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Attachment Mediates Effects of Trait Mindfulness on Stress Responses to Conflict

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Abstract While the regulation of stress is usually thought of as an intrapersonal process, research suggests that relational factors such as attachment anxiety and avoidance play an influential role in stress regulation. Mindfulness, the process of intentionally paying attention to present moment experiences in a nonjudgmental way, has been associated with both enhanced romantic attachment security and stress regulation, though the precise role of attachment in mindfulness–stress paths remains unclear. The current study explores (1) the association between mindfulness and romantic partners' physiological and subjective stress responses to a relationship conflict discussion and (2) the role of attachment anxiety and avoidance in statistically mediating that association. Heterosexual couples (n=114 dyads) completed self-report measures of mindfulness and attachment approximately 1 week prior to a lab session involving a conflict discussion task. Participants rated state positive and negative affect and stress appraisals following the discussion, and five saliva samples were collected for cortisol assay to measure physiological stress. Results supported the proposed mediational model, with significant indirect effects of total mindfulness scores on stress outcomes through attachment. Specifically, mindfulness is related to lower cortisol levels during the conflict discussion via lower attachment avoidance and predicted less negative affect and more positive cognitive appraisals following the conflict discussion via lower attachment anxiety.

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Introduction

The manner in which individuals and couples cope with stress has important consequences for physical, mental, and relationship health. Poor romantic relationship quality is associated with increased health risks, including psychological disorders (Coyne et al. 2002; Davila et al. 2003) and morbidity/mortality (e.g., Helgeson 1991; Hibbard and Pope 1993). It has been suggested that mindfulness—the process of intentionally paying attention to present moment experiences in a nonjudgmental way—counters such risks by allowing people to better regulate their subjective and physiological responses to stress, including relationship stress (Kabat-Zinn 1990). Mindfulness has been associated with enhanced relationship quality in dating and married couples (Barnes et al. 2007; Burpee and Langer 2005; Carson et al. 2004; Jones et al. 2011). In particular, research suggests that the cultivation of mindfulness may enhance secure attachment, which, in turn, improves relationship functioning (e.g., Pepping et al. 2013; Siegel 2007). However, not much is known about how mindfulness and attachment might work together to impact couples' psychophysiological stress regulation.

Attachment is characterized by an individual's typical emotion regulation strategies involving significant others, especially when faced with distress or challenge (Shaver and Mikulincer 2002). Romantic attachment security/insecurity is often measured with the Experiences in Close Relationships scale, which taps both attachment anxiety (fears of unlovability and rejection, which give rise to emotion-hyperactivating strategies) and attachment avoidance (discomfort with closeness and interdependence, which gives rise to emotion-deactivating strategies) (Brennan et al. 1998).

Recently, researchers have begun to discuss similarities between secure attachment and mindfulness. One study of a sample of experienced meditators (Shaver et al. 2007) found inverse associations between romantic attachment anxiety and avoidance and scores on a commonly used measure of dispositional mindfulness, the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2006). Another study partially replicated these findings in a sample of nonmeditators, finding negative correlations between attachment anxiety and avoidance and several facets of dispositional mindfulness (Goodall et al. 2012).

When faced with difficulties in interpersonal relationships, the capacity for nonreactively tolerating both one's own and another person's negative emotion is thought to reduce the likelihood of employing hyperactivating or deactivating strategies, which, in turn, supports attentive awareness; thus, there is reason to believe that the emotion-regulating qualities inherent in mindfulness support those involved in romantic attachment security and vice versa (Ryan et al. 2007). Although the association between attachment and mindfulness is probably bidirectional, several studies have provided evidence that mindfulness cultivation may enhance secure romantic attachment, and secure attachment can help explain the connection between mindfulness and higher quality romantic relationships. One study showed that the effect of mindfulness on attachment anxiety was stronger in a group of experienced meditators, suggesting that mindfulness practice may effectively enhance secure attachment over time (Pepping et al. 2013). Another study showed that trait mindfulness was positively related to marital satisfaction and that this effect was partially mediated by the quality of spousal attachment (Jones et al. 2011).

