Interpersonal motives and social-evaluative threat: Effects of acceptance and status stressors on cardiovascular reactivity and salivary cortisol response

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Abstract
Social-evaluative threat evokes increases in salivary cortisol and heightened cardiovascular reactivity. However, the types or content of social threats underlying these physiological responses are not clearly delineated in direct comparisons. Based in interpersonal theory, the present study manipulated high and low levels of acceptance threat (i.e., evaluation of likability, potential for inclusion) and status threat (i.e., evaluation of competence, leadership potential) during a modified Trier Social Stress Test, using a sample of 137 undergraduates (73 women). Both acceptance threat and status threat heightened salivary cortisol, heart rate, and blood pressure responses to the task. Hence, concerns about social inclusion or connection with others and concerns about social standing or status can contribute independently to physiological stress responses.

Descriptors: Evaluative threat, Cardiovascular reactivity, Salivary cortisol, Status, acceptance, Social stress, Social self, Self-preservation, Anxiety, Shame

Getting along and getting ahead are fundamental challenges in human adaptation and social life (Hogan, 1983). Motives related to affiliative relationships (i.e., acceptance by others) and social standing (i.e., status relative to others) are basic and far-reaching influences on behavior, cognition, emotion, and health (Baumeister & Leary, 1995; Dickerson, Gruenewald, & Kemeny, 2004; Fiske, Cuddy, & Glick, 2007; Taylor & Gonzaga, 2006), perhaps reflecting our evolutionary history as a highly social species (Kenrick, Griskevicius, Neuberg, & Shaller, 2010). These two motives—broadly defined—are central features of interpersonal theory (cf. Pincus & Ansell, 2013), where striving for acceptance, inclusion, and connection with others, and for status, achievement, and influence are at the core of social behavior and emotional adjustment (Wiggins & Trapnell, 1996). Social interactions related to acceptance (e.g., inclusion vs. rejection) and status (e.g., success vs. failure) independently influence self-esteem and well-being (Anderson, Kraus, Galinsky, & Keltner, 2012; Hsu, Brennan, & Molina, 2010; Leary, Cottrell, & Phillips, 2001). Because acceptance and status are key resources that are dependent on the reactions of others, concerns about social evaluation are common sources of stress (Lam & Dickerson, 2013; Smith, Cundiff, & Uchino, 2012).

In describing such social-evaluative threats, Dickerson and colleagues (2004) suggest that “threats to the social self are situations that provide the potential for a loss of social esteem, social status, or social acceptance,” and that “prototypical threats to the social self are conditions in which an important aspect of the self-identity is, or could be, negatively judged by others” (p. 1195). In related models, evaluation of valued personal characteristics increases the individual’s self-involvement and effortful goal-related activity, often evoking heightened physiological response (Gendolla & Richter, 2010).

Such threats to identity, inclusion, or regard evoke physiological stress responses, through activation of the hypothalamic-pituitary-adrenocortical (HPA) axis and the sympathetic nervous system (SNS; Bosch et al., 2009; Lam & Dickerson, 2013), as indicated by salivary cortisol (e.g., Dickerson & Kemeny, 2004; Dickerson, Myceck, & Zaldivar, 2008), cardiac pre-ejection period (Bosch et al., 2009), heart rate, and blood pressure (e.g., Gendolla & Richter, 2010; Smith, Nealey, Kircher, & Limon, 1997; Wright et al., 1995) in laboratory-based experimental studies. These findings have been replicated in observational studies of ambulatory blood pressure (Smith, Birmingham, & Uchino, 2012) and salivary cortisol during daily experience (Schotz, Schulz, Hellhammer, Stone, & Hellhammer, 2006).

