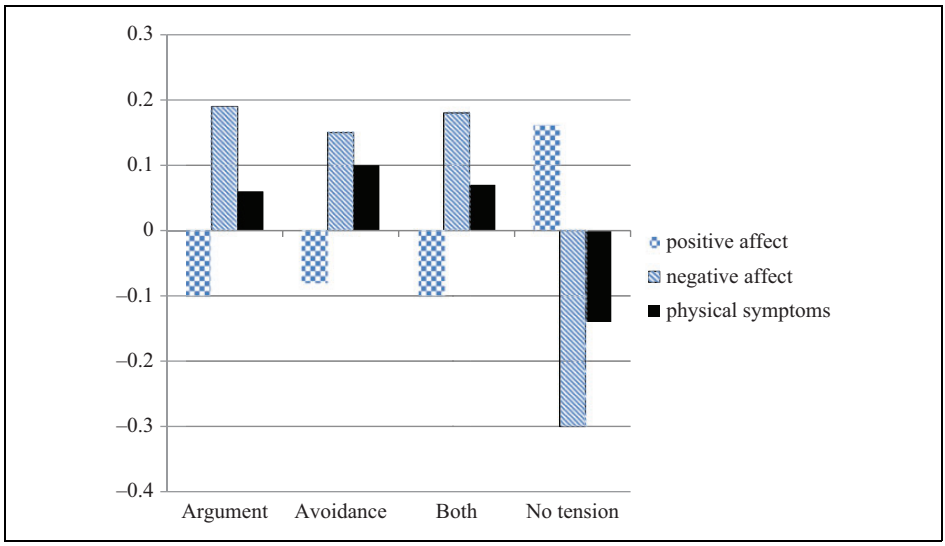

Figure 1. Bivariate correlations between coping strategy types and same-day well-being outcomes.

Table 5. Piecewise multilevel model predicting cortisol as a function of coping strategy type on the same day and previous day.

	Intercept		CAR		DEC		DEC square[a]	
Predictor	*b*	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*
Sample average	2.88	.03**	.54	.03**	−.25	.00**	.01	.00**
Same day argument	.05	.03	−.18	.07*	−.01	.00		
Same day avoidance	.03	.02	.09	.06	−.00	.00		
Same day both	.15	.06*	−.27	.16	−.02	.01		
Same day no tension								
Previous day argument	.02	.03	−.01	.07	−.00	.00		
Previous day avoidance	.06	.02*	−.06	.05	−.00	.00		
Previous day both	−.01	.05	.04	.11	.00	.00		
Previous day no tension								
Gender	−.04	.01**						
Age	.01	.00**						
Self-rated health	.07	.01**						
Proportion of days avoided	−.19	.09*						
Smoker	.04	.02*						
Waking time	−.05	.01**						
Weekend	−.02	.01**						

DEC: daily decline; CAR: cortisol awakening response.

[a]DEC square is included to test for the quadratic effect. There were no significant associations between coping strategies and the quadratic effect, and these effects were removed from the model. Models were estimated in two steps, which included the main effects in the first step followed by both main effects and interactions in the second step. This table represents the second step which included all variables in the model.

*$p \leq .05$; **$p \leq .01$.

