EFFECT OF STRESS ON EMPATHIC ACCURACY IN

ROMANTIC COUPLES

by

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ABSTRACT

Theoretical models of romantic relationships consider empathy, or the ability to understand and feel the thoughts and feelings of another, to be an essential ingredient of successful romantic relationships. Empathy is thought to promote optimal relationship functioning by enhancing intimacy, increasing the effectiveness of social support, and improving the likelihood that spouses can effectively manage and resolve conflict. Building on these theoretical ideas, improving empathic ability in couples is one of the fundamental goals directing Integrative Behavioral Couple Therapy, a therapy with among the strongest empirical support for treating relationship distress. Yet, despite the theoretical importance of empathy for relationship processes, little is currently known about situational factors associated with *empathic accuracy* (correctly understanding the thoughts and feelings of a spouse) during relationship interactions. Converging evidence implicates stress as a common life experience likely to substantially impair empathic accuracy, though this possibility has not been studied empirically. The current study is a pilot study using an experimental design and video recall procedure to examine the effect of a standardized stress task on romantic couples' empathic accuracy during a conflict discussion. Associations between empathic accuracy and relationship functioning variables are also examined. Results indicate that couples assigned to the stress condition demonstrated significantly reduced empathic accuracy compared with those in a control condition. Associations between empathic accuracy and each partner's self-report of

relationship satisfaction, intimacy, and support were nonsignificant. However, there was a trend-level association between higher empathic accuracy and lower self-report of demanding behaviors. Results are discussed in terms of the deleterious effects of stress and empathic accuracy's association with relationship functioning.

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INTRODUCTION

Several theories of relationship functioning place empathy—and empathic accuracy—in a pivotal role for romantic relationship functioning (Dimidjian, Martell, & Christensen, 2002; Epstein & Baucom, 2002; Johnson & Denton, 2002; Snyder & Schneider, 2002;). Empirical studies have largely supported the link between greater empathic accuracy and better romantic relationship functioning and greater relationship satisfaction (Bissonnette, Rusbult, & Kilpatrick, 1997; Cohen, Schulz, Weiss, & Waldinger, 2012; Ickes & Simpson, 1997). Research on perspective taking, which is theoretically similar to empathy and empathic accuracy, has also found higher levels of perspective taking to be associated with better marital adjustment and greater marital satisfaction (Franzoi, Davis, & Young, 1985; Long & Andrews, 1990).

The link between empathic accuracy and relationship functioning is likely explained largely by the influence of empathic accuracy on a number of relational processes. Chief among these is conflict. Conflict occurs in all relationships, but the ways in which a couple engages in and responds to conflict is an important determinant of marital satisfaction (see Baucom & Eldridge, 2013 for a review). Research has consistently found two important conflict behaviors to be associated with successful and satisfied relationships (Gottman, 1994; Rusbult, Johnson, & Morrow, 1986). The first involves refraining from destructive behaviors such as nagging, complaining, criticizing, or withdrawing from the interaction. The second conflict-related imperative for healthy

relationships involves refraining from reciprocation of destructive behavior when one partner *does* engage in such behavior.

Negative reciprocity, in which destructive or neglectful behaviors toward one's partner are responded to in kind, is considered one of the hallmarks of distressed couples (e.g., Fincham & Beach, 1999; Margolin & Wampold, 1981; Rusbult et al., 1986). Yet whether or not a negative behavior will be responded to in kind depends on many factors, one of which is the individual's appraisal of the situation and his or her partner (Bissonnette et al., 1997). If an individual attributes the negative behavior of a spouse to hostile intent, for example, he or she may be more likely to respond with his or her own negative behaviors. On the other hand, if the individual attributes the spouse's behavior to be a byproduct of a stressful day, he or she may choose to inhibit impulses to reciprocate destructive behaviors, a behavior known as accommodation (Rusbult, Verette, Whitnet, Slovik, & Lipkus, 1991). Thus the attributions and appraisals made of one's partner's thoughts, feelings, and motivations play a key role in whether negative behavior will be responded to with more negative behavior or with accommodation (Bissonnette et al., 1997). Misappraisal of a partner's motive, intent, or meaning—in other words, being empathically *inaccurate*—may lead to an improper or incongruently negative response to the partner, fueling further conflict. Indeed, empathic accuracy has been found to be positively linked with accommodative behavior in married couples (Kilpatrick, Bissonnette, & Rusbult, 2002).

Social support in romantic relationships is another relational process that likely mediates the link between empathic accuracy and marital functioning. Accurate appraisal of a partner's mental or emotional state should allow one to be more aware of when

support is helpful or desired, what type of support to provide, and how to go about providing it. Indeed, Verhofstadt and colleagues found greater empathic accuracy to be predictive of more skillful support among married couples (Verhofstadt, Buysse, Ickes, Davis, & Devoldre, 2008), which is itself positively associated with marital functioning and predictive of changes in marital functioning (Conger, Rueter, & Elder, 1999; Pasch & Bradbury, 1998). Enhancing one's skill in support provision, then, may be another way in which empathic accuracy contributes to relationship functioning.

A third relational process likely at play in driving the relationship between empathic accuracy and marital functioning is intimacy. Intimacy can be defined as a feeling of connectedness and closeness with another person, and higher levels of intimacy are associated with greater relationship satisfaction (Laurenceau, Barrett, & Rovine, 2005; Lippert & Prager, 2001). A leading model for intimacy describes it as an interpersonal process that arises both from self-disclosure as well as from perceived partner responsiveness (i.e., the speaker feels understood, validated, and cared about from the response of the listener) to the disclosure (Reis & Shaver, 1988). This interpersonal process model of intimacy has been supported by empirical findings linking self-disclosure and perceived partner responsiveness to the experience of intimacy for both partners (Laurenceau, Barrett, & Pietromonaco, 1998; Laurenceau et al., 2005). Additionally, perceived partner responsiveness has been found to partially mediate the relationship between disclosure and intimacy (Laurenceau et al., 2005). Such a finding suggests that feeling intimacy after a disclosure requires, to some extent, a partner that is perceived as attentive and engaged. Understanding of and responsiveness to disclosure is one arm of empathy, and it follows that responsiveness is most effective when it is based

on an empathically accurate—as opposed to inaccurate—inference (Winczewski, Bowen, & Collins, 2016).

In sum, it is likely that empathic accuracy is related to relationship functioning and satisfaction by impacting how couples engage in conflict, seek and provide support to one another, and establish intimacy. These links are likely to be especially strong during the first years of marriage, when empathic accuracy appears to be most important and before less resource-intensive habitual interaction patterns have had a chance to develop (see Bissonnette et al., 1997, for a discussion).

Individual, Relational, and Situational Factors Associated With Empathic Accuracy

The importance of empathic accuracy for relationship and marital functioning begs two important questions: What explains differences in empathic accuracy, and how can we improve it in married couples? Clinical scientists ultimately want to know how to improve empathic accuracy in married couples in order to improve relationship functioning and satisfaction. Some marital interventions, such as Integrative Behavioral Couple Therapy (Dimidjian et al., 2002), attempt to do just that. However, before we can optimally target empathic accuracy in individuals and couples, we first must better understand what contributes to empathic accuracy and what explains the great deal of variability in empathic accuracy observed among individuals, dyads, and situations. Given that the achievement of empathic accuracy with one's partner is a challenge even under optimal circumstances (e.g., Cohen et al., 2012), we especially must better understand the circumstances under which it becomes impaired.

Past research on the determinants of empathic accuracy can be broken down into

three broad categories: those specific to an individual, those specific to a dyad or relationship, and those specific to the context at the moment an interaction occurs. While much of this work has been done with the aim of understanding empathic accuracy for its own sake rather than as a means to explain and understand romantic relationship functioning (e.g., Decety & Ickes, 2011; Ickes, 1997), it provides an empirical basis for theorizing about how such factors are likely to impact romantic relationships. The review below therefore includes a mix of studies, some of which are not based on relationship samples.