Beyond these psychological effects, there is evidence for effects of mindfulness on stress physiology—in particular, the activation of the hypothalamic-pituitary-adrenal (HPA) axis. However, only a handful of studies have addressed links between dispositional mindfulness and HPA activity during acute stress, and only one involved interpersonal conflict stress. One study revealed lower cortisol reactivity to the Trier Social Stress Test, as well as reduced anxiety and negative affect, among participants higher in self-reported mindfulness (Brown et al. 2012). Another study conducted within the current sample demonstrated sex specific effects of mindfulness facets on romantic partners' cortisol responses to conflict stress, which, in turn, related to greater well-being and/or lower depressive symptoms (Laurent et al. 2013). These findings offer preliminary support for the stress-buffering role of mindfulness in relationships, though questions about mechanisms remain, such as the role of attachment quality in mindfulness-stress associations.

Securely attached romantic partners have been shown to respond to conflict more constructively and to experience less distress than anxiously and/or avoidantly attached partners (Birnbaum et al. 1997; Carnelley et al. 1994; Kobak and Hazan 1991; Radecki-Bush et al. 1993; Shaver and Mikulincer 2002; Simpson et al. 1996). HPA responses to relationship conflict in romantic couples have also been related to attachment quality. Studies examining romantic attachment and cortisol response to conflict have demonstrated increased cortisol related to both attachment anxiety and mutual avoidance (i.e., when both partners show high attachment avoidance) (Laurent and Powers 2007; Powers et al. 2006). Taken together, these largely separate lines of research have linked (a) mindfulness with romantic attachment and (b) both mindfulness and secure romantic attachment with buffered psychophysiological responses to interpersonal stress. What has not been examined, to our knowledge, is whether mindfulness indirectly impacts partners' stress via romantic attachment. Clarifying such paths would help elucidate mechanisms by which mindfulness influences health and well-being within close relationships.

The current study contributes to the literature on mindfulness, attachment, and stress by examining associations between dispositional mindfulness and both subjective and physiological (cortisol) stress responses to an acute interpersonal stressor and the role of attachment in this association. Most prior research has focused on group-wide pre–post intervention changes, rather than on individual differences in self-reported mindfulness, even though the latter may be more decisive for effects on the HPA axis (Jacobs et al. 2013). We hypothesized that individuals higher in trait mindfulness would exhibit less distress (i.e., reduced cortisol reactivity, less negative affect, and cognitive appraisals that are less negative) in response to a conflict discussion with a romantic partner and that attachment anxiety and avoidance would explain the association between mindfulness and stress responses (i.e., statistical mediation). Also, based on previous research, we examined whether associations between mindfulness and stress response differed based on sex.

Method

Participants

Participants were 114 couples ranging in age from 18 to 69 years old (M=21.31, SD=6.12), recruited through a university student research participant pool and with flyers advertising the study in public areas. Study requirements asked that all individuals be at least 18 years old and involved in a romantic relationship for at least 2 months. Compensation was either 3 h of research credit or 20 dollars. Approximately 83 % of the sample was Caucasian, and 86.8 % of participants were undergraduate students. Relationships varied in length from the requisite minimum of 2 months to 47 years, with an average relationship length of approximately 2.23 years (M=

2.23, *SD*=4.84). The majority (59.6 %) described their relationship as "dating exclusively," while 20.2 % were "living together," 13.1 % were either engaged or married, and 7 % were "dating casually" or in an "open relationship." Couples spent an average of 58.5 h and five nights together each week (hours per week: *M*=58.50, *SD*=40.12; nights: *M*=5.32, *SD*=2.63).

Of the 114 couples who participated in the first session of data collection, 103 returned for the second session of data collection. Of these 103 couples that completed both sessions, a data collection error led to missing affect and cognitive appraisal data for two individuals. *T*-tests comparing participants who completed both sessions of data collection to those who completed only the first session revealed no significant differences in mindfulness or attachment.

Procedures

Approval for all recruiting methods, measures and procedures was obtained through the University of Wyoming Institutional Review Board. Data were collected in two sessions approximately 1-week apart. During the first session, each partner separately (i.e., in different rooms) completed a battery of questionnaires assessing relatively stable or trait-like constructs, including the FFMQ, which is a measure of trait mindfulness, and the Experiences in Close Relationships (ECR) scale, which is a measure of adult attachment style. Cortisol samples were collected at the second session, which began at 4:00 p.m. to control for diurnal variability in cortisol levels. During this session, participants engaged in an interactive conflict discussion together and completed additional questionnaires assessing state dependent constructs related to the conflict task, including the Positive and Negative Affect Schedule (PANAS) to assess state affect and the visual analogue scales (VAS) to assess cognitive stress appraisals. Throughout the session, participants gave five saliva samples to assess physiological stress before, during, and after the conflict.

Following the first saliva sample at entry, participants were asked to nominate a topic of unresolved conflict in their relationship. A research assistant then flipped a coin to determine whose topic would be discussed during the conflict task. Following a second pretask saliva sample, partners were given 15 min to discuss the topic. Participants were instructed to engage in the discussion as naturally as possible (i.e., the way they would outside of the lab) and to attempt to resolve the issue if possible. Research assistants monitored the conflict discussion from a separate room via live video feed (without audio) to ensure both the privacy and safety of each partner. After the conflict discussion, participants separately completed the state dependent measures. During this period, they also contributed three more saliva samples to assess conflict HPA stress reactivity and recovery (see below for saliva-sampling procedures).

Saliva-Sampling Procedures

The cortisol response takes approximately 15 to 20 min to travel from the adrenal cortex to saliva where it can be detected through sampling (Laurent and Powers 2007). The first sample, then, reflects stress levels prior to coming into the lab and captures any anticipatory stress participants felt in response to participating in a psychological study. The second saliva sample, collected 20 min after learning about the conflict discussion, reflects anticipatory stress response to the conflict discussion task. The third saliva sample was collected 10 min following the end of the discussion and reflects cortisol response during the task. The fourth and fifth samples were collected at 15-min intervals following the third saliva sample and reflect recovery (or lack thereof) from the stress induced by the conflict discussion.

To ensure the integrity of the cortisol samples, participants were required to adhere to the following conditions: within 24 h of the study—no more than one alcoholic beverage; the day of the study—no alcohol, nicotine or nonprescription drugs; within 3 h of the study—no vigorous exercise or brushing of teeth; and within 1 h of the study—nothing to eat or drink except unsweetened water (Salimetrics 2011). After ensuring that participants had adhered to these conditions, partners were given written instructions on how to provide saliva samples. Participants passively drooled through a small piece of drinking straw into a cryovial for 2 min, providing at least 1.5 ml of saliva. The vial was then immediately sealed and placed in a freezer (−20 °C) until shipment to the Johns Hopkins Center for Interdisciplinary Salivary Bioscience for analysis.

Measures

Experiences in Close Relationships (Brennan et al. 1998) The ECR scale is a well-validated 36-item measure of romantic attachment anxiety and avoidance. Items are rated on a seven-point Likert-type scale ranging from 1 (disagree strongly) to 7 (agree strongly). The anxiety subscale assesses desire for closeness and anxiety about abandonment, while the avoidance subscale refers to discomfort with dependency and closeness. Internal consistency was good for both subscales (avoidance α=.90; anxiety α=.88).

Five-Facet Mindfulness Questionnaire (Baer et al. 2006) The 39-item FFMQ assesses trait mindfulness (i.e., an individuals' general propensity for mindfulness in daily life). A five-point Likert-type scale is used to assess the frequency that each item is true for the responder (1=never or very rarely true, 5=very often or always true). Although the FFMQ can yield five

individual subscale scores, these scores can also be combined to give a total mindfulness score. The current investigation focused on how mindfulness in general, rather than specific mindfulness facets, is related to stress response to conflict. This total score has been used in previous research (e.g., Jones et al. 2011; Pepping et al. 2013) and demonstrated good internal consistency in the current study (α=.86).

Positive and Negative Affect Schedule (Watson et al. 1988) The PANAS is a 20-item measure of various emotion states, 10 positive and 10 negative. Participants were instructed to rate the extent to which they were experiencing each emotion at the present moment on a scale from 1 (very slightly or not at all) to 5 (extremely). Alphas were .88 for posttask negative affect and .89 for posttask positive affect.

Visual Analogue Scales (Gaab et al. 2005) VAS are instruments used to assess subjective characteristics, experiences, or attitudes that cannot be directly measured (e.g., subjective stress). The VAS used in this study were used by Gaab et al. (2005) to assess perceived stress during a psychosocial stress situation. In the present study, the VAS were used to assess cognitive reactions to the conflict discussion following the conflict discussion. The items assess primary appraisals (i.e., how threatening and challenging the stressor was perceived to be) and secondary appraisals (i.e., how well the participants felt they were able to control the stress situation). Participants were asked to rate the extent to which each stress appraisal was true for them using a Likert-type scale. Both scales demonstrated good internal consistency (respectively, αs=.83 and .77).

Cortisol The saliva samples were analyzed with the HS Salivary Cortisol diagnostic Enzyme Immunoassay (Salimetrics product no. 1–3002). The correlation between cortisol in the saliva and serum cortisol (i.e., cortisol in the bloodstream) for this procedure is significant (r (47)=0.91, p<.0001). The minimal concentration of cortisol required for detection is< 0.003 μg/dL. The intra-assay precision coefficient of variation was 3.35–3.65 %. The interassay precision coefficient of variation was 3.75–6.41 % (Johns Hopkins Center for Interdisciplinary Salivary Bioscience 2012).

Results

Preliminary Model Testing

Means, standard deviations, and bivariate correlations between variables are shown in Table 1. To generate estimates of cortisol during the conflict discussion, hierarchical linear modeling (HLM) (Raudenbush and Bryk 2002) was used to fit quadratic growth models to the five sampling points, where intercepts were coded to reflect cortisol levels during the conflict discussion. None of the linear or quadratic slope estimates showed significant effects and are not discussed further. Reported analyses focus on cortisol levels during the conflict discussion.

Preliminary models were fit to determine if paths from mindfulness to stress responses differed by sex. The first models considered were multigroup models testing the indirect effect of mindfulness on stress responses via attachment, separately for male subjects and female subjects. Here, stress responses refer to cortisol levels during the discussion based on the third saliva sample, as well as stress appraisals and negative affect measured following the discussion. The second models considered were the same; but in these models, all paths were constrained to be equal for male subjects and female subjects. The fit of these constrained models was not significantly different from that of unconstrained models (difference χ^2 [4]=2.08 for cortisol models, 1.79 for primary stress appraisal models, and 2.91 for negative affect models; *ns*), suggesting that the path structure did not differ by sex. Therefore, all reported analyses are aggregated across sex.

Main Effects

Total FFMQ mindfulness predicted lower ECR anxiety and avoidance scores (respectively, b=−.94, SE=.14; b=−.48, SE=.11, ps<.001). ECR avoidance predicted higher cortisol intercepts (b=.12, SE=.06, p=.03), while ECR anxiety predicted higher postdiscussion primary appraisals (b=.39, SE=.10, p<.001) and higher levels of negative affect postdiscussion (b=.19, SE=.05, p<.001). There were no significant effects of mindfulness or attachment on secondary appraisals. Mindfulness showed a significant total effect (i.e., unmediated) on both negative affect (b=−.26, SE=.10, p=.008) and primary appraisals (b=−.72, SE=.22, p=.001) but not on cortisol (b=−.01, SE=.09, *ns*).

Mediation Models

Results showed a significant indirect effect of total FFMQ score on cortisol levels via reduced ECR avoidance (b=−.06, SE=.03, p=.048; see Fig. 1). In other words, greater trait mindfulness is related to lower levels of cortisol during the conflict discussion through reduced levels of attachment avoidance. Additionally, there were significant indirect effects of total FFMQ score on both postdiscussion primary appraisals and postdiscussion negative affect via reduced ECR anxiety (respectively, b=−.37, SE=.11; b=−.18, SE=.05, ps≤.001). That is, greater trait mindfulness is related to more positive cognitive appraisals of the conflict task and lower levels of negative affect following the conflict discussion via reduced attachment anxiety. The previously significant total effects of mindfulness on primary appraisals and negative

Table 1 Means, standard deviations, and correlations between measures

Measure	M	SD	1	2	3	4	5
1. ECR anxiety	3.01	1.00					
2. ECR avoidance	2.01	.78	.32**				
3. Total FFMQ	3.44	.45	−.42**	−.28**			
4. Negative affect	1.56	.65	.31**	.14*	−.18**		
5. Primary appraisal	2.56	1.44	.31**	.20**	−.23**	.65**	
6. HPA activation during conflict	−2.08	.57	.11	.18**	−.01	.15*	.09

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

affect were no longer significant once ECR anxiety was included as a mediator in the models (i.e., in these models, there was no significant direct effect of mindfulness on appraisals or affect). Moreover, models including direct effects did not fit significantly better than models that did not include direct effects (difference χ^2 [1]=1.15 for cortisol models, 1.44 for primary stress appraisal models, and .45 for negative affect models; *ns*).

Alternative Model

Alternative paths from attachment to stress outcomes via mindfulness were also investigated. Significant indirect effects were found for attachment anxiety on negative affect via mindfulness (b=.043, SE=.02, p=.016) and for attachment anxiety and avoidance on primary appraisals via mindfulness (b=.12, SE=.04, p=.004 for anxiety; b=.07, SE=.03, p=.04 for avoidance). Indirect effects of attachment anxiety/avoidance on cortisol intercepts via mindfulness were not significant (b=.002, SE=.01, p=.88 for anxiety; b=.001, SE=.01, p=.88 for avoidance). Thus, although our primary hypothesized model provided the best overall explanation for psychophysiological stress responses, it is likely that reciprocal mindfulness–attachment effects contribute to subjective stress outcomes.

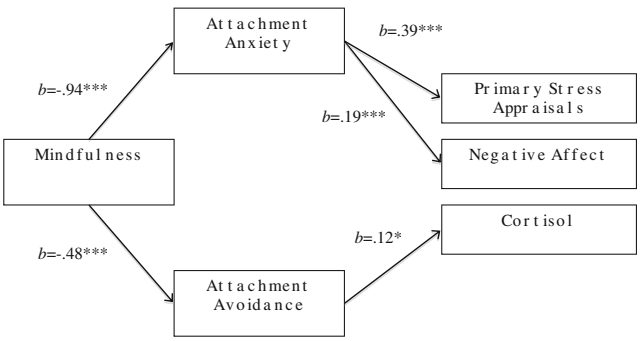

Fig. 1 Summary of significant direct effects of (1) mindfulness on attachment anxiety/avoidance and (2) attachment anxiety/avoidance on stress responses to conflict. The indirect effects of mindfulness, through attachment anxiety, on primary stress appraisals (b=−.37, p<.01), and negative affect (b=−.18, p<.001) were significant. The indirect effect of mindfulness on cortisol, through attachment avoidance, was significant (b=−.06, p<.05). All coefficients are unstandardized. *p<.05, **p<.01, ***p<.001

Discussion

The results we found suggest that mindfulness is associated with lower levels of attachment anxiety and avoidance, which, in turn, buffers stress responses to relationship conflict. Specifically, mindfulness predicted lower cortisol levels during the conflict discussion through reduced attachment avoidance. Additionally, mindfulness predicted cognitive appraisals that were less negatively valenced and less negative affect after the conflict discussion through reduced attachment anxiety. This suggests that partners higher in mindfulness experience relationship conflict as less distressing because they do not rely on ineffective emotion regulation strategies associated with insecure attachment.

The indirect path from mindfulness to lower cortisol via reduced attachment avoidance corroborates previous research suggesting that individuals high in attachment avoidance actually show a heightened physiological stress response in situations where attachment status is relevant (Carpenter and Kirkpatrick 1996; Dozier and Kobak 1992; Feeney and Kirkpatrick 1996). For individuals high in attachment avoidance, the conflict discussion task may have been particularly challenging, as the demands of the situation conflicted with the tendency to attempt to avoid situations that elicit attachment relevant thoughts and responses. The tension between engagement in conflict and attempts to minimize or ignore attachment-related information may produce subtle internal conflict and inhibition indicated by heightened physiological reactivity (Dozier and Kobak 1992). It may be that the nonjudgmental, present-moment orientation associated with mindfulness encourages fuller engagement with the specific aspects of that particular situation, rather than avoidant withdrawal, resulting in a reduction in physiological stress reactivity.

In contrast to the path to physiological stress involving attachment avoidance, mindfulness predicted less subjective distress via reduced attachment anxiety. Since anxiously

attached individuals tend to magnify attachment related information in conscious awareness, it makes sense that mindfulness would serve to reduce this subjective distress at the conscious, rather than physiological, level. That is, the hyperactivating style associated with attachment anxiety may more directly bring about negative thoughts and feelings captured by self-report, whereas the deactivating style associated with attachment avoidance may involve costs accessible only by alternative (i.e., physiological and observer report) measures. The intentional deployment of attention to present-moment experience may serve as an effective alternative to the automatic hypervigiliant processes that typify anxious attachment (e.g., worry and rumination), resulting in a less distressing experience of the conflict both cognitively and emotionally.

Thus, enhanced attachment security helps explain the association between greater mindfulness and reduced stress responses to romantic relationship conflict. However, an interesting question to consider is why there was no total effect (i.e., unmediated) of mindfulness on physiological stress response. It is possible that unmeasured variables associated with mindfulness have an opposite effect on cortisol responses from that of attachment security, thus suppressing the total effect of mindfulness on cortisol. One potential candidate would be the level and manner of engagement with the stressor. That is, mindfulness encourages individuals to fully experience and engage with whatever happens in the moment, including reactions to the stressor, with a certain level of equanimity. In the context of conflict, full engagement with what is occurring may necessarily add to, rather than decrease, stress responses. Additionally, in contrast to previous work, we did not find differential effects of mindfulness on stress response based on sex. It may be that sex matters when considering effects of specific facets of mindfulness, whereas effects of overall trait mindfulness are similar in men and women. Moreover, direct effects of mindfulness on cortisol may depend on sex, while indirect effects via attachment operate similarly for male and female partners.

Limitations and Future Directions

Several potential limitations to this work should be noted. First, a central limitation of the current study is that these data are cross sectional. Regarding subjective stress responses specifically (i.e., *not* physiological stress response), alternative model testing showed that attachment helped explain the mindfulness–stress association in a manner similar to mindfulness explaining the attachment–stress association. Thus, the causal directionality of these effects is unclear. However, it is worth noting that this reverse path did not explain physiological stress outcomes, which suggests that the originally proposed model may do a better job overall of explaining couples' stress regulation.

Other limitations had to do with the nature of the current sample. Participants consisted mostly of couples in dating relationships, rather than marital partnerships. Other patterns of effects could be observed in marital relationships or if couples were followed longitudinally. Also, a very small percentage of our sample had significant experience with mindfulness practices; based on a questionnaire administered to a subset of the current sample, the modal amount of time spent practicing mindfulness was zero, and the majority (68 %) reported less than 1 year of experience with mindfulness practices. Mindfulness meditation practitioners have been demonstrated to respond in a systematically different way to self-report mindfulness questionnaires compared with nonpractitioners (Grossman 2008; Grossman and Van Dam 2011). The concepts communicated in the measures likely have different meanings for different people based on their prior experiences with mindfulness, and the impact of mindfulness qualities may have been diluted in this study by participants' typical inexperience with mindfulness.

Finally, interpretations of the HPA response are complicated by ongoing debate over the relative costs of hyper- versus hypoactivation in the context of romantic relationships. Previous research has demonstrated benefits of a certain amount of cortisol reactivity during conflict (Fehm-Wolfsdorf et al. 1999; Laurent et al. 2013), suggesting that reducing cortisol is not always beneficial. More research is needed to further explore how aspects of individual and relationship functioning impact cortisol response–recovery trajectories and in which contexts higher versus lower cortisol signals better adjustment.

Despite these potential limitations, the findings of this study suggest that mindfulness has beneficial implications for the quality of romantic attachment and coping with concomitant stressors. This marks mindfulness interventions as promising therapeutic tools for treating distressed couples and decreasing mental and physical health risks.

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