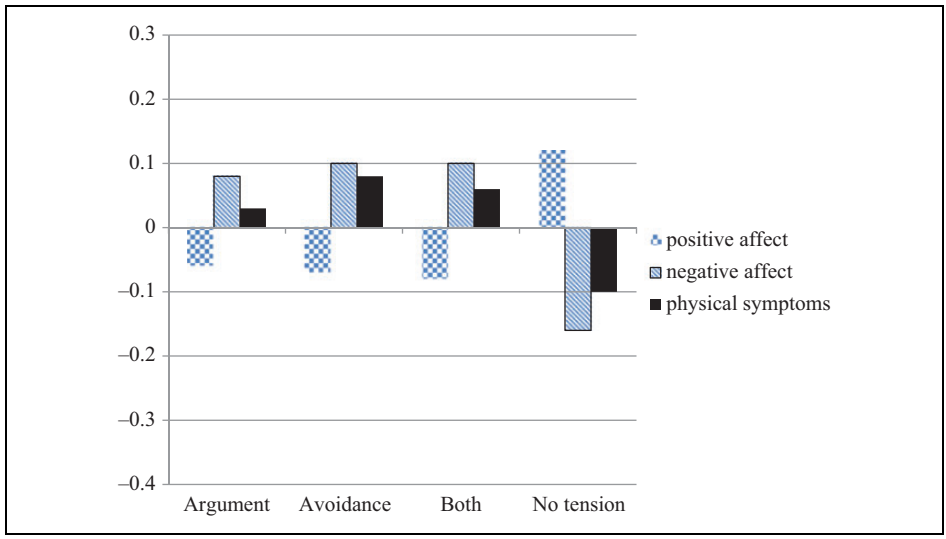

Figure 2. Bivariate correlations between coping strategy types and next-day well-being outcomes.

revealed a significant interaction between same day arguments and the CAR. The interaction indicated that the CAR varied between argument days and no tension days; individuals had a steeper CAR on argument days compared to days in which they had no tension.

Self-reported well-being and cortisol as a function of previous day arguments and avoidance of arguments

Previous day tensions were associated with negative affect, physical symptoms, and cortisol but were not associated with positive affect. The models and pairwise comparisons predicting negative affect revealed that, consistent with our hypothesis, previous day avoidance predicted greater next day negative affect compared to having no tension on the previous day (Table 4; Figure 2). However, unlike our prediction, there was no significant difference between previous day arguments and avoidance when predicting negative affect.

Similarly, the models predicting physical symptoms revealed that previous day avoidance predicted greater next day physical symptoms compared to having no tension (Table 4; Figure 2). However, unlike our prediction, there was no significant difference between previous day arguments and avoidance when predicting physical symptoms.

The cortisol analyses revealed that the previous day coping was associated with next day cortisol levels. Model 1 showed that days in which individuals reported avoidance were associated with higher cortisol on the next day compared to days in which no tension was reported ($b = .03$, $SE = .02$, $p < .05$). Pairwise comparisons of means revealed there were no other differences between the coping strategy days. Model 2, which examined associations between previous day coping and patterns of cortisol on

the next day, revealed that there were no significant effects of previous day tensions on the CAR or DEC.

The models also revealed between-person associations between coping strategies and well-being. Participants who reported more avoidance (higher proportion of days avoiding conflict) reported lower positive affect, higher negative affect, and more physical symptoms. The associations between the proportion of days argued and well-being were weaker but indicated that people who reported more arguments had lower positive affect and higher negative affect. There were no significant associations between proportion of days avoided or argued and overall cortisol levels.

Post hoc tests

Because individuals have tensions within different relationships (e.g., spouses, family, and nonfamily), we conducted additional analyses to take into account these variations. Married individuals were more likely to have tensions with spouses (Argue 45%, Avoid 41%), followed by nonfamily (Argue 29%, Avoid 36%) and other family (Argue 27%, Avoid 23%), whereas unmarried individuals were most likely to have tensions with nonfamily (Argue 50%, Avoid 55%), followed by other family (Argue 31%, Avoid 33%) and romantic partner (Argue 18%, Avoid 12%). Thus, we conducted all of the analyses controlling for marital status (1 = *married* or 0 = *unmarried*), and the findings remained the same.

Because individuals with chronic illnesses may have different relationship dynamics as well as different reactivities to tensions, we conducted all of the analyses again controlling for the number of chronic illnesses and found the same pattern of results.

Discussion

Consistent with the exposure reactivity model, interpersonal coping strategies appear to have important implications for daily well-being and physiological stress (Almeida, 2005). This is the first study to our knowledge that compares the effects of naturally occurring daily arguments and avoidance of arguments on daily well-being. This study revealed that daily interpersonal tensions are associated with lower self-reported well-being and variations in cortisol. Individuals were most likely to engage in avoidance with almost two thirds of the participants reporting avoidance and less than half of the participants reporting arguments. How individuals coped with tensions was associated with variations in daily well-being. Arguments were associated with lower well-being than avoidance on the same day which may indicate more immediate effects whereas avoidance was more consistently associated with poorer next day well-being which may indicate delayed effects. In addition, individuals who reported both coping strategies on the same day reported the lowest well-being.

Implications of arguments for daily well-being and cortisol

As we hypothesized, same day engagement in arguments appeared to have a more detrimental effect on well-being than same day avoidance. In particular, people reported higher negative affect and lower positive affect on days in which they engaged in arguments, whereas there were fewer links between previous day arguments and well-being.

Individuals also had a steeper CAR on argument days compared to days in which they had no tension. In contrast, there was no association between arguments and next day cortisol. This finding is consistent with prior research showing that arguments are associated with lower self-reported well-being (Charles et al., 2009; Heffner et al., 2004) but advances the research by showing that direct coping may be initially distressing but less distressing over time. Indeed, direct strategies may be more likely to lead to problem resolution and often predict better long-term relationship outcomes (Drigotas, Whitney, & Rusbult, 1995; Overall, Fletcher, Simpson, & Sibley, 2009).

Implications of avoidance for daily well-being and cortisol

As predicted, previous day avoidance of arguments was associated with greater negative affect, greater physical symptoms, and higher cortisol when compared with non-interpersonal tension days. Previous day avoidant strategies may have a greater effect on next day well-being outcomes because the problem is still unresolved. According to Brosschot, Pieper, and Thayer (2005), stressors can lead to prolonged reactivity, especially if they involve rumination or worrying (i.e., perseveration cognition) about the stressor and how to best cope with it. Thus, avoidant coping strategies may be soothing in the short term but they may lead to long-term negative outcomes for health and relationships (Smith, Vivian, & O'Leary, 1990). Indeed, avoidant strategies are less visible to social partners and judged as less effective in terms of problem solving and improving relationships compared to direct strategies (Drigotas et al., 1995). Although people rate avoidant strategies as more successful in the short term, avoidance does not predict positive changes in relationships whereas direct strategies are initially perceived as less successful but predict positive changes in relationships (Overall et al., 2009). The higher cortisol levels on the next day may be especially problematic, given that higher levels of cortisol are associated with poorer psychological and physical well-being (Adam et al., 2006). Of course, it is also possible that a third variable accounts for the association between avoidance and next day well-being. For example, anticipating future interactions with the person may be associated with lower well-being on the next day.

Implications of both argument and avoidance days for daily well-being and cortisol

Although the primary purpose of this study was to compare the effects of avoidance and engagement in arguments, we also discovered that a small proportion of people reported engaging in both arguments and avoiding arguments on the same day. Indeed, a strength of this study is that we were able to examine both engagement of arguments and avoidance of arguments separately as well as together. Interestingly, it appears that people who experience both tensions may be at the greatest risk for health problems and poor psychological well-being. Individuals who reported both arguments and avoidance on the same day or previous day reported the poorest well-being (e.g., lower positive affect, higher negative affect, and more physical symptoms). People who report arguments and avoidance of arguments on the same day are most likely experiencing

unusually high levels of interpersonal stress. We need to conduct further research to understand what types of problems are occurring in these situations.

Limitations and future research directions

There are several limitations to the present study and directions for future research. First, we recognize that the associations between well-being and interpersonal tensions are most likely bidirectional. For example, poorer self-reported well-being or higher cortisol may increase sensitivity to interpersonal slights and lead to a greater likelihood of tensions. The anticipation of tensions rather than the experience of those tensions may lead to poorer psychological well-being and higher cortisol levels (Fries et al., 2009).

In addition, we were not able to examine specific aspects of the interpersonal tensions that may influence the links between coping and well-being. For example, it is unclear how individuals' social partners reacted to the tension and whether the combination of dyadic coping strategies leads to variations in well-being. Negative reciprocity is especially harmful for relationships and well-being (Gottman, Coan, Carrere, & Swanson, 1998). It is also unclear whether individuals used constructive or destructive strategies when they engaged in or avoided arguments. Individuals may engage in an argument by calmly discussing the problem or by engaging in more negative behaviors, such as yelling (Birditt et al., 2005). Future research should examine the particular behaviors that people use.

We were also surprised that the coping strategies were not more consistently associated with either the CAR or the DEC. The lack of findings may be due to how we measured cortisol. Unfortunately, due to cost concerns and study logistics we were only able to obtain four samples of cortisol each day. Other researchers have used four samples within the 1-hr period postwaking to measure CAR (Pruessner et al., 1997). Specifically, cortisol levels are measured at the time of waking, 15 min later, 30 min later, and 1 hr (60 min) later. Thus, the cortisol measured in this study may reflect basal cortisol.

Daily interpersonal tensions and coping are associated with self-reported well-being and cortisol. Engaging in arguments may have more immediate effects on well-being, whereas the effects of avoidance may be more delayed but more work needs to be done to examine this hypothesis. It may be that avoidance is more harmful to long-term health because problems are not resolved. This work is especially important because people are more likely to use avoidance than to engage in arguments, and it provides some insight into how the negative aspects of relationships may "get under the skin" to influence health.

Authors' note

A previous version of this article was presented at the 2010 annual meeting of the American Psychological Association, San Diego, California, USA.

Acknowledgment

We would like to thank Angela Turkelson for her assistance with analyses and Dr Robert Stawski for his feedback on earlier drafts of the article.

Funding

This research was funded by grants P01 AG020166 and R01AG019 947 239 to D. M. A. and grant K99 (AG029879) to K. S. B.

References

Adam, E. K., Hawkley, L. C., Kudielka, B. M., & Cacioppo, J. T. (2006). Day-to-day dynamics of experience–cortisol associations in a population-based sample of older adults. *Proceedings of the National Academy of Sciences*, *103*, 17058–17063. doi:10.1073/pnas.0605053103

Almeida, D. M. (2005). Resilience and vulnerability to daily stressors assessed via diary methods. *Current Directions in Psychological Science*, *14*, 64–68. doi:10.1111/j.0963-7214.2005.00336.x

Almeida, D. M., & Kessler, R. C. (1998). Everyday stressors and gender differences in daily distress. *Journal of Personality and Social Psychology*, *75*, 670–680. doi:10.1037/0022-3514.75.3.670

Almeida, D. M., McGonagle, K. A., & King, H. (2009). Assessing daily stress processes in social surveys by combining stressor exposure and salivary control. *Biodemography and Social Biology*, *55*, 220–238.

Almeida, D. M., Piazza, J. R., & Stawski, R. S. (2009). Interindividual differences and intraindividual variability in the cortisol awakening response: An examination of age and gender. *Psychology and Aging*, *24*, 819–827. doi:10.1037/a0017910

Birditt, K. S., Cichy, K., & Almeida, D. (2011). Age differences in exposure and reactivity to interpersonal tensions among Black and White individuals across adulthood. *Race and Social Problems*, *3*, 225–239. doi:10.1007/s12552-011-9058-y

Birditt, K. S., Fingerman, K. L., & Almeida, D. M. (2005). Age differences in exposure and reactions to interpersonal tensions: A daily diary study. *Psychology and Aging*, *20*, 330–340. doi:10.1037/0882-7974.20.2.330

Blanchard-Fields, F., Stein, R., & Watson, T. L. (2004). Age differences in emotion-regulation strategies in handling everyday problems. *The Journals of Gerontology: Psychological Sciences*, *59B*, P261–P269. doi:10.1093/geronb/59.6.P261

Bolger, N., DeLongis, A., Kessler, R. C., & Schilling, E. A. (1989). Effects of daily stress on negative mood. *Journal of Personality and Social Psychology*, *57*, 808–818. doi:10.1037/0022-3514.57.5.808

Bolger, N., & Zuckerman, A. (1995). A framework for studying personality in the stress process. *Journal of Personality and Social Psychology*, *69*, 890–902. doi:10.1037/0022-3514.69.5.890

Brosschot, J. F., Pieper, S., & Thayer, J. F. (2005). Expanding stress theory: Prolonged activation and perseverative cognition. *Psychoneuroendocrinology*, *30*, 1043–1049. doi:10.1016/j.psyneuen.2005.04.008

Brown, L. L., Tomarken, A. J., Orth, D. N., Loosen, P. T., Kalin, N. H., & Davidson, R. J. (1996). Individual differences in repressive-defensiveness predict basal salivary cortisol levels. *Journal of Personality and Social Psychology*, *70*, 362–371. doi:10.1037/0022-3514.70.2.362.

Charles, S. T., Piazza, J. R., Luong, G., & Almeida, D. M. (2009). Now you see it, now you don't: Age differences in affective reactivity to social tensions. *Psychology and Aging*, *24*, 645–653. doi:10.1037/a0016673

Charles, S. T., Piazza, J. R., Slwinski, M., Mogle, J., & Almeida, D. M. (2013). The wear-and-tear of daily stressors on mental health. *Psychological Science*, *24*, 733–741.

Clow, A., Thorn, L., Evans, P., & Hucklebridge, F. (2004). The awakening cortisol response: Methodological issues and significance. *Stress: The International Journal on the Biology of Stress*, *7*, 29–37.

Drigotas, S. M., Whitney, G. A., & Rusbult, C. E. (1995). On the peculiarities of loyalty: A diary study of responses to dissatisfaction in everyday life. *Personality and Social Psychology Bulletin*, *21*, 596–609. doi:10.1177/0146167295216006

Edwards, S., Evans, P., Hucklebridge, F., & Clow, A. (2001). Association between time of awakening and diurnal cortisol secretory activity. *Psychoneuroendocrinology*, *26*, 613–622.

Evans, P., Forte, D., Jacobs, C., Fredhoi, C., Aitchison, E., Hucklebridge, F., & Clow, A. (2007). Cortisol secretory activity in older people in relation to positive and negative well-being. *Psychoneuroendocrinology*, *32*, 922–930. doi:10.1016/j.psyneuen.2007.06.017

Fehm-Wolfsdorf, G., Groth, T., Kaiser, A., & Hahlweg, K. (1999). Cortisol responses to marital conflict depend on marital interaction quality. *International Journal of Behavioral Medicine*, *6*, 207–227. doi:10.1207/s15327558ijbm0603_1

Folkman, S., Lazarus, R. S., Pimley, S., & Novacek, J. (1987). Age differences in stress and coping processes. *Psychology and Aging*, *2*, 171–184. doi:10.1037/0882-7974.2.2.171

Friedman, E. M., Karlamangla, A. S., Almeida, D. M., & Seeman, T. E. (2012). Social strain and cortisol regulation in midlife in the US. *Social Science and Medicine*, *74*, 607–615. doi:10.1016/j.socscimed.2011.11.003

Friedman, R. A., Tidd, S. T., Currall, S. C., & Tsai, J. C. (2000). What goes around comes around: The impact of personal conflict style on work conflict and stress. *International Journal of Conflict Management*, *11*, 32–55. doi:10.1108/eb022834

Fries, E., Dettenborn, L., & Kirschbaum, C. (2009). The cortisol awakening response (CAR): Facts and future directions. *International Journal of Psychophysiology*, *72*, 67–73. doi:10.1016/j.ijpsycho.2008.03.014

Gottman, J. M., Coan, J., Carrere, S., & Swanson, C. (1998). Predicting marital happiness and stability from newlywed interactions. *Journal of Marriage & the Family*, *60*, 5–22. doi:10.2307/353438

Grzywacz, J. G., Almeida, D. M., Neupert, S. D., & Ettner, S. L. (2004). Socioeconomic status and health: A micro-level analysis of exposure and vulnerability to daily stressors. *Journal of Health and Social Behavior*, *45*, 1–16. doi:10.1177/002214650404500101

Heffner, K. L., Kiecolt-Glaser, J. K., Loving, T. J., Glaser, R., & Malarkey, W. B. (2004). Spousal support satisfaction as a modifer of physiological responses to marital conflict in younger and older couples. *Journal of Behavioral Medicine*, *27*, 233–254. doi:10.1023/B: JOBM.0000028497.79129.ad

Hruschka, D. J., Kohrt, B. A., & Worthman, C. M. (2005). Estimating between- and within-individual variation in cortisol levels using multilevel models. *Psychneuroendocrinology*, *30*, 698–714. doi:10.1016/j.psyneuen.2005.03.002

Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., & Normand, S. -L. . . . Zaslavsky, A. M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences*, *32*, 959–976. doi:10.1017/S0033291702006074

Kiecolt-Glaser, J. K., Glaser, R., Cacioppo, J. T., MacCallum, R. C., Snydersmith, M., Kim, C., & Malarkey, W. B. (1997). Marital conflict in older adults: Endocrinological and immunological correlates. *Psychosomatic Medicine*, *59*, 339–349.

Kiecolt-Glaser, J., & Newton, T. L. (2001). Marriage and health: His and hers. *Psychological Bulletin*, *127*, 472–503. doi:10.1037/0033-2909.127.4.472

Laurent, H. K., & Powers, S. I. (2006). Social cognitive predictors of hypothalamic–pituitary adrenal reactivity to interpersonal conflict in emerging adult couples. *Journal of Social and Personal Relationships*, *23*, 703–720.

Lazarus, R. S. (1999). *Stress and emotion*. New York, NY: Springer Publishing.

Malarkey, W. B., Kiecolt-Glaser, J. K., Pearl, D., & Glaser, R. (1994). Hostile behavior during marital conflict alters pituitary and adrenal hormones. *Psychosomatic Medicine*, *56*, 41–51.

Marin, T. J., Martin, T. M., Blackwell, E., Stetler, C., & Miller, G. E. (2007). Differentiating the impact of episodic and chronic stressors on hypothalamic–pituitary–adrenocortical axis regulation in young women. *Health Psychology*, *26*, 447–455. doi:10.1037/0278-6133.26.4.447

McEwen, B. S. (2003). Mood disorders and allostatic load. *Biological Psychiatry*, *54*, 200–207.

McEwen, B. S., & Seeman, T. (1999). Protective and damaging effects of mediators of stress: Elaborating and testing the concepts of allostasis and allostatic load. *Annals of the New York Academy of Sciences*, *896*, 30–47.

O'Donnell, K., Badrick, E., Kumari, M., & Steptoe, A. (2008). Psychological coping styles and cortisol over the day in healthy older adults. *Psychoneuroendocrinology*, *33*, 601–611. doi:10.1016/j.psyneuen.2008.01.015

Overall, N. C., Fletcher, G. J. O., Simpson, J. A., & Sibley, C. G. (2009). Regulating partners in intimate relationships: The costs and benefits of different communication strategies. *Journal of Personality and Social Psychology*, *96*, 620–639. doi:10.1037/a0012961

Papp, L. M., Goeke-Morey, M., & Cummings, E. M. (2007). Linkages between spouses' psychological distress and marital conflict in the home. *Journal of Family Psychology*, *21*, 533–537. doi:10.1037/0893-3200.21.3.533

Pruessner, J. C., Gaab, J., Hellhammer, D. H., Lintz, D., Schommer, N., & Kirschbaum, C. (1997). Increasing correlations between personality traits and cortisol stress responses obtained by data aggregation. *Psychoneuroendocrinology*, *22*, 615–625. doi:10.1016/S0306-4530(97)00072-3

Robles, T. F., Shaffer, V. A., Malarkey, W. B., & Kiecolt-Glaser, J. K. (2006). Positive behaviors during marital conflict: Influences on stress hormones. *Journal of Social and Personal Relationships*, *23*, 305–325. doi:10.1177/0265407506062482

Rovine, M. J., von Eye, A., & Wood, P. (1988). The effect of low covariate criterion correlations on the analysis-of-covariance. In E. Wegmen (Ed.), *Computer science and statistics: Proceedings of the 20th symposium of the interface* (pp. 500–504). Alexandria, VA: American Statistical Association.

Sapolsky, R. M., Romero, L. M., & Munck, A. U. (2000). How do glucocorticoids influence stress responses? Integrating permissive, suppressive, stimulatory, and preparatory actions. *Endocrine Reviews*, *21*, 55–89.

Schlotz, W., Hellhammer, J., Schulz, P., & Stone, A. A. (2004). Perceived work overload and chronic worrying predict weekend-weekday differences in the cortisol awakening response. *Psychosomatic Medicine*, *66*, 207–214. doi:10.1097/01.psy.0000116715.78238.56

Schmidt-Reinwald, A., Pruessner, J. C., Hellhammer, D. H., Federenko, I., Rohleder, N., Schürmeyer, T. H., & Kirschbaum, C. (1999). The cortisol response to awakening in relation to different challenge tests and a 12-hour cortisol rhythm. *Life Sciences*, *64*, 1653–1660.

Selye, H (1979). *The stress of my life*. New York, NY: Van Nostrand.

Smith, D. A., Vivian, D., & O'Leary, K. D. (1990). Longitudinal prediction of marital discord from premarital expressions of affect. *Journal of Consulting and Clinical Psychology*, *58*, 790–798. doi:10.1037/0022-006X.58.6.790

Stawski, R. S., Almeida, D. M., Lachman, M. E., Tun, P. A., Rosnick, C. B., & Seeman, T. (2011). Associations between cognitive function and naturally occurring daily cortisol during middle-adulthood: Timing is everything. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences*, *66B*, 71–81. doi:10.1093/geronb/gbq094

Stawski, R. S., Cichy, K. E., Piazza, J. R., & Almeida, D. M. (2013). Associations among daily stressors and salivary cortisol: Findings from the national study of daily experiences. *Psychoneuroendocrinology*, *38*, 2654–2665.

Steptoe, A., Kunz-Ebrecht, S., Owen, N., Feldman, P. J., Willemsen, G., Kirschbaum, C., & Marmot, M. (2003). Socioeconomic status and stress-related biological responses over the working day. *Psychosomatic Medicine*, *65*, 461–470. doi:10.1097/01.PSY.0000035717.78650.A1

Suls, J., & Fletcher, B. (1985). The relative efficacy of avoidant and nonavoidant coping strategies: A meta-analysis. *Health Psychology*, *4*, 249–288. doi:10.1037/0278-6133.4.3.249

Taylor, S. E., Repetti, R. L., & Seeman, T. (1997). Health psychology: What is an unhealthy environment and how does it get under the skin? *Annual Review of Psychology*, *48*, 411–447. doi:10.1146/annurev.psych.48.1.411

Thorn, L., Hucklebridge, F., Evans, P., & Clow, A. (2006). Suspected non-adherence and weekend versus week day differences in the awakening cortisol response. *Psychoneuroendocrinology*, *31*, 1009–1018. doi:10.1016/j.psyneuen.2006.05.012

Turner-Cobb, J. M., & Steptoe, A. (1996). Psychosocial stress and susceptibility to upper respiratory tract illness in an adult population sample. *Psychosomatic Medicine*, *58*, 404–412.

Uchino, B. N. (2004). *Social support and physical health: Understanding the health consequences of relationships*. New Haven, CT: Yale University Press.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063–1070. doi:10.1037/0022-3514.54.6.1063