

# Perception in Romantic Relationships: a Latent Profile Analysis of Trait Mindfulness in Relation to Attachment and Attributions

Jonathan G. Kimmes<sup>1</sup> · Jared A. Durtschi<sup>2</sup> · Frank D. Fincham<sup>1</sup>

Published online: 7 April 2017  
© Springer Science+Business Media New York 2017

**Abstract** To advance understanding of the role of trait mindfulness in attributions for romantic partner transgressions, we examined the direct and indirect associations among attachment, trait mindfulness, and attributions in a sample of 542 young adults in romantic relationships. A latent profile analysis was used to identify four classes of trait mindfulness (i.e., High Mindfulness, Nonjudgmentally Aware, Low Mindfulness, Judgmentally Observing), and a subsequent structural equation model revealed several significant associations among attachment, the classes of trait mindfulness, and benign attributions for partner transgressions. For example, the High Mindfulness class and the Nonjudgmentally Aware class were positively associated with benign attributions. Furthermore, two significant indirect effects emerged. First, heightened attachment anxiety was associated with a decreased probability of being in the Nonjudgmentally Aware class, which was linked to a decrease in benign attributions. Second, avoidant attachment was associated with a decreased probability of membership in the High Mindfulness class, which was linked to a decrease in benign attributions. Areas for future research based on the findings of this study are discussed.

**Keywords** Attachment · Attribution · Couples · Latent profile analysis · Trait mindfulness

---

✉ Jonathan G. Kimmes  
jkimmes@fsu.edu

<sup>1</sup> Department of Family and Child Sciences, Florida State University, 218 Sandels Building, Tallahassee, Florida 32306-1491, USA

<sup>2</sup> Kansas State University, Manhattan, USA

## Introduction

From deciphering a slightly flippant response to judging blameworthiness after learning of a long-standing affair, partners in romantic relationships continually assess the causes of and intentions behind each other's behavior. Such attributions reliably predict numerous relationship parameters, including relationship satisfaction, interactional behavior, trust, and the propensity to forgive partner transgressions (e.g., Kimmes and Durtschi 2016; Miller and Rempel 2004). The task of aligning perceptions with reality in romantic relationships is exceedingly difficult, however, and cognitive biases tend to be most pronounced when the emotional stakes are high, such as during and following partner transgressions. Although research has shown that trait mindfulness plays a role in appraisal of social interactions (e.g., Heppner et al. 2008; Tan et al. 2014), the way in which trait mindfulness relates to attributional processes in romantic relationships has not yet been examined.

One possibility is that the elements of trait mindfulness emerge from a cognitive infrastructure formed in early childhood. Working models of attachment—the implicit beliefs, attitudes, and expectations that form the lens through which individuals view one's self and others—may dictate one's level of dispositional mindfulness. The nature of the relationship between attachment and mindfulness was detailed by Parker et al. (2015) as follows: “Our proposal is that early experience may also shape mindfulness later in life. We speculate that secure attachment and a sense of safety and interpersonal trust may influence the propensity for the development of presence and mindful awareness” (p. 232). It is therefore possible that working models of attachment be a determinant of trait mindfulness and ultimately impact attributions for partner transgressions. Exploring this possibility may be important for researchers and clinicians in that it may bring about a more nuanced and in-depth

understanding of the interplay between mindfulness and romantic relationship outcomes thereby contributing to the development of mindfulness-based interventions that promote healthy romantic relationships. However, without accounting for the way in which the facets of trait mindfulness relate to each other within individuals, the utility of the above account for researchers and clinicians may be limited.

Although mindfulness may be conceptualized as a fluid state, it is also a trait that remains relatively stable across time (Brown and Ryan 2003). One of the most well-known and oft-used measures of trait mindfulness is the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2006). This measure includes five subscales, each representing one of the five facets of mindfulness: observing, describing, acting with awareness, nonjudging, and nonreactivity. The observing facet is the tendency to notice internal and external stimuli. Describing is the ability to use language to describe one's experiences. Acting with awareness is the tendency to act with present-centered awareness, without going on "automatic pilot." The nonjudging facet is the tendency to take a nonevaluative stance toward thoughts and feelings. Finally, the nonreactivity facet is the capacity to disengage from thoughts, images, and feelings, allowing them to come and go (Baer et al. 2006).

Researchers typically sum scores across these five separate facets (i.e., subscales) of mindfulness in the FFMQ to compute an overall mindfulness score. Some puzzling findings regarding the subscales in the FFMQ suggest that this common approach may not be optimal. For example, the observing facet has been shown to have unexpected positive associations with variables such as psychological symptoms, disassociation, absent-mindedness, and thought suppression, all of which were negatively correlated with the other four facets (Baer et al. 2006). It is possible that this and similar oddities in the FFMQ may reflect that particular constellations of the five facets are associated with different subgroups of individuals. However, this possibility cannot be explored using the traditional approach in which overall FFMQ scores are analyzed. In contrast to this variable-centered approach, we propose to use sophisticated statistical modeling to create classes (i.e., subgroups) of participants based on their scores on each of these five subscales with others who have similar response patterns to them within this sample—a person-centered approach. For example, 25% of participants may be grouped into one class of individuals who are high in awareness, low in reactivity, and mid-range in the other facets. Other unique classes of people would be grouped together based on their similar mindfulness characteristics. These classes can then be statistically modeled as predictors and outcomes. The type of modeling used to create such classes of trait mindfulness is called latent profile analysis; it is a person-centered approach to data analysis because it involves testing associations based on the various classes of people.

Two studies using the FFMQ have utilized latent profile analysis (i.e., Bravo et al. 2015; Pearson et al. 2015). In both studies, four classes of trait mindfulness were identified. The High Mindfulness class was high in each facet of mindfulness, whereas the Low Mindfulness class was comparatively low in each facet. The Nonjudgmentally Aware class was characterized by low scores on the observing and nonreactivity to inner experience subscales and high scores on the acting with awareness and nonjudging subscales. The Judgmentally Observing class topped the other classes in scores on the observing facet but had relatively low scores on the nonjudging and acting with awareness facets. Although researchers have examined the links between trait mindfulness class membership and psychological variables, including depression and distress intolerance, the associations between class membership and relational variables, such as attachment and attributions, were not explored.