A great deal of research has been devoted to understanding individual differences in empathic accuracy. In a series of meta-analyses, Davis and Kraus (1997) found that more accurate judges tend to be more intelligent, have greater cognitive complexity and flexibility, and have better psychological adjustment. However, these individual differences (with the exception of intelligence) appear to only emerge when different raters infer about the same target individual(s), which does not apply to the vast majority of romantic relationships (Ickes et al., 2000). For the target, those who are more "readable," that is, more expressive of thoughts and feelings, tend to elicit more empathically accurate judgments from observers (Hancock & Ickes, 1996; Marangoni, Garcia, Ickes, & Teng, 1995; Zaki, Bolger, & Ochsner, 2008). These individual differences are important predictors of empathic accuracy, but they account for a relatively small portion of total variability in empathic accuracy.

One additional individual characteristic that may be important for empathic accuracy in romantic relationships specifically is attachment style. Compared to anxious and securely attached individuals, avoidant romantic partners have been found to be less

empathically accurate during discussions of relationship conflict (Simpson et al., 2011). Conversely, anxiously attached individuals have been found to be *more* empathically accurate, compared with avoidant or securely attached individuals, when discussing issues that are threatening to the relationship (Simpson, Ickes, & Grich, 1999; Simpson et al., 2011). These findings make intuitive sense: Avoidant individuals may be less engaged with their partner and less in tune with their partner's thoughts and feelings in the moment, while anxiously attached individuals are likely to be hyperaware during relationship-threatening situations and thus especially in tune with their partner's thoughts and feelings (Simpson et al., 2011). However, another study found no association between attachment style and the ability to track changes in emotion over time (Overall, Fletcher, Simpson, & Fillo, 2015), but found that avoidant individuals overestimated the intensity of their partner's negative emotions in general, while securely and anxiously attached individuals did not.

Relationship factors are also important for empathic accuracy. Among unacquainted dyads, sheer cumulative amount of time spent together appears to be the best predictor of empathic accuracy, in which more time leads to better accuracy (Ickes et al., 1990; Stinson & Ickes, 1992). Among romantic couples, those who rate themselves as more committed to one another tend to show greater empathic accuracy during the first two years of marriage (Bissonnette et al., 1997). However, the most important relational factor found so far to predict empathic accuracy in married couples appears to be length of relationship. Contrary to findings for unacquainted dyads, empathic accuracy appears to *decline* among married couples over time, and its association with relationship satisfaction also declines (Bissonette et al., 1997; Thomas, Fletcher, & Lange, 1997). It is

not currently known why such declines occur, but some theorists suggest that, over time, couples tend to rely less on on-line meaning analysis of their partner during a given interaction and instead develop habitual response patterns to situations and interactions that occur with some regularity (Bissonnette et al., 1997; Story et al., 2007; Weiss, 1980). Thus, during any given interaction, an individual attunes less to the information from a specific interaction and instead relies on information and patterns from past interactions.

On the surface, these findings suggest that empathic accuracy simply becomes less relevant over time as couples rely less on on-line meaning analysis and instead increasingly rely on habitual interaction patterns. However, the apparent decline in importance of empathic accuracy may be attributable to the fact that all couples simply use on-line empathic inferences less over time even though unsatisfied couples would benefit from retuning their "empathic radar." Satisfied couples, who tend to be more empathically accurate during the first years of marriage, have developed their adaptive and healthy interaction habits based on empathically accurate inferences of their partners' thoughts, feelings, needs, and wants. Once habits are formed based on accurate information about their partner, satisfied couples may begin to rely less on moment-by-moment empathic inferences without their relationships suffering negative consequences (Bissonnette et al., 1997). Unsatisfied couples likely undergo the same process as satisfied couples, establishing interaction patterns over time based partly on empathic inferences. However, they may be creating those patterns based on faulty, empathically *inaccurate* inferences. Therefore, learning to develop empathic accuracy is likely an important goal for these couples in order to "retune" their behavior patterns with one another and thereby establish healthier interaction patterns and develop a more satisfied

relationship.

Despite the relevance of individual and relational factors for empathic accuracy, they account for only a relatively small amount of variance in empathic accuracy (Davis & Kraus, 1997; Ickes et al., 2000), suggesting that examining situational influences on empathic accuracy may currently be the most fruitful for improving our understanding of empathic accuracy. One important situational factor for empathic accuracy that has been studied in romantic couples is relationship threat. Under situations that present as a possible threat to the relationship, such as when one's partner interacts with a highly attractive member of the opposite sex, some individuals are less empathically accurate toward their partner compared with when the partner interacts with a less attractive member of the opposite sex (Simpson, Ickes, & Blackstone, 1995; Simpson et al., 1999; Simpson et al., 2011). Thus it may be that situations which prompt anxiety about the stability or quality of the relationship may pull for motivated inaccuracy by a romantic partner.

Beyond relationship-threatening circumstances, few other situational variables have been studied with respect to empathic accuracy. However, there are a host of potential circumstances in which empathic accuracy is likely to be impaired. Tuning into the cognitive and emotional states of another, and making accurate inferences about those states, is difficult even under ideal circumstances (e.g., Cohen et al., 2012). Making an accurate empathic appraisal requires integrating several disparate sources of often-ambiguous information while taking into account the partner's current mood, historical responses to similar situations, relationship factors, and so on. Such a task requires a substantial commitment of cognitive and emotional resources (e.g., Bird & Viding, 2014;

Preston & de Waal, 2002). It is therefore likely that empathic accuracy is impaired under circumstances in which cognitive or emotional resources are taxed or depleted.

Stress is a common and oft-studied life experience that can tax cognitive and emotional resources (e.g., Kudielka, Hellhammer, & Kirschbaum, 2007), though its effect on empathic accuracy has yet to be studied. For example, studies of self-control have used various types of stressors to show that the ability to exercise self-control can be depleted by exposure to stress (e.g., Muraven & Baumeister, 2000; Muraven, Tice, & Baumeister, 1998). Stress has also been found experimentally to impair memory retrieval, and the impairment is more pronounced for emotionally laden material (such as is often the case during marital conflict; Wolf, 2008, 2009).

Additional converging evidence on the association between stress and higher order processes comes from research on individual differences in executive functioning. For example, individual differences in executive functioning predict individual differences in reactivity to and recovery from stress (Williams, Suchy, & Rau, 2009). These stress processes have also been found to be related to the ability to attend to the moods of others, such that individuals with greater cortisol reactivity and systolic blood pressure (SBP) reactivity to stress exhibit poorer trait ability to attend to the moods of others (Salovey, Stroud, Woolery, & Epel, 2002). Taken together, research on self-control, memory, executive function, and stress processes suggests a link between stress and higher order cognitive functioning in both situational and personality contexts. It may be that under conditions of stress, the body's way of responding to stress depletes the same resources necessary to make accurate empathic inferences.

Moreover, stress likely further impairs empathic accuracy by directly influencing

the appraisals we make of others. For example, stress increases the likelihood that individuals will commit the fundamental attribution error (erroneously attributing a behavior to a personality characteristic without adequately considering situational factors) as well as increasing the negativity of attributions made toward others (Kubota et al., 2014). However, the potential effect of stress on momentary appraisals made in romantic relationships specifically has not been studied empirically. Perhaps the closest empirical support for a link between stress and appraisals in romantic relationships comes from a longitudinal study that found that negative cognitions about the relationship mediated a link between more stressful life experiences for wives and poorer marital quality over time (Neff & Karney, 2004). However, Neff and Karney examined general perceptions of romantic partners rather than examining the relationship between stress and momentary appraisals. It is not unlikely that such distortions in partner perceptions would apply to inferences in the moment in addition to more globally, such that stress may alter the ways spouses perceive one another in the moment, and therefore negatively impact empathic accuracy.

In summary, stress is likely to substantially impair empathic accuracy. It may do so by taxing cognitive resources that are necessary to integrate the various sources of information involved in making an empathic appraisal. It may also impair empathic accuracy by altering the appraisals partners make of each other. However, the relationship between stress and empathic accuracy has not yet been examined empirically. The current study therefore proposes to experimentally examine the effect of a laboratory-administered stressor on empathic accuracy in romantic couples who are discussing an area of disagreement in their relationship.

Hypotheses

The current study examines three primary hypotheses regarding the association between stress and empathic accuracy. First, couples assigned to a stress condition will exhibit lower empathic accuracy toward each other compared with couples in a control condition (H1). Second, higher empathic accuracy is hypothesized to be associated with greater self-report of intimacy and support, less negative conflict, and higher relationship satisfaction (H2). The third hypothesis is exploratory and seeks to determine if the link between empathic accuracy and relationship satisfaction will be stronger for those in the stress condition compared with those in the control condition (H3). The third hypothesis reflects the possibility that relationship satisfaction is more contingent on being able to understand one's partner when stressed compared with when not stressed. Hypothesized relationships for Hypotheses 2 and 3 are shown in the appendix.

METHODS

Participants

The current study represents a pilot study of 30 couples ages 18-50 recruited from the University of Utah's undergraduate research subject pool, flyers posted on campus and in the community, advertisements posted on Craigslist and KSL, and through Facebook advertisements. Potential participants were told the study was examining how romantic partners interact with and understand one another. Prior work suggests empathic accuracy is most relevant in married couples during the first 2 years of marriage (e.g., Bissonnette et al., 1997), so inclusion criteria required participants to either be married for less than 2 years or to be in a committed, monogamous dating relationship for at least 1 year and to be cohabiting at the time of participation. Participants were also required to be nonsmokers. Participants were compensated $35 each, or for individuals who preferred course credit, the alternative option of three hours of research credit.

Out of 60 participants total, 49 (81.7%) identified as White, five (8.3%) as Asian, one (1.7%) as Native Hawaiian or Pacific Islander, and five (8.3%) chose not to answer. Eight participants (13.3%) identified their ethnicity as Hispanic or Latino. Couples were mostly married, though three couples were unmarried. Of those that were married, they were married for an average of 0.87 years ($SD = 0.57$), while the average relationship length, including dating and marriage, was 3.13 years ($SD = 1.82$). Twenty-eight couples were opposite-sex couples, while two were same-sex (one male-male and one female-

female). Median individual annual income was $15,000 (*SD* = $19,944). Fifteen (25%) participants reported having a high school diploma or equivalent, 34 (56.7%) had a college degree, 10 (16.7%) had a graduate or professional degree, and one (1.7%) chose not to answer.

<div align="center">Procedures</div>

Participants were instructed not to ingest alcohol, tobacco, or caffeine 2 hours prior to participation because physiological measures were also collected but are not analyzed in the current study. After providing written informed consent, participants were connected with physiological equipment and completed a series of baseline tasks to establish physiological baselines. Participants then completed a battery of self-report questionnaires, which included demographics and measures of communication patterns, closeness, relationship satisfaction, partner-provided support, attachment style, self-consciousness, and social sensitivity. Next, participants completed the Problem Areas Questionnaire (PAQ; Christensen, 1990), a measure of common areas of conflict in romantic relationships, in order to identify the topic of conversation for the following interaction task. The topic selected was the one that had the highest cumulative disagreement across both partners and which both partners were also willing to discuss. After identifying a topic of discussion, participants were instructed to discuss the topic with one another for 10 minutes, and all study personnel left the room for the duration of the discussion. The conversation was video recorded for use in the video recall procedure.

Following the conversation, participants completed a brief questionnaire about the discussion, and then were asked to individually complete a video recall procedure

designed to measure empathic accuracy.[1] For the first step of the video recall procedure (self-rating 1), each partner separately watched a recording of the previous conflict discussion with the aid of the ObserverXT software, which allows videos to be automatically stopped at specific intervals. At each 1-minute interval, the video was automatically paused by the software and participants were prompted to write down any specific thought or feeling they recalled having during the past minute. Participants were permitted to leave a row blank if they did not recall having had any specific thoughts or feelings during a minute, and they were asked to record only the most important thought or feeling if they had more than one thought or feeling (or one of each) during a given minute. Participants were also asked to report how they felt in general during the minute, on an integer scale from -4 (extremely negative) to +4 (extremely positive). Prior to starting the task, participants were instructed and later reminded again to only record thoughts or feelings they distinctly recalled having had during the conversation, not what they think or feel when watching the video. They were also encouraged to be as open and honest as possible and to not engage in self-censorship, and they were assured that their answers would be kept confidential and would not be shared with their partner.

Prior to the second step of the video recall procedures, participants completed one of two conditions previously determined by randomization. In the stress condition, participants completed the Trier Social Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993). The TSST is a potent and long-lasting standardized social stressor

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[1] The video recall procedure is modeled around that developed by Ickes and colleagues (Ickes et al., 1990; Simpson et al., 1995), with one modification. The procedure developed by Ickes and colleagues allows the participant to stop the recording him- or herself any time they recall having had a thought or feeling. The procedure was adjusted for the current study by stopping the recording every 1 minute, rather than allowing participants to decide, in order to allow for equivalency of comparisons of the first and third ratings. According to W. Ickes, such a modification is unlikely to adversely affect the validity of the video recall paradigm for measuring empathic accuracy (W. Ickes, personal communication, August 15, 2014).

used extensively in experimental designs aimed at inducing stress responses (Kudielka et al., 2007). In the 13-minute TSST protocol, a participant is asked to take the role of a job applicant and prepare and deliver a 5-minute speech aimed at convincing a "selection committee" that he or she is the right candidate for the job. Following the speech, participants are asked to perform a difficult serial subtraction task. Those in the role of "selection committee" are trained to be cold and unresponsive during the entire TSST procedure. In the control condition, participants rated nature pictures for an equivalent length of 13 minutes.

Following the stress or control task, participants completed the second step of the video recall procedure (partner rating). For this task, participants again watched the conflict discussion video, but this time were asked at each 1-minute interval to record the specific thought or feeling they believed their spouse had during the previous 1 minute. Participants also completed three other ratings for each minute, not part of the current study: their partner's general mood during the previous minute on a scale from -4 to +4, how much effort they believed their partner made to understand them, and what their partner would *say* was their thought or feeling if they believed their partner would not be forthcoming about their true thoughts or feelings. Participants were again encouraged to be open and honest and were assured that their answers would be kept confidential.

Following the second step of the video recall procedure (partner rating), participants were asked to repeat the procedure from the first step of the video recall procedure, in which they recorded their own thoughts and feelings (self-rating 2). The second self-rating was done in order to assess whether the stress task would change participants' reporting styles, which could be an alternative explanation to the hypothesis

that empathic accuracy specifically would be impaired. Including a second self-rating also allows for an examination of test-retest reliability for the self-rating component of the video recall procedure, which has not yet been examined in empirical research.

Following the second self-rating, participants were thanked, paid (if applicable), and debriefed. During debriefing participants were informed that the experiment was designed to examine the effects of stress on couples' ability to be empathically accurate with one another during a conflict discussion. Participants were additionally informed of the randomization procedure, and they were asked to not repeat the purpose of the study to others who may possibly participate in the future.

Measures

Empathic Accuracy

Empathic accuracy was calculated based on the method developed by Ickes and colleagues (Ickes et al., 1990; also see Ickes, 1997). This method operationalizes empathic accuracy as the extent to which one partner's (the observer) inferences about his or her partner's thoughts and feelings match the partner's self-ratings of thoughts and feelings. In order to calculate an empathic accuracy score, research assistants compared corresponding self and partner thought/feeling entries for each 1-minute time period and rated them on a 2-point scale (2: essentially the same content; 1: similar but not the same content; 0: essentially different content). Scores for the entire interaction were added up and averaged across six research assistant raters,[2] then divided by the total possible score (i.e., two possible points per inference multiplied by the number of inferences) to get a

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[2] Previous research has suggested the use of at least four raters in order to achieve interrater reliability of .9 or above (Bissonnette et al., 1997; Ickes et al., 1990; Ickes, Stinson, Bissonnette, & Garcia, 1990, Marangoni et al., 1993), though reliability in the current study was slightly below that goal.

final empathic accuracy score ranging from 0 to 1 (Ickes et al., 1990). Separate empathic

accuracy scores were calculated for each spouse. Interrater reliability for empathic

accuracy scores was .888. Intraclass correlations for empathic accuracy within couples

was .208 (p = .271), indicating that the empathic accuracies of partners within a couple

were not significantly related to one another.

Conflict

Conflict was measured using the Communication Patterns Questionnaire (CPQ;

Christensen, 1987; Crenshaw, Christensen, D. Baucom, Epstein, & B. Baucom, in press).

The CPQ is a 35-item self-report questionnaire that measures three types of conflict

behavior in romantic couples: self-demand/partner-withdraw, partner-demand/self-

withdraw, and constructive communication. Demand/withdraw is an interaction pattern in

which one partner nags, demands, or criticizes, while the other avoids discussion or

withdraws (Christensen, 1987). Only the demand/withdraw scales were used in the

current study. Cronbach's alphas for self-demand/partner-withdraw and partner-

demand/self-withdraw were .771 and .830, respectively.

Support

Support was measured using the Support in Intimate Relationships Rating Scale-

Revised (SIRRS-R; Barry, Bunde, Brock, & Lawrence, 2009). The SIRRS-R is a self-

report questionnaire with 25 Likert-style items assessing four domains of global

perceptions of support enacted by the partner over the past month: esteem/emotional,

physical comfort, informational, and tangible. An aggregate score of support was used in

the current study; Cronbach's α = .951.

Intimacy

Intimacy was measured using the Inclusion of the Other in the Self Scale (IOS; A. Aron, E. Aron, & Smollan, 1992). The IOS is a single-item pictorial measure with good reliability, convergent validity with longer measures of closeness and intimacy, and is predictive of outcomes in romantic relationships (Aron et al., 1992).

Relationship Satisfaction

Relationship satisfaction was measured using the Couples Satisfaction Index, 16-item version (CSI-16; Funk & Rogge, 2007). The CSI is an extensively validated self-report measure for assessing relationship satisfaction in romantic couples, and the 16-item version is comparable to the full, 32-item version in terms of precision and power to detect differences between various levels of relationship satisfaction (Funk & Rogge, 2007). Cronbach's alpha for the CSI-16 in this sample was .872.

Individual Difference Covariates

Attachment

Attachment was measured using the Experiences in Close Relationships Questionnaire—Revised (Fraley, Waller, & Brennan, 2000). The ECR-R is a 36-item self-report measure assessing two dimensions of romantic attachment: anxiety and avoidance. Cronbach's alphas for anxious and avoidant attachment were .927 and .865, respectively.

Social Sensitivity

Individual differences in social sensitivity were measured using the Reading the Mind in the Eyes Test, revised version (Eyes Test; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). The Eyes Test consists of 36 pictures of pairs of eyes in which participants must select the correct emotion shown in the eyes from among four choices. The Eyes Test has shown good ability to detect individual differences in social sensitivity (Baron-Cohen et al., 2011). Cronbach's alpha for the Eyes Test was .474.

Analytic Plan

Given the nested structure of participants in the current study, in which individuals are nested within couples, all analyses were conducted using multilevel models (MLM), modeled using the HLM 7.01 software package (Raudenbush, Bryk, & Congdon, 2011), and all results are based on using robust standard errors in HLM. Hypothesis 1 examined the relationship between stress condition and empathic accuracy (EA) while controlling for gender and individual differences in social sensitivity, and was conducted using the following multilevel model (presented in series of equations format):

Level 1

$$EA_{ij} = \beta_{0j} + \beta_{1j}*(GENDER_{ij}) + \beta_{2j}*(EYES\_GC_{ij}) + r_{ij}$$

Level 2

$$\beta_{0j} = \gamma_{00} + \gamma_{01}*(CONDITION_j) + \mu_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

$$\beta_{2j} = \gamma_{20}$$

where *i* represents partners within a couple, *j* represents couples, GENDER is effect-coded gender (male = -.5; female = .5), EYES_GC represents grand-centered scores on

the Eyes Test, and CONDITION is dummy coded stress condition (0 = control; 1 = stress). In order to rule out possible alternative explanations, sensitivity analyses were conducted by adding age, attachment anxiety and avoidance, and length of relationship to the model to see if inclusion of these additional variables would impact the association between condition and empathic accuracy. Lastly, in order to address the possible alternative explanation that stress may change participants' reporting styles rather than specifically impairing empathic accuracy, consistency in self-ratings between the stress and control conditions was also examined by modeling the relationship between condition and participants' self-rating test-retest score, while controlling for gender.

Hypotheses two and three were examined using actor-partner interdependence models (APIM; Kenny, Kashy, & Cook, 2006) to model the relationships between each partner's empathic accuracy and each partner's intimacy, support, conflict, and relationship satisfaction (H2), and the potential moderating effect of stress on the relationship between empathic accuracy and relationship satisfaction (H3). APIM is appropriate in this case because intimacy, support, conflict, and relationship satisfaction are hypothesized to have different patterns of both actor and partner effects in their associations with empathic accuracy. APIMs for indistinguishable dyads were run due to the presence of two same-sex couples (Kenny et al., 2006). Hypothesized relationships are shown in Appendix A. The equation below describes the general model that will be used to examine main effects and interactions (presented in series of equations format):

Level 1

$Y(intimacy/support/conflict/satisfaction)_{ij} = \beta_{0j} + \beta_{1j}*(GENDER_{ij}) + \beta_{2j}*(EA\_GC\_A_{ij}) + \beta_{3j}*(EA\_GC\_P) + r_{ij}$

Level 2 (without stress interaction; H2)

$\beta_{0j} = \gamma_{00} + u_{0j}$

$\beta_{qj} = \gamma_{q0}$, for q = 1 to 3

Level 2 (with stress interaction; H3)

$\beta_{0j} = \gamma_{00} + \gamma_{01}*(\text{CONDITION}_j) + u_{0j}$

$\beta_{1j} = \gamma_{10}$

$\beta_{2j} = \gamma_{20} + \gamma_{21}*(\text{CONDITION}_j)$

$\beta_{3j} = \gamma_{30} + \gamma_{31}*(\text{CONDITION}_j)$

where *i* represents partners within a couple, *j* represents couples, GENDER is effect-coded gender (male = -.5; female = .5), EA_GC_A is grand-centered empathic accuracy for actor (i.e., self), EA_GC_P is grand-centered empathic accuracy for partner, and CONDITION is dummy-coded stress condition (0 = control; 1 = stress).

Power Analyses

In absence of empirical evidence to expect otherwise, power was estimated assuming small to moderate effect sizes with alpha set at .05 and with 50 total couples, though the current study contains only 30 couples and is to be considered a pilot study. All power analyses were conducted using G*Power 3.1.7. The effect size estimate for hypothesis one utilized two comparison studies in order to create both a conservative and liberal estimate of power. One previous study using an experimental manipulation to examine the effect of relationship threat on empathic accuracy found an effect size of Cohen's *d* = .491 (Simpson et al., 1995). Using this conservative effect size estimate, in which the putative explanation for the effect was subtle and subconscious, power for the current study would be estimated at .68. Another study, which used an experimental

manipulation to examine the effect of mood induction on accuracy of social judgments, found an effect size of Cohen's $d = 3.03$ (Ambady & Gray, 2002), which would translate to a power of .99 in the current study. Given the strength of the stress manipulation used in the current study (Kudielka et al., 2007) while considering both the conservative and liberal estimates taken from two previous studies, a medium to large effect size of at least $d = .7$ can be expected for hypothesis one, resulting in an estimated power of at least .87.

Power for hypothesis two was estimated assuming a moderate effect size of $r = .35$ for the correlation between empathic accuracy and each of conflict, intimacy, and support. Using a conservative adjustment to sample size of $n_{effective} = 80$ to account for dependency of husbands and wives, power was estimated to be .91. For hypothesis three, assuming an effect size of $\Delta r = .15$, power was estimated to be .84.

RESULTS

Initial examination of potential outliers identified several cases that warranted further examination. The CSI-16 had four cases with unexpectedly low scores (CSI = 13 to 28; the fifth lowest was 49), two of which were from a couple that was not living together at the time and stated they were considering a divorce. The SIRRS-R had two cases with unexpectedly low scores (SIIRS-R = 6 and 8; the third-lowest score was 36). These outliers were winsorized prior to analysis, but the direction, magnitude, and significance values of results remained unchanged compared with those obtained using the raw scores. Case statistics also identified one potential outlier couple—the potentially-divorcing couple—so study hypotheses were tested with and without the couple included. Results were highly similar, so greater inclusion was prioritized and the couple was left in the final analyses.

Table 1 presents means, standard deviations, and zero-order correlations for all study variables. Contrary to expectations, zero-order correlations between empathic accuracy and other study variables were nonsignificant at the $p < .05$ level. One possible explanation for this finding may be that empathic accuracy was a state measurement, whereas the other measures were individual or relationship trait or trait-like measures. However, empathic accuracy for those in the control condition only was significantly related to individual differences in social sensitivity, such that those with greater social sensitivity were more empathically accurate. The association was not significant for those

in the stress condition, suggesting that accuracy under stress may have more to do with situational factors than individual ability or couple characteristics. Correlations between the Eyes Test and other study variables were also nonsignificant, suggesting that individual differences in social sensitivity are not significantly related to measures of romantic relationship functioning. Consistent with expectations, nearly all self-report measures of relationship functioning and attachment style were significantly related to one another in the expected directions. The few exceptions to that pattern of findings were that attachment avoidance was not significantly related to satisfaction, self-demand/partner-withdraw, or support, and attachment anxiety was not significantly related to intimacy.

Multilevel Models

Empathic accuracy was first modeled without predictors in order to examine proportion of variance in empathic accuracy accounted for by within-couple factors compared with between-couple factors. Based on this model, 77.74% of the variance in empathic accuracy was within couples, indicating that there was greater variability in empathic accuracy among spouses within a couple than there was between couples. Next, gender, Eyes Test score, and condition were entered into the model in order to test the effect of stress on empathic accuracy. Results from these analyses, as well as tests of H2 and H3, are shown in Table 2. Results indicate a significant effect of condition on empathic accuracy ($B = -.043$, $p = .035$), supporting H1.[3] These results indicate that participants who underwent a stressful task before making empathic inferences about their partners showed significantly poorer empathic accuracy compared with those who

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[3] The effect of condition on empathic accuracy changed slightly with the removal of the outlier couple ($B = -.041$, $p = .050$).

participated in a control task. Neither gender ($B = -.008$, $p = .616$) nor Eyes Test ($B = .003$, $p = .299$) were significantly associated with empathic accuracy. This model explained 42.97% of the between couple variance in empathic accuracy. Sensitivity analyses were then conducted by adding attachment anxiety and avoidance, age, and relationship length to the model to determine if the addition of these variables would impact the association between stress condition and empathic accuracy. None of the additional variables were significantly related to empathic accuracy ($ps > .168$); however, their inclusion reduced the effect of condition to trend level ($B = -.036$, $p = .082$).

It is possible that, rather than impairing empathic accuracy specifically, participation in a stressful task could have affected participants' reporting style during the video recall task in general. To test this possibility, a self-rating test-retest score was first computed for each participant using a method identical to that used to calculate empathic accuracy. That is, six trained coders compared two ratings—in this case, each participant's first self-rating with their second self-rating—for each minute and scored them on a scale from 0 to 2. Interrater reliability for the test-retest score was .937. Scores were added up across the ten minutes, divided by the total possible points, then averaged across coders to compute each individual's self-rating test-retest score on a scale from 0 (perfectly inconsistent) to 1 (perfectly consistent). The test-retest score was then regressed onto gender and condition in order to examine the effect of condition on test-retest score. Because the second self-rating occurred after the stress manipulation, if the stress manipulation changed participants' reporting style, that change should be reflected by a significant effect of condition on test-retest score. However, the association between condition and test-retest score was nonsignificant ($B = -.016$, $p = .685$). In fact, means

and standard deviations of test-retest scores for the control group ($M = .452$, $SD = .156$) and stress group ($M = .436$, $SD = .143$) were highly similar.

Next, the relationship between each partner's empathic accuracy and each partner's relationship satisfaction was modeled using APIMs, controlling for gender. As shown in Table 2, contrary to hypotheses, results of this model did not show a significant effect of either actor ($B = .884$, $p = .908$) or partner ($B = -1.155$, $p = .879$) empathic accuracy on an individual's relationship satisfaction. One possible explanation for these surprising results may be that, though couples who were married for more than 2 years were excluded from the study, some included couples had nonetheless been together for substantially longer than 2 years when factoring in time spent dating (Range $= 0.92$ to 8.92 years), and thus may have developed a pattern of interaction, much like long-term married couples, that is less reliant on on-line empathic accuracy (Bissonnette et al., 1997). To test this possibility, relationship length was added to the model at level 2 on the intercept term and as a cross-level interaction with actor and partner effects. All associations were nonsignificant (ps $> .195$), indicating that relationship satisfaction was not significantly related to relationship length, nor did relationship length interact with empathic accuracy to predict satisfaction.

APIMs predicting intimacy, negative conflict behaviors, and support from actor and partner empathic accuracy largely did not support hypotheses (Table 3). Romantic partners' feelings of intimacy were not related to their own empathic accuracy ($B = .422$, $p = .819$), nor their partners' accuracy ($B = 2.111$, $p = .366$). The same pattern emerged for support (Actor $B = -10.32$, $p = .655$; Partner $B = 4.14$, $p = .873$). For demand/withdraw behaviors, higher empathic accuracy was associated with lower self-

report of self-demand/partner-withdraw at a trend level ($B = -27.05$, $p = .061$),[4] but was not significantly associated with partner-demand/self-withdraw ($B = -1.11$, $p = .928$). These results suggest that empathic accuracy may be linked to lower demanding, but not withdrawing, behaviors. As demand/withdraw is a dyadic pattern, a meaningful association between one's own empathic accuracy and self-demand/partner-withdraw would suggest there would also be a meaningful association between partner empathic accuracy and self-report of *partner*-demand/self-withdraw if partners were to report on demand/withdraw in consistent ways. This association was nonsignificant, though the direction and magnitude of the association were similar ($B = -28.32$, $p = .123$). The actor effect of empathic accuracy on partner-demand/self-withdraw was nonsignificant ($B = 1.96$, $p = .918$). It is worth noting that, though the significance tests were somewhat mixed regarding the association between an individual's empathic accuracy and his or her demanding behavior, depending on who reported it, the magnitude of the associations for empathic accuracy and demanding as well as empathic accuracy and withdrawing were highly similar across reporters. Interpreted together, considering the dyadic nature of demand/withdraw, this pattern of results for demand/withdraw suggest that greater empathic accuracy may be related to engaging in less demanding behavior, but does not appear to be related to withdrawing. However, considering the low sample size of the current study, these results should be considered preliminary.

There were either significant or trend-level gender differences for 3 of the 5 relationship outcomes examined. Controlling for empathic accuracy of both partners, men

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[4] The association between empathic accuracy and self-demand/partner-withdraw became significant with the removal of the outlier couple ($B = -29.12$, $p = .048$), and the gender effect on self-demand/partner-withdraw changed from a trend to being nonsignificant ($B = 3.17$, $p = .143$).

felt closer to their partners than women did (B = -.612, p = .019). Additionally, men reported greater partner-demand/self-withdraw (B = -4.64, p = .029) and showed a trend of less self-demand/partner-withdraw (B = 3.52, p = .096).[4] This pattern of results for demand/withdraw is consistent with the body of literature finding that women more frequently take a demanding role during conflict while men more frequently take a withdrawing role (e.g., Baucom, McFarland, & Christensen, 2010; Christensen & Heavey, 1990). There was no gender difference for support (B = -4.22, p = .194) or relationship satisfaction (B = -0.02, p = .988).

To test whether condition and empathic accuracy interact to predict satisfaction (H3), stress condition was added to the original APIM model predicting satisfaction with actor and partner empathic accuracy (without relationship length) at level two, both on the intercept (main effect of condition on satisfaction) and as a cross-level interaction between condition and both actor and partner empathic accuracy. Results are shown in Table 4. There was not a significant main effect of condition on satisfaction (B = .309, p = .847), which is expected given that satisfaction was assessed prior to randomization to condition. However, contrary to H3, there was also a nonsignificant cross-level interaction between condition and empathic accuracy in predicting satisfaction (Condition*Actor B = -7.45, p = .655; Condition*Partner B = 10.45, p = .500). These results suggest that empathic accuracy is not differentially related to satisfaction based on the context under which it is assessed.

Table 1

Means, Standard Deviations, and Correlations for Variables, Collapsed Across Gender and Condition

Variable	M (SD)	Correlations										
		1	2	3	4	5	6	7	8	9	10	11
1. EA (all)	0.186 (.08)	-										
2. Age	25.22 (3.94)	-.010	-									
3. Rel. Length (mo.)	37.57 (21.8)	-.140	.098	-								
4. Eyes Test	27.66 (3.5)	.146	-.178	.202	-							
5. CSI-16	57.63 (11.4)	-.111	-.312*	.143	-.020	-						
6. CPQ - SD/PW	23.90 (10.3)	-.206	-.010	-.130	-.152	-.477***	-					
7. CPQ - SW/PD	24.66 (13.0)	-.015	.161	-.080	-.129	-.343**	.412**	-				
8. SIRRS-R	68.76 (18.1)	-.081	-.111	-.102	-.003	.669***	-.327*	-.274*	-			
9. IOS	4.77 (1.3)	.058	-.192	-.178	.144	.552***	-.434**	-.265*	.597***	-		
10. ECR-R–Anxiety	3.13 (1.3)	.105	.257*	-.318*	-.028	-.474***	.392**	.468***	-.343**	-.221	-	
11. ECR-R–Avoid	2.21 (0.8)	.149	.161	-.071	-.108	-.156	.214	.587***	-.205	-.363**	.465***	-
12. EA (Control)	0.207 (.07)	-	-.009	.076	.510**	-.056	-.253	-.217	-.035	-.007	.071	-.087
13. EA (Stress)	0.165 (.07)	-	-.131	-.323	-.197	-.137	-.214	.111	-.098	.140	.032	.281

Note. Means and correlations are based on raw data prior to winsorizing. EA = Empathic accuracy; Full = Full sample; Cntrl = Control condition only; Stress = Stress condition only; Rel. Length = Relationship Length; Eyes = Reading the Mind in the Eyes Test-Revised Version; CSI-16 = Couples Satisfaction Index-16; CPQ-D/W = Demand/withdraw subscale of Communication Patterns Questionnaire; CPQ-W/D = Withdraw/demand subscale of CPQ; SIRRS-R = Support in Intimate Relationships Rating Scale-Revised; IOS = Inclusion of the Other in Self Scale; ECR-R – Anx = Experiences in Close Relationships Rating Scale-Revised—Attachment Anxiety scale; Avd = Attachment Avoidance scale.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2

Regression Model Predicting Empathic Accuracy

	H1: EA		
Variable	*B*	(*SE*)	*p*
Intercept	.207***	(.013)	<.001
Gender	-.008	(.016)	.616
Eyes Test	.003	(.003)	.299
Condition	-.043*	(.019)	.035

Note. Eyes Test = Reading the Mind in the Eyes Test-Revised; Cond = Condition.

* *p* < .05. ** *p* < .01. *** *p* < .001.

Table 3

Associations Between Empathic Accuracy and Self-Report of Global Relationship Functioning Variables

	CSI-16		
Variable	B	(SE)	p
Intercept	59.65***	(0.74)	<.001
Gender	-0.02	(1.21)	.988
EA (actor)	0.88	(7.57)	.908
EA (partner)	-1.16	(7.51)	.879

	CPQ-SD/PW			CPQ-PD/SW		
Variable	B	(SE)	p	B	(SE)	p
Intercept	23.90***	(1.46)	<.001	24.66***	(1.83)	<.001
Gender	3.52†	(2.04)	.096	-4.64*	(2.01)	.029
EA (actor)	-27.05†	(13.83)	.061	1.96	(18.98)	.918
EA (partner)	-1.11	(12.17)	.928	-28.32	(17.76)	.123

	SIRRS-R		
Variable	B	(SE)	p
Intercept	69.73***	(2.27)	<.001
Gender	-4.22	(3.17)	.194
EA (actor)	-10.32	(22.84)	.655
EA (partner)	4.14	(25.68)	.873

	IOS		
Variable	B	(SE)	p
Intercept	4.77***	(0.20)	<.001
Gender	-0.61*	(0.25)	.019
EA (actor)	0.42	(1.83)	.819
EA (partner)	2.11	(2.30)	.366

Note. CSI-16 = Couples Satisfaction Index-16 Item Version (Funk & Rogge, 2007); CPQ = Communication Patterns Questionnaire (Christensen, 1987); SD/PW = self-demand/partner withdraw subscale; PD/SW = partner-demand/self-withdraw subscale; SIRRS-R = Support in Intimate Relationships Rating Scale-Revised (Barry et al., 2009); IOS = Inclusion of Other in the Self Scale (i.e., intimacy; Aron et al., 1992); EA (actor) = empathic accuracy for actor (self); EA (partner) = partner's empathic accuracy; Cond = Condition. CSI-16 and SIRRS-R results are based on winsorized scores.
† $p < .1$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4

Test of Interaction Between Condition and Empathic Accuracy in Predicting Relationship Satisfaction (H3)

Variable	H3: CSI-16		
	B	*(SE)*	*P*
Intercept	59.53***	(1.14)	<.001
Gender	-0.30	(1.36)	.847
EA (actor)	4.56	(11.59)	.696
EA (partner)	-5.38	(10.19)	.602
Condition	0.31	(1.59)	.847
Cond*EA (actor)	-7.45	(16.45)	.655
Cond*EA (partner)	10.45	(15.28)	.500

Note. CSI-16 = Couples Satisfaction Index-16 Item Version; EA_actor = empathic accuracy for actor (self); EA_partner = partner's empathic accuracy; Cond = Condition. Results are based on winsorised CSI-16 scores.

* $p < .05$. ** $p < .01$. *** $p < .001$.

DISCUSSION

Identifying correlates of empathic accuracy has been the subject of a great deal of research in the last quarter of a century, but these efforts have struggled to find reliable differences across individuals (e.g., Ickes et al., 2000; Zaki et al., 2008), and relational factors that have been studied are complex and do not provide a satisfying explanation for the variation in empathic accuracy observed during couple interactions (e.g., Simpson et al., 1995; Thomas et al., 1997). Empathic accuracy may thus depend largely on temporary or situational forces. However, few studies have identified situational effects on empathic accuracy, and those that have done so have examined situations with reduced ecological validity, such as when couples feel the relationship is threatened in some way (e.g., Simpson et al., 1995; Simpson et al., 2011). It is necessary to identify more common situational factors likely to affect couples during their daily lives and across numerous possible contexts.

The present study identified one situational factor common in daily life, stress, that impairs empathic accuracy in romantic couples. The study was a pilot study investigating a causal association between stress and empathic accuracy in committed romantic couples. Using a standardized and validated stress protocol, the study found that stress significantly impairs partners' ability to understand one another's thoughts and feelings during conflict. Though the study was underpowered to detect an effect of the predicted magnitude at a sample size of 30 couples, a significant effect was observed.

Further, the effect was not better explained by attachment anxiety or avoidance, age, or relationship length. The effect of stress was reduced to trend level with the inclusion of these additional variables, but none of the added variables were individually associated with empathic accuracy, suggesting that the observed differences in empathic accuracy are not better explained by those variables. Moreover, because the study is already underpowered at 30 couples, and sensitivity analyses resulted in inclusion of seven simultaneous predictors, the reduction of the effect of stress to a trend level may be a result of low sample size.

Given the observed effect of condition on empathic accuracy, the current study also tested the possibility that the observed reduction in empathic accuracy may be a byproduct of a change in reporting style induced by the stress manipulation rather than a reduction in empathic accuracy per se. However, by finding no difference in test-retest scores between the control and stress conditions, results did not support this explanation. Additionally, mean test-retest score between groups was highly similar, such that a sample size of approximately 1,375 couples would be needed for the observed difference in test-retest scores to reach significance at the $p < .05$ level.

The current study also examined associations between empathic accuracy and relationship satisfaction and did not find a significant association. This finding was somewhat surprising given past research finding significant positive associations between empathic accuracy and satisfaction for couples early in their relationship (Bissonette et al., 1997; Cohen et al., 2012; but also see Winczewski et al., 2016). In fact, couples married for 2 years or longer were excluded from the study in order to focus on couples for whom empathic accuracy is theorized to be most important or most relevant

(Bissonnette et al., 1997; Thomas et al., 1997). However, though many couples had been together for substantially longer than 2 years when considering time spent dating, length of relationship did not interact with empathic accuracy to predict satisfaction, suggesting that a decline in empathic accuracy over the course of a long-term relationship is not the reason for the null finding. One possible explanation for this set of findings is that, while empathic accuracy is believed to facilitate healthy relationship functioning by allowing partners to respond optimally to one another during conflict, when seeking support, and through enhancing intimacy (Baucom & Atkins, 2013), empathic accuracy does not necessarily lead to these relationship promoting behaviors on its own. For example, Winczewski et al. (2016) found that empathic accuracy was associated with responsiveness to one's romantic partner only when perceivers felt high levels of empathic concern for their partners, but not when empathic concern was low. That is, there may be a requirement that empathic accuracy is accompanied by motivation to understand and respond to one's partner in order for it to exert a beneficial effect. The importance of motivation is also supported by another study finding that (perception of) empathic effort was significantly—and relatively more strongly than empathic accuracy—related to satisfaction (Cohen et al., 2012). Unfortunately, that study did not examine possible interactions between empathic effort and empathic accuracy.

Actor and partner associations between empathic accuracy and other relationship functioning variables were also examined. There were not significant associations between empathic accuracy and either actor or partner report of intimacy or support. On the other hand, there were partial but mixed indications that higher empathic accuracy may be associated with lower demand behaviors, while empathic accuracy was not

significantly related to withdrawing behaviors. This pattern of results suggests that empathic accuracy may be related to the absence of negative behaviors (e.g., demanding) rather than the presence of positive behaviors. Another possible explanation for this pattern of largely null findings is that satisfaction, support, intimacy, and conflict were measured via self-report questionnaires administered near the beginning of study procedures and assessed general patterns in the relationship, whereas empathic accuracy was measured "on-line," i.e., in the moment over the course of a given discussion. Examining such associations assumes that the empathic accuracy measured during a conversation is at least somewhat representative of an individual's or couple's empathic accuracy in general.

The current study also explored the possibility that empathic accuracy under stressful conditions may be relatively more strongly related to relationship satisfaction than empathic accuracy under normal conditions. However, there was not a significant interaction between stress condition and either actor or partner empathic accuracy in predicting relationship satisfaction. This null finding is somewhat difficult to interpret considering that the study was underpowered to test main effects, which means it is even more so to test interaction effects. However, it may be that empathic accuracy is largely consistent across situations, such that those with high accuracy in nonstressful conditions are also relatively more accurate than others when in stressful conditions. Future research would benefit from using a within-subjects design, in which all spouses completed procedures under both control and stress conditions, to examine consistency in empathic accuracy across such situations. Alternatively, an interaction may be obscured for the same reason provided previously, that empathic accuracy alone might not necessarily be

associated with relationship-enhancing behaviors, but may also require the presence of motivation.

Though this pilot study provided support for the primary hypothesis, it will be important to re-examine hypotheses with a complete sample of 50 couples as planned (Simmons, Nelson, & Simonsohn, 2011), and results should be viewed as preliminary until the full sample is collected and analyzed. Nonetheless, this study adds preliminary evidence to the body of literature finding that factors entirely outside a relationship can affect couples' functioning within the relationship (Conger, Rueter, & Elder, 1999; Neff & Karney, 2004; Pasch & Bradbury, 1998). Like work-home spillover, in which stress from work has been found to "spill over" into home life (e.g., Repetti, Wang, & Saxbe, 2009), this study observed the effect of an outside stressor on functioning within the relationship. The current study also adds to the body of literature finding that the consequences of stress are far-reaching and not exclusive to the context in which the stress is produced (e.g., Kubota et al., 2014; Muraven & Baumeister, 2000; Wolf, 2008).

If reproduced with the full sample, these results have important implications for couple therapy. First, most existing couple therapies highlight the importance of environmental context on relationship functioning and incorporate situational context into the conceptualization of a couple's presenting problem. This study provides some indirect support for this approach by identifying a common life experience external to the relationship that can impact functioning within the couple. Second, many empirically supported couple therapies place a high importance on sharing emotions between partners and trying to understand one another's thoughts and feelings (e.g., Dimidjian et al., 2002; Johnson & Denson, 2002), and a recently proposed unified protocol for couple therapy

also highlights the importance of emotional exchange (Christensen, 2010). However, partners' efforts to understand one another in therapy may be hampered when one or both partners are stressed, such as when experiencing financial strain, illness, job loss, and so on, or even simply after a long work day. Yet couples who seek therapy typically also experience other concurrent stressors in life (e.g., Doss, Atkins, & Christensen, 2003), so the circumstances in which couples are likely to have impaired empathic accuracy are the very circumstances in which couple therapy is most frequently provided. Existing research provides some support for this possibility. For example, couples who are more emotionally aroused during therapy subsequently remember fewer skills from therapy (Baucom, Weusthoff, Atkins, & Hahlweg, 2012). Couple therapists should be aware of contextual factors that may influence partners' ability to accurately tune-in to one another during therapy. For example, in Affective Reconstruction therapy, Snyder and Schneider (2002) recommend identifying and addressing "disabling relationship crises" (e.g., death of a loved one) prior to attempting to strengthen the dyad itself, as such crises may impair couples' ability to develop relationship skills and establish emotional intimacy (Snyder & Schneider, 2002). Future research would benefit from examining if, when, and to what extent stress impairs empathic understanding during couple therapy.

<center>Placement of Stress Task in Procedures</center>

The placement of the stress task in the procedures warrants some discussion related to ecological validity and to highlight an area for future research. In these procedures, couples had a conflict discussion, provided self-ratings, then were randomized to either a stress or control task, and then provided empathic inferences about their partners, which means that couples participated (or not) in the stress task *after*

having the conflict discussion. In the real world, empathic inferences are made over the course of a conversation, not after, and they likely influence the course of the conversation itself. The concurrent nature of conversation and empathic inference also means that, when members of a couple are stressed prior to the time they make empathic inferences, the stress precedes the conversation itself as well.

The placement of the stress task in the current study was chosen to maximize internal validity at the expense of some ecological validity. The current study is a test of a causal association, so it was necessary to isolate the empathic inference to ensure that only the partner rating was different between stress and control condition. If the stress task was placed prior to the conversation, which is what would occur in the real world, then the ultimate source of differences in empathic accuracy would be challenging, if not impossible, to determine, as the stress task would have likely altered the course of the conversation itself in addition to altering partners' empathic accuracy (e.g., Conger et al., 1999; Rusbult et al., 1991). As is, the current study is a test of a causal association between stress and empathic accuracy in isolation. Future research would benefit from examining the association between stress and empathic accuracy in daily life as it naturally occurs, for example, using a daily diary method (e.g., Overall et al., 2015).

<div align="center">Reliability of Video Recall Procedure</div>

The current study provides the first examination to my knowledge of test-retest reliability using the Ickes (e.g., Ickes et al., 1990) video recall procedure. The average test-retest score for self-ratings in the sample, in which 0 indicates complete inconsistency and 1 indicates perfect consistency, was .444. At first glance, this score seems exceptionally low for a procedure that considers the self-rating to be the "correct"

answer—i.e., the standard upon which partner inferences are compared (Ickes et al., 1990; Ickes & Simpson, 1997). However, there are several possible explanations for the observed low test-retest score other than poor reliability of the measure itself. First, although the first self-rating occurred immediately after the conversation, the second self-rating occurred 45 minutes or more after the conversation—after the first self-rating, stress or control task, and partner rating—which may have caused participants to forget some of what they had thought or felt at the time of the conversation. One way to examine whether time since conversation impacted recall would be to randomize the order of the partner rating and second self-rating, and then examine if those who did the second self-rating after the partner rating had lower test-retest scores than the group who did the second self-rating before the partner rating. However, because partner ratings were integral to the main study hypotheses, it was important to place the partner rating as early as possible in the study procedures in order to minimize the risk of fatigue or some other confounding factors negatively influencing such ratings.

Alternatively, participants may have felt bored or disengaged when asked to do the second self-rating, as it occurred at the end of a 3-hour procedure, and it was the third time participants watched the same video of their conversation. Lastly, the test-retest score was not calculated with Cronbach's alpha as is typically reported for test-retest reliability, but instead used the same 0 to 2-point scoring used in the Ickes (e.g., Ickes et al., 1990) empathic accuracy paradigm, a necessity arising due to making comparisons of verbal content rather than numerical ratings. It is unclear at this time how this score compares to test-retest reliability of numerical ratings obtained via Cronbach's alpha. However, despite these cautions, the test-retest scores reported here provide a baseline

estimate of test-retest reliability of self-ratings in the video recall procedure. Future research would benefit from examining test-retest reliability using a smaller interval of time between measures, as well as using number ratings of mood to calculate Cronbach's alpha for better comparison with other measures.

<u>Limitations</u>

There are several limitations to keep in mind when considering the results of the current study. First, the study was a pilot study with only 30 couples rather than the full sample of 50 couples as originally planned, so all results should be considered preliminary, especially those involving tests of interactions, given the limited power observed with this small sample. Data are still being collected and analyses will be redone once all 50 couples have been enrolled. Second, as mentioned, the primary hypothesis was a test of a causal association and thus maximized internal validity at the expense of external validity. Future research should examine associations between stress and empathic accuracy as they naturally occur in order to identify the real-world magnitude of the association and temporal patterns. Third, the study was predominantly White, non-Hispanic, and heterosexual, potentially limiting generalizability to other populations. Future research would benefit from testing these associations in more racially and ethnically diverse samples and with more same-sex couples. Fourth, the current study examined empathic accuracy during a conflict discussion, so it is unclear if the stress manipulation would result in reduced empathic accuracy for other types of interactions. However, a prior study found that empathic accuracy for positive emotions was greatest when the subject had low physiological arousal (Levenson & Ruef, 1992), as is the case in a control condition relative to the Trier Social Stress Test (e.g., Larson,

Ader, & Moynihan, 2001), suggesting that the observed results would likely apply to positive interactions as well. Finally, the couple functioning variables (relationship satisfaction, support, demand/withdraw, and intimacy) assessed were self-reports of general patterns in the relationship rather than satisfaction or behaviors enacted during the conversation in which empathic accuracy was assessed, and these associations do not necessarily generalize to these variables as they occur in the moment (e.g., satisfaction with the conversation rather than satisfaction with the relationship).

Summary and Future Directions

The findings of the current study provide preliminary support for the hypothesis that stress impairs empathic accuracy in romantic partners. However, the study found limited support for the association between empathic accuracy and relationship functioning variables assessed globally, which was limited to a trend-level association with lower levels of self-report of global demanding, but not withdrawing, behaviors. Additionally, there was not a significant interaction between stress condition and empathic accuracy on relationship satisfaction, suggesting that empathic accuracy under stress is not relatively more strongly related than accuracy under normal conditions. These findings need to be replicated with a full sample of 50 couples before firm conclusions can be made, especially with regard to the interaction analyzed, and data are still being collected toward that end. However, these preliminary results highlight the importance of stress for couples' ability to understand one another during conflict.

The current study maximized internal validity in order to test an important causal hypothesis between stress and empathic accuracy. It is an important step toward understanding factors that may impact empathic functioning in couples, but it is unable to

assess the association between naturally occurring stress and empathic accuracy in couples' daily lives. Future research should examine these variables assessed over the course of several conversations or over time in order to understand their real-world association and to understand how these important variables unfold over time. Additionally, while a positive association between empathic accuracy in couples and relationship functioning is frequently assumed to be true, recent research has lent doubt to that assumption (Winczewski et al., 2016). More needs to be known about the circumstances under which empathic accuracy contributes to relationship functioning, and whether factors that impact accuracy in turn also influence other relationship functioning variables.

The measure of empathic accuracy should also be dissected to more closely examine the impact of stress on various types of accuracy. For example, couples reported a range of both positive and negative thoughts and feelings, and there is some evidence that accuracy of positive emotions may be influenced by different factors than accuracy of negative emotions. For example, Levenson and Reuf (1992) found that accuracy of positive emotions was more strongly related to a state of low arousal, whereas accuracy of negative emotions was more strongly related to a state of physiological synchrony between partners. Additionally, other methods for measuring empathic accuracy have been proposed, such as the Truth and Bias model (West & Kenny, 2011), which distinguishes between perception of emotions in general (e.g., does one tend to over- or under-estimate another's emotional states) and tracking change in emotion over time (i.e., how well one can identify changes when they occur). The Truth and Bias model also partials out two components of accuracy—assumed similarity and "true" accuracy (see

West & Kenny, 2011, for a discussion of accuracy components). Examining the impact of stress on these various types and components of empathic accuracy would substantially advance understanding of empathic functioning in general and may point toward possible mechanisms of action.
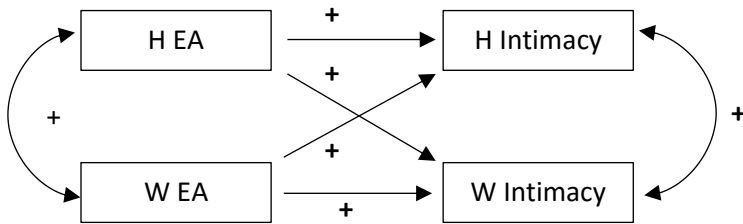
APPENDIX

Figure A1. Hypothesized relationship between empathic accuracy (EA) and intimacy using APIM. H = husbands; W = wives.
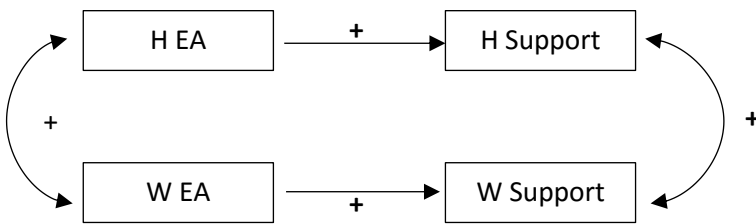

Figure A2. Hypothesized relationship between empathic accuracy (EA) and support using APIM. H = husbands; W = wives.
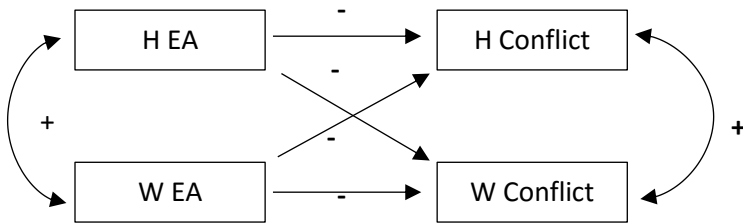

Figure A3. Hypothesized relationship between empathic accuracy (EA) and conflict using APIM. H = husbands; W = wives.
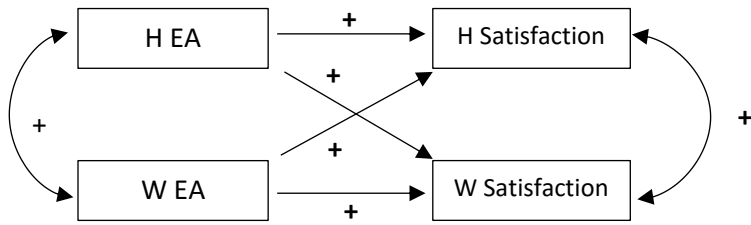
Figure A4. Hypothesized relationship between empathic accuracy (EA) and relationship satisfaction using APIM. H = husbands; W = wives.

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