However, it is often unclear which specific aspects of social threat influence these responses. That is, the relative importance of acceptance and status stressors as distinct determinants of physiological response is not yet clearly established. Instances of social-evaluative threat in everyday experience often combine both concerns, but conceptual and empirical analyses suggest they are distinct (Pincus & Ansell, 2013). The most widely used social-evaluative stressors could threaten both concerns, but emphasize status by evaluating intelligence or competence, or by utilizing simulated job interviews (e.g., Kirschbaum, Pirke, & Hellhammer,
Such stressors have robust effects on physiological reactivity (Bosch et al., 2009; Lam & Dickerson, 2013). Threats to acceptance have been utilized often in studies of emotional and social responses (MacDonald & Jensen-Campbell, 2009), but are less common in studies of physiological stress responses. However, threats to social acceptance (e.g., rejection, ostracism) evoke heightened release of cortisol (e.g., Blackhart, Eckel, & Tice, 2007; Ford & Collins, 2010) and increased cardiovascular reactivity (CVR; Stroud et al., 2002, 2009).

Direct comparisons of the effects of status and acceptance threats are also less common (e.g., Smith, Gallo, Goble, Ngu, & Stark, 1998; Smith et al., 1996; Stroud et al., 2009; Stroud, Salovey, & Epel, 2002). Further, when both types have been included in the same study, low threat comparison conditions are sometimes lacking or the status and acceptance stressors differ in other task features (e.g., speaking, cognitive demands) that could alter physiological responses, complicating conclusions about their relative effects (Het, Rohleder, Schoof, Kirschbaum, & Wolf, 2009).

To compare their effects directly, high and low levels of status and acceptance threat must be manipulated independently in the same context, while holding other aspects of the task constant.

To address these issues, the present study manipulated two social-evaluative threats: an acceptance stressor evaluated likability and potential for social inclusion, and a status stressor evaluated competence and leadership potential. CVR and salivary cortisol response were measured. We examined blood pressure and heart rate during and after the task, because these periods represent separate components of cardiovascular stress responses (Brosschot, Gerin, & Thayer, 2006; Chida & Steptoe, 2010). We predicted that status and acceptance threats would have independent and additive effects in increasing blood pressure, heart rate, and salivary cortisol responses.

We also examined self-conscious emotion (SCE; i.e., shame, embarrassment) and state anxiety. Shame is described as the key affective response to social-evaluative threat (Dickerson et al., 2004), but anxiety is also a well-established response to such threats (e.g., Smith et al., 1997). These effects may respond differently to acceptance and status stressors, but this has not been examined in prior research. We also examined the moderating effect of gender, as some theory and research suggests that men may be more responsive to stressors involving status, whereas women may be more responsive to those involving acceptance (Smith, Limon, Gallo, & Ngu, 1996; Stroud et al., 2002; Wright & Barreto, 2012).

Method

Participants

A total of 137 undergraduates (73 females) from the University of Utah Psychology Department research participant pool completed the study and provided complete data. Mean age was 23.2 years (SD = 5.1). Seventy percent were Caucasian, 14% Hispanic/Latino, and 8% Asian. Participants were excluded if they were taking medication that could alter cardiovascular responses or salivary cortisol (e.g., beta-blockers, corticosteroid therapy), or if they had smoked, used oral tobacco, or consumed beverages other than water within the prior 2 h, or any food within the prior hour.

Measures

Self-reports. State anxiety was assessed with a 6-item version of the Spielberger (1980) scale (4-point Likert items). Internal consistency ranged from .79 to .85. SCE was assessed with a scale consisting of ten 4-point Likert items reflecting shame and embarrassment (Dickerson et al., 2008). Internal consistencies ranged from .84 to .93. Time since awakening, hours of prior night sleep, height, weight, and levels of routine physical activity levels were also assessed via self-reports.

Cardiovascular response. Blood pressure and heart rate were assessed using the oscillometric method with a Critikon Dinamap monitor (Model 100). Average values for systolic blood pressure (SBP), diastolic blood pressure (DBP), and heart rate (HR) were calculated for baseline, initial task, role-play speaking, and role-play listening periods. Three measures taken at 90-s intervals at the end of the baseline period were averaged. One measurement was taken during each of the 90-sec task speaking and listening periods. Three additional measurements were taken during the posttask period.

Salivary cortisol. Samples were collected after the baseline, and at 5 and 15 min after the conclusion of the task (i.e., 26 and 36 min after task onset). The temporal specificity of salivary cortisol is not precise (Dickerson & Kemeny, 2004), so the first and second post-task samples were treated as two levels in the mixed analysis of variance (ANOVA) described below, but not interpreted as task and recovery period values, per se. Samples were collected with Sarstedt cortisol Salivettes, stored using standard procedures, and analyzed at the Technical University of Dresden using immunoassays (IBL International) with well-documented sensitivity (0.2 nmol/l), reliability (intra- and interassay coefficients of variation < 5%), and validity (Miller, Plessow, Rauh, Groschl, & Kirschbaum, 2013).

Design and Procedure

The design was a 2 (high vs. low Acceptance Threat) × 2 (high vs. low Status Threat) × 2 (Gender) factorial. Sessions began between 11 am and 2:45 pm. Participants were told that the study examined physiological responses to social experiences, and that their cardiovascular and salivary cortisol responses would be assessed while they first sat quietly, and then while they engaged in social interaction tasks. They were told further that the study focused on effects of speaking, so responses would be recorded while they spoke and listened. Participants sat alone at a table in the experimental chamber and completed questionnaires (not utilized in the present analyses) for approximately 30 min.

Baseline period. The blood pressure cuff was attached to the non-dominant arm, and participants underwent a 10-min minimally involving task baseline procedure (Smith et al., 1997). Three SBP/DBP/HR readings taken at 90-s intervals during the final 4.5 min of this period provided baseline values. Participants completed state affect scales at the end of the baseline period, and then provided the first saliva sample.

Experimental task and recovery period. Participants received prerecorded task instructions through a speaker in the experimental chamber. After baseline, a video camera was turned to face all participants, and they were informed that the purpose of the recording was to document when they were speaking. Participants were then given three sheets listing short prompts, one for each phase of the speaking task, to help them speak for the full period. Recorded instructions then asked them to begin speaking...
about their typical schedule (e.g., when they get up, what they do after lunch, after dinner, etc.). After speaking for 90 s, recorded instructions asked participants to speak again for 90 s, discussing which daily activities they described were choices and which were obligations, what this pattern of choices and obligations reflected about their personal qualities, and which of these qualities they would like to change.

The instructions then asked them to stop and listen for 90 s to their prerecorded partner in a role-played interaction involving a minor auto accident in a parking lot. In the role play scenario, the other party was abrasive and falsely accused the participant of causing the collision. Participants then responded for 90 s, listened again for 90 s to the abrasive and defensive partner, and spoke again for 90 s.

Participants then completed the second affect questionnaire about how they felt during the task, and sat quietly alone for 5 min. Recovery period cardiovascular measures were recorded. Participants then provided a second saliva sample and completed the third affect questionnaire, in terms of how they felt during the recovery period. After 10 min, they provided the third saliva sample and were debriefed.

**Evaluative threat manipulation.** Men and women were block-randomized to one of four conditions. In the low threat condition, the prerecorded instructions after baseline and before the speaking tasks informed participants that, although their interview responses would be recorded, this was simply to determine when they were speaking. They were assured that their verbal responses would not be evaluated in any way.

In the high acceptance threat condition, participants were informed that the experiment focused on physiological responses to social experiences in which they were judged or evaluated in terms of how likeable, interesting, and friendly they were. So, while they were responding to questions about their everyday activities and responding to a role-played interaction, two raters would be seated across the table from them and periodically rate how likeable, interesting, and friendly they were, and “how likely it is that you would be liked and included by others, as opposed to disliked and excluded, and whether or not people would invite you to join social activities like parties or group outings, and whether other people would include you or exclude you when they make decisions about friends, roommates, clubs, or social media like Facebook.”

The high status threat condition instructions were identical except that the focus of the raters’ evaluation was on how intelligent, competent, and skilled the participants appeared, and “how likely it is that you would be respected or even admired by others, except that the focus of the raters’ evaluation was on how intelligent, competent, and skilled the participants appeared, and “how likely it is that you would be respected and maybe even authority.”

In the high acceptance/high status threat condition, these two foci of evaluation were combined, so that participants were told that the raters would evaluate both how likeable, interesting, and friendly they are, and how intelligent, competent, and skilled they are. The further elaboration of this evaluative focus combined the specific wording of the acceptance threat and status threat instructions above.

The speech tasks were presented through prerecorded instructions. The threat conditions were adaptations of the Trier Social Stress Test (Kirschbaum et al., 1993), in which the tasks and speech topics were modified, as described above, to appear relevant to evaluations of status and acceptance. In the threat conditions only, two experimenters (one male, one female) with clipboards entered the room and sat across from participants. Maintaining a neutral expression, they made notations on the clipboards at predetermined intervals to simulate ratings of likability and/or competence. Low threat participants completed the same task, but were alone in the chamber. Hence, other than instructions and presence of evaluators, the task activities were identical in all four conditions, so as to control effects of potential speech artifacts on physiological response (Het et al., 2009).

**Overview of Analyses**

Affective and physiological responses were analyzed as task-baseline change scores (or recovery-baseline; Llabre, Spitzer, Saab, Ironson, & Schneiderman, 1991), in 2 (high vs. low Acceptance Threat) × 2 (high vs. low Status Threat) × 2 (Gender) ANCOVAs. The main effects of acceptance threat and status threat tested the primary hypotheses that these stressors would evoke heightened responses. In the case of significant interactions, follow-up mean comparisons utilized the appropriate error term (Bernhardson, 1975). Main effects and interactions that are not described did not approach significance. Effect sizes are reported as partial η² for main effects and interactions, and as Cohen’s d for main effects and mean comparisons. Preliminary analyses revealed no departures from homogeneity of variance, but some minor departures from normality (e.g., positive skew for SCE and salivary cortisol changes). Because analyses of transformed outcomes produced the same pattern of significant and nonsignificant effects and similar effect sizes, analyses of untransformed variables are reported below. Controlling time since awakening, hours of prior night sleep, body mass index, age, and physical activity levels through analysis of covariance (ANCOVA) did not alter any of the effects of evaluative threat on salivary cortisol response or CVR reported below.

**Results**

**Baseline Equivalence of Groups**

In 2 (high vs. low Acceptance Threat) × 2 (high vs. low Status Threat) × 2 (Gender) ANOVAs of baseline measures, men had higher SBP than did women (111.5 mmHg vs. 105.2 mmHg, SEs = 1.3, 1.2), F(1,129) = 43.6, p < .001, η² = .252, d = .54, and lower HR (69.3 bpm vs. 71.4 bpm, SEs = 1.4, 1.3), F(1,129) = 4.44, p = .037, η² = .033, d = .18. No other effects were significant (see Table II). Control of baseline values in ANCOVA did not alter results of analyses reported below.

**Effects of Acceptance and Status Threats**

**Self-conscious emotion.** High status threat participants reported greater overall increases in SCE than low status threat participants (4.03 vs. 1.78, SE = .62, .61), F(1,129) = 6.72, p = .011, η² = .046, d = .44. In a Status Threat × Period interaction, F(1,129) = 3.97, p = .048, η² = .028, this effect was significant during the task (5.99 vs. 2.91, SEs = .80, .79), t(129) = 3.20, p = .002, d = .53, but not recovery (2.07 vs. 0.65, SEs = .54, .53), t(129) = 1.48, p = .14, d = .31. The main effect of acceptance threat was not significant, F(1,129) = 2.45, p = .12, η² = .017, d = .27.
High acceptance threat participants reported larger increases in anxiety than low acceptance threat participants (3.87 vs. 2.57, report larger increases in anxiety than low status threat participants (3.9 vs. 2.57, SE = .35, .34), F(1,129) = 13.60, p < .001, \( \eta^2 \) = .089, d = .62. The Acceptance Threat × Period interaction was not significant, F(1,129) = 1.37. High status threat participants tended to report larger increases in anxiety than low status threat participants (3.39 vs. 2.57, SE = .34, .34), but this effect was not significant, F(1,129) = 2.92, p = .09, \( \eta^2 \) = .021, d = .30.

### SBP

High acceptance threat participants displayed greater overall SBP change than those in low acceptance threat conditions (16.2 mmHg vs. 9.9 mmHg, SEs = .81, .83), F(1,129) = 28.85, p < .001, \( \eta^2 \) = .177, d = .74. In an Acceptance Threat × Period interaction, F(1,129) = 8.27, p = .005, \( \eta^2 \) = .058, this effect was significant during the task (23.0 mmHg vs. 15.2 mmHg, SE = 1.01, 1.03), t(129) = 6.05, p < .001, d = .79, and recovery period (9.3 mmHg vs. 4.6 mmHg, SE = .76 vs. .77), t(124) = 3.66, p < .001, d = .68, but was larger during the task.

High status threat participants displayed greater SBP change than low status threat participants (15.7 mmHg vs. 10.3 mmHg, SEs = .81, .83), F(1,129) = 21.68, p < .001, \( \eta^2 \) = .139, d = .62. In a Status Threat × Period interaction, F(1,129) = 13.98, p < .001, \( \eta^2 \) = .094, this effect was significant during the task (22.8 mmHg vs. 15.4 mmHg, SE = 1.02, 1.03), t(129) = 5.76, p < .001, d = .77, and recovery period (8.7 mmHg vs. 5.3 mmHg, SE = .76 vs. .77), t(129) = 2.65, p < .009, d = .47, but larger during the task.

The Acceptance Threat × Status Threat interaction was significant, F(1,129) = 5.65, p = .019, \( \eta^2 \) = .040. As presented in Figure 1 (top left panel), follow-up mean comparisons indicated that overall SBP change was greater in each of the threat conditions than in the no threat condition, all t(129) > 4.9, p < .001, d > .84. Differences among the three threat conditions were considerably smaller. The high acceptance threat/high status threat mean was significantly greater than the low acceptance threat/high status threat mean, t(129) = 2.10, p = .038, d = .37, but was not greater than the high acceptance threat/low status threat mean, t(129) = 1.6, p = .11, d = .28.

### DBP

High acceptance threat participants displayed greater overall increases in DBP than low acceptance threat participants (7.5 mmHg vs. 5.4 mmHg, SEs = .50, .51), F(1,129) = 8.60, p = .004, \( \eta^2 \) = .060, d = .38. In an Acceptance Threat × Period interaction, F(1,129) = 4.83, p = .03, \( \eta^2 \) = .035, this effect was significant during the task (12.0 mmHg vs. 9.0 mmHg, SE = .67, .68), t(124) = 3.63, p < .001, d = .48, but not recovery, t(124) = 1.28, d = .18.

High status threat participants displayed greater overall increases in DBP than low status threat participants (7.4 mmHg vs. 5.5 mmHg, SE = .50, .51), F(1,129) = 6.71, p = .011, \( \eta^2 \) = .048, d = .33. In a Status Threat × Period interaction, F(1,129) = 9.59, p = .002, \( \eta^2 \) = .067, this effect was significant during the task (12.1 mmHg vs. 8.9 mmHg, SE = .67, .68), t(129) = 3.92, p < .001, d = .58, but not recovery, t(129) = .51, d = .07.

The Acceptance Threat × Status Threat two-way interaction for DBP reactivity was significant, F(1,129) = 6.12, p = .015, \( \eta^2 \) = .044. As presented in Figure 1 (top right panel), DBP responses were substantially greater in all three threat conditions, relative to the no threat condition, all t(129) > 3.3, p < .002, d > .60, whereas the differences among the three threat conditions were not significant.

### HR

As depicted in Figure 1 (bottom left panel), high acceptance threat participants had greater HR increases than low acceptance threat participants (6.25 bpm vs. 3.19 bpm, SE = .65, .66), F(1,129) = 11.03, p = .001, \( \eta^2 \) = .076, d = .47. In an Acceptance Threat × Period interaction, F(1,129) = 20.23, p < .001, \( \eta^2 \) = .131, the effect of acceptance threat was significant during the task (12.2 bpm vs. 6.7 bpm, SE = .91, .92), t(129) = 5.11, p < .001, d = .71, but not recovery, t(129) = .57, d = .14.

High status threat participants displayed larger overall increases in HR than those in the low status threat condition (5.8 bpm vs. 3.7 bpm, SE = .65, .66), F(1,129) = 5.05, p = .026, \( \eta^2 \) = .036, d = .33. The Status Threat × Period interaction approached significance, F(1,129) = 3.66, p = .058, \( \eta^2 \) = .027, and the simple effect of status threat again was significant during the task (11.0 bpm vs. 7.9 bpm), t(129) = 2.89, p = .005, d = .48, but not during recovery, t(129) = 1.23, d = .20. The Acceptance Threat × Status Threat interaction for HR was not significant, F(1,129) = 0.11.

### Salivary cortisol

As seen in Figure 1 (bottom right panel), high acceptance threat participants displayed larger increases than low acceptance threat participants (2.87 nmol/l vs. –0.38 nmol/l, SE = .73, .74), F(1,129) = 9.70, p = .002, \( \eta^2 \) = .070, d = .54. The Acceptance Threat × Period interaction was not significant, F(1,129) = 0.91. Also, high status threat participants displayed

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1. The simple main effect of acceptance threat on change in state anxiety was significant during both the task period, t(129) = 3.81, p < .001, d = .56, and the recovery period, t(129) = 2.81, p = .006, d = .51.

2. The simple main effect of acceptance threat on change in salivary cortisol was significant during the first (2.96 nmol/l vs. –0.096 nmol/l, SE = .72, .74), t(129) = 2.87, p = .005, d = .49, and second (2.79 nmol/l vs. –0.66 nmol/l, SE = .77, .79) posttask assessments, t(129) = 3.24, p = .002, d = .52.
larger cortisol increases than low status threat participants (2.63 nmol/l vs. −0.14 nmol/l, SE = .74, .74), \(F(1,129) = 7.02, p = .009, \eta^2 = .052, d = .44\). Neither the Status Threat × Period interaction nor the Acceptance Threat × Status Threat interaction was significant \(Fs < 1.2\).

**Discussion**

The threat of negative social evaluation of important aspects of self-identity (i.e., threats to the social self) plays a central role in theories of the effects of stress on physiological response (Dickerson et al., 2004; Gendolla & Richter, 2010). In interpersonal theory (Pincus & Ansell, 2013), such social stressors can involve two primary motives or concerns—threats to acceptance and threats to status. The present study manipulated both types of social-evaluative threat while holding other aspects of the task constant, and examined affective, cardiovascular, and salivary cortisol responses.

For self-reported affective responses, the status stressor resulted in increased SCE (e.g., shame), but not increased state anxiety. In contrast, the acceptance stressor had a substantial effect on state anxiety, but not SCE. These differing self-reported responses suggest that the stressors were generally effective but with at least somewhat distinct psychological impacts. It is possible that prior evidence that shame is the strongest affective response to social-evaluative threat (Dickerson et al., 2004) may be due to the emphasis on status-related concerns in those stressors. Anxiety responses may be more pronounced when social inclusion and acceptance are salient concerns. Thus, the present results suggest that status and acceptance stressors may have different effects on these two negative affects, a tentative conclusion that warrants further research.

As predicted, both the acceptance and status stressors had significant main effects on changes in SBP, DBP, HR, and salivary cortisol. Effects on HR and salivary cortisol reactivity were fully consistent with the predicted pattern of independent effects of these two sources of social-evaluative threat. Specifically, beyond the main effects of acceptance and status threats on HR and salivary cortisol, the Acceptance Threat × Status Threat interaction was not significant. Further, the two single threat groups were similar in the magnitude of HR and cortisol responses, and both greater than the responses seen in the low threat control. Also, the combined threat resulted in the highest level of HR and salivary cortisol reactivity, consistent with the predicted pattern of independent and additive effects of these two types of social-evaluative threat.

For blood pressure responses, both the acceptance threat and the status threat main effects on SBP and DBP increases were significant, again consistent with predictions. Further, both single threat groups had larger increases in SBP and DBP compared to...
responses in the low threat control condition. However, the predicted main effects were qualified by an unexpected Acceptance Threat × Status Threat interaction for both SBP and DBP, such that the major difference among groups was between the low threat control and each of the three threat conditions. For DBP there were no differences among the three threat groups, suggesting that either type of evaluative threat was sufficient to evoke a substantial vascular response and that the combined status and acceptance threats did not increase this response further. The pattern for SBP was similar, but there was some evidence of a small additive effect of the two threats. Hence, consistent with predictions, both types of threat evoked a significant and similar effect on blood pressure reactivity. However, inconsistent with the predicted pattern of independent and additive effects, the presence versus absence of threat had a considerably larger effect on blood pressure reactivity than their additive combination.

It is possible that the simple presence versus absence of threat was largely responsible for effects on vascular reactivity, rather than the specific evaluative threats regarding acceptance and status. For example, the high threat instructions—regardless of their focus on acceptance or status—may have prompted generally increased vigilance, effort, or self-focused attention, each of which have been found to produce heightened physiological responses (Gendolla & Richter, 2010; Silva, 2012; Smith, Ruiz, & Uchino, 2000). However, the different effects of the two types of threat on affective responses and their additive effects on HR and salivary cortisol—and to a lesser extent, SBP—suggest that the two threats had distinct and independent effects on stress responses. Hence, the pattern of effects on the full set of outcomes is not easily attributed to a simple presence versus absence of general evaluative threat or some other general process that was equivalent across the threat conditions (e.g., vigilance, effort, self-focused attention).

Alternatively, it is possible that the different patterns for HR and cortisol responses versus blood pressure responses reflect differing underlying physiological mechanisms. Both sources of social-evaluative threat may have evoked an overall increase in peripheral vascular resistance through alpha-adrenergic SNS activation that was evident especially in DBP and to a lesser extent in SBP responses (Kamarck & Lovatto, 2003), and that the two sources of threat did not have additive vascular effects beyond this basic response. In contrast, the effects on salivary cortisol, HR, and to a lesser extent on SBP may indicate that the acceptance and status threats had independent and additive effects on HPA activation, and similarly independent and additive effects on cardiac reactivity through beta-adrenergic SNS activation (Bosch et al., 2009). However, the unexpected nonadditive pattern for blood pressure reactivity should be replicated in future research. Such research could also assess these potential underlying physiological mechanisms, and thereby clarify why acceptance and status threats had additive effects on cardiac and HPA axis reactivity but their combination did not evoke substantial vascular reactivity beyond the presence versus absence of either threat alone.

Limitations

In addition to this issue of mechanisms underlying the different pattern of effects across the various physiological outcomes, there are other limitations of the present study that warrant further research. For example, the sample consisted of young, healthy, and largely Caucasian university students. Although the motivational themes of status and acceptance are clearly important in the lives of undergraduates and across a wide age range in adulthood (McAdams, Hoffman, Mansfield, & Day, 1996), these findings should be replicated with more diverse groups.

Importantly, as is often the case in situations of social-evaluative threat, standards for successful performance were unclear in the present task procedure. These social threats could have quite different effects in contexts where standards for successful task performance are less ambiguous and vary in difficulty (Gendolla & Richter, 2010; Wright & Barreto, 2012). Given the importance of status and acceptance as key social resources, individuals would likely be motivated to avoid negative evaluations across a wide range of task difficulty levels. However, individual differences in perceived ability to meet such challenges or in the importance of status and acceptance threats could moderate their effects on physiological responses (Gendolla & Richter, 2010; Wright & Barreto, 2012).

There were no main effects of gender in the present study, and gender did not moderate the effect of acceptance threat or status threat on physiological response. These null results are at least somewhat inconsistent with prior research in which women were more responsive to stressors related to acceptance, whereas men were more responsive to stressors related to status (Smith et al., 1996; Stroud et al., 2002; Wright & Barreto, 2012). It is possible that the specific acceptance and status threats used here were sufficiently broad and engaging as to evoke similar physiological and affective reactions from women and men, but future research is needed to clarify potential sex differences in responses to tasks and stressors related to these two interpersonal motives.

Finally, some potential influences on salivary cortisol response (e.g., menstrual phase) were not measured. Given the randomized design, it is unlikely that these potential confounds account for effects of the experimentally manipulated acceptance and status threats. Instead, it is more likely that these factors increased observed overall variability in cortisol response, perhaps resulting in smaller effect sizes for the two manipulated variables. Further, as noted previously, control of time since awakening, hours of prior night sleep, age, levels of regular exercise, and body mass index through ANCOVA did not alter the effects of acceptance threat and status threat on cortisol response. Nonetheless, future research should measure and control additional potential confounds.

Conclusions and Implications

These limitations notwithstanding, the present results extend previous theory and research by demonstrating that two distinct interpersonal stressors can act as social-evaluative threats. Threats related to acceptance (i.e., likability, inclusion) and status (i.e., perceived competence, respect) evoked heightened cardiovascular and salivary cortisol responses. Thus, the two basic concerns of “getting along and getting ahead” (Hogan, 1983) can both evoke increases in negative affect and substantial physiological stress responses, further supporting and extending conceptual models regarding threats to the “social self” (Dickerson et al., 2004).

These results may also have implications for models of stress and cardiovascular disease (CVD; Steptoe & Kivimaki, 2013). The association of stress and related psychosocial factors with CVD is presumed to be mediated in part by physiological reactivity and delayed recovery in response to stressors, including CVR (Chida & Steptoe, 2010) and cortisol (Hamer, Endrighi, Venuraju, Lahiri, & Steptoe, 2012). Many psychosocial risk factors and sources of stress that influence CVD involve interpersonal processes related to acceptance, such as social isolation (Barth, Schneider, & von Kanel, 2010), interpersonal conflict (De Vogli, Chandola, &
Marmot, (2007), and trait hostility (Chida & Steptoe, 2009). Others involve adverse effects of status stressors, such as job stress (Kivimaki et al., 2013), trait dominance (Smith et al., 2008), and low socioeconomic status (Ruiz, Prather, & Steffon, 2012). In the present direct comparison, both types of stressors evoked significant psychophysiological responses.

As noted above, motives involving acceptance and status are central elements of interpersonal theory (Horowitz & Strack, 2011; Pincus & Ansell, 2013). This conceptual perspective may suggest useful additions to models of social-evaluative threat and physiological response (Dickerson et al., 2004; Gendolla & Richter, 2010). Also, by demonstrating the independent effects of status and acceptance stressors on physiological mechanisms believed to link psychosocial risk factors with CVD, the present results illustrate the value of the interpersonal perspective as an organizing framework in the study of stress and health (Smith & Cundiff, 2011; Smith, Gallo, & Ruiz, 2003; Smith, Traupman, Uchino, & Berg, 2010).

References


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