As previously noted, working models of attachment may influence trait mindfulness and attributions for partner transgressions. According to attachment theory, working models of attachment are the cognitive-affective schemas that relate to core beliefs, attitudes, and expectations about attachment figures and one's self that arise from the quality of child-caregiver interactions (Bowlby 1980). In adulthood, working models of attachment are applied to romantic partners (Mikulincer and Shaver 2012). Differences between individuals in terms of attachment are conceptualized along two dimensions, attachment anxiety and attachment avoidance, which reflect two differing strategies adopted to protect the self in social relationships (Mikulincer and Shaver 2005). In the context of relationship stress, anxiously attached individuals are more likely to attempt to elicit the attachment figure's involvement and reassurance. For example, individuals with elevated attachment anxiety may demonstrate overdependence on the attachment figure. In contrast, individuals high in attachment avoidance tend to avoid self-disclosure and orient away from attachment figures as a strategy to manage relationship stress (Mikulincer and Shaver 2005).

Based on attachment theory, perceptions of a partner's transgression and subsequent attributions regarding causes of and intention behind partner behavior may largely reflect his or her working models of attachment. Consistent with this point of view, a number of studies document an association between insecure attachment and less benign attributions in romantic relationships (e.g., Kimmes et al. 2015; Lawler-Row et al. 2006; Pearce and Halford 2008). Furthermore, in a review of the studies exploring the link between attachment and attributions, it was concluded that individuals with heightened attachment anxiety or avoidance tend to process social information in a negatively biased fashion, whereas those who were securely attached absorb social information in a more balanced manner (Dykas and Cassidy 2011). Despite the

established connection between attachment and attributions, the factors that mediate this association remain unclear.

In addition to the research showing that attachment is associated with attributions in romantic relationships, there is evidence that attachment is linked with trait mindfulness. Pepping et al. (2014) found that anxious and avoidant attachment was significantly associated with lower total scores for trait mindfulness on the FFMQ. However, examination of the relationships between the dimensions of insecure attachment and specific facets of mindfulness showed that neither anxious nor avoidant attachment was significantly associated with lower scores on the nonreactivity facet. Furthermore, anxious attachment had a significant positive association with the observing facet, but this was not the case for avoidant attachment. In another investigation, trait mindfulness, as measured by the Mindful Attention Awareness Scale (MAAS; Brown and Ryan 2003), was negatively linked with anxious but not avoidant attachment (Walsh et al. 2009). The results from these studies suggest that relationships between the dimensions of attachment and trait mindfulness may be complex and warrant further attention from researchers.

Although researchers have examined the link between attachment and trait mindfulness, the association between trait mindfulness and attributions for partner transgressions has not been tested. There is evidence, however, that trait mindfulness is associated with less hostile attribution bias in responding to hypothetical negative social situations (Heppner et al. 2008). This finding is consistent with the notion that individuals who are low in trait mindfulness are more likely to filter out exculpatory information or selectively attend to information compatible with blameworthiness during and in response to partner transgressions. It is also important to note that mindfulness has also been linked with mental state inference abilities which play an important role in attributions. More specifically, a recent study showed that participants who completed a single, 5-min mindfulness exercise demonstrated superior mental state inference abilities compared to participants in a control group, as evidenced by the scores on the Reading the Mind in the Eyes Test (RMET; Baron-Cohen et al. 2001; Tan et al. 2014).

If multiple classes of trait mindfulness can be identified, then it is possible to explore whether these classes mediate the relationship between the dimensions of attachment and attributions. That is, attachment anxiety and avoidance may influence the likelihood of belonging to varying types of mindfulness classes, and class membership may, in turn, be linked with attributional tendencies in romantic relationships. Take, for example, the Judgmentally Observing class, first identified by Pearson et al. (2015) and characterized by relatively high levels of observing and relatively low levels of nonjudging of inner experience and acting with awareness. It would be reasonable to expect that attachment anxiety would be positively associated with the odds of membership in the Judgmentally Observing class. High levels of attachment

anxiety reflect an automatic and incessant preoccupation with the availability of attachment figures, which may contribute to decreased scores on the acting with awareness and nonjudging subscales. This form of trait mindfulness may negatively skew perception in romantic relationships such that partners of anxiously attached individuals are unlikely to get the benefit of the doubt following a transgression.

Understanding the role of trait mindfulness in romantic relationships may be useful for clinicians who work with couples to promote healthier and more fulfilling romantic relationships (Karremans et al. 2015). Although mindfulness-based interventions and programs have been developed in an effort to promote healthy and fulfilling romantic relationships, research evaluating the effectiveness of these programs has yielded mixed results in terms of their impact on relationship outcomes (e.g., Carson et al. 2004; Gambrel and Piercy 2015). The use of alternative approaches to measure mindfulness may bring about a more comprehensive understanding of the links between trait mindfulness and variables involving relationship functioning and thereby facilitate the development, implementation, refinement, and evaluation of mindfulness-based interventions for couples.

The purpose of this study was to (a) identify subgroups of individuals who share similar constellations of the facets of trait mindfulness, (b) explore whether the dimensions of attachment are associated with the likelihood of membership in trait mindfulness classes, (c) examine the associations between trait mindfulness class membership and partner attributions, and (d) test whether trait mindfulness class membership serves as a mechanism that links attachment and partner attributions. Because research has shown that relationship satisfaction and closeness are positively associated with trait mindfulness (e.g., Barnes et al. 2007; Lenger et al. 2016), they were statistically controlled for in the analyses. In addition, depression and neuroticism have an inverse relationship with trait mindfulness (Barnhofer et al. 2011) and attributions for partner transgressions (Horneffer and Fincham 1996), so these variables were also controlled for in the analyses. This study extends previous research by examining the links between anxious and avoidant attachment to profiles of trait mindfulness and the association between trait mindfulness and attributions in romantic relationships.

## Method

### Participants

To participate in the study, individuals were required to be 18–29 years of age and in a romantic relationship. Of the 608 individuals who accessed the link to the survey, 560 agreed to the informed consent document and began to take the

survey. To enhance the reliability of the data, 16 participants were not included in subsequent analyses because they failed to complete at least half of the items, and two other participants were not included in subsequent analyses because they completed the survey in less than 15 min. Thus, the final sample for this study comprised 542 participants (68.8% were female). The average age was 20.3 ( $SD = 2.00$ ) and the average relationship length was about 23 months (97.4% of participants reported that their romantic relationship was with an opposite sex partner). In terms of race, the sample was 88.7% European American, 2.5% African American, 3.5% Latino, 2.3% Asian, 0.6% Native American, 1.8% multiracial, and 0.6% other race.

## Procedure

Participants for this study were recruited from a variety of introductory-level courses at a university in a rural Midwestern area. Prospective participants were informed that the survey was being conducted as part of an effort to better understand young adult romantic relationships and were given key information about the survey, as well as a link that could be used to access it. Students were encouraged to take the survey if they met the survey criteria, and they were also asked to invite their peers who met the criteria to participate. No extra credit was given to students for completing the survey, and class instructors were not informed about which students took the survey. The online survey took approximately 30 min, and those who completed it were sent a US\$10 payment for their time.

## Measures

**Anxious and Avoidant Attachment** The Experiences in Close Relationships—Revised (ECR-R; Fraley et al. 2000) was used to assess participants' level of attachment anxiety and avoidance. This measure has 36 items, with 18 items used for the anxiety subscale (e.g., "I often worry that this person doesn't really care for me") and 18 items used for the avoidance subscale (e.g., "I prefer not to show this person how I feel deep down"). Each item was accompanied by a 7-point Likert scale with responses ranging from 1 = *strongly disagree* to 7 = *strongly agree*; participants were asked to select the responses that best fit the way in which they relate to their romantic partner. The mean score of the items within each subscale was calculated for the analysis such that higher scores indicated a higher level of that dimension of attachment insecurity. Coefficient alpha was .92 for the avoidance subscale and .86 for the anxious subscale.

**Benign Attributions** The Relationship Attribution Measure (RAM; Fincham and Bradbury 1992) was used to assess attributions for partner behaviors. The RAM measures both

causal and responsibility attributions, whereas causal attributions have to do with who or what produced an event, and responsibility attributions concern culpability for the event once the cause is known. The 24-item RAM is a valid measure as evidenced by its association with observed behavior and relationship satisfaction and is reliable as evidenced by high internal consistency and high test–retest correlations (Hall and Fincham 2008). Participants were presented with four hypothetical negative partner behaviors (e.g., "Imagine that your partner is distant and cool toward you"). Six items followed each negative partner behavior, three to assess causal attributions and three to assess responsibility attributions. Participants were asked to indicate the degree to which they agreed with each statement using a 6-point scale (1 = *strongly disagree* to 6 = *strongly agree*). The mean of the items for each subscale was independently calculated and coded such that a higher attribution score represented more benign attributions about the partner. The alpha coefficient alpha was .87 for causal attribution items and .93 for responsibility attribution items. Benign attributions were measured as a single latent variable, with causal attributions and responsibility attributions as the two indicators. The standardized factor loadings for causal and responsibility attributions were .88 and .90, respectively.

**Trait Mindfulness** The FFMQ (Baer et al. 2006) was used to assess trait mindfulness. Since the inception of the FFMQ, its psychometric properties have been tested extensively, with studies yielding evidence supporting its reliability and validity (e.g., Christopher et al. 2012). Participants were asked to indicate the degree to which each of the 39 statements was true for them using a 5-point scale (1 = *never or very rarely true* to 5 = *very often or always true*). The average score was calculated for the items within each of the five subscales. The observing subscale (eight items;  $\alpha = .80$ ) measured the tendency to notice internal and external experiences. The describing subscale (eight items;  $\alpha = .82$ ) assessed the capacity to put words to internal and external experiences. The acting with awareness subscale (eight items;  $\alpha = .80$ ) measured the tendency to maintain focused on one's actions in the present moment. The nonreactivity to inner experience subscale (seven items;  $\alpha = .79$ ) measured the capacity to allow thoughts, images, and feelings to come and go and not get stuck in them. Finally, the nonjudging of inner experience subscale (eight items;  $\alpha = .88$ ) was the tendency to take a nonevaluative attitude toward inner experience.

**Control Variables** The Couples Satisfaction Index-4 (CSI-4; Funk and Rogge 2007) was used to control for relationship satisfaction in the analysis. The four items in this measure were scored based on a 6-point scale. For each participant, the mean score for the items was calculated; higher scores reflected more relationship satisfaction. The alpha coefficient for the CSI-4

was .85. To control for level of closeness to one's romantic partner, we used the Inclusion of Other in the Self Scale (IOS; Aron et al. 1992), a single-item measure. The IOS comprises seven diagrams, each with two circles, one labeled "self" and one labeled "other." Participants were asked to select the diagram that best fits how they perceive their romantic relationship. The choices ranged from *nonoverlapping circles* (1) to *almost completely overlapped circles* (7), with greater overlap indicating more closeness. Depressive symptoms were assessed using the Patient Health Questionnaire (PHQ-9; Kroenke et al. 2001). Participants were asked how often over the past 2 weeks they have been bothered by the symptoms of depression described in the items in PHQ-9. Responses in this nine-item measure ranged from 0 = *not at all* to 3 = *nearly every day*, and the mean score for the items was calculated and coded such that higher scores reflected higher levels of depression. The alpha coefficient for this measure was .73. Neuroticism, the final covariate included in the model, was measured using the Eysenck Personality Questionnaire—Brief Version (EPQ-BV; Sato 2005), a 12-item measure in which participants were asked to respond to several questions regarding their tendency to feel a variety of negative emotional states. Responses for the EPQ-BV range from 1 = *not at all* to 5 = *extremely*, and the mean scores of the items were used for the analyses, with higher scores reflecting more neuroticism. The alpha coefficient for the EPQ-BV was .92.

### Data Analyses

The first analysis was a latent profile analysis (LPA), a specific kind of a person-centered approach in which subgroups of individuals are identified when they share similar configurations of a set of variables. The analyses were conducted using Mplus 7.11 (Muthén and Muthén 2012). In this study, the LPA was used to identify classes of individuals who have similar patterns of scores across the five facets of mindfulness. Starting by testing the fit of a single-class model against a 2-class model, we iteratively tested a series of models with two classes, three classes, four classes, five classes, and six classes. Several statistical indicators were used to compare the models, including Akaike's Information Criterion (AIC), the Bayesian information criterion (BIC; Schwarz 1978), the sample-size-adjusted BIC (ABIC; Sclove 1987), the Lo–Mendell–Rubin Likelihood Ratio Test (LMR; Lo et al. 2001), and entropy. Whereas lower values for AIC, BIC, and ABIC indicate a more optimal class solution, higher values for entropy suggest a better fit to the data. The LMR is a test in which a significant value ( $p < .05$ ) indicates that the solution with  $k$  groups fits better than a model with  $k - 1$  groups.

After reaching the optimal number of classes, posterior probabilities were used to assign each participant to a single class, per the classify–analyze approach described by Bray et al. (2015). We then dummy coded the categorical class variable so that class membership could be meaningfully

included in the model. Following that step, we ran the full structural equation model. Bootstrapping, a resampling procedure used in tests of mediation, was employed using 2000 bootstrap resamples to test the indirect effects in the model. Indirect effects may be considered statistically significant when 0 is not included in the 95% confidence interval around it (Shrout and Bolger 2002). Full-information maximum likelihood (FIML) estimation was used to handle missing data (Peters and Enders 2002).

### Results

Descriptive statistics and correlations among the variables are shown in Table 1. Among the five FFMQ subscales, significant positive associations were found for all but four cases ( $p < .001$ ), two of which did not reach statistical significance; in the other two cases, significant inverse associations were found. More specifically, observing was significantly inversely correlated with nonjudging ( $r = -.20, p < .001$ ) and acting with awareness ( $r = -.20, p < .001$ ). The five subscales were differentially associated with several variables in the model, which points to the need for a more nuanced approach to measuring trait mindfulness.

### Classes of Mindfulness

The indicators of the model fit for 2-, 3-, 4-, 5-, and 6-class solutions can be viewed in Table 2. The Lo–Mendell–Rubin Likelihood Ratio (LMR) test revealed that the 4-class model fit better than the 3-class model ( $p < .001$ ) and that the 5-class model was not significantly better than the 4-class model. Although the entropy value for the 4-class model (.80) was slightly lower than the entropy value for the 3-class model (.82), the 4-class model outperformed the 3-class model on AIC, BIC, and ABIC and only slightly higher AIC and ABIC than the 5-class model. Taken together, the statistical indicators provided evidence that the 4-class model was the best fit to the data.

The four classes, which are shown in Fig. 1, were structured similarly to those found by Bravo et al. (2015) and Pearson et al. (2015); consequently, following these researchers, we opted to refer to the four classes as the Judgmentally Observing class, the Low Mindfulness class, Nonjudgmentally Aware class, and High Mindfulness class, respectively. Of the 531 participants included in the analysis, 119 (22.4%) were members of the Judgmentally Observing class, 219 (41.2%) were members of the Low Mindfulness class, 41 (7.7%) were members of the Nonjudgmentally Aware class, and 152 (28.6%) were members of the High Mindfulness class. Pairwise mean comparisons were also conducted (see Table 3). In the Judgmentally Observing class, the lowest average score was on nonjudging facet and the highest

**Table 1** Bivariate correlations among model variables (*N* = 531)

| Variables                             | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | 11     | 12      | 13   |
|---------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|---------|------|
| 1. Observing                          | –       |         |         |         |         |         |         |         |         |         |        |         |      |
| 2. Nonjudging                         | -.20*** | –       |         |         |         |         |         |         |         |         |        |         |      |
| 3. Acting with awareness              | -.20*** | .45***  | –       |         |         |         |         |         |         |         |        |         |      |
| 4. Describing                         | .39***  | .16***  | .16***  | –       |         |         |         |         |         |         |        |         |      |
| 5. Nonreactivity                      | .27***  | .04     | .05     | .27***  | –       |         |         |         |         |         |        |         |      |
| 6. Anxious attachment                 | .01     | -.46*** | -.35*** | -.18*** | -.14*** | –       |         |         |         |         |        |         |      |
| 7. Avoidant attachment                | -.12**  | -.21*** | -.18*** | -.35*** | -.07    | .39***  | –       |         |         |         |        |         |      |
| 8. Benign causal attributions         | -.03    | .27***  | .22***  | .05     | .10*    | -.38*** | -.36*** | –       |         |         |        |         |      |
| 9. Benign responsibility attributions | -.02    | .25***  | .16***  | .10*    | .12**   | -.35*** | -.28*** | .74***  | –       |         |        |         |      |
| 10. Relationship satisfaction         | .02     | .27***  | .16***  | .16***  | .07     | -.44*** | -.50*** | .35***  | .33***  | –       |        |         |      |
| 11. Depression                        | .13***  | -.43*** | -.34*** | -.20*   | -.06    | .31***  | .14***  | -.16*** | -.20*** | -.28*** | –      |         |      |
| 12. Closeness                         | -.12**  | .10*    | .11*    | .10*    | .03     | -.23*** | -.31*** | .20***  | .13**   | .41***  | -.04   | –       |      |
| 13. Neuroticism                       | .10*    | -.54*** | -.38*** | -.22*** | -.29*** | .47***  | .18***  | -.28*** | -.23*** | -.22*** | .55*** | -.07*** | –    |
| M                                     | 3.20    | 3.37    | 3.22    | 3.35    | 3.10    | 3.23    | 2.63    | 3.73    | 4.23    | 5.18    | 1.99   | 4.14    | 2.29 |
| SD                                    | .58     | .77     | .61     | .69     | .63     | .90     | .95     | .81     | .97     | .85     | .42    | 1.44    | .84  |

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001 (two-tailed)

average score was in the observing facet. In other words, individuals in Judgmentally Observing class were likely to notice internal and external stimuli, but they were also likely to make evaluative judgments about their thoughts and feelings. The Low Mindfulness class and the High Mindfulness class had relatively little variation across the facets of mindfulness, but the average score for each facet in the High Mindfulness class was higher than the average score for the corresponding facet in the Low Mindfulness class. The Nonjudgmentally Aware class was characterized by relatively low scores on

observing and nonreactivity facets and relatively high scores on the nonjudging and acting with awareness facets.

**Model Fit, Direct Effects, and Indirect Effects**

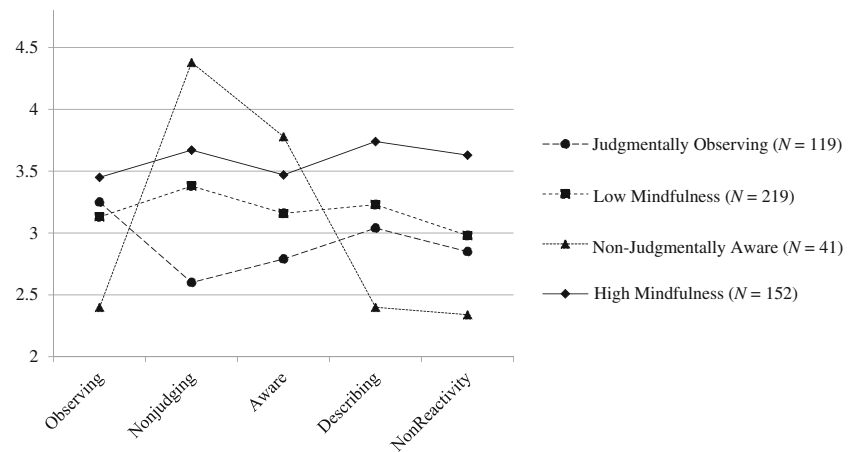
Figure 2 shows the full structural equation model, including the associations among the dimensions of attachment, the classes of trait mindfulness, and attributions. The model fits the data adequately,  $\chi^2(9) = 9.43, p = .22, CFI = 1.00, RMSEA = .03$  (90% confidence interval [CI]: .00, .06), and SRMR < .01.

**Table 2** Criteria for assessing fit for different number of classes

|                       | 2-class model        | 3-class model                   | 4-class model                               | 5-class model  |
|-----------------------|----------------------|---------------------------------|---|--|
| AIC                   | 4847.5               | 4693.7                          | 4622.5                                      | 4583.2   |
| BIC                   | 4948.6               | 4864.7                          | 4853.3                                      | 4873.9   |
| Adjusted BIC          | 4876.1               | 4737.7                          | 4681.9                                      | 4658.1   |
| Entropy               | .70                  | .82                             | .80   | .78  |
| Lo–Mendell–Rubin      | –2534.1***           | –2306.85***                     | –2257.3***                                  | –2263.0  |
| Likelihood ratio test |                      |                                 |   |  |
| N for each class      | C1 = 236<br>C2 = 295 | C1 = 280<br>C2 = 207<br>C3 = 44 | C1 = 119<br>C2 = 219<br>C3 = 41<br>C4 = 152 | C1 = 204<br>C2 = 13<br>C3 = 39<br>C4 = 164<br>C5 = 111 |

The 4-class model was selected as the best-fitting and most parsimonious model that made theoretical sense  
\*\*\**p* < .001 (two-tailed)

**Fig. 1** Latent classes defined by means on the five facets of trait mindfulness ( $N = 531$ )



Relative to the Low Mindfulness class, a one-unit increase in anxious attachment was associated with a 9.53-fold increase in the likelihood of belonging to the Judgmentally Observing class ( $b = .10, p < .001$  OR: 9.53), an 83% reduction in odds of being in Nonjudgmentally Aware class ( $b = -.06, p < .001$  OR: .17), and a 53% reduction in odds of being in the High Mindfulness class ( $b = -.05, p < .05$  OR: .47). Relative to the Low Mindfulness class, a one-unit increase in avoidant attachment was associated with a 1.93-fold increase in the likelihood of belonging to the Judgmentally Observing class ( $b = .04, p < .05$  OR: 1.93) and a 29% reduction in odds of being in the High Mindfulness class ( $b = -.07, p < .01$  OR: .71). There was no significant association between avoidant attachment and the odds of being in the Nonjudgmentally Aware class ( $b = .00, p = .95$  OR: .94).

Anxious ( $\beta = -.18, p < .01$ ) and avoidant attachment ( $\beta = -.35, p < .001$ ) were inversely linked with benign attributions, and there were two statistically significant associations between trait mindfulness class membership and benign attributions. First, relative to the Low Mindfulness class, membership in the High Mindfulness class was positively

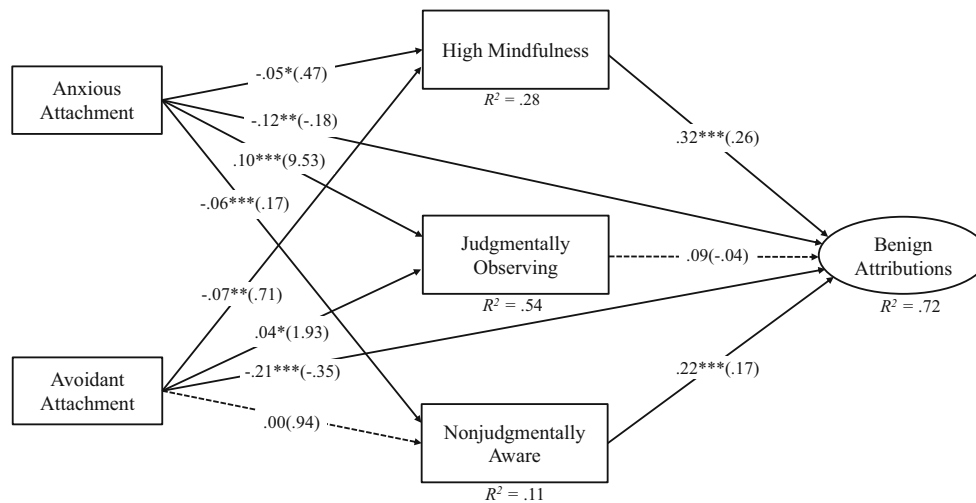
associated with benign attributions ( $\beta = .26, p < .001$ ). Second, membership in the Nonjudgmentally Aware class was linked with more benign attributions ( $\beta = .17, p < .01$ ). In light of the documented link between attachment and attributions, indirect associations were of interest and speak to whether mindfulness might function as a mechanism that accounts for the attachment–attribution association. Two indirect effects reached statistical significance. The first was from anxious attachment  $\rightarrow$  Nonjudgmentally Aware class  $\rightarrow$  benign attributions ( $\beta = -.03, p < .01, 95\% \text{ CI} = -.07, -.01$ ). The second significant indirect effect was from avoidant attachment  $\rightarrow$  High Mindfulness class  $\rightarrow$  benign attributions ( $\beta = -.04, p < .01, 95\% \text{ CI} = -.07, -.02$ ).

Altogether, the model accounted for 72% of the variance in benign attributions. The effect sizes of the significant paths from the dimensions of attachment to the classes of trait mindfulness can be evaluated by examining the odds ratios. With the exception of the large effect size of the direct path from anxious attachment and membership in the Nonjudgmentally Observing class, the effect sizes for the other direct paths from the dimensions of attachment to the classes of trait mindfulness

**Table 3** Mean comparisons between latent classes on mindfulness facets and model variables ( $N = 531$ )

| Variables             | Judgmentally Observing | Low Mindfulness   | Nonjudgmentally Aware | High Mindfulness  |
|-----------------------|------------------------|-------------------|-----------------------|-------------------|
| Observing             | 3.27 <sub>a</sub>      | 3.13 <sub>b</sub> | 2.40 <sub>c</sub>     | 3.45 <sub>d</sub> |
| Describing            | 3.04 <sub>a</sub>      | 3.23 <sub>a</sub> | 3.32 <sub>a</sub>     | 3.74 <sub>b</sub> |
| Acting with awareness | 2.79 <sub>a</sub>      | 3.16 <sub>b</sub> | 3.78 <sub>c</sub>     | 3.47 <sub>d</sub> |
| Nonjudging            | 2.59 <sub>a</sub>      | 3.39 <sub>b</sub> | 4.38 <sub>c</sub>     | 3.67 <sub>d</sub> |
| Nonreactivity         | 2.84 <sub>a</sub>      | 2.98 <sub>a</sub> | 2.34 <sub>b</sub>     | 3.63 <sub>c</sub> |
| Anxious attachment    | 4.11 <sub>a</sub>      | 3.24 <sub>b</sub> | 2.34 <sub>c</sub>     | 2.76 <sub>d</sub> |
| Avoidant attachment   | 3.19 <sub>a</sub>      | 2.67 <sub>b</sub> | 2.28 <sub>c</sub>     | 2.25 <sub>c</sub> |
| Attributions          | 3.88 <sub>a</sub>      | 4.03 <sub>a</sub> | 4.66 <sub>b</sub>     | 4.64 <sub>b</sub> |
| Depression            | 2.38 <sub>a</sub>      | 1.98 <sub>b</sub> | 1.44 <sub>c</sub>     | 1.86 <sub>d</sub> |
| Closeness             | 3.41 <sub>a</sub>      | 5.46 <sub>b</sub> | 5.41 <sub>b</sub>     | 5.18 <sub>b</sub> |
| Neuroticism           | 3.33 <sub>a</sub>      | 2.34 <sub>b</sub> | 1.43 <sub>c</sub>     | 1.66 <sub>d</sub> |

Means in a row sharing a subscript indicate that they are not significantly different from each other



**Fig. 2** Model of associations among dimensions of attachment, classes of trait mindfulness, and benign attributions ( $N = 531$ ). Model fit indices:  $\chi^2(9) = 9.43$ ,  $p = .22$ , CFI = 1.00, RMSEA = .03 (90% confidence interval [CI]: .00, .06), and SRMR <.01. For direct paths to the classes of trait mindfulness, unstandardized coefficients are outside parentheses

and odds ratios are reported inside parentheses. For direct paths to benign attributions, unstandardized coefficients are outside parentheses and standardized coefficients are inside parentheses. *Solid arrows* represent significant pathways, whereas *dotted arrows* represent nonsignificant pathways.  $*p < .05$ ;  $**p < .01$ ;  $***p < .001$  (two-tailed)

were small. The effect sizes of the significant direct paths to benign attributions can be evaluated by examining the standardized betas. Medium effect sizes were found for the direct paths from the High Mindfulness class to benign attributions and the direct path from avoidant attachment to benign attributions, but small effect sizes were found for the other significant direct paths to benign attribution. Although most of the effect sizes were small, it is important to consider that the four control variables—closeness, depression, neuroticism, and relationship satisfaction—have repeatedly been linked with attachment, trait mindfulness, and attributions and therefore reduced the magnitude of the effects in the model.

## Discussion

This study attempted to explore the ways in which the constituents of trait mindfulness tend to constellate within individuals and to advance understanding regarding the role that trait mindfulness plays in romantic relationships. Using a latent profile analysis, we found evidence for four classes of trait mindfulness based on the patterned organization of the facets of mindfulness within individuals. The classes found in this study resemble the four classes identified in two previous investigations (i.e., Bravo et al. 2015; Pearson et al. 2015) and were therefore given the same names: High Mindfulness, Low Mindfulness, Nonjudgmentally Aware, and Judgmentally Observing. This study extends previous research, however, by providing evidence that the classes of trait mindfulness are associated with the dimensions of adult attachment and partner attributions.

We found that both forms of insecure attachment were linked with a greater likelihood of membership in the Judgmentally

Observing class and a reduced likelihood of membership in the High Mindfulness class. This is consistent with research indicating that attachment anxiety and avoidance have a comparable impact on cognitive processes, such as attention and memory, which are involved in the formation of attributions (van Emmichoven et al. 2003). On the other hand, it is important to note that anxious, but not avoidant, attachment was negatively linked to membership in the Nonjudgmentally Aware class. This is consonant with findings from an investigation in which anxious attachment, but not avoidant attachment, was negatively linked with trait mindfulness (Walsh et al. 2009). Ultimately, anxious and avoidant attachment may share associations with some, but not all, of the classes of trait mindfulness.

Class membership was also associated with partner attributions. For example, members of the High Mindfulness class were more apt to make charitable interpretations of partner transgressions than members of the Low Mindfulness class. This is consistent with a previous finding in which less mindful individuals showed heightened neurophysiological reactivity associated with negativity bias (Ho et al. 2015). In the present study, we also demonstrated that membership in the Nonjudgmentally Aware class was linked with more benign partner attributions and that membership in the Judgmentally Observing class was linked with less favorable partner attributions. The findings from this study support the notion that various classes of trait mindfulness may differ in terms of the way they alter perception in romantic relationships.

Two indirect effects were identified. In the first, heightened attachment anxiety was associated with a decreased probability of membership in the Nonjudgmentally Aware class relative to the Low Mindfulness class and, by extension, less benign attributions. In the second, increased attachment



avoidance was associated with less benign attributions via a decreased likelihood of membership in the High Mindfulness class relative to the Low Mindfulness class. Although previous research has demonstrated a strong link between attachment insecurity and attributions (e.g., Pearce and Halford 2008; Sümer and Cozzarelli 2004), the indirect effects identified in this study also provide preliminary evidence that trait mindfulness mediates the association between these variables. Each form of attachment insecurity may alter the attitudinal, attentional, and perceptual constituents of trait mindfulness, setting the stage for negatively biased interpretations of partner behaviors such that transgressions are more likely to be viewed as intentional and worthy of blame.

Based on the results of this study, one area for future research is the development of instruments specifically designed to classify individuals into discrete subgroups of trait mindfulness. In this way, researchers may be better able to determine whether variation in trait mindfulness fits a typological model. Until such measurements are created and garner empirical support, researchers may consider employing person-centered approaches when using the FFMQ (Baer et al. 2006) to test the efficacy of mindfulness-based interventions. For example, researchers may use latent transition analyses to test whether various mindfulness-based interventions lead to changes in trait mindfulness class membership.

Because we found a connection between attachment and trait mindfulness class membership, future research is needed to determine the potential causal relationship between them. The intrapersonal attunement associated with mindfulness and the interpersonal attunement associated with secure attachment may reinforce each other in a loop (Siegel 2007). Research that demonstrates a reciprocal relationship between attachment security and trait mindfulness would raise the possibility that attachment-based interventions could promote trait mindfulness and that mindfulness practices may facilitate change in working models of attachment.

Lastly, given that the study provided preliminary evidence for a relationship between trait mindfulness and attributions, empirical research is needed to examine the use of mindfulness practices in altering attributional tendencies. Despite evidence that engaging in mindfulness practices may alter automatic attentional and perceptual processing (e.g., Cahn and Polich 2009), researchers have not yet explored the way in which these practices alter attributional patterns for partner behaviors.

## Limitations

The findings from this study should be interpreted in the light of several limitations. First, participants were assessed at a single point in time, so it is not possible to use the data to establish the temporal and causal ordering of the variables. Second, there is concern within the scientific community that there may often be

a substantial chasm between one's perception of one's own level of mindfulness and the degree to which one is truly mindful (Bergomi et al. 2013). However, despite recent advances involving the measurement of mindfulness by examining brain region activation, self-report measures are currently the most viable approach for measuring mindfulness. A third limitation of this study involves the unresolved issue of how to determine the number of classes in a latent profile analysis. When conducting an LPA, it is common for fit indices to yield support for different conclusions in terms of class enumeration. Researchers use a combination of fit indices and theoretical considerations to make decisions regarding the number of classes to use (Wang and Hanges 2011). In this study, because most of the fit indices supported a 4-class solution and there was no theoretical rationale to support the 3-class solution, we elected to use the 4-class solution.

Notwithstanding the above noted limitations, it is important to underscore that this study represents an attempt to advance understanding of the association between attachment and trait mindfulness by using a person-centered approach in the measurement of trait mindfulness. It also extends research involving mindfulness and romantic relationships by providing evidence that trait mindfulness is linked with partner attributions. The use of a person-centered approach to measure trait mindfulness in this study is a meaningful strength because it helps overcome a number of drawbacks to the more common variable-centered approach to measuring trait mindfulness (see Chiesa 2012). Other notable strengths of this study include the use of measures with strong psychometric properties, the inclusion of several theoretically relevant control variables in the model, and the use of a relatively large sample of young adults in romantic relationships.

Habitually uncharitable interpretations of partner transgressions hinder the development of a long-lasting, healthy romantic relationship, but trait mindfulness may be a central factor that brings perception in closer register with reality in the attributional process. It is important to consider, however, that insecure working models of attachment may reduce the tendency to be mindful, playing an indirect role in the attributional process. Although preexisting models of relational experiences may bias the attributional process via trait mindfulness, research focused on the nature of the relationships among anxious and avoidant attachment, trait mindfulness, and attributions has the potential to facilitate a better understanding of the development of romantic relationships and how to foster healthy romantic relationships. This could be achieved by various means ranging from psychoeducation in primary prevention through secondary prevention in which mindfulness is increased to bring about more benign attributions in couples.

In examining the role of trait mindfulness in romantic relationships, accounting for the way the facets of trait mindfulness cohere within individuals may set the stage for a more flexible application of mindfulness-based interventions, as opposed to a “one size fits all” approach (Vago 2014). That is,

the use of person-centered approaches in this area of research may aid in the development of targeted and cost-effective mindfulness-based treatment programs for couples and may, therefore, be an important step toward maximizing outcomes of mindfulness-based practices in clinical work with couples.

**Authors' Contributions** JGK designed and executed the study, performed the statistical analyses, and wrote the manuscript. JAD collaborated with the design of the study and writing of the manuscript. FDF collaborated in the writing and editing of the manuscript.

**Compliance with Ethical Standards** This study was approved by the appropriate ethics committee and was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. All individuals gave their informed consent prior to participating in the study.

**Funding** The data used in this study was collected with funds from the Substance Abuse and Mental Health Administration (SAMHSA) and the American Association for Marriage and Family Therapy Minority Fellowship Program (2014 AAMFT MFP Research Grant).

## References

- Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology*, *63*(4), 596–612.
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, *13*(1), 27–45. doi:10.1177/1073191105283504.
- Barnhofer, T., Duggan, D. S., & Griffith, J. W. (2011). Dispositional mindfulness moderates the relation between neuroticism and depressive symptoms. *Personality and Individual Differences*, *51*(8), 958–962. doi:10.1016/j.paid.2011.07.032.
- Barnes, S., Brown, K. W., Krusemark, E., Campbell, W. K., & Rogge, R. D. (2007). The role of mindfulness in romantic relationship satisfaction and responses to relationship stress. *Journal of Marital and Family Therapy*, *33*(4), 482–500. doi:10.1111/j.1752-0606.2007.00033.x.
- Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The “Reading the Mind in the Eyes” test revised version: a study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry*, *42*(2), 241–251.
- Bergomi, C., Tschacher, W., & Kupper, Z. (2013). The assessment of mindfulness with self-report measures: existing scales and open issues. *Mindfulness*, *4*(3), 191–202. doi:10.1007/s12671-012-0110-9.
- Bowlby, J. (1980). *Attachment and loss: vol. 3 loss, sadness and depression*. New York: Basic Books.
- Bravo, A. J., Boothe, L. G., & Pearson, M. R. (2015). Getting personal with mindfulness: a latent profile analysis of mindfulness and psychological outcomes. *Mindfulness*, *7*(2), 1–13. doi:10.1007/s12671-015-0459-7.
- Bray, B. C., Lanza, S. T., & Tan, X. (2015). Eliminating bias in classify-analyze approaches for latent class analysis. *Structural Equation Modeling*, *22*(1), 1–11. doi:10.1080/10705511.2014.935265.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84*(4), 822–848.
- Cahn, B. R., & Polich, J. (2009). Meditation (Vipassana) and the P3a event-related brain potential. *International Journal of Psychophysiology*, *72*(1), 51–60. doi:10.1016/j.ijpsycho.2008.03.013.
- Carson, J. W., Carson, K. M., Gil, K. M., & Baucom, D. H. (2004). Mindfulness-based relationship enhancement. *Behavior Therapy*, *35*(3), 471–494. doi:10.1016/S0005-7894(04)80028-5.
- Chiesa, A. (2012). The difficulty of defining mindfulness: current thought and critical issues. *Mindfulness*, *4*(3), 255–268. doi:10.1007/s12671-012-0123-4.
- Christopher, M. S., Neuser, N. J., Michael, P. G., & Baitmangalkar, A. (2012). Exploring the psychometric properties of the Five Facet Mindfulness Questionnaire. *Mindfulness*, *3*(2), 124–131. doi:10.1007/s12671-011-0086-x.
- Dykas, M. J., & Cassidy, J. (2011). Attachment and the processing of social information across the life span: theory and evidence. *Psychological Bulletin*, *137*(1), 19–46. doi:10.1037/a0021367.
- van Emmichoven, I. A., van Ijzendoorn, M. H., de Ruiter, C., & Brosschot, J. F. (2003). Selective processing of threatening information: effects of attachment representation and anxiety disorder on attention and memory. *Development and Psychopathology*, *15*(1), 219–237. doi:10.1017/S0954579403000129.
- Fincham, F. D., & Bradbury, T. N. (1992). Assessing attributions in marriage: the relationship attribution measure. *Journal of Personality and Social Psychology*, *62*(3), 457–468.
- Fraley, R. C., Waller, N. G., & Brennan, K. A. (2000). An item response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology*, *78*(2), 350–365.
- Funk, J. L., & Rogge, R. D. (2007). Testing the ruler with item response theory: increasing precision of measurement for relationship satisfaction with the Couples Satisfaction Index. *Journal of Family Psychology*, *21*(4), 572–583. doi:10.1037/0893-3200.21.4.572.
- Gambrel, L. E., & Piercy, F. P. (2015). Mindfulness-based relationship education for couples expecting their first child—part 1: a randomized mixed-methods program evaluation. *Journal of Marital and Family Therapy*, *41*(1), 5–24. doi:10.1111/jmft.12066.
- Hall, J. H., & Fincham, F. D. (2008). The temporal course of self-forgiveness. *Journal of Social and Clinical Psychology*, *27*(2), 174–202.
- Heppner, W. L., Kernis, M. H., Lakey, C. E., Campbell, W. K., Goldman, B. M., Davis, P. J., & Cascio, E. V. (2008). Mindfulness as a means of reducing aggressive behavior: dispositional and situational evidence. *Aggressive Behavior*, *34*(5), 486–496.
- Ho, N. S., Sun, D., Ting, K. H., Chan, C. C., & Lee, T. (2015). Mindfulness trait predicts neurophysiological reactivity associated with negativity bias: an ERP study. *Evidence-Based Complementary and Alternative Medicine*, 2015.
- Horneffer, K. J., & Fincham, F. D. (1996). Attributional models of depression and marital distress. *Personality and Social Psychology Bulletin*, *22*(7), 678–689.
- Karremans, J. C., Schellekens, M. P., & Kappen, G. (2015). Bridging the sciences of mindfulness and romantic relationships: a theoretical model and research agenda. *Personality and Social Psychology Review*. doi:10.1177/1088868315615450.
- Kimmes, J. G., & Durtschi, J. A. (2016). Forgiveness in romantic relationships: the roles of attachment, attributions, and empathy. *Journal of Marital and Family Therapy*, *42*(4), 645–658. doi:10.1111/jmft.12171.
- Kimmes, J. G., Durtschi, J. A., Clifford, C. E., Knapp, D. J., & Fincham, F. D. (2015). The role of pessimistic attributions in the association between anxious attachment and relationship satisfaction. *Family Relations*, *64*(4), 547–562. doi:10.1111/fare.12130.
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9. *Journal of General Internal Medicine*, *16*(9), 606–613.
- Lawler-Row, K. A., Younger, J. W., Piferi, R. L., & Jones, W. H. (2006). The role of adult attachment style in forgiveness following an interpersonal offense. *Journal of Counseling & Development*, *84*, 493–502. doi:10.1002/j.1556-6678.2006.tb00434.x.

- Lenger, K. A., Gordon, C. L., & Nguyen, S. P. (2016). Intra-individual and cross-partner associations between the five facets of mindfulness and relationship satisfaction. *Mindