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The effects of interpersonal emotional expression, partner responsiveness, and emotional approach coping on stress responses

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Abstract

Expressing emotions is a common strategy for coping with stress. Yet, little is known about the effects of using this strategy in close relationships, or when and for whom emotional expression is effective. This study examined romantic partner responsiveness and the dispositional tendency to use emotional approach coping (EAC; the processing and expression of emotions) as moderators of the effects of experimentally manipulated emotional expression on stress responses to a laboratory stressor. We brought couples (N=145) to the lab and randomly assigned one partner (the participant) to perform a stressful task. We manipulated whether participants expressed their feelings about the task to their partner (Expression vs. No-expression), and whether participants received supportive messages from their partners (as an indicator of partner responsiveness; Support vs. No-support). We examined physiological stress responses (cortisol and salivary alpha-amylase; sAA), negative emotional stress responses (anxiety and self-conscious emotions), and post-task ruminative thoughts. Participants high in EAC showed larger sAA and cortisol responses and reported more negative post-task ruminative thoughts after emotionally expressing to their partners, but partner support mitigated the effect on cortisol. Participants low in EAC showed smaller cortisol responses and reported less negative emotional responses and fewer negative post-task ruminative thoughts after emotionally expressing to their partners. Receiving partner support reduced negative emotional responses for people high in EAC, but increased negative emotional responses for those low in EAC. These results may help explain when and for whom emotional expression is an effective means of coping in the immediate context of a stressor.

Keywords

Emotional expression; Emotional approach coping; Cortisol; Romantic Relationships; Support

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Emotional expression – expressing one's thoughts and feelings about stressors – is a commonly used coping strategy and predicts better psychological and physical health (Frattaroli, 2006; Stanton, 2011). However, there are limits to these beneficial effects (Frattaroli, 2006; Smyth & Pennebaker, 2008; Stanton, 2011). In both experimental expressive writing studies (Frattaroli, 2006) and correlational studies of coping with chronic disease (Stanton, 2011), considerable variability exists in the effectiveness of coping through emotional expression. Coping through emotional expression can also be maladaptive (e.g., Niles et al., 2014; Seery, Silver, Holman, Ence & Chu, 2008). Thus, there is a need to delineate when and for whom coping through emotional expression is effective.

Furthermore, during times of stress people often turn to their romantic partners to express their thoughts and feelings. However, the effects of emotional expression on physical and psychological well-being have been studied primarily in an *individual* rather than an *interpersonal* or *dyadic* context (Frattaroli, 2006; Stanton & Low, 2012a). Little is known about the effects of coping through emotional expression within specific behavioral interactions in couples. Limited evidence from emotional disclosure studies on couples shows that daily emotional disclosure among wives, but not husbands, buffers the effects of daily work worries on cortisol production (Slatcher et al., 2010) and daily negative mood on the ability to fall asleep (Kane et al., 2014). However, in the context of chronic pain, greater pain-related emotional disclosure to spouses is associated with more invalidating responses from spouses (Cano, Leon, Williams, May, & Lutz, 2012) which may lead to greater distress. To our knowledge, there are no experimental studies examining coping through emotional expression in couples.

Therefore, the goal of the present study is to experimentally investigate when and for whom emotional expression is an effective coping strategy in romantic couples. Aspects of the interpersonal context in which emotional expression occurs and dispositional tendencies of those using emotional expression likely play a role in when and for whom coping through emotional expression is effective (Stanton & Low, 2012a). The present study tested romantic partner responsiveness to emotional expression and the dispositional tendency to use emotional approach coping as potential moderators of the effects of experimentally manipulated emotional expression to romantic partners on stress responses.

In the context of interpersonal emotional expression, a person's responsiveness to the expresser is a potentially important moderator of the effects of emotional expression. A person is responsive to an expresser when he or she is receptive to the emotional expression, is understanding and accepting of the expresser, and demonstrates care through affection, support, and sensitivity to the expresser's needs. A growing body of research on close relationships shows that perceiving romantic partners as responsive to emotional disclosure promotes positive relational and individual well-being (e.g., Reis, 2012; Feeney & Collins, 2015). Responsiveness can influence the effectiveness of emotional expression as a way of coping on health and well-being (e.g., Lepore, Fernandez-Berrocal, Ragan & Ramos, 2004; Stanton, 2011). For example, women with breast cancer reported greater improvements in quality of life when they felt free to express their cancer-related worries and believed others were receptive to their expressions (Stanton, Danoff-Burg et al., 2000). In contrast, the

perception that others discourage stressor-related emotional expression, referred to as social constraint, is associated with poor health and well-being outcomes (e.g., Lepore, Silver, Wortman and Wayment, 1996; Lepore & Revenson, 2007). Men with prostate cancer reported higher distress when they perceived others as discouraging of their cancer-related expressions (Hoyt, 2009).

A few experimental studies show that responsiveness influences the effectiveness of emotional expression to a stranger in coping with stressors (Lepore, Ragan & Jones, 2000; Lepore et al., 2004). However, the findings from these experimental studies are inconsistent. One study showed that both talking about a stressor and talking to a validating stranger predicted better adjustment to the stressor than not talking to anyone (Lepore, Ragan & Jones, 2000), while another other study showed that talking to an invalidating (perspective challenging) stranger predicted better adjustment to a stressor (Lepore et al., 2004). These findings are limited because emotional expressions were made to strangers and not close others. Thus, the present study focused specifically on romantic partner responsiveness to emotional expression, and used partner support in response to emotional expression as an indicator of partner responsiveness.

In addition to partner responsiveness, characteristics of the expresser may also play a role in the effectiveness of coping through emotional expression. Emotional approach coping comprises actively approaching and managing the positive and negative emotional sequelae of a stressor (Stanton, Danoff-Burg, Cameron, & Ellis, 1994). Dispositional emotional approach coping involves the tendency to cope with stressors by emotional processing (acknowledging and understanding emotional responses) and by emotional expression (verbally and/or nonverbally expressing feelings) (Stanton, Kirk et al., 2000). Two competing hypotheses exist for how dispositional emotional approach coping may influence the effects of actual instances of emotional expression.

The “matching” hypothesis posits that the most effective coping interventions match people’s preferred coping tendencies (Engebreston, Matthews & Scheir, 1989; Stanton, Kirk et al., 2000; Stanton & Low, 2012a). According to this hypothesis, emotional expression will benefit people high in emotional approach coping but may not affect or may potentially harm those low in emotional approach coping. Results from several studies support the matching hypothesis in regards to emotional approach coping (Austenfeld, Paulo & Stanton, 2006; Kraft et al., 2008; Niles et al., 2014; Seeley, et al., 2016; Stanton, Kirk et al., 2000, Study 4). Among written emotional expression intervention studies, young adults high in emotional approach coping randomly assigned to express their thoughts and feelings later reported less migraine headache-related pain/disability (Kraft et al., 2008) and fewer depressive symptoms (Austenfeld et al., 2006). Similarly, young adults high in emotional expressivity (a composite including emotional approach coping) reported lower anxiety following a written emotional expression intervention, while young adults low in emotional expressivity reported higher anxiety following the intervention (Niles, et al., 2014). The latter study suggests that not only is matching beneficial, but a mismatch may be harmful. Finally, in a study of verbal emotional expression, undergraduate students were randomly assigned to either discuss their thoughts and feelings or discuss facts regarding a distressing situation in two interviews 48 hours apart. Students high in emotional expression (a facet of

emotional approach coping) showed lower physiological arousal during the second interview if they emotionally expressed during the first interview (Stanton, Kirk et al., 2000, Study 4).

A competing hypothesis posits that emotional expression will benefit those who do not typically cope through emotional expression and/or those who have difficulty coping through emotional expression. The support for this hypothesis comes from studies examining other affective dispositions such as ambivalence over emotional expression (Norman, Lumley, Dooley & Diamond, 2004; Lu & Stanton, 2010) and alexithymia (Paez, Velasco & Gonzales, 1999; Solano et al., 2003) that are distinct from but related to emotional approach coping. In one study, undergraduate students who were above the median on difficulty describing feelings to others (a facet of alexithymia) showed lower negative mood two months after an intensive traumatic writing manipulation than those below the median (Paez et al., 1999). In another study, among undergraduate students, negative mood improved over the course of four months after a written emotional disclosure manipulation for those high in ambivalence about emotional expression compared to low (Lu & Stanton, 2010). To our knowledge, no studies examining emotional approach coping as a moderator of emotional expression have supported this hypothesis. Most studies to date assessing dispositional emotional approach coping support the matching hypothesis (e.g., Austenfeld, Paulo & Stanton, 2006; Kraft et al., 2008;Seeley, et al., 2016; Stanton, Kirk et al., 2000, Study 4). However, these studies were largely conducted in an individual rather than social or interpersonal context (for exception see Stanton, Kirk et al., 2000, Study 4). That is, people typically expressed their emotions during a writing session or a series of writing sessions. Emotional approach coping may moderate this type of solitary expression differently than an interpersonal emotional expression between romantic partners (Cohen et al., 2008).

The present study

The purpose of this study was to examine experimentally how romantic partner support (an indicator of partner responsiveness to emotional expression) and dispositional emotional approach coping moderate the effects of emotional expression to a romantic partner on stress responses to an acute socially evaluative laboratory stressor. Theory and empirical evidence suggest that the stress response consists of a multifaceted psychobiological response including physiological, affective, and cognitive components (e.g., Dickerson, Gruenewald, Kemeny, 2004; Engert et al., 2011). There have been calls to study multiple stress responses simultaneously in the same study rather than individually across studies, particularly the need to examine multiple physiological systems together (e.g., Thomas & Lovallo, 2000). Thus, in the present study, we examined a broad range of stress responses including physiological and psychological (affective and cognitive) responses.

In terms of physiological stress responses, we assessed salivary alpha-amylase (sAA) and cortisol as indicators of the sympathetic nervous system responses (Nater & Rohleder, 2009) and hypothalamic pituitary adrenal (HPA) axis, respectively. Although, cortisol and sAA are both elicited in response to stress (Engert et al., 2011; Nater & Rohleder, 2009), they show differential responses to stressors. In the lab, cortisol is most consistently elicited by socially evaluative (threats to self-esteem, social status, and social acceptance) and

uncontrollable stressors (e.g, Dickerson & Kemeny, 2004; Dickerson, Mycek, & Zaldivar, 2008; Het et al., 2009), whereas sAA is elicited by socially evaluative and non-socially evaluative stressors (Het et al., 2009). Similarly, sAA appears to have a lower threshold for responding in terms of stressor impact than cortisol often being elicited in response to minor stressors that fail to elicit a cortisol response (e.g., van Stegren, Wolf, & Kindt, 2008)

In terms of psychological responses, we assessed anxiety and self-conscious emotions, and positive and negative task-related ruminative thoughts after the stressful task. According to social self-preservation theory (e.g. Dickerson, Gruenwald, & Kemeny, 2004), socially evaluative threat elicits shame or self-conscious emotions as part of an adaptive, specific, and coordinated psychobiological response. Thus, we assessed both anxiety as a general emotional response to the laboratory stressor and self-conscious emotions as a specific emotional response to the socially evaluative component of the laboratory stressor. Finally, the perseverative cognition hypothesis postulates that worry and rumination prolong physiological and negative emotional responses to stressors leading to negative health effects (Brosschot, Gerin, & Thayer, 2006). We also assessed negative and positive task-related ruminative thoughts after the stressful task.

We hypothesized that both romantic partner responsive support and dispositional emotional approach coping would moderate the degree to which emotional expression influenced physiological and psychological stress responses. For partner responsiveness, we hypothesized that emotional expression would be associated with lower physiological and negative psychological stress responses when partners provided support. For emotional approach coping, we tested the competing predictions of the matching hypothesis that posits emotional expression will predict lower stress responses for those high in emotional approach coping, and the hypothesis that posits emotional expression will predict lower stress responses for those low in emotional approach coping.

Our central hypotheses regarded interactive effects of emotional approach coping, responsive social support, and emotional expression. However, emotional approach coping and responsive support may independently affect physiological and psychological stress responses. The dispositional tendency to utilize emotional approach coping may serve as a coping resource that helps people manage stressful situations (Master et al., 2009; Berghuis & Stanton, 2002). In regard to support, the effects of receiving social support on health and well-being in the literature are mixed in terms of benefit and harm (e.g., Shrout, Herman & Bolger, 2006; Bolger & Amarel, 2007). However, when partner support is of high quality and responsive to the needs of the recipient and the situation, receiving social support is beneficial (e.g., Maisel & Gable, 2009; Kane, McCall, Blascovich & Collins, 2012). Thus, we tested the hypotheses that higher emotional approach coping and receiving responsive social support from a partner would be associated with smaller physiological stress responses and lower negative psychological responses to an acute stressor.

Method

Study Overview

Before coming to the lab, couples completed online background questionnaires including a measure of emotional approach coping. At the lab, we randomly assigned one partner (*the participant*) to complete the Trier Social Stress Test -- a speech and surprise serial math task performed in front of two evaluators (TSST; Kirschbaum, Pirke, & Hellhammer, 1993). We manipulated emotional expression to partners about the TSST and support received from partners before and after the TSST in a 2 (Express vs. No-express) X 2 (Support vs. No-support) experimental design. There were 35 participants in the Express-No Support condition, 35 in the Express-Support condition, 31 in the No Express-Support condition, and 34 in the No Express-No Support condition. Saliva samples were taken six times during the session to assess sAA and cortisol. Participants also reported their emotional and cognitive responses to the TSST.[1] All study procedures and protocols were approved by the UCLA IRB. Materials for the study are available at the following link: https://osf.io/jkrvq/.[2]

Participants

One hundred and fifty-seven couples (4 same-sex couples) aged 18–40 were recruited from the campus community. Sample size was determined by guidelines available at the time the study was designed and conducted (2009–2011), and by financial constraints. We planned to recruit 40 participants per cell, which exceeded the prevailing rule of thumb (20 participants per cell) at the time.[3] Participants were required to be in a monogamous romantic relationship for at least six months. Exclusion criteria included non-English fluency, pregnancy, medical conditions or medications with obvious endocrinological or immunological effects, illicit drug use, regular smoking and excessive caffeine or alcohol use. Women taking hormone-based contraception were included except for contraception that reduced the number of menstrual cycles per year. All laboratory sessions were scheduled during the first 10 days of the menstrual cycle or when the participants on birth control were taking the inactive pills.[4] Twelve couples dropped out after completing the background questionnaires at home. Thus, 145 participants and their partners attended the laboratory session. Three participants were dropped due to suspicion, two were dropped due to task refusal, two were dropped due to illness, two were dropped due lack of study eligibility,[5] and one was dropped due to research protocol error. The final sample was 135 participants (65 women, 70 men; $Age_M = 21.63$, $SD = 3.49$) and their partners. Participants

[1]The focus of this investigation was on individual stress responses to the TSST. We also measured challenge and threat appraisals prior to the TSST, self-reported stress with respect to the speech task, self-reported stress with respect to the math task, and post-task state self-esteem. Results for these dependent variables are in the Online Supplementary Material, and do not change the conclusions reported in this paper. Additional relationship variables not relevant to the present investigation were also assessed.

[2]Due to confidentiality concerns, we are unable to make our data available on a public website; however, in accordance with APA policy, we will make the data used in our analyses in this article available to researchers upon request.

[3]Taking into account the study design and obtained sample size (N=135), we conducted a sensitivity analysis to determine the adequacy of our sample for detecting two-way and three-way interactions. Using G*Power v3.1.9.2 for linear multiple regression (fixed model, R^2 increase, power = .80), we found that a sample size of N=135 has sufficient power to detect a minimum effect size of $f^2 = .059$ (ΔR^2=.056) for two-way and three-way interactions. This means that our sample had adequate power to detect relatively small to moderate effect sizes according to Cohen's (1988) guidelines.

[4]Twenty-seven women reported using birth control (41.5% of women in the sample). The frequency of women on birth control was similar across the four conditions, $\chi^2(3) = .555$, $p = .907$. Birth control usage was effects coded (−1) no birth control and (1) birth control and was not related to cortisol, b[95% CI] = 0.06 [−0.57, 0.68, $SE = .31$, $\beta = .02$, $p = .861$, or sAA, b[95% CI] = 4.68 [−4.01, 13.37], $SE = 4.39$, $\beta = .11$, $p = .289$. Adjusting for birth control did not alter the results for cortisol or sAA.

were 38% White, 33% Asian/Pacific Islander, 17% Latino/Hispanic, 5% African-American and 7% "Other". Average relationship length, as reported by participants, was 25.22 months (SD = 25.00, range = 6 – 132 months). The majority (71%) were in long-term committed relationships with the remainder dating exclusively (17%), married (8%) or engaged to be married (4%); 26% of couples lived together. Couple members received either class credit or monetary compensation for their participation.

Background Questionnaire

At least three days before coming to the lab, couples completed online background questionnaires assessing demographic information, relationship characteristics and personality characteristics. Couples were instructed to complete the survey privately and refrain from discussing it with each other until after their lab session.

Dispositional Emotional Approach Coping (EAC)—Participants completed the Emotional Approach Coping Scale (Stanton, Kirk et al., 2000) containing two 4-item subscales: emotional processing (e.g., "I take time to figure out what I'm really feeling"; α = .70) and emotional expression ("I let my feelings come out freely"; α = .83). Participants completed the items with respect to what they *generally* do, think and feel when experiencing stress on 1 (*I usually don't do this at all*) to 4 (*I usually do this*) scale. Consistent with prior studies (e.g., Stanton, 2011), the subscales were highly correlated, r = .63. Thus, they were combined into an emotional approach coping composite due to the absence of *a priori* hypotheses regarding differences in emotional processing and emotional expression.[6]

Laboratory Session

Couples were asked to refrain from activities that could influence cortisol and sAA ranging from 24 to 1/2 hours before the lab session (e.g., vigorous exercise, napping, and brushing teeth). Compliance was assessed at the beginning of the lab session. To accommodate the diurnal variation in cortisol, all lab sessions were scheduled after 2pm (Dickerson & Kemeny, 2004).

Experimental Procedure.—See Figure 1 for a complete timeline. After providing consent, couple members were separated into different rooms. Before a baseline saliva sample, participants relaxed for 30 minutes to acclimate to the lab. During this time, participants reported their health behaviors that day (e.g. caffeine consumption) and baseline emotions. Next, participants learned of their random assignment to the TSST, and of their partners' assignment to a puzzle activity. To increase personal relevance, participants were told TSST performance feedback as indicator of future employment success would be provided after the study. The speech topic was withheld until after the pre-task Express manipulation to avoid the manipulation's potential interference with speech preparation.

[5]Despite careful screening protocols, it was discovered after the laboratory session that two participants (couples) did not meet the relationship requirement. They were removed from the present analyses prior to hypothesis testing.
[6]See Supplementary Online Material for analyses with the subscales separately.

After the pre-task Express manipulation (see below), participants were given seven minutes for speech preparation and then provided a second saliva sample. During the speech preparation, the pre-task Support manipulation was conducted (see below). Participants then rated anticipatory negative emotions and were escorted to another room to complete the TSST. Afterwards, participants provided a third saliva sample, and the post-task Express manipulation was conducted. Then, participants rated negative emotions during the TSST and the post-task Support manipulation was conducted. After the fourth saliva sample, participants had an eight-minute waiting period and then rated ruminative thoughts during the waiting period, followed by a fifth saliva sample, manipulation check questions, and a sixth saliva sample. Participants were debriefed, probed for suspicion and received compensation. Additional saliva samples were taken to assess immune and genetic markers.

Experimental manipulations.

Express condition.—In the *Express condition* (*n* = 70), participants were instructed to write, as openly and honestly as possible, their thoughts and feelings about the tasks to their partners for five minutes right before their speech preparation (pre-task) and right after the TSST (post-task). In the No-Express condition, participants were asked to wait for "the next five minutes or so" while the experimenter went to collect speech preparation materials. In the Support condition, participants were told their partners could write a note back. To reduce any potential negativity due to not receiving a return note in the No-support condition, participants were told their partners could not write a note back because their partners were running behind.

Support condition.—In the *Support condition* (*n* = 66), participants' *partners* were instructed to copy a pre-task supportive note and a post-task supportive note in their own handwriting that were pre-written and pilot-tested to be very supportive, responsive, and caring (see Collins & Feeney, 2004 for a similar methodology). Partners were told to copy the notes in their own words but to keep the same content and to use the exact words if it felt natural. Participants were allowed to address their notes in any way (e.g., a pet name or nickname for their partner) and sign in any way (and were given an example). In the Express condition, partners were also instructed to write a line or two in response to participants' expressive pre- and post-task notes. Participants were led to believe that their partners authored the notes. To control for note delivery, participants in the No-support condition were interrupted by the experimenter who collected an item from the room.

> Pre-Task Support Note:
>
> Hey _____ - I just wanted to let you know that I am thinking of you. I'm sorry you got stuck doing those tasks. I know public speaking can be stressful, but just remember that this is just an experiment and it will be over really soon. Just be yourself and I'm sure they'll think you're great! I can't wait to hear all about it.
>
> Post-Task Support Note:
>
> Hey _____ - I didn't get to see your speech or math task, but I'm sure you did a great job – especially given how little time you had to prepare! Public speaking is

never easy and no matter what happened I still think you're great! I would give you the job. I can't wait to see you!

Manipulation checks.

Support condition.—All participants rated three items at the end of the study (α = .86) assessing how supported they felt by their partners during study on a scale from 1 (*Not at all*) to 7 (*Extremely*). Participants rated how 'silently supported' they felt and the extent to which they felt like their partner was thinking about them and hoping things were going well during their tasks, and their partner's overall supportiveness during the study.

Express condition.—Participants in the Express condition rated two items at the end of the study (r = .75) assessing the extent to which they expressed their "thoughts and feelings" and expressed "emotions" about the task in their messages to their partners on a scale from 1 (*Not at all*) to 7 (*A great deal*). Additionally, three trained raters coded participants' notes for the degree to which they expressed their thoughts, feelings, and opinions regarding the task in the pre-task (ICC[2,k] =.91) and the post-task (ICC[2,k] =.82) notes. Raters coded the notes on a scale from 1 (*None*) to 5 (*A lot*). The three coders' ratings were averaged to form a composite.

Physiological responses.—Six passive drool saliva samples were collected during the study (Figure 1). Cortisol reflects HPA responses to external events approximately 20–40 minutes prior to saliva collection (Dickerson & Kemeny, 2004). In contrast, sAA reflects responses to external events approximately 1–5 minutes prior to saliva collection (Rohleder & Nater, 2009). To accommodate this timing difference, samples 1 and 3–6 were assayed for cortisol and samples 1–5 were assayed for sAA. Samples were stored at −20º C and shipped on dry ice to the Biological Psychology laboratory at the Technical University of Dresden in Dresden, Germany. sAA was measured using an enzyme kinetic method (Rohleder et al., 2006). Cortisol was measured using a high sensitivity chemiluminescence immunoassay (IBL International, Hamburg, Germany). The intra- and interassay coefficients of variation CVs for both analytes were at or below 9%. Cortisol and sAA were measured by averaging two sets of duplicates. Single cortisol and sAA metrics were created for analyses by computing area under the curve above baseline (AUC_{AB}; Pruessner et al., 2003; Khoury et al., 2015). AUC_{AB} single assessments were chosen to simplify the analyses and reduce the number of tests conducted due sample size and the inclusion of three primary predictor variables.[7] A recent factor analysis of several different cortisol assessments concluded that many cortisol change measures are largely redundant, and the AUC with respect to increase (similar to above baseline) was highly correlated with other cortisol change measures (Khoury et al., 2015).

Cortisol and sAA were screened for outliers (± 4 SD from the mean), and one participant was dropped from the cortisol analysis. Four additional participants were dropped from the cortisol and sAA analyses due to medication usage or smoking right before the lab session. To retain all remaining participants in the AUC_{AB} calculation, baseline and final missing

[7]See Supplementary Online Material for analyses examining sAA and cortisol reactivity and recovery trajectories.

values were imputed using single imputation (Rubin, 1987). Single imputation is a valid method given the small percentage of missing values (<1% for cortisol and 1% for sAA) (Acock, 2005). Negative skew was corrected by using the logarithmic transformation for cortisol AUC_{AB} and the square root transformation for sAA AUC_{AB}, henceforth referred to as cortisol and sAA, respectively.

Negative Emotional Responses.—Negative emotion was measured (a) at baseline, (b) prior to TSST, but after the pre-task manipulation, to assess anticipatory responses and (c) after the TSST to assess affect *during* the TSST[8]. The negative emotion composite ($\alpha_{baseline}$ = .81; $\alpha_{anticipatoryTSST}$ = .91, α_{TSST} = .90) was composed of two dimensions - anxiety (tense, worried, nervous/jittery, and anxious) and self-conscious emotions (self-conscious, unsure of myself, embarrassed). Participants rated the degree to which they felt each emotion according to the time period of interest on a scale from 0 (*Not at all)* to 4 (*Extremely*). Although initially designed to be separate indices of specific categories of negative emotion (i.e., anxiety and self-conscious emotions), the items loaded onto one factor at each measurement occasion and were highly correlated. Thus the items were combined to form a negative emotion composite. Finally, because the anticipatory and TSST assessments were highly correlated (r = .79), they were averaged to form a negative emotional response composite.

Task-related Ruminative Thoughts.—Directly following the eight minute waiting period and a total of 25 minutes after the TSST, participants rated *negative task-related thoughts* (α = .92; 10 items such as “How bad my speech was” and “what a failure I was”), and *positive task-related thoughts* (α = .80; 7 items such as “my speech was good” and “the evaluators liked me”). Participants rated the degree to which they were thinking about these negative and positive thoughts on a scale from 0 (*Not at all*) to 4 (*Extremely*) adapted from Zoccola, Dickerson & Zaldivar, 2008.

Data Analytic Approach

Hierarchical linear regressions predicted physiological, emotional and cognitive stress responses to the task from EAC (centered), the Support condition (0 = *No support*, 1 = *Support*) and the Express condition (0 = *No express*, 1 = *Express*) at Step 1, the three two-way interactions (Express X Support, emotional approach coping X Express, emotional approach coping x Support) at Step 2 and the three-way interaction (emotional approach coping X Express X Support) at Step 3. Main effects were interpreted at Step 1, two-way interactions at Step 2 and three-way interactions at Step 3. Gender (−1 = *men*, 1 = *women*), and when available, the baseline assessment of each measure were adjusted for in all analyses. Significant interactions were explored by computing relevant simple slopes (emotional approach coping mean ± 1 *SD*) and determining regions of significance (www.quantpsy.org; Preacher, Curran & Bauer, 2006).

[8]Only items that were assessed at all three measurement occasions were included in the composite; additional items that tapped anxiety (i.e., fearful) or self-conscious emotion (i.e., humiliated and ashamed) were not included. Only four negative emotion composite items were assessed 25 minutes after the task and were not included.

Results

Table 1 shows descriptive statistics and intercorrelations among study variables. Negative emotional responses were correlated with negative post-task ruminative thoughts, but not with positive post-task ruminative thoughts.

Manipulation Checks

Support manipulation.—A hierarchical regression analysis predicting perceptions of partner support from the Support condition, the Express condition, emotional approach coping, and all two-way and three-way interactions showed a strong effect of the Support condition on perceptions of support, b[95% CI] = 1.68 [1.20, 2.16], SE = .24, β = .51, p < .001. Participants in the Support condition reported feeling significantly more supported than those in the No-Support condition. Participants reported feeling more supported in the Express condition relative to the No-Express condition, b[95% CI] = 0.47 [−0.01, 0.94], SE = .24, β = .14, p =.06, but this difference was not significant. The Support by Express interaction was also not significant, b[95% CI] = −0.29 [−1.26, 0.69], SE = .49, β = −.08, p =.56. Furthermore, the results of this analysis revealed that emotional approach coping was not associated with the tendency to see one's partner as more supportive, b[95% CI] = 0.04[−0.35, 0.43], SE = .20, β =.02, p =.84, and did not moderate the effectiveness of the support manipulation, or the non-significant effect of the express manipulation (p's > .55).[9]

Express manipulation.[10]

Self-reported Expression.—Among those in the Express condition, a hierarchical regression analysis showed that participants in the Support condition did not express more than participants in the No-Support condition, b[95% CI] = 0.56[−0.30, 1.42], SE =.43, β =.17, p =.20. Furthermore, the Express manipulation was equally effective for those high and low in emotional approach coping. Emotional approach coping was not associated with the degree of emotional expression, b[95% CI] = 0.28[−0.43, 0.98], SE = .35, β =.10, p = .44, nor did it moderate the non-significant effect of the Support manipulation on expression of thoughts and feelings, b[95% CI] = −0.09 [−1.51, 1.32], SE =.71, β =.−.02, p = .90.

Coded Expression Ratings.—The amount of emotional expression coded from the pre and post-task notes was correlated, r = .56, p <.001. Participants emotionally expressed significantly more in the post-task note (M = 3.19, SD = .89) compared to the pre-task note (M = 2.83, SD = 1.09), t(67) = −3.151, p<.01, d = .38 (Cohen's d calculated using the standard deviation of the mean difference). Hierarchical regression analyses showed that participants did not significantly differ in their emotional expression within the pre-task note based on Support condition, b[95% CI] = 0.35[−0.18, 0.87], SE =.26, β =.16, p =.20, emotional approach coping, b[95% CI] = 0,15 [−0.29, 0.59], SE = .22, β = .09, p= .49, or

[9]See Supplementary Online Material for all results. Adjusting for gender did not alter the present results. The mean of support perceptions for the Support condition was 5.93 (SD = 1.04) and for the No-support condition was 4.24 (SD = 1.68)..

[10]Sample sizes for the express manipulation check analyses varied slightly. The self-reported manipulation check items were added after the start of data collection, and three participants received the incorrect questionnaire reducing the sample size (n = 62). However, missing data were equivalent across the Support and No-support conditions. Three notes were not coded. Two notes (one pre- and one post-task) were not written in English, and a pre-task note was not retrieved from a partner ($n_{pre\text{-}task}$ = 68, $n_{post\text{-}task}$ = 69). Adjusting for gender did not alter the present results.

the Support by emotional approach coping interaction, *b*[95% CI] = −0.79 [−1.66, 0.07], *SE* =.43, β = −.31, *p*=.07. Similarly, participants did not significantly differ in their emotional expression in the post-task note based on the Support condition, *b*[95% CI] = 0.05 [−0.39, 0.49], *SE* = 0.22, β =.03, *p*=.82, emotional approach coping, *b*[95% CI] = 0.18 [−0.18, 0.55], *SE* =.18, β =.12, *p*=.32, or the Support by emotional approach coping interaction, *b*[95% CI] = −0.46[−1.18, 0.26], *SE* =.36, β =−.22, *p* =.21.

Emotional Approach Coping.—A two-way analysis of variance verified that emotional approach coping scores were equivalent across participants randomly assigned to each condition. The main effects of the Support condition (Support vs. No-Support), and the Express condition (Express vs. No-Express) were not significant, *Ms* = 2.91 vs. 2.75, *F*(1,131) = 2.20, *p* = .14; ω_p^2 = .01, and *Ms* = 2.87 vs. 2.79, *F*(1,131) = .48, *p* = .49; ω_p^2 = −.003, respectively. Their interaction was also not significant, *F*(1,131) = .14, *p* = .71; ω_p^2 = −.01.

Physiological Stress Responses

sAA.—The average trajectory for sAA, presented in Figure 2, indicates that participants experienced significant increases and declines in sAA over the course of the study. Regression analysis testing the moderation of emotional expression by partner responsive support and dispositional emotional approach coping is presented in Table 2. Adjusting for baseline sAA, there was a significant two-way emotional approach coping by Express condition interaction (Table 2). Simple slopes analyses averaging over the Support condition (Figure 4) indicated that among participants who *did not* emotionally express to their partners (No-Express condition), participants' emotional approach coping was not related to sAA, *b*[95% CI] = −4.31 [−18.12, 9.49], *SE* = 6.97, *t* = −.618, *p* = .54. However, among participants who emotionally expressed to their partners (Express condition), higher emotional approach coping was related to larger sAA responses, *b*[95% CI] = 16.56 [2.38, 30.74], *SE* = 7.16, *t* = 2.31, *p* = .02. Regions of significance analyses indicated that participants greater than 0.61 SD above the emotional approach coping mean had significantly larger sAA responses in the Express relative to the No-Express condition. Thus, participants high in emotional approach coping experienced larger sAA responses when they emotionally expressed to their partners.

Cortisol.—The average trajectory for cortisol, presented in Figure 3, indicates that participants experienced significant increases and declines in cortisol over the course of the study. Regression analysis testing the moderation of emotional expression by partner responsive support and dispositional emotional approach coping is presented in Table 2. Adjusting for baseline cortisol, there was a significant three-way emotional approach coping by Express condition by Support condition interaction. Simple slopes analysis revealed that in the No-Express condition (Figure 5, left panel), emotional approach coping was not related to cortisol (*p's* > .41) irrespective of support receipt. However, in the Express condition (Figure 5, right panel), when participants *did not* receive support after emotionally expressing (Express -No Support condition), higher emotional approach coping was related to significantly larger cortisol responses, *b*[95% CI] = 1.57 [0.21, 2.93], *SE* = .69, *t* = 2.29, *p* = .02. In contrast, when participants received support after emotionally expressing (Express-

Support condition), emotional approach coping was not related to cortisol responses, *b*[95% CI] = −1.14 [−2.62, 0.34], *SE* = .75, *t* = −1.53, *p* = .13.

Among those who emotionally expressed (Express condition), participants greater than 0.87 SD above the emotional approach coping mean had significantly smaller cortisol responses when they received support after emotionally expressing compared to when they *did not* receive support. Conversely, participants lower than 1.29 SD below the emotional approach coping mean had significantly smaller cortisol responses when they *did not* receive support after emotionally expressing compared to when they received support. In sum, receiving partner support attenuated larger cortisol responses for participants high in emotional approach coping when they emotionally expressed, but *not* receiving support significantly reduced cortisol responses for participants low in emotional approach coping when they emotionally expressed.

Negative Emotional Responses

Adjusting for baseline negative emotion, the two-way emotional approach coping by Express condition and two-way emotional approach coping by Support condition interactions were significant (Table 3). For the emotional approach coping by Express condition interaction, simple slopes analyses averaging over the Support condition (Figure 6a) showed that in the No-express condition, higher emotional approach coping was related to lower negative emotional responses, *b*[95% CI] = −0.33 [−0.63, −0.02], *SE* = .16, *t* = −2.08, *p* = .04. In the Express condition, emotional approach coping was not related to negative emotional responses, *b*[95% CI] = 0.15 [−0.15, 0.46], *SE* = .15, *t* = 1.00, *p* =.32. Participants lower than 1.12 SD below the emotional approach coping mean had significantly lower negative emotional responses to the task in the Express relative to the No-Express condition.[11] Thus, when participants low in emotional approach coping expressed to their partners, they reported smaller negative emotional responses to the task.

For the emotional approach coping by Support condition interaction, simple slopes analyses averaging over the Express condition (Figure 6b) indicated that in the No-support condition, emotional approach coping was not related to negative emotional responses, *b*[95% CI] = 0.22 [−0.09, 0.53], *SE* = .15., *t* = 1.39, *p* = .17. In the Support condition, higher emotional approach coping was related to lower negative emotional responses, *b*[95% CI] = −0.39 [−0.69,−0.08], *SE* = .15, *t* = −2.53, *p* = .01. Participants greater than 1.44 SD above the emotional approach coping mean reported significantly lower negative emotional responses in the Support compared to the No-support condition. Conversely, participants less than 0.66 SD below the emotional approach coping mean reported significantly higher negative emotional responses in the Support compared to the No-support condition. Thus, receiving support reduced negative emotional responses for those high in emotional approach coping and increased negative emotional responses for those low in emotional approach coping.

[11]Significant differences emerged at high levels of emotional approach coping, but outside the range of possible emotional approach coping values obtained in the present study.

Post-task Ruminative Thoughts

Negative Task-Related Ruminative Thoughts.—The two-way emotional approach coping by Express condition interaction was significant (Table 3). Simple slopes analyses averaging over the Support condition (Figure 7) indicated that in the No-express condition, higher emotional approach coping was significantly related to fewer negative ruminative thoughts, *b*[95% CI] = −0.48 [−0.88, −.07], *SE* = .20, *t* = −2.34, *p* = .02. However, in the Express condition, higher emotional approach coping was not related to negative ruminative thoughts, *b*[95% CI] = 0.34 [−0.06, 0.73], *SE* = .21, *t* = 1.70, *p* =.09. Participants greater than 1.25 SD above the emotional approach coping mean reported significantly more negative ruminative thoughts in the Express compared to the No-express condition. Conversely, participants lower than 0.65 SD below the emotional approach coping mean reported significantly fewer negative ruminative thoughts in the Express compared to the No-Express condition. Thus, when participants high in emotional approach coping emotionally expressed to their partners, they reported greater negative ruminative thoughts, but when participants low in emotional approach coping emotionally expressed to their partners, they reported fewer negative ruminative thoughts.

Positive Task-Related Ruminative Thoughts.—Only significant main effects of emotional approach coping and the Support condition emerged (Table 3). Participants high in emotional approach coping reported thinking more positive thoughts about their tasks than those low in emotional approach coping. Participants in the Support condition reported thinking less positive thoughts about their tasks than those in the No-support condition.[12]

Discussion

This study examined romantic partner responsiveness to emotional expression and dispositional emotional approach coping as two potential moderators of the effects of experimentally manipulated interpersonal emotional expression on physiological and psychological responses to an acute stressor. In contrast to most studies supporting the matching hypothesis (e.g., Stanton & Low, 2012a; Stanton, 2011), the present findings supported the hypothesis that interpersonal emotional expression is most beneficial for those who do not typically cope by expressing their thoughts and feelings. Participants *high* in emotional approach coping had larger sAA and cortisol responses to the task and reported more negative ruminative thoughts when they emotionally expressed to their partners relative to when they did not express. While, in contrast, participants *low* in emotional approach coping had smaller cortisol responses, reported lower negative emotional responses (anxiety and self-conscious emotions) and fewer negative post-task ruminative thoughts when they expressed their thoughts and feelings to their partners compared to when they did not emotionally express. Although speculative, it is possible that people low in

[12]We also assessed positive ruminative thoughts in relation others (e.g., “positive thoughts about my partner,” “positive thoughts about friends and family,” and “that others value me as a person”; α = .76, 5 items). Greater emotional approach coping was significantly related to thinking more positive thoughts about others (e.g., friends, their partner), *β* = .19, *b*[95% CI] = 0.28[0.03, 0.53], *SE* = 0.13, *p* = .03. Additionally, participants in the Support condition reported thinking more positive thoughts about others than those in the No-support condition, *β* = .16, *b*[95% CI] = 0.29[−0.01, 0.59], *SE* = 0.15, *p* = .06, but this difference was not statistically significant. There were no significant effects of emotional approach coping, emotional expression or support on negative ruminative thoughts about the partner (*p’s* > .12) (i.e., “negative thoughts about my partner”; single item).

emotional approach coping benefit more from affect labeling, in which putting feelings into words dampens affective responses to stressors (e.g., Lieberman, Inagaki, Tabibnia & Crockett, 2011). Conversely, people high in emotional approach coping, relative to low, report experiencing emotions more strongly (Stanton, Kirk et al., 2000, Study 1), and interpersonal emotional expression in concert with these strong emotional experiences may amplify emotional, cognitive and related physiological responses to stressors. Consistent with the amplified physiological and psychological stress responses of those high in emotional approach coping after emotionally expressing in this study, people in general often experience increases in negative affect and physical symptoms immediately following a traumatic written disclosure (e.g., Pennebaker, Kiecolt-Glaser, & Glaser, 1988; Norman et al., 2004; Cohen et al., 2008).

Several methodological differences may explain why these results differed from prior studies supporting the matching hypothesis including the type of emotional expression (individual vs. interpersonal), timing of outcomes (immediate vs. longitudinal), and type of stressors (acute vs. chronic). Most prior studies manipulated emotional expression via an *individual* writing task (e.g., Austenfeld et al., 2006; Niles et al., 2014,), and did not manipulate *interpersonal* emotional expression towards a romantic partner. Consistent with the present findings, those high in emotional approach coping experienced more intrusive thoughts six weeks after an interpersonal disclosure compared to a written disclosure (Cohen et al., 2008). Furthermore, the present study assessed immediate stress responses in the laboratory, in contrast to measuring outcomes weeks to months after the emotional expression occurred (e.g., Austenfeld et al., 2006; Niles et al., 2014; c.f., Seeley, et al., 2016) or stress responses during re-exposure to a stressor (Stanton, Kirk et al., 2000 Study 4). Finally, the present study assessed responses to an acute rather than a chronic stressor (e.g., Stanton & Low, 2012).

In the context of the broader literature (e.g., Stanton, 2011), the findings to date suggest differences in immediate stress responses and long-term health outcomes for those high and low in emotional approach coping when they emotionally express. For people high in emotional approach coping, there may be a potential immediate cost to interpersonal emotional expression (larger stress responses), but long-term health benefits through processes such as habituation (Stanton, Kirk et al., 2000 Study 4), desensitization, or cognitive restructuring (Lepore et al., 2004). For those low in emotional approach coping, the short-term benefit of smaller stress responses has less clear implications for long-term health outcomes based on evidence that a mismatch of the use of a coping strategy and preference for that strategy can be maladaptive over time (e.g., Niles et al., 2014).

As an indicator of partner responsiveness, partner support moderated the interactive effects of emotional approach coping and emotional expression on cortisol, but not sAA, negative emotional responses, or negative task-related ruminative thoughts. For those high in emotional approach coping, receiving partner support after emotionally expressing attenuated cortisol responses to the task. In contrast, for those low in emotional approach coping, receiving partner support after emotionally expressing increased cortisol responses. The HPA axis is socially modulated and sensitive to social evaluative threat (e.g., Dickerson & Kemeny, 2004; Gunnar & Donzella, 2002), which may explain why partner support

moderated the effect of emotional expression on cortisol, but not on sAA. In prior studies, when the socially evaluative component of the TSST was removed, the TSST did not elicit a cortisol response (Het et al., 2009; Dickerson et al., 2008), but still elicited a sAA response (Het et al., 2009).

Consistent with self-affirmation theory (e.g., Sherman & Cohen, 2006), it is possible that for people high in emotional approach coping, receiving responsive support to an emotional expression buffers the effect of a negative evaluation from the judges during the TSST. People high in emotional approach coping often elicit partner support via their emotional expression (Stanton, 2011), and may be more receptive to and positive towards emotional support from their partners (Stanton, Kirk et al., 2000). Thus, receiving partner support may be less threatening to self-efficacy and self-esteem for those high in emotional approach coping, and potentially more threatening to those low in emotional approach coping (e.g., Nadler, 1986).[13] Partner support may allow those high in emotional approach coping to benefit from emotional expression without the potential short-term costs of larger cortisol responses, in part, by buffering the effects of or reducing social evaluative threat. Supporting this interpretation and similar to the pattern of results for cortisol, but irrespective of whether or not participants emotionally expressed, those high in emotional approach coping reported less negative emotional responses (anxiety and self-conscious emotions) to the task after receiving support while those low in emotional approach coping reported greater negative emotional responses to the task after receiving partner support. Although the emotional support provided in this study was designed to be responsive to both the emotional expression (in the Express condition) and the stressful situation, support was most effective at reducing cortisol responses after emotional expression and negative emotional responses to the task for those high in emotional approach coping.

Features of the support manipulation might also explain the lack of consistent findings for partner responsiveness across the different stress responses. First, only one facet of responsiveness was assessed – written verbal support. Perhaps the negative effects of support for those low in emotional approach coping may be diminished with less overt forms of support demonstrating partner responsiveness that can only occur during face-to-face interactions such a partner's non-verbal emotional expression, mimicry, and active listening (Bolger & Amarel, 2007). Support provided during a less socially evaluative situations may also reduce these negative effects (Kane, et al., 2012). Importantly, the present study did not involve an unresponsive or socially constraining partner, just the absence of partner responsiveness. Participants may have inferred support even in the absence of it. Although participants in the Support condition reported feeling more supported than participants in the No-support condition, participants in the No-support condition also reported feeling supported. It might be the case that an overtly unresponsive partner has a larger impact than a responsive one, particularly among romantic partners (Lepore et al., 2000; c.f. Lepore, et al., 2004).

[13]Participants low in emotional approach coping (1 SD below the mean) also reported lower state self-esteem 25 minutes after the TSST after receiving support compared to not receiving support. See Supplementary Online Material for results.

Neither emotional approach coping nor partner support moderated the effects of emotional expression on task-related positive ruminative thoughts. However, emotional approach coping was related to more positive ruminative thoughts, consistent with findings showing high emotional approach coping to be an intrapersonal resource that aids in coping with stressors (Masters et al., 2009). Receiving support, irrespective of emotional expression or emotional approach coping, was associated with fewer positive ruminative thoughts about the task which could be related to support reducing self-efficacy (Nadler, 1986), despite the notes being responsive. However, receiving social support from a romantic partner may have differential effects on individual emotional well-being and relational well-being (Gleason et al., 2008). In the present study, receiving partner support lead to marginally significantly more positive thoughts about others after the task.

The present study had several strengths including an experimental design that manipulated interpersonal emotional expression combined with the measurement of multiple indices of physiological and psychological stress responses to an acute stressor. However, these strengths also limit generalizability, as responses to an acute laboratory stressor might differ from stress responses in everyday life or in response to ongoing chronic stressors. The participants in the study were primarily young college dating couples, and results may differ in a community sample. The present study did not include a writing control condition. It is possible that merely writing to a partner in the context of a stressful experience, regardless of content, could explain the present findings. We chose a non-writing control because we did not want an un-related writing task to serve as a form of distraction coping. Future research should compare interpersonal emotional expression with non-stressor related interpersonal expression. Furthermore, it is also possible that people high in emotional approach coping prefer to speak with their partners in person rather than communicate through written notes which might have influenced the present findings. While we cannot rule out this alternative explanation, written communication through notes is a conventional controlled laboratory paradigm and we note that it is similar to other popular forms of written communication such as texting, emailing, or Facebook messaging. Future research should include other forms of interpersonal communication. It will also be important for future research to explore potential gender differences in the effects of emotional expression, emotional approach coping, and responsive support on stress responses. Finally, these results should be replicated in a larger sample.

This study is the first to our knowledge to explore when and for whom emotional expression is an effective means of coping among couples using an experimental paradigm. The interpersonal context, the timing of the emotional expression and individual differences such as emotional approach coping play a role in the effects of emotionally expressive coping. These results suggest that processes through which interpersonal emotional expression affect health outcomes over time may differ for those low and high in emotional approach coping. For those high in emotional approach coping, emotional expression may have short-term costs in terms of larger stress responses in the immediate context of stressor, but downstream health benefits. Partner support, at least for cortisol responses, may mitigate this short-term cost of a larger stress response. For those low in emotional approach coping, emotional expression to a romantic partner in the immediate context of stressor may lower physiological and psychological stress responses with the potential to lead to downstream

health benefits. However, to the degree that emotional expression engenders overt emotional support provision, these downstream health benefits may be limited. Because people often turn to close others to cope with stressors, future research should explore the processes and mechanisms through which emotional expression to a romantic partner in response to daily stressors translate into downstream health outcomes.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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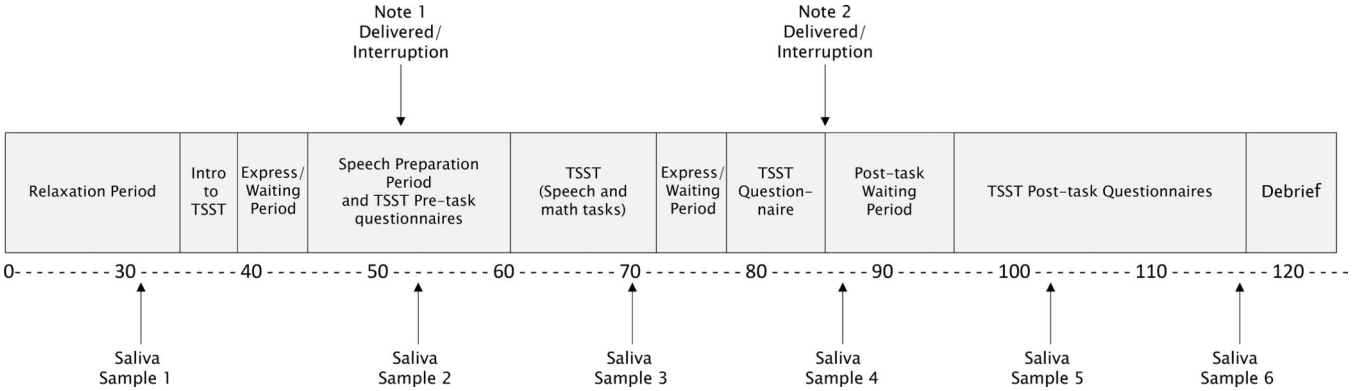

Figure 1.
Lab Session Timeline

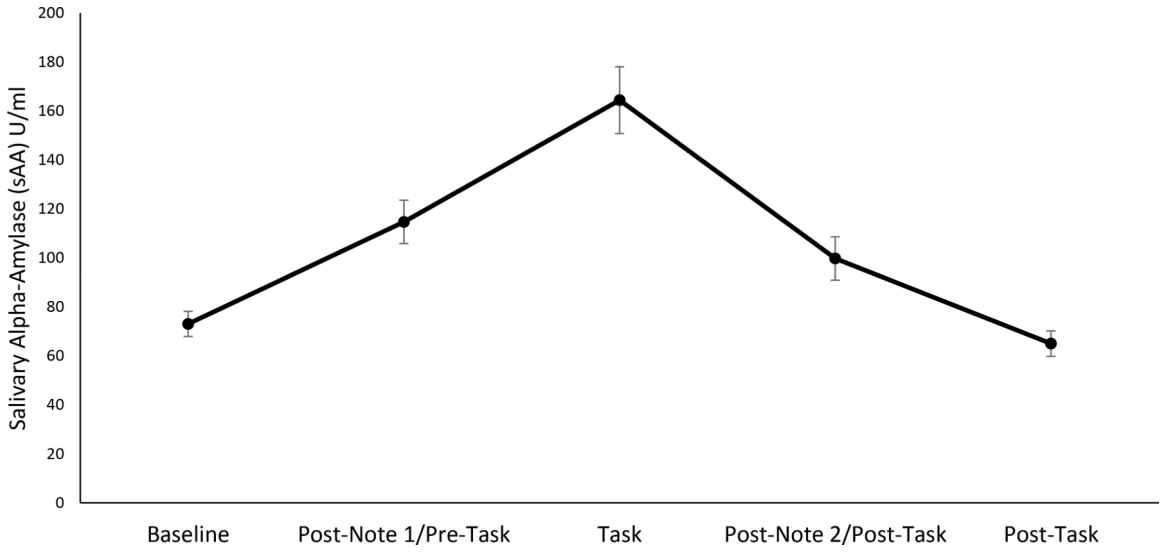

Figure 2.

The average observed salivary alpha-amylase (sAA) trajectory (mean± 1SE, raw) assessed at each time point during the study.

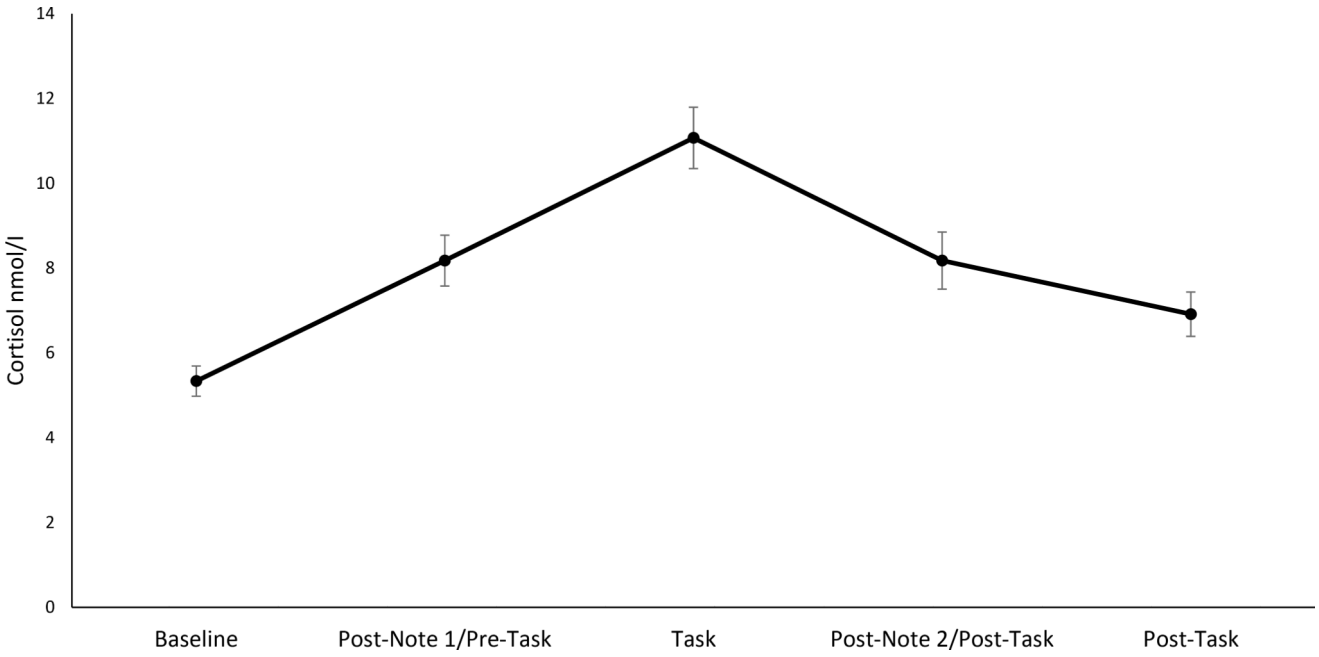

Figure 3.

The average observed cortisol trajectory (mean± 1SE, raw values) reflected at each time point during the study.

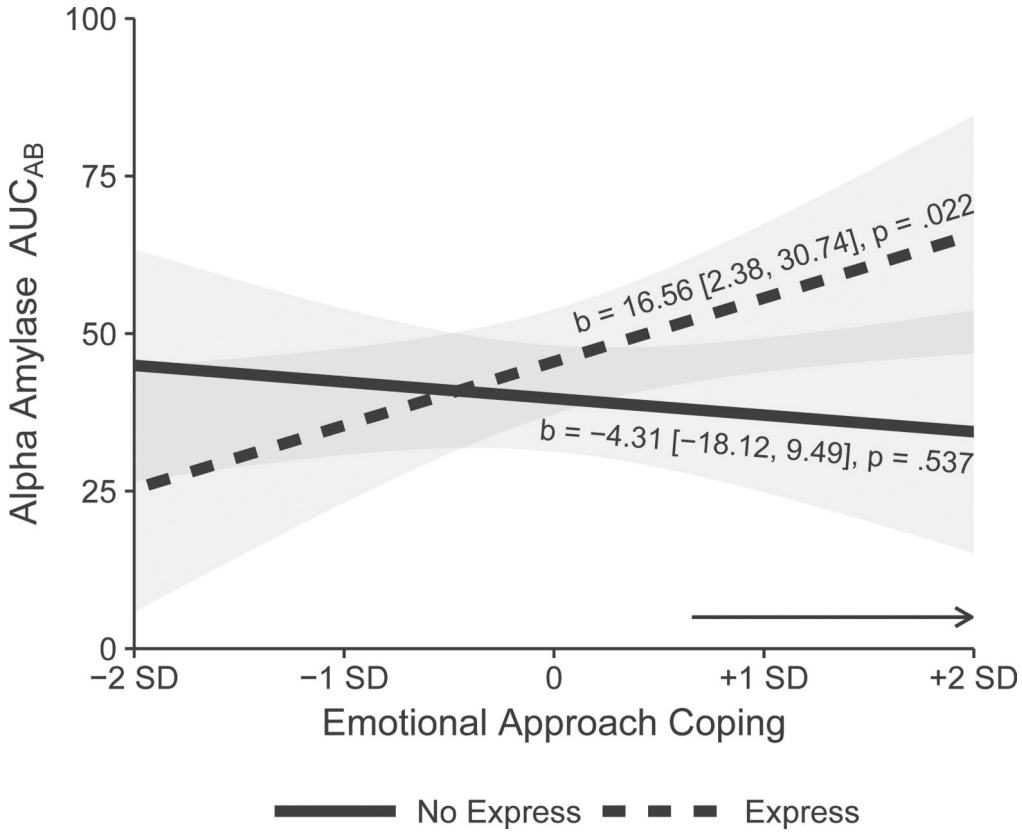

Figure 4.

Salivary alpha amylase by the Express condition and emotional approach coping. AUC_{AB} = area under the curve above baseline. Shaded region indicates the 95% confidence intervals. Arrow indicates the region of significance.

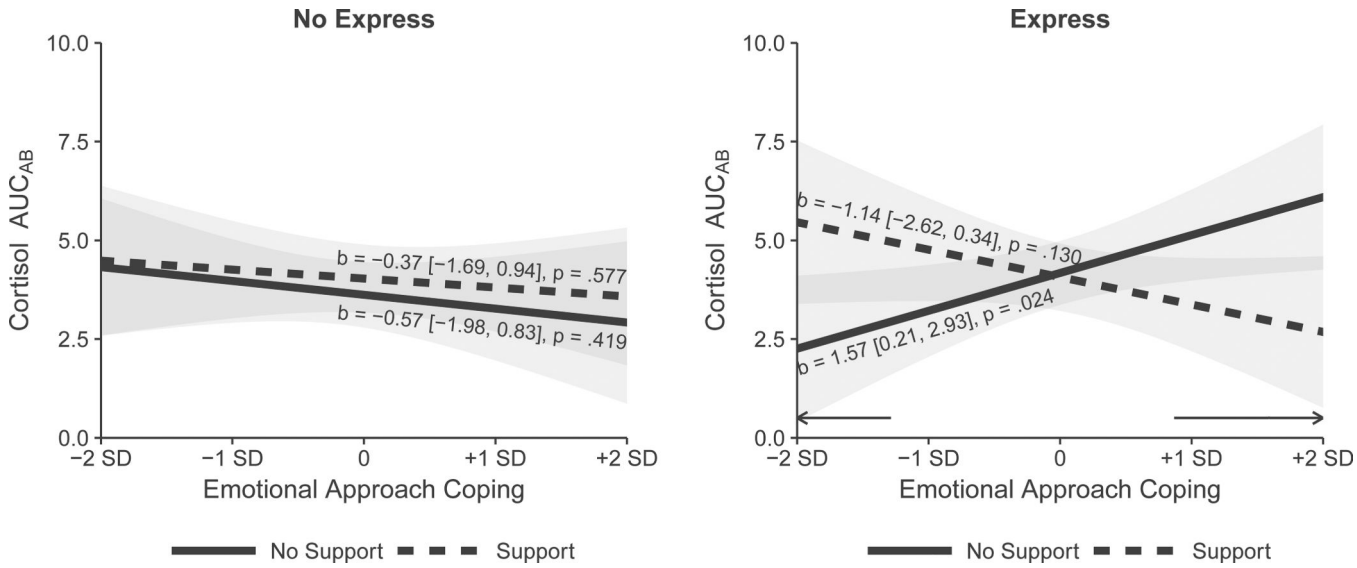

Figure 5.

Cortisol by the Express condition, the Support condition, and emotional approach coping (three-way interaction). Shaded region indicates the 95% confidence intervals. Arrows indicate the regions of significance.

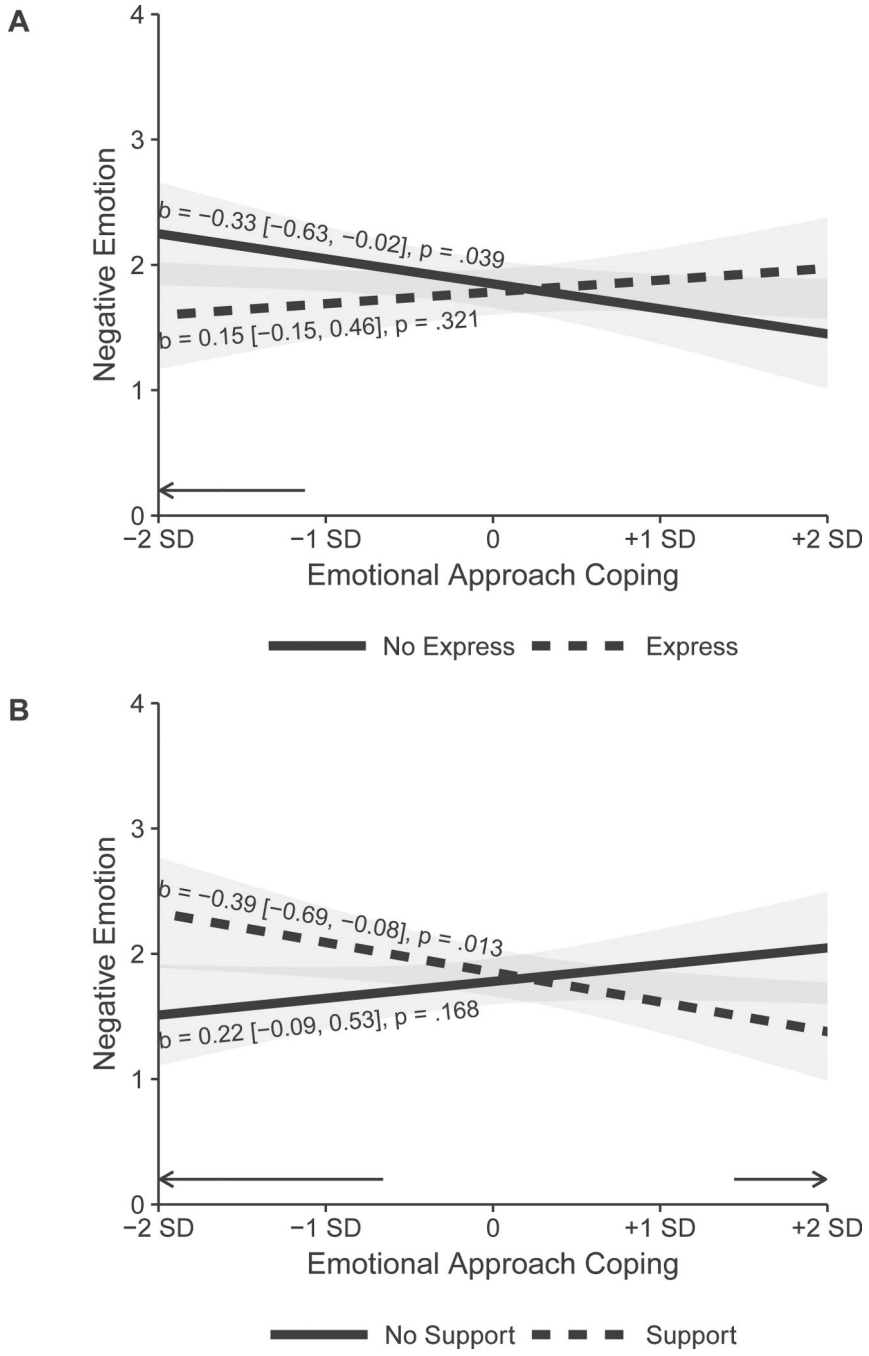

Figure 6.

Negative emotional responses by (A) the Express condition and emotional approach coping and (B) the Support condition and emotional approach coping. Shaded region indicates the 95% confidence intervals. Arrow indicates the region of significance.

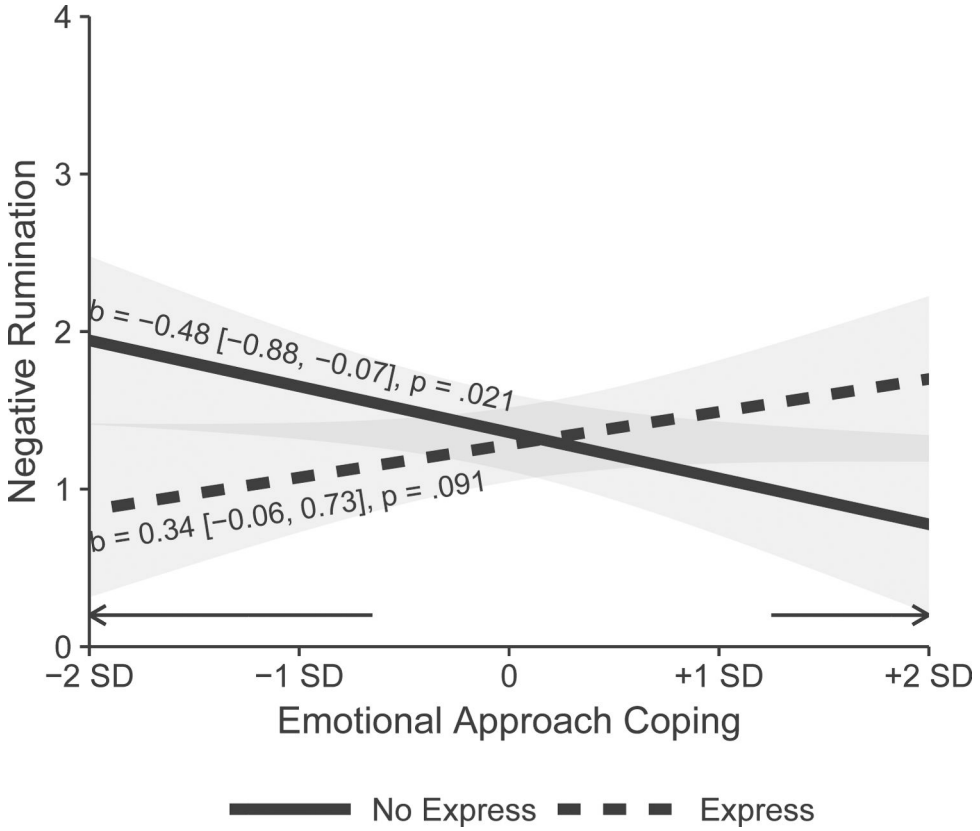

Figure 7.

Negative task-related ruminative thoughts by the Express condition and emotional approach coping. Shaded region indicates the 95% confidence intervals. Arrows indicate the regions of significance.

Table 1.

Intercorrelations and descriptive statistics for primary variables.

Dependent variable	1	2	3	4	5	6
1. EAC	1.00					
2. Cortisol AUC_{AB} [a]	−.06	1.00				
3. sAA AUC_{AB} [a]	.10	.27**	1.00			
4. Negative Emotional Reactivity	−.01	.07	.05	1.00		
5. Negative Task-related Thoughts	−.05	.05	.05	.71***	1.00	
6. Positive Task-related Thoughts	.18*	−.09	.09	−.17*	−.05	1.00
Means	2.83	3.97	42.60	1.80	1.31	0.94
Standard Deviations	.61	2.56	34.91	.89	1.02	.67
N	135	130	131	135	135	135

Note. Sample sizes differed due to four participants' removal from physiological outcome analyses and one additional participant's removal from the AUC_{AB} Cortisol analysis due to extremely high values.

[a] Transformed variables used. EAC = Emotional Approach Coping; AUC_{AB} = Area Under the Curve Above Baseline; sAA = Salivary Alpha Amylase.

* $p < .05$

** $p < .01$

*** $p < .001$.

Table 2.

Hierarchical regression analyses predicting physiological stress responses by Support condition, Express condition and EAC.

Independent Variable	Cortisol AUC_{AB}				sAA AUC_{AB}			
	β	b	SE	95%CI	β	b	SE	95%CI
Step 1								
Baseline	−.30**	−1.34**	0.39	[−2.15, −0.61]	.19*	1.98	0.92	[0.16, 3.80]
Gender	−.23**	−0.60**	0.22	[−1.03, 0.17]	−.06	−1.94	3.09	[−8.06, 4.18]
Support condition	.01	0.06	0.43	[−0.79, 0.92]	−.05	−3.19	6.12	[−15.30, 8.93]
Express condition	.05	0.27	0.43	[−0.58, 1.12]	.09	6.11	6.05	[−5.87, 18.10]
EAC	−.02	−0.08	0.36	[−0.79, 0.63]	.09	5.19	5.13	[−4.96, 15.33]
$R^2\Delta$	.14**				.06			
Step 2								
Support X Express	−.08	−0.49	0.86	[−2.21, 1.22]	.20	16.13	11.97	[−7.58, 39.83]
Support X EAC	−.20†	−1.18	0.71	[−2.58, 0.22]	−.10	−8.26	9.89	[−27.85, 11.32]
Express X EAC	.12	0.72	0.71	[−0.68, 2.12]	.25*	20.87*	9.91	[1.25, 40.49]
$R^2\Delta$	.03				.06†			
Step 3								
Support X Express X EAC	−.32*	−2.912*	1.41	[−5.70, −0.13]	.12	14.20	19.87	[−25.14, 53.53]
$R^2\Delta$	.03*				.00			

Note. N = 130–131. b = unstandardized beta; SE = unstandardized beta standard error; Gender coded −1= men, 1=women; Support condition coded 0= No support, 1 = Support; Express condition coded 0=No express, 1 = express. EAC = Emotional Approach Coping; AUC_{AB} = Area under the curve above baseline; sAA = Salivary Alpha Amylase.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$.

Table 3.

Hierarchical regression analyses predicting psychological stress responses by Support condition, Express condition and EAC.

Independent Variable	Negative Emotional Responses				Negative Task-related Thoughts				Positive Task-related Thoughts			
	β	b	SE	95%CI	β	b	SE	95%CI	β	b	SE	95%CI
Step 1												
Baseline	.46***	0.67***	0.12	[0.44, 0.90]	*NA*				*NA*			
Gender	.08	0.07	0.07	[−0.07, 0.21]	.03	0.03	0.09	[−0.15, 0.20]	−.12	−0.08	0.06	[−0.19, .03]
Support condition	.04	0.06	0.14	[−0.21, 0.34]	−.04	−0.07	0.18	[−0.42, 0.28]	−.17*	−0.23*	0.11	[−0.45, −0.001]
Express condition	−.03	−0.06	0.14	[−0.33, 0.13]	−.03	−0.07	0.18	[−0.42, 0.28]	−.04	−0.05	0.11	[−0.27,0.18]
EAC	−.07	−0.10	0.12	[−0.32, 0.13]	−.04	−0.07	0.15	[−0.37, 0.22]	.23**	0.25**	0.09	[0.06, 0.44]
$R^2\Delta$	.23***				.01				.08*			
Step 2												
Support X Express	−.09	−0.18	0.27	[−0.71, 0.34]	−.23	−0.53	0.34	[−1.21, 0.15]	−.10	−0.16	0.23	[−0.61, 0.30]
Support X EAC	−.30**	−0.60**	0.22	[−1.04, −0.17]	−.22†	−0.51†	0.28	[−1.07, 0.05]	−.02	−0.03	0.19	[−0.40, 0.34]
Express X EAC	.23*	0.48*	0.22	[0.05, 0.91]	.35**	0.82**	0.28	[0.26, 1.37]	−.15	−0.23	0.19	[−0.60, 0.14]
$R^2\Delta$	.08**				.10**				.02			
Step 3												
Support X Express X EAC	.21	0.62	0.43	[−0.23, 1.48]	.19	0.64	0.56	[−0.48, 1.75]	.18	0.39	0.37	[−0.35, 1.13]
$R^2\Delta$	.01				.01				.01			

Note. *N* = 135. b = unstandardized beta; SE = unstandardized beta standard error; *NA* = not applicable; Gender coded −1= men, 1=women; Support condition coded 0= No support, 1 = Support; Express condition coded 0=No express, 1 = express. EAC = Emotional Approach Coping.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$.