Received: 19 December 2022 | Revised: 31 May 2023 | Accepted: 8 June 2023

DOI: 10.1111/psyp.14379

PSYCHOPHYSIOLOGY SPR WILEY

ORIGINAL ARTICLE

Sense of power and markers of challenge and threat during extra-dyadic problem discussions with romantic partners

Abriana M. Gresham[1] | **Brett J. Peters**[1] | **Ashley Tudder**[2] | **Jeffry A. Simpson**[3]

[1]Department of Psychology, Ohio University, Athens, Ohio, USA

[2]Department of Psychological and Brain Sciences, Washington University in St. Louis, St. Louis, Missouri, USA

[3]Department of Psychology, University of Minnesota, Twin Cities, Minneapolis, Minnesota, USA

Correspondence
Abriana M. Gresham, Department of Psychology, Ohio University, Athens, OH 45701, USA.
Email: ag890518@ohio.edu

Abstract

Power, the capacity to influence others while resisting their attempts at influence, has implications for a wide variety of individual- and relationship-level outcomes. One potential mechanism through which power may be associated with various outcomes is motivation orientation. High power has been linked to greater approach-oriented motivation, whereas low power has been linked to greater avoidance-oriented motivation. However, current research has mostly relied on artificially created relationships (and the power dynamics therein) in the lab to assess the associations between power and motivation orientations. Utilizing the Biopsychosocial Model of Challenge and Threat framework, the current study examined how power is related to physiological responses indicative of psychological challenge (i.e., approach) and threat (i.e., avoidance) during discussions of problems outside of the relationship between romantic partners. The primary hypothesis that higher power would be associated with more approach-oriented challenge and less avoidance-oriented threat was supported via self-reports, but not via physiological assessments. Instead, physiological assessments revealed that for those disclosing problems to high-power partners, greater power was associated with reactivity consistent with more avoidance-oriented threat and less approach-oriented challenge. This is the first research to examine associations between power and in vivo indices of challenge and threat during interactions between romantic partners. It advances our understanding of how power elicits motivation orientations and influences the stress response system by highlighting the importance of situational attributes (e.g., role during a conversation) that may undermine power during disclosures with a high-power partner.

KEYWORDS

challenge and threat, dyadic data analysis, relationships, sense of power

1 | INTRODUCTION

Power, the capacity to influence others while resisting their attempts at influence (Simpson et al., 2015), has implications for a wide variety of outcomes, particularly in romantic relationships. One potential mechanism through which power may be associated with these various outcomes is motivation orientation. High power has been linked to greater approach-oriented motivation and low power has been linked to greater avoidance-oriented motivation (Keltner et al., 2003). Current research, however, has mostly relied on self-report or artificially created relationships (and the power dynamics therein) in the lab to measure associations between power and motivation orientations. Utilizing a framework provided by the Biopsychosocial Model of Challenge and Threat (Blascovich, 2008; Blascovich & Mendes, 2010), the current study examines how a person's sense of power is related to physiological responses associated with approach (i.e., challenge) and avoidance (i.e., threat) motivation during extra-dyadic problem discussions with their current romantic partners. The current research is the first to examine the relation between power and in vivo indices of challenge and threat during interactions between romantic partners to advance our understanding of how power elicits motivation orientations and impacts stress response systems.

1.1 | Sense of power in interpersonal relationships

Power is a fundamental feature of social relationships (Keltner et al., 2003). The amount of power an individual has is shaped by characteristics such as their personal attributes (e.g., attractiveness; Fletcher et al., 1999) and personality traits (e.g., extraversion; McCrae & Costa, 1987). These characteristics give rise to resources, such as expertise and access to information, that allow individuals to influence or resist influence from others (French & Raven, 1959). However, power is an inherently interpersonal quality in that the amount of power an individual has is often dependent on others (Anderson et al., 2012; Emerson, 1962; Simpson et al., 2015; Thibaut & Kelley, 1959). Power, therefore, may be particularly important in shaping outcomes for both individuals *and* close others.

Power has implications for outcomes across a variety of domains including workplace relationships, friendships, and family structures. In romantic relationships, power is a key determinant of individual outcomes such as depression, well-being, and likelihood of violence victimization (Galliher & Rostosky, 1999; Renzetti, 1988; Walsh, 1989) and relationship outcomes like satisfaction, trust, and intimacy (Grauerholz, 1987; Gray-Little & Burks, 1983; Peplau et al., 1982). Notably, a person's *sense* of power in their relationship is uniquely associated with their relationship quality after accounting for measures that approximate *actual* control over resources (e.g., status; Körner & Schütz, 2021). Viewed more broadly, *sense of power* is one's general perception of their capacity to influence others, and reflects beliefs about one's ability to influence others across a variety of relationships (e.g., friendships, romantic partnerships, familial relationships; Anderson et al., 2012).

Although power has clear implications for relationships and personal outcomes, recent research has highlighted potential ambiguities in the way that power has been measured to explain these outcomes (Körner & Schütz, 2021; Overall et al., 2022). For example, studies that take a categorical approach to assessing power dynamics often classify participants as being high-power, equal-power (i.e., egalitarian), or low power in their relationships (Gray-Little & Burks, 1983). This method is limited in that it does not differentiate egalitarian couples in which both partners are high (vs. low) in power. Further, it does not differentiate effects of actor power from those of partner power. Actor power is the capacity an individual (i.e., an actor) has to influence their partner, whereas partner power is the capacity for partners to influence actors. As Overall et al. (2022) highlight, using assessments that conflate actor and partner power limit the ability of researchers to determine whether it is low actor power or high partner power that leads to negative outcomes. Thus, treating actor and partner power as distinct constructs is necessary to fully understand the outcomes associated with power dynamics in romantic relationships.

1.2 | Motivation and power

The Approach/Inhibition Theory of Power posits that consequences of power result from differential activation of approach or avoidance (i.e., inhibition) tendencies (Keltner et al., 2003). Specifically, because of the varying resources available to them, high- and low-power individuals should experience different motivation orientations when faced with goal-relevant stimuli. When individuals have higher power, they are likely to appraise more resources to cope and fewer demands, allowing them to better align their behavior and preferences with their goals. That is, their relatively lower demands and greater resources to cope should lead higher-power individuals to seek out their desired outcomes. Alternatively, individuals lower in power should adopt an avoidance orientation because they appraise their resources to be more limited,

leading them to be less able to cope with demands and motivating them to avoid negative outcomes.

The overlap between outcomes associated with high and low levels of power and approach and avoidance orientations in romantic partnerships suggests that one's motivation orientation may be a key mechanism by which power influences both individual and relationship-level outcomes. For example, partners who have equal amounts of power tend to experience greater relationship satisfaction (Peplau et al., 1982), which parallels findings showing that partners who have approach orientations tend to experience greater relationship satisfaction, particularly when their partners are also approach-oriented (Impett et al., 2010). Additionally, just as avoidance-oriented individuals typically avoid interactions with their partners that could result in conflict (Impett et al., 2008; Impett & Gordon, 2010), individuals with less power in their romantic relationship tend to avoid expressing complaints or emotions to their partner in order to avert conflict (Cloven & Roloff, 1993; Overall et al., 2022).

Although power and motivation are linked in the Approach-Inhibition Theory of Power (Keltner et al., 2003) and are associated with similar relationship outcomes (Cloven & Roloff, 1993; Impett et al., 2008, 2010; Impett & Gordon, 2010; Peplau et al., 1982), these findings have primarily been documented via self- and partner-reports. To date, little if any work has examined whether or how power is associated with motivation orientations during goal-relevant interactions between romantic partners in vivo, bypassing some of the limitations associated with self- or partner-reports.

One type of interaction that may be particularly relevant to power dynamics in relationships is extra-dyadic problem discussions (i.e., problems that exist outside of the relationship). Romantic partners are often a source of support when partners must deal with issues outside their relationship (e.g., at work, with school, among peers; Clark & Mils, 1993; Collins & Feeney, 2000; Reis et al., 2004). Understanding whether and how power promotes the adoption of approach or avoidance orientations during such interactions could help to explain the differential individual- and relationship-level outcomes that high- and low-power partners frequently experience in relationship contexts (Gable & Impett, 2012).

1.3 | The biopsychosocial model of challenge and threat

One way to examine momentary motivation orientations is through physiological markers of challenge and threat. The Biopsychosocial (BPS) Model of Challenge and Threat (Blascovich, 2008; Blascovich & Mendes, 2010; Blascovich & Tomaka, 1996) provides a theoretical framework to examine motivation orientations related to power within romantic relationships. The BPS Model suggests that both appraisals of demands (e.g., effort, uncertainty) and appraisals of resources (e.g., ability, familiarity) determine biological responses to goal-relevant situations (e.g., discussions of problems with one's partner; Blascovich & Mendes, 2010; Jamieson et al., 2018). When individuals perceive that they have sufficient resources to cope with perceived demands, they usually exhibit an approach-oriented challenge response in which their body "readies itself" to cope with a stressor. Alternatively, when appraisals of demands outweigh the resources needed to cope, individuals often exhibit an avoidance-oriented threat response, which prompts their body to avoid harm or damage. Importantly, challenge and threat exist as ends of a continuum of reactivity on which alterations in appraisals of resources and demands move individuals toward more threat (and less challenge) or toward more challenge (and less threat).

Challenge and threat are distinguished by differential patterns of cardiovascular responses. Both challenge and threat responses activate the sympathetic-adrenal-medullary (SAM) axis (Blascovich & Mendes, 2010). The SAM axis is initially stimulated by activation of the hypothalamus in response to a stressor. The hypothalamus activates the adrenal medulla, prompting the release of catecholamines such as epinephrine (i.e., adrenaline) and norepinephrine. The half-life of catecholamines is only a few minutes. Thus, quickly after the stressor subsides, the body returns to a homeostatic state. Threat states, along with the activation of the SAM axis, are associated with activation of the hypothalamic–pituitary–adrenal (HPA) axis (Blascovich & Mendes, 2010). The HPA-axis pathway is triggered by the activation of the hypothalamus to secrete corticotrophin-releasing hormone (CRH). CRH acts on the pituitary gland, which then secretes adrenocorticotropic hormone (ACTH) to the adrenal glands. In response, the adrenal glands secrete cortisol, a catabolic hormone. Cortisol has a half-life of over an hour, which produces a more prolonged stress response compared to the SAM axis alone.

Both the SAM axis and the HPA-axis have downstream effects on the cardiovascular system. Activation of the SAM axis is associated with greater sympathetic arousal, as indicated by a shortened pre-ejection period (PEP; the time between the left ventricle of the heart contracting and the aortic valve opening), promotes cardiac efficiency, and leads to dilation of the peripheral vasculature. If the HPA-axis is also activated, the effects of the SAM axis will be modulated (Golczynska et al., 1995; Pavcovich & Valentino, 1997), leading to unchanged or reduced cardiac efficiency and constriction of the peripheral vasculature.

Therefore, cardiac output (CO), a measure of cardiac efficiency, increases during challenge responses and decreases or stays the same (relative to resting baseline) during threat responses, whereas total peripheral resistance (TPR), a measure of vascular resistance, decreases during challenge and increases during threat (Blascovich, 2008; Blascovich & Mendes, 2010; Seery, 2013).

Although challenge and threat physiological responses do not necessarily measure approach or avoidance motivation states directly, existing accounts justify their use as indicators of approach-avoidance orientations in particular contexts, especially goal-relevant situations (Blascovich, 2008). Theoretically, because challenge and threat states are informed by appraisals of situational demands and available resources to cope with those demands, greater challenge and less threat states should predict greater approach-oriented motivation, whereas greater threat and less challenge states should predict greater avoidance-oriented motivation (Jamieson, 2017). Experimental evidence supports this idea. Both challenge and threat appraisals (Elliot & Harackiewicz, 1996) and physiological responses (Chalabaev et al., 2009) are related to experimentally manipulated performance approach and avoidance goals, and challenge-threat physiological responses are also associated with approach and avoidance-oriented nonverbal behaviors (Beltzer et al., 2014; Mendes, Blascovich, et al., 2007; Weisbuch et al., 2009). More indirectly, anger, an emotion associated with approach-oriented behavioral systems (Carver & Harmon-Jones, 2009) is linked to physiological responses indicative of challenge (Jamieson et al., 2013). Further, because self-report assessments of approach-avoidance motivations during a conversation would disrupt its natural flow, the use of physiological indicators of challenge and threat during the conversation allows one to bypass self-reports, permitting conversations to unfold uninterrupted (Seery, 2013).

By integrating the BPS Model of Challenge and Threat with theories of motivation and power, we can examine the motivation orientations that power elicits during actual interactions between romantic partners. Since greater power tends to be associated with approach motivations, individuals with higher levels of power should exhibit greater approach-oriented challenge and less avoidance-oriented threat responses during goal-relevant interactions with their partner given their greater perceived resources and lower perceived demands. In support of this, experimental manipulations of power during simulated social interactions with nonintimates (i.e., priming power before giving a recorded speech, role-playing as a seller of a mobile phone plan to a "buyer") reveal that individuals primed with high power demonstrate patterns of physiological activity that are consistent with approach-oriented challenge responses, whereas individuals primed with low power demonstrate patterns of physiological activity that are consistent with more avoidance-oriented threat responses (Scheepers et al., 2012).

Although prior research supports that experimental manipulations of power are related to challenge and threat responses during simulated social interactions (Scheepers et al., 2012), no research has evaluated whether or how power shapes physiological challenge and threat responses during actual social interactions in established relationships. Existing work has demonstrated that romantic partners tend to experience different outcomes based in part on whether each partner experiences more approach- or avoidance-oriented motivation (e.g., relationship satisfaction, individual well-being; Gable & Impett, 2012). As such, evaluating the effects of power in established romantic relationships would provide more ecologically valid insights into whether and how power shapes motivation during daily couple interactions, many of which could have important implications for individual- and relationship-level outcomes.

1.4 | The current study

The current study integrates theories of power, motivation, and the BPS Model of Challenge and Threat to examine whether and how power predicts motivationally tuned physiological responses during interactions between romantic partners. To do so, we used an existing dataset to examine how power was related to in vivo physiological responses during a lab task in which one individual (the *discloser*) revealed a problem that they were currently dealing with outside of the relationship to their partner (the *responder*). The primary research question centered on the extent to which one's sense of power was associated with their physiological responses during this extra-dyadic problem discussion task. We predicted that power would be associated with physiological indices of challenge and threat, such that higher levels of power would be associated with a more approach-oriented challenge response (marked by a shortened PEP, increases in CO, and decreases in TPR relative to baseline) and a less avoidance-oriented threat response (marked by a shortened PEP, little-to-no change in CO, and increases in TPR relative to baseline) during the problem-oriented conversation with their partners.

Much of the existing literature on effects of power has used metrics that conflate actor and partner power (Overall et al., 2022). Thus, we adopted a dimensional approach to examine whether partner power also predicted physiological indicators of challenge and threat. This allowed us to investigate several different power

dynamics that may exist in romantic relationships (e.g., low–low, low–high, high–low, and high–high patterns) and to examine potentially important interaction effects that could provide a more nuanced understanding of how power is related to momentary, motivationally oriented physiological responses during extra-dyadic problem conversations.

Our secondary research question focuses on how power is associated with self-reported appraisals of resources and demands before and after the conversation. Despite past research demonstrating that appraisals of resources and demands do not necessarily occur through conscious processes (Blascovich & Mendes, 2010; Jamieson, 2017) and, therefore, might not be consistent with physiological markers of these appraisals (Peters & Jamieson, 2016; Tudder et al., 2020), research reliably links higher power with more approach-oriented motivation and behavior (Keltner et al., 2003; Overall et al., 2022) and with reduced fear and anxiety during social stressors (Schmid & Schmid Mast, 2013). Therefore, we predicted that higher power would be associated with self-reported appraisals of greater coping resources relative to situational demands (i.e., greater challenge and less threat).

Finally, exploratory analyses examined the extent to which conversation role (discloser vs. responder) moderated the association between power and physiological reactivity. The unique demands of each role assignment may interact with power to produce differential physiological activity. For example, if high-power partners typically approach problem-oriented discussions with their partner (i.e., tend to adopt the "discloser" role; Gable & Impett, 2012; Keltner et al., 2003), they may react differently when placed in the responder role than in the discloser role. Indeed, previous research using a similar protocol has found conversation role to be a moderating factor between trait measures of dominance and physiological reactivity (Tudder et al., 2020). However, research by Tudder and colleagues (2020) focused on a discussion between partners involving a hypothetical relationship transition, not an extra-dyadic problem discussion. Therefore, we did not generate specific hypotheses about how conversation role might moderate associations between power and indices of approach and avoidance motivation during extra-dyadic problem discussions.

2 | METHOD

The proposed research used data collected as part of a larger study examining co-rumination in romantic relationships during extra-dyadic problem discussions. The study was not preregistered. Materials and data are available upon request.

2.1 | Participants and power

Participants were recruited through Ohio University's SONA system, campus-wide e-mails, and flyers. Before participation, interested couples were screened for exclusion criteria (e.g., presence of a cardiac pacemaker, diagnosis of hypertension, use of medications that may interact with cardiovascular function) and inclusion criteria (e.g., being at least 18 years old and in a romantic relationship with each other for at least 3 months). A total sample of 280 individuals representing 140 dyads participated in the study. One dyad was excluded for not meeting inclusion criteria. This resulted in a final sample of 139 dyads ($N = 278$ individuals). Participants missing self-report or physiological data were excluded from relevant analyses. Participants were primarily white ($N = 235$), non-Hispanic ($N = 264$), and had an average age of 20.2 years (SD = 2.49). Dyads were primarily heterosexual ($N = 125$ dyads), and participants reported being together for an average of 22.43 months (SD = 22.49). Full sample characteristics appear in Table 1. To determine sufficient sample size, a series of Monte Carlo simulations were conducted with equality constraints for the paths modeling effects of each dyad (Lane & Hennes, 2018; Mehl & Conner, 2012). Past dyadic datasets with similar physiological outcome measures (i.e., PEP, CO, and TPR) and experimental conditions (e.g., a dyad-level experimental condition and conversation role), as well as a trait-like continuous variable were used to approximate effects (Peters et al., 2014, 2018, 2019; Peters & Jamieson, 2016). Based on hypothesized effects with an estimated small-to-medium effects size ($r \sim 0.15$) and consistent with past observed effect sizes, it was determined that 120 dyads were needed to achieve sufficient power (>0.80) for a three-way interaction effect. Thus, the final sample size allowed for proper tests of the proposed and exploratory hypotheses.

2.2 | Procedure

All components of the study procedure were reviewed and approved by Ohio University's institutional review board. Couples arrived at the lab together and were separated into adjacent, private testing rooms where each partner completed an initial intake interview to confirm their eligibility. After providing consent, each participant completed the Sense of Power Scale (Anderson et al., 2012) and a problem-generation questionnaire, which prompted them to identify and describe two personal problems that did not include their romantic partner, rating the importance of the problem and how stressful it was (see Measures section). Couple members (partners) were then randomly assigned to roles for their problem discussion task: the

TABLE 1 Sample characteristics.

	M (SD)	Range
Age[a]	20.21 (2.50)	18–36
Relationship Length[b]	22.43 (22.49)	1–124
	N	**%**
Gender[a]		
Man	131	48.30
Woman	138	50.90
Other	2	0.70
Race[a]		
White	235	86.70
Black/African American	16	5.90
Asian	7	2.60
Mixed/Other	13	4.80
Ethnicity[a]		
Hispanic/Latino	7	2.50
Non-Hispanic/Latino	264	97.40
Relationship status[c]		
Casual	4	1.50
Steady	32	11.70
Serious	222	81.30
Engaged	5	1.80
Married	10	3.70
Cohabitation status[c]		
Yes	69	25.30
No	204	74.70

Note: $N = 278$ except where 7[a], 6[b], and 5[c] individuals did not record a response. Age is measured in years. Relationship length is measured in months.

discloser (who would share one of their reported problems), and the responder (who would respond to their partner's [discloser's] problem) For a description of these instructions, see the online supplemental material (OSM).

After this baseline questionnaire period, physiological sensors were affixed to each participant. They were instructed to sit quietly for 5 min for a resting baseline assessment. Experimenters then informed each participant that they would be having a conversation about the discloser's problem. Because this study also examined co-rumination in romantic relationships and included an experimental manipulation of co-rumination, participants were given different instructions based on their condition assignment. A full overview of the co-rumination manipulation is presented in the OSM.

Participants were given three minutes to gather their thoughts on the topic, during which they responded to a brief questionnaire that assessed their stress appraisals regarding the upcoming conversation. Following the three-minute anticipation period, a portable wall separating the two participant rooms was collapsed and each couple engaged in an eight-minute conversation concerning the discloser's problem. At the end of the problem discussion, the wall was extended to separate each participant (partners) back into their private testing room where they answered an additional set of questionnaires that included a measure of stress appraisals during the conversation. After completing the entire study protocol, participants were debriefed and compensated with either a $16 e-gift card or two hours of course extra credit.

2.3 | Measures

Full versions of all scales can be found in the OSM.

2.3.1 | Sense of power

Each participant's personal sense of power was measured using the Sense of Power Scale (Anderson et al., 2012). This 8-item measure gauges an individual's general perceived ability to control or influence others across four domains: their ability to make decisions in relationships, their ability to influence others' behavior, their ability to influence others' opinions and beliefs, and their ability to satisfy their own wants within their relationships with others. Responses were averaged to form a composite that reflects how powerful each participant believed they were.

2.3.2 | Problem-generation questionnaire

This questionnaire prompted participants to write down two extra-dyadic problems (i.e., problems that were not about their partner or their relationship) that they were currently facing. Participants also reported how stressful this problem was on a scale from 1 (not at all) to 7 (very much). The problem that was rated as being most stressful for the discloser was used as the conversation topic. This type of questionnaire has been used in previous work to generate extra-dyadic problem discussion during laboratory protocols (Byrd-Craven et al., 2011; Rose et al., 2014; Tudder et al., 2023).

2.3.3 | Cardiovascular measures

During the baseline and problem conversation periods, electrocardiography (ECG), impedance cardiography (ICG), and blood pressure (BP) were collected. ECG

TABLE 2 Descriptive statistics for primary study variables.

	M	SD	Minimum	Maximum	α
Power[a]	4.85	0.79	2.00	6.75	0.78
PEP[d]	−6.19	10.06	−51.00	13.00	—
C/T index[e]	−0.0023	1.74	−8.29	5.36	—
Pre conversation appraisals[b]	2.61	1.76	0.00	7.00	0.714; 0.814
Post conversation appraisals[c]	3.13	2.02	0.00	7.00	0.743; 0.838

Note: $N = 278$ except where 5[a], 14[b], 22[c], 29[d], and 43[e] participants had missing data. α values for appraisals are presented for the resources composite (first) and the demands composite (second), separately.

and ICG (impedance magnitude, Z_0 and its derivative, dZ/dt) signals were collected at 1000 Hz with a MP160 Biopac system (Biopac Systems Inc.) during the baseline and conversation periods. BP readings (systolic blood pressure, SBP; diastolic blood pressure, DBP; mean arterial pressure, MAP) were collected every 2 min during the baseline and conversation periods using a Colin T105 blood pressure monitor (Colin Medical Instruments) with a cuff on participants' nondominant arm. All physiological measures were initiated and recorded from a control room, separate from participants' rooms. This method of dyadic physiological data collection has been used in previous related research (Peters et al., 2014, 2019; Peters & Jamieson, 2016; Tudder et al., 2020, 2023).

ECG and ICG were scored offline by trained personnel. Signals were visually examined for artifacts and ensemble averages were analyzed using MindWare software (MindWare Technologies). ECG and ICG data were analyzed in one-minute segments. B-points in the dZ/dt wave (opening of the aortic valve) and *Q*-points in the ECG wave (start of the left ventricle contraction) were calculated using the maximum slope change method. *R*-points in the ECG wave (left ventricle contraction) were detected by MindWare. Personnel blind to self-report ratings and conversation role assignment visually examined all B, Q, and R points and manually corrected erroneous placements, if necessary. ECG, ICG, and BP measures were used to determine pre-ejection period (PEP), cardiac output (CO), and total peripheral resistance (TPR). Reactivity scores for the conversation period were computed using a standard method in which scores obtained from the last minute of the baseline period (the most relaxed period) were subtracted from scores during the first minute of the target period (i.e., the most reactive minute of the problem discussion period). This method of using change scores between the last minute of baseline and the first minute of a target task has been psychometrically justified (see Llabre et al., 1991) and used extensively in research using the Biopsychosocial Model of Challenge and Threat (e.g., Blascovich et al., 1999; Jamieson et al., 2012, 2013; Mendes et al., 2001, 2002; Peters et al., 2014; Peters & Jamieson, 2016; Tudder et al., 2020).[1]

2.3.4 | Self-reported appraisals of resources and demands

Each participant completed a four-item questionnaire that assessed their appraisals of resources and demands immediately before and after the conversation with their partner (Beltzer et al., 2014; Mendes, Gray, et al., 2007). Two items assessed appraisals of resources (e.g., "I have the abilities to do well during the conversation") and two items assessed appraisals of demands (e.g., "The upcoming conversation is very demanding"). A challenge-threat ratio was created for both measurement periods by dividing the composite score for items assessing resources by the composite score for items assessing demands, with higher scores indicating greater challenge and less threat.

2.4 | Data analytic plan

Descriptive and reliability statistics for study variables appear in Table 2. Zero-order correlations between all primary variables appear in Table 3. To test the hypotheses, a series of Actor-Partner Interdependence Models (APIM) were conducted using the MIXED procedure in SPSS 28. Using this procedure allowed us to account for the statistical dependence between partners in our dyadic data (Kenny et al., 2006) and includes both actor and partner power in each model. Dyad members (partners) were distinguished based on their role in the conversation (i.e., whether they were assigned to the discloser role or the responder role). While not a focus of this research, all analyses controlled for experimental condition (i.e., co-rumination vs. natural; contrast coded such that

[1]In response to a reviewer's request, we ran additional analyses that included the challenge and threat index from minutes 1, 3 and 5 in each conversation. Findings from these additional analyses were consistent with all significant effects reported in the main manuscript and are not discussed further.

TABLE 3 Zero-order correlations among primary study variables.

	1	2	3	4	5
1. Actor power	—				
2. Partner power	0.034	—			
3. PEP reactivity	0.106	0.080	—		
4. C/T index	0.079	0.016	0.552*	—	
5. Pre conversation appraisals	0.225*	0.083	0.031	0.063	—
6. Post conversation appraisals	0.235*	0.106	−0.021	0.042	0.656*

*$p < .001$.

−1 = natural condition and 1 = co-rumination condition). There were no significant differences in participants' sense of power across condition assignment or conversation role. A full description of and findings related to the co-rumination manipulation can be found in the OSM.

To test whether participants experienced sympathetic arousal during the conversation relative to baseline, PEP reactivity scores were regressed onto: (1) actor power (grand-mean centered), (2) partner power (grand-mean centered), (3) conversation role, and (4–7) all possible interaction effects (actor power × partner power, actor power × role, partner power × role, actor power × partner power × role). To determine how actor and partner power were associated with physiological indexes of challenge and threat, CO and TPR reactivity scores were first transformed into a challenge/threat (C/T) index by adding standardized TPR to the inverse of standardized CO, such that higher values indicated more threat (e.g., Blascovich et al., 2004). This index was then regressed on to: (1) actor power (grand-mean centered), (2) partner power (grand-mean centered), (3) conversation role, and (4–7) all possible interaction effects (actor power × partner power, actor power × role, partner power × role, actor power × partner power × role). Additionally, supplemental analyses that explore effects on CO and TPR separately are presented the OSM.

To determine how actor and partner power were associated with self-reported appraisals of resources and demands, the ratio of self-reported appraisals of resources to demands before and after the conversation were regressed on to: (1) actor power, (2) partner power, (3) conversation role, and (4–7) all possible interaction effects (actor power × partner power, actor power × role, partner power × role, actor power × partner power × role).

3 | RESULTS

Across all results, higher or lower power is relative to averages of the sample. See Tables 4 and 5 for a full summary of analyses.

3.1 | Physiological indicators of challenge and threat

3.1.1 | PEP

On average, participants demonstrated a shortened PEP during the conversation compared to baseline, indicative of greater sympathetic arousal and task engagement, $B = -6.31$, 95% CI [−7.60, −5.01], $t = -9.64$, $p < .001$, $r = .67$. There were no effects of actor or partner power or role on PEP reactivity.

3.1.2 | C/T index

There were no main effects of actor power, partner power, or role on the C/T index. However, there was a significant interaction between actor power, partner power, and role, $B = 0.47$, 95% CI [0.08, 0.86], $t = 2.38$, $p = .019$, $r = .22$ (see Figure 1). Among disclosers with high-power partners, higher actor power was associated with more threat, $B = 0.713$, 95% CI [0.082, 1.344], $t = 2.24$, $p = .027$, $r = .21$. No other simple effects tests were significant

3.2 | Self-reported appraisals of resources and demands

3.2.1 | Preconversation self-reported appraisals of resources and demands

There was a main effect of actor power such that those with higher levels of power reported greater resources relative to demands (i.e., greater challenge), $B = 0.43$, 95% CI [0.16, 0.70], $t = 3.14$, $p = .002$, $r = .20$. There was also a marginal effect for role such that disclosers reported greater resources relative to demands, $B = 0.17$, 95% CI [−0.03, 0.37], $t = 1.71$, $p = .090$, $r = .15$. Partner power and interaction effects were not significant.

TABLE 4 Effects of actor and partner power, role, and condition on PEP and the C/T index.

						95% CI	
	B	SE	*t*	*r*	*p*	LL	UL
PEP							
Intercept	−6.31	0.65	−9.64	0.67	<.001	−7.60	−5.01
Actor power	0.98	0.87	1.13	0.08	.261	−0.74	2.70
Partner power	1.26	0.86	1.47	0.10	.144	−0.43	2.95
Role	−0.76	0.66	−1.15	0.11	.253	−2.06	0.55
Actor power × partner power	1.50	1.10	1.37	0.13	.174	−0.68	3.68
Actor power × role	0.58	0.86	0.68	0.05	.499	−1.12	2.28
Partner Power × role	0.31	0.85	0.37	0.03	.715	−1.37	2.00
Actor power × partner power × role	0.37	1.11	0.34	0.03	.737	−1.82	2.57
Condition	−0.28	0.61	−0.46	0.04	.645	−1.49	0.93
C/T index							
Actor power	0.12	0.16	0.74	0.05	.461	−0.19	0.43
Partner power	0.04	0.16	0.22	0.02	.824	−0.28	0.35
Role	−0.01	0.12	−0.11	0.01	.915	−0.24	0.22
Actor power × partner power	0.09	0.20	0.44	0.04	.658	−0.31	0.49
Actor power × role	0.15	0.16	0.99	0.07	.323	−0.15	0.46
Partner power × role	−0.04	0.16	−0.27	0.02	.785	−0.36	0.27
Actor power × partner power × role	0.47	0.20	2.38	0.22	.019	0.08	0.86
Condition	−0.18	0.12	−1.53	0.14	.129	−0.42	0.05

Note: Actor and partner power were grand-mean centered. Role was contrast coded −1 = responder, 1 = discloser. Condition was contrast coded −1 = natural condition, 1 = co-rumination condition.

Abbreviations: CI, confidence interval; LL, lower limit; UL, upper limit.

3.2.2 | Postconversation appraisals of resources and demands

There was a main effect of actor power such that those higher in power reported greater resources relative to demands than those lower in power, $B = 0.49$, 95% CI [0.18, 0.80], $t = 3.09$, $p = .002$, $r = .20$. No other effects were significant.

4 | DISCUSSION

The current study integrated theories of power, motivation, and the BPS Model of Challenge and Threat to investigate whether and how power predicts motivationally tuned physiological responses during interactions between romantic partners. Relative to baseline, we found that participants were more sympathetically aroused during the conversation (indicated by a shortened PEP), allowing us to interpret patterns of CO and TPR reactivity as markers of approach-oriented challenge and avoidance-oriented threat. The primary hypothesis—that individuals with greater power would demonstrate physiological reactivity consistent with greater challenge and less threat—was not supported (i.e., there was no main effect of actor power on the C/T index). However, we found that actor power, partner power, and role during the conversation interacted to predict physiological indicators of challenge and threat. Specifically, disclosers interacting with higher power responding partners exhibited physiological responses consistent with greater threat and less challenge when they (disclosers) were higher in power.

Previous research suggests that people who are higher in power should be less avoidance-oriented and more approach-oriented (i.e., less threatened and more challenged; Keltner et al., 2003). Our physiological findings, however, indicate that this was not the case for individuals disclosing personal, extra-dyadic problems to high-power partners. In this case, having more power was associated with physiological markers indicative of more

TABLE 5 Effects of actor and partner power, role, and condition on pre- and postconversation appraisals.

						95% CI	
	B	SE	*t*	*r*	*p*	LL	UL
Pre conversation appraisals							
Actor power	0.43	0.14	3.14	0.20	.002	0.16	0.70
Partner power	0.09	0.14	0.65	0.04	.514	−0.18	0.36
Role	0.17	0.10	1.71	0.15	.090	−0.03	0.37
Actor power × partner power	−0.18	0.18	−0.95	0.09	.342	−0.54	0.19
Actor power × role	0.16	0.14	1.15	0.07	.251	−0.11	0.43
Partner power × role	0.11	0.14	0.76	0.05	.447	−0.17	0.38
Actor power × partner power × role	−0.03	0.17	−0.16	0.01	.870	−0.36	0.30
Condition	−0.32	0.11	−2.90	0.25	.004	−0.54	−0.10
Postconversation appraisals							
Actor power	0.49	0.16	3.09	0.20	.002	0.18	0.80
Partner power	0.13	0.16	0.81	0.05	.418	−0.18	0.44
Role	0.07	0.11	0.68	0.06	.499	−0.14	0.29
Actor power × partner power	−0.12	0.22	−0.54	0.05	.591	−0.55	0.32
Actor power × role	0.25	0.16	1.59	0.11	.112	−0.06	0.56
Partner power × role	−0.01	0.16	−0.06	0.00	.951	−0.32	0.30
Actor power × partner power × role	−0.30	0.18	−1.66	0.15	.100	−0.65	0.06
Condition	−0.45	0.14	−3.35	0.29	.001	−0.72	−0.19

Note: Actor and partner power were grand-mean centered. Role was contrast coded −1 = responder, 1 = discloser. Condition was contrast coded −1 = natural condition, 1 = co-rumination condition.

Abbreviations: CI, confidence interval; LL, lower limit; UL, upper limit.

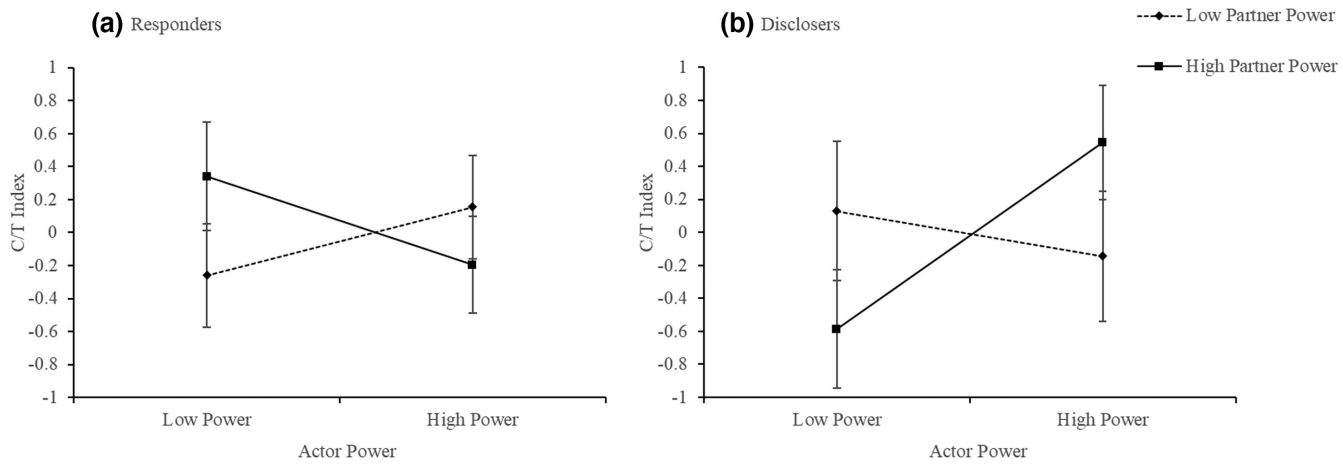

FIGURE 1 C/T index reactivity by actor power, partner power, and role (panel A: responders, panel B: disclosers). High and low actor and partner power refer to 1 SD above and below the sample mean, respectively. Error bars represent ±1 standard error.

avoidance-oriented motivation, whereas having less power was associated with physiological markers indicative of more approach-oriented motivation. One potential explanation for this finding is that, for high-power individuals, disclosing a personal problem to a high-power partner could threaten the discloser's power. Threats to

power have been described as either external factors (e.g., uncertainty, power illegitimacy, power instability) or internal factors (e.g., anxiety, power motives, incompetence, feelings of low power, submissive traits) that move power holders away from typically assumed approach-oriented motivation and toward avoidance-oriented motivation (Deng et al., 2018). That is, even individuals who are high in power may experience more avoidance-oriented motivation when their power feels threatened.

In this study, threat to power could arise from multiple sources that encompass qualities of the actor, the partner, and/or the situation. Disclosing an ongoing, extra-dyadic problem, for example, may make feelings of stress and anxiety related to the problem salient, which, in turn, may serve as an internal threat to one's assessment of their own power (Deng et al., 2018). This threat may be compounded by interacting with a high-power partner who may not meet one's interaction expectations, further contributing to uncertainty. For instance, self-disclosers may often expect to be met with responsiveness from their partners (i.e., behavior that demonstrates understanding, validation, and caring; Reis et al., 2004). However, it is possible that in some contexts high-power partners may be less likely to be responsive (Galinsky et al., 2006; Gordon & Chen, 2013), contradicting high-power actors' expectations about the conversation. Additionally, for individuals with high-power partners, having higher power may be threatening if that power can be lost (i.e., avoiding losses), whereas having low power leaves room for individuals to approach gains (Kahneman & Tversky, 1984). For disclosers, the potential loss of power may become more salient as power increases, prompting the avoidance-related physiological response that we observed rather than the approach-oriented response that we expected (Keltner et al., 2003).

Interestingly, however, our secondary hypothesis was fully supported. A main effect of power revealed that higher power was associated with self-reported appraisals indicative of having more resources to cope relative to current situational demands. These effects were present for assessments both before and after the conversation. That is, higher power was associated with appraisals more indicative of approach-oriented motivation while individuals prepared for the conversation and after it concluded. This finding is consistent with the Approach/Inhibition Theory of Power (Keltner et al., 2003) as well as empirical tests of this theory (Anderson & Berdahl, 2002). In sum, although higher power is associated with both pre- and postconversation appraisals more consistent with approach-oriented challenge, physiological indicators of challenge and threat during the conversation highlight that high (vs. low) power actors may be more avoidance-oriented in situations where there are potential external or internal threats to their power (Deng et al., 2018). Relative to other types of relationships, partners in romantic relationships may be able to mutually pose threats to each other's power, rendering the power dynamics in romantic relationships unique compared to other relationship types.

4.1 | Limitations and future directions

Although the current research has notable strengths such as measuring and modeling both actor and partner power and assessing physiological indicators of challenge and threat during an important problem discussion between romantic partners, some limitations should be addressed in order to move this line of work forward. First, this study assessed power by asking participants to report on their sense of power "in their relationships with others" instead of assessing it in their current romantic relationship. Power is, in part, relationship-specific in that one's sense of power in their relationship with their romantic partner may not be the same as their sense of power in their relationship with their best friend or current romantic partner. Accordingly, future work should incorporate relationship-specific measures of power (such as the Relationship Power Inventory; Farrell et al., 2015) to more accurately estimate the effect of relationship-specific power (vs. general power) on approach and avoidance motivations. Further, given the importance of power across a variety of social relationships, future work should also investigate how power is associated with motivation-related responses in different contexts (e.g., in the workplace) and relationships (e.g., boss and employee). That being said, some prior research has found that a person's sense of power in one domain (e.g., in a friendship) tends to be moderately and positively correlated with their sense of power in another domain (e.g., in their romantic relationship; Anderson et al., 2012). Thus, general sense of power should approximate the sense of power in a person's current romantic relationship and provides a first in vivo assessment that uses measures comparable to a large body of existing power-related research.

Additionally, the current study is demographically limited in that it contains mostly young, unmarried, and noncohabitating couples with an average relationship length of less than 2 years. Future work should determine whether and how power shapes motivation orientations during problem discussion conversations by evaluating whether these effects are replicable in older, more established, and married/cohabitating couples where power dynamics may be different. Some prior research suggests that dating and married couples have different "stakes" in relationship maintenance. In dating

couples, for example, overtly and explicitly exercising power may disrupt the relationship and risk dissolution, whereas in married or more committed couples, the explicit exercise of power may be more normal and not generate such risks (Worley & Samp, 2019). Future research should evaluate whether the effects observed in this study extend beyond young, primarily dating couples and whether they are potentially influenced by the "stakes" of relationship maintenance. Also, given that this study was conducted among mostly White and non-Hispanic/Latinx heterosexual couples in the United States, our findings may not generalize to other relationship structures or cultural, racial, or ethnic backgrounds where experiences and the adaptiveness of approach-oriented responding in interpersonal dynamics vary (Boiger et al., 2022).

Future studies can extend other experimental limitations of this work in a few ways. Although the conversation prompt used in this study was meant to facilitate an extra-dyadic problem discussion, responders reported being familiar with the problem that their partner disclosed (1 = not familiar at all, 5 = extremely familiar; $M = 4.15$, $SD = 1.001$) and, on average, both disclosers and responders reported previously discussing the problem before the laboratory session (1 = never, 5 = very often; $M_{Disclosers} = 3.32$, $SD_{Disclosers} = 0.806$; $M_{Responders} = 3.62$, $SD_{Responders} = 0.812$). Given that these problems were generally not new to the couples, it is possible that the extra-dyadic problem was related to an intradyadic issue. Future work might incorporate discussions of conflict between partners to determine whether the way that power is associated with markers of challenge and threat generalizes to other contexts. Further, although we view the in vivo method of this study as a strength, there are some tradeoffs to internal validity that come at the expense of using this type of immersive method (Baucom et al., 2018; Kamarck et al., 2003). Specifically, we did not experimentally manipulate power in our study, and even though we suggest that actors who are high in power may experience more avoidance-oriented motivation when their power feels threatened, we did not directly measure or manipulate threats to power. Future work could incorporate an experimental condition in which power is manipulated to test whether our effects are the result of individual differences in sense of power, situational power, or how those factors interact to predict approach and avoidance-related responses.

Finally, because the three-way interaction effect that we found was not hypothesized, future experimental work will be necessary to replicate this finding and expand on our understanding of the discrepancy between self-report and physiological markers of challenge and threat. Extensions to this line of research should include neuroendocrine markers of stress. In particular, measuring cortisol reactivity as a marker of HPA-axis activity could corroborate our findings related to cardiovascular challenge and threat. Additionally, measuring testosterone reactivity, which has implications for power-relevant interactions between romantic partners (e.g., Dhillon et al., 2020; Makhanova et al., 2018; Peters et al., 2016), might reveal important physiological mechanisms that drive submission or dominance in these contexts.

5 | CONCLUSION

The current study has both methodological and theoretical implications for future research examining power in close relationships. First, these findings illustrate that one's general sense of power is related to motivation orientations during extra-dyadic problem discussions with a romantic partner and highlights the importance of adopting a dimensional approach when measuring power so both actor and partner effects can be modeled. This is the first study to examine associations between power and in vivo indices of challenge and threat during interactions between romantic partners. It reveals that there are discrepancies between self-report and physiological assessments of challenge and threat. Because appraisals of resources and demands are not a fully conscious process (Blascovich & Mendes, 2010), we do not necessarily interpret these findings as contradictory. Instead, we view them as highlighting the need for more comprehensive assessments of stress appraisals and physiological stress reactivity. Further, this study may suggest that actor, partner, and situational qualities interact to produce more avoidance-oriented threat responses in high (vs. low) power actors who are disclosing a problem to their high-power partner. Although these specific circumstances lead to more avoidance-oriented threat responses, individuals higher in power report feelings consistent with greater challenge-oriented responses, as expected by the Approach/Inhibition Theory of Power (Keltner et al., 2003). In conclusion, even though higher power appears to be associated with more approach-oriented motivation in general, high (vs. low) power actors tend to experience greater threat when disclosing personal problems to a high-power partner. Under these circumstances, high-power actors and perhaps couples in which both partners have high levels of "balanced" power may not be able to reap the personal and relational benefits typically associated with these power dynamics.

AUTHOR CONTRIBUTIONS

Abriana M. Gresham: Conceptualization; data curation; formal analysis; investigation; visualization; writing – original draft; writing – review and editing. **Brett**

J. Peters: Conceptualization; data curation; investigation; methodology; project administration; supervision; writing – original draft; writing – review and editing. **Ashley Tudder:** Data curation; investigation; methodology; project administration; writing – review and editing. **Jeffry A. Simpson:** Writing – review and editing.

DATA AVAILABILITY STATEMENT

Materials and data used in the manuscript are available upon request.

ORCID

Abriana M. Gresham https://orcid.org/0000-0001-6358-9893
Brett J. Peters https://orcid.org/0000-0002-6483-7198
Ashley Tudder https://orcid.org/0000-0002-9048-6678
Jeffry A. Simpson https://orcid.org/0000-0003-1899-2493

REFERENCES

Anderson, C., & Berdahl, J. L. (2002). The experience of power: Examining the effects of power on approach and inhibition tendencies. *Journal of Personality and Social Psychology*, *83*(6), 1362–1377. https://doi.org/10.1037/0022-3514.83.6.1362

Anderson, C., John, O. P., & Keltner, D. (2012). The personal sense of power. *Journal of Personality*, *80*(2), 313–344. https://doi.org/10.1111/j.1467-6494.2011.00734.x

Baucom, B. R. W., Baucom, K. J. W., Hogan, J. N., Crenshaw, A. O., Bourne, S. V., Crowell, S. E., Georgiou, P., & Goodwin, M. S. (2018). Cardiovascular reactivity during marital conflict in laboratory and naturalistic settings: Differential associations with relationship and individual functioning across contexts. *Family Process*, *57*(3), 662–678. https://doi.org/10.1111/famp.12353

Beltzer, M. L., Nock, M. K., Peters, B. J., & Jamieson, J. P. (2014). Rethinking butterflies: The affective, physiological, and performance effects of reappraising arousal during social evaluation. *Emotion*, *14*(4), 761–768. https://doi.org/10.1037/a0036326

Blascovich, J. (2008). Challenge and threat. In A. J. Elliot (Ed.), *Handbook of approach and avoidance motivation* (pp. 431–444). Psychology Press. https://doi.org/10.4324/9780203888148.ch25

Blascovich, J., & Mendes, W. B. (2010). Social psychophysiology and embodiment. In S. T. Fiske, D. T. Gilbert, & G. Lindzey (Eds.), *Handbook of social psychology* (Vol. *1*, 5th ed., pp. 194–227). John Wiley & Sons, Inc.. https://doi.org/10.1002/9780470561119.socpsy001006

Blascovich, J., Mendes, W. B., Hunter, S. B., & Salomon, K. (1999). Social "facilitation" as challenge and threat. *Journal of Personality and Social Psychology*, *77*(1), 68–77. https://doi.org/10.1037//0022-3514.77.1.68

Blascovich, J., Seery, M. D., Mugridge, C. A., Norris, R. K., & Weisbuch, M. (2004). Predicting athletic performance from cardiovascular indexes of challenge and threat. *Journal of Experimental Social Psychology*, *40*(5), 683–688. https://doi.org/10.1016/j.jesp.2003.10.007

Blascovich, J., & Tomaka, J. (1996). The biopsychosocial model of arousal regulation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. *28*, pp. 1–51). Academic Press. https://doi.org/10.1016/S0065-2601(08)60235-X

Boiger, M., Kirchner-Häusler, A., Schouten, A., Uchida, Y., & Mesquita, B. (2022). Different bumps in the road: The emotional dynamics of couple disagreements in Belgium and Japan. *Emotion*, *22*, 805–819. https://doi.org/10.1037/emo0000910

Byrd-Craven, J., Granger, D. A., & Auer, B. J. (2011). Stress reactivity to co-rumination in young women's friendships: Cortisol, alpha-amylase, and negative affect focus. *Journal of Social and Personal Relationships*, *28*(4), 469–487. https://doi.org/10.1177/0265407510382319

Carver, C. S., & Harmon-Jones, E. (2009). Anger is an approach-related affect: Evidence and implications. *Psychological Bulletin*, *135*(2), 183–204. https://doi.org/10.1037/a0013965

Chalabaev, A., Major, B., Cury, F., & Sarrazin, P. (2009). Physiological markers of challenge and threat mediate the effects of performance-based goals on performance. *Journal of Experimental Social Psychology*, *45*(4), 991–994. https://doi.org/10.1016/j.jesp.2009.04.009

Clark, M. S., & Mils, J. (1993). The difference between communal and exchange relationships: What it is and is not. *Personality and Social Psychology Bulletin*, *19*(6), 684–691. https://doi.org/10.1177/0146167293196003

Cloven, D. H., & Roloff, M. E. (1993). The chilling effect of aggressive potential on the expression of complaints in intimate relationships. *Communication Monographs*, *60*(3), 199–219. https://doi.org/10.1080/03637759309376309

Collins, N. L., & Feeney, B. C. (2000). A safe haven: An attachment theory perspective on support seeking and caregiving in intimate relationships. *Journal of Personality and Social Psychology*, *78*(6), 1053–1073. https://doi.org/10.1037/0022-3514.78.6.1053

Deng, M., Zheng, M., & Guinote, A. (2018). When does power trigger approach motivation? Threats and the role of perceived control in the power domain. *Social and Personality Psychology Compass*, *12*(5), e12390. https://doi.org/10.1111/spc3.12390

Dhillon, A., Denes, A., Crowley, J. P., Ponivas, A., Winkler, K. L., & Bennett, M. (2020). Does testosterone influence young adult romantic partners' accommodation during conversations about stressors? *Human Communication Research*, *46*(4), 444–469. https://doi.org/10.1093/hcr/hqaa008

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology*, *70*(3), 461–475. https://doi.org/10.1037/0022-3514.70.3.461

Emerson, R. M. (1962). Power-dependence relations. *American Sociological Review*, *27*(1), 31–41. https://doi.org/10.2307/2089716

Farrell, A. K., Simpson, J. A., & Rothman, A. J. (2015). The relationship power inventory: Development and validation. *Personal Relationships*, *22*(3), 387–413. https://doi.org/10.1111/pere.12072

Fletcher, G. J. O., Simpson, J. A., Thomas, G., & Giles, L. (1999). Ideals in intimate relationships. *Journal of Personality and Social Psychology*, *76*(1), 72–89. https://doi.org/10.1037/0022-3514.76.1.72

French, J. R. P., & Raven, B. (1959). The bases of social power. In D. E. Cartwright (Ed.), *Studies in social power* (pp. 259–269). Research Center for Group Dynamics, Institute for Social Research, University of Michigan.

Gable, S. L., & Impett, E. A. (2012). Approach and avoidance motives and close relationships. *Social & Personality Psychology Compass*, *6*(1), 95–108. https://doi.org/10.1111/j.1751-9004.2011.00405.x

Galinsky, A. D., Magee, J. C., Inesi, M. E., & Gruenfeld, D. H. (2006). Power and perspectives not taken. *Psychological Science*, *17*(12), 1068–1074. https://doi.org/10.1111/j.1467-9280.2006.01824.x

Galliher, R. V., & Rostosky, S. S. (1999). Power and psychological well-being in late adolescent romantic relationships. *Sex Roles*, *40*(9–10), 689–710. https://doi.org/10.1023/A:1018804617443

Golczynska, A., Lenders, J. W. M., & Goldstein, D. S. (1995). Glucocorticoid-induced sympathoinhibition in humans. *Clinical Pharmacology & Therapeutics*, *58*(1), 90–98. https://doi.org/10.1016/0009-9236(95)90076-4

Gordon, A. M., & Chen, S. (2013). Does power help or hurt? The moderating role of self–other focus on power and perspective-taking in romantic relationships. *Personality and Social Psychology Bulletin*, *39*(8), 1097–1110. https://doi.org/10.1177/0146167213490031

Grauerholz, E. (1987). Balancing the power in dating relationships. *Sex Roles*, *17*(9–10), 563–571. https://doi.org/10.1007/BF00287736

Gray-Little, B., & Burks, N. (1983). Power and satisfaction in marriage: A review and critique. *Psychological Bulletin*, *93*(9), 513–538. https://doi.org/10.1037/0033-2909.93.3.513

Impett, E. A., & Gordon, A. M. (2010). Why do people sacrifice to approach rewards versus to avoid costs? Insights from attachment theory. *Personal Relationships*, *17*(2), 299–315. https://doi.org/10.1111/j.1475-6811.2010.01277.x

Impett, E. A., Gordon, A. M., Kogan, A., Oveis, C., Gable, S. L., & Keltner, D. (2010). Moving toward more perfect unions: Daily and long-term consequences of approach and avoidance goals in romantic relationships. *Journal of Personality and Social Psychology*, *99*(6), 948–963. https://doi.org/10.1037/a0020271

Impett, E. A., Gordon, A. M., & Strachman, A. (2008). Attachment and daily sexual goals: A study of dating couples. *Personal Relationships*, *15*(3), 375–390. https://doi.org/10.1111/j.1475-6811.2008.00204.x

Jamieson, J. P. (2017). Challenge and threat appraisals. In A. J. Elliot, C. S. Dweck, & D. S. Yeager (Eds.), *Handbook of competence and motivation: Theory and application* (2nd ed., pp. 175–191). The Guilford Press.

Jamieson, J. P., Hangen, E. J., Lee, H. Y., & Yeager, D. S. (2018). Capitalizing on appraisal processes to improve affective responses to social stress. *Emotion Review*, *10*(1), 30–39. https://doi.org/10.1177/1754073917693085

Jamieson, J. P., Koslov, K., Nock, M. K., & Mendes, W. B. (2013). Experiencing discrimination increases risk taking. *Psychological Science*, *24*(2), 131–139. https://doi.org/10.1177/0956797612448194

Jamieson, J. P., Nock, M. K., & Mendes, W. B. (2012). Mind over matter: Reappraising arousal improves cardiovascular and cognitive responses to stress. *Journal of Experimental Psychology. General*, *141*(3), 417–422. https://doi.org/10.1037/a0025719

Kahneman, D., & Tversky, A. (1984). Choices, values, and frames. *American Psychologist*, *39*, 341–350. https://doi.org/10.1037/0003-066X.39.4.341

Kamarck, T. W., Schwartz, J. E., Janicki, D. L., Shiffman, S., & Raynor, D. A. (2003). Correspondence between laboratory and ambulatory measures of cardiovascular reactivity: A multilevel modeling approach. *Psychophysiology*, *40*(5), 675–683. https://doi.org/10.1111/1469-8986.00069

Keltner, D., Gruenfeld, D. H., & Anderson, C. (2003). Power, approach, and inhibition. *Psychological Review*, *110*(2), 265–284. https://doi.org/10.1037/0033-295X.110.2.265

Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis*. Guilford Press.

Körner, R., & Schütz, A. (2021). Power in romantic relationships: How positional and experienced power are associated with relationship quality. *Journal of Social and Personal Relationships*, *38*(9), 2653–2677. https://doi.org/10.1177/02654075211017670

Lane, S. P., & Hennes, E. P. (2018). Power struggles: Estimating sample size for multilevel relationships research. *Journal of Social and Personal Relationships*, *35*(1), 7–31. https://doi.org/10.1177/0265407517710342

Llabre, M. M., Spitzer, S. B., Saab, P. G., Ironson, G. H., & Schneiderman, N. (1991). The reliability and specificity of delta versus residualized change as measures of cardiovascular reactivity to behavioral challenges. *Psychophysiology*, *28*(6), 701–711. https://doi.org/10.1111/j.1469-8986.1991.tb01017.x

Makhanova, A., McNulty, J. K., Eckel, L. A., Nikonova, L., & Maner, J. K. (2018). Sex differences in testosterone reactivity during marital conflict. *Hormones and Behavior*, *105*, 22–27. https://doi.org/10.1016/j.yhbeh.2018.07.007

McCrae, R. R., & Costa, P. T. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology*, *52*(1), 81–90. https://doi.org/10.1037/0022-3514.52.1.81

Mehl, M. R., & Conner, T. S. (2012). *Handbook of research methods for studying daily life*. The Guilford Press.

Mendes, W. B., Blascovich, J., Hunter, S. B., Lickel, B., & Jost, J. T. (2007). Threatened by the unexpected: Physiological responses during social interactions with expectancy-violating partners. *Journal of Personality and Social Psychology*, *92*(4), 698–716. https://doi.org/10.1037/0022-3514.92.4.698

Mendes, W. B., Blascovich, J., Lickel, B., & Hunter, S. (2002). Challenge and threat during social interactions with white and black men. *Personality and Social Psychology Bulletin*, *28*(7), 939–952. https://doi.org/10.1177/014616720202800707

Mendes, W. B., Blascovich, J., Major, B., & Seery, M. (2001). Challenge and threat responses during downward and upward social comparisons. *European Journal of Social Psychology*, *31*(5), 477–497. https://doi.org/10.1002/ejsp.80

Mendes, W. B., Gray, H. M., Mendoza-Denton, R., Major, B., & Epel, E. S. (2007). Why egalitarianism might be good for your health: Physiological thriving during stressfull intergroup encounters. *Psychological Science*, *18*(11), 991–998. https://doi.org/10.1111/j.1467-9280.2007.02014.x

Overall, N. C., Maner, J. K., Hammond, M. D., Cross, E. J., Chang, V. T., Low, R. S. T., Girme, Y. U., Jayamaha, S. D., Reid, C. J., & Sasaki, E. (2022). Actor and partner power are distinct and have differential effects on social behavior. *Journal of Personality and Social Psychology*, *124*, 311–343. https://doi.org/10.1037/pspi0000398

Pavcovich, L. A., & Valentino, R. J. (1997). Regulation of a putative neurotransmitter effect of corticotropin-releasing factor: Effects of adrenalectomy. *Journal of Neuroscience*, *17*(1), 401–408. https://doi.org/10.1523/JNEUROSCI.17-01-00401.1997

Peplau, L. A., Padesky, C., & Hamilton, M. (1982). Satisfaction in lesbian relationships. *Journal of Homosexuality*, *8*(2), 23–35. https://doi.org/10.1300/J082v08n02_04

Peters, B. J., Hammond, M. D., Reis, H. T., & Jamieson, J. P. (2016). The consequences of having a dominant romantic partner on testosterone responses during a social interaction. *Psychoneuroendocrinology*, *74*, 308–315. https://doi.org/10.1016/j.psyneuen.2016.09.024

Peters, B. J., & Jamieson, J. P. (2016). The consequences of suppressing affective displays in romantic relationships: A challenge and threat perspective. *Emotion*, *16*(7), 1050–1066. https://doi.org/10.1037/emo0000202

Peters, B. J., Overall, N. C., Girme, Y. U., & Jamieson, J. P. (2019). Partners' attachment insecurity predicts greater physiological threat in anticipation of attachment-relevant interactions. *Journal of Social and Personal Relationships*, *36*(2), 469–489. https://doi.org/10.1177/0265407517734655

Peters, B. J., Overall, N. C., & Jamieson, J. P. (2014). Physiological and cognitive consequences of suppressing and expressing emotion in dyadic interactions. *International Journal of Psychophysiology*, *94*(1), 100–107. https://doi.org/10.1016/j.ijpsycho.2014.07.015

Peters, B. J., Reis, H. T., & Jamieson, J. P. (2018). Cardiovascular indexes of threat impair responsiveness in situations of conflicting interests. *International Journal of Psychophysiology*, *123*, 1–7. https://doi.org/10.1016/j.ijpsycho.2017.12.005

Reis, H. T., Clark, M. S., & Holmes, J. G. (2004). Perceived partner responsiveness as an organizing construct in the study of intimacy and closeness. In D. J. Mashek & A. Aron (Eds.), *Handbook of closeness and intimacy* (pp. 201–225). Psychology Press. https://doi.org/10.4324/9781410610010

Renzetti, C. M. (1988). Violence in lesbian relationships: A preliminary analysis of causal factors. *Journal of Interpersonal Violence*, *3*(4), 381–399. https://doi.org/10.1177/088626088003004003

Rose, A. J., Schwartz-Mette, R. A., Glick, G. C., Smith, R. L., & Luebbe, A. M. (2014). An observational study of co-rumination in adolescent friendships. *Developmental Psychology*, *50*(9), 2199–2209. https://doi.org/10.1037/a0037465

Scheepers, D., de Wit, F., Ellemers, N., & Sassenberg, K. (2012). Social power makes the heart work more efficiently: Evidence from cardiovascular markers of challenge and threat. *Journal of Experimental Social Psychology*, *48*(1), 371–374. https://doi.org/10.1016/j.jesp.2011.06.014

Schmid, P. C., & Schmid Mast, M. (2013). Power increases performance in a social evaluation situation as a result of decreased stress responses. *European Journal of Social Psychology*, *43*(3), 201–211. https://doi.org/10.1002/ejsp.1937

Seery, M. D. (2013). The biopsychosocial model of challenge and threat: Using the heart to measure the mind. *Social & Personality Psychology Compass*, *7*(9), 637–653. https://doi.org/10.1111/spc3.12052

Simpson, J. A., Farrell, A. K., Oriña, M. M., & Rothman, A. J. (2015). Power and social influence in relationships. In M. Mikulincer, P. R. Shaver, J. A. Simpson, & J. F. Dovidio (Eds.), *APA handbook of personality and social psychology: Interpersonal relations* (Vol. *3*, pp. 393–420). American Psychological Association. https://doi.org/10.1037/14344-015

Thibaut, J. W., & Kelley, H. H. (1959). The social psychology of groups. *Routledge*. https://doi.org/10.4324/9781315135007

Tudder, A., Gresham, A. M., Peters, B. J., Reis, H. T., & Jamieson, J. P. (2020). The effects of dispositional restrictiveness on physiological markers of challenge and threat during a hypothetical transitional period in romantic relationships. *Psychophysiology*, *57*(10), e13624. https://doi.org/10.1111/psyp.13624

Tudder, A., Wilkinson, M., Gresham, A. M., & Peters, B. J. (2023). The intrapersonal and interpersonal consequences of a new experimental manipulation of co-rumination. *Emotion*, *23*(4), 1190–1201.

Walsh, F. (1989). Reconsidering gender in the marital quid pro quo. In M. McGoldrick, C. M. Anderson, & F. Walsh (Eds.), *Women in families: A framework for family therapy* (pp. 267–285). W. W. Norton & Co.

Weisbuch, M., Seery, M., Ambady, N., & Blascovich, J. (2009). On the correspondence between physiological and nonverbal responses: Nonverbal behavior accompanying challenge and threat. *Journal of Nonverbal Behavior*, *33*(2), 141–148. https://doi.org/10.1007/s10919-008-0064-8

Worley, T. R., & Samp, J. A. (2019). Dyadic power, marital status, face concerns, and politeness in the context of relational complaining. *Journal of Social and Personal Relationships*, *36*(4), 1367–1391. https://doi.org/10.1177/0265407518765988

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Table S1 Effects of Actor and Partner Power, Role, and Condition on CO and TPR.

Figure S1 CO Reactivity by Actor Power, Partner Power, and Role.

Figure S2 TPR Reactivity by Actor Power, Partner Power, and Role.

How to cite this article: Gresham, A. M., Peters, B. J., Tudder, A., & Simpson, J. A. (2023). Sense of power and markers of challenge and threat during extra-dyadic problem discussions with romantic partners. *Psychophysiology*, *60*, e14379. https://doi.org/10.1111/psyp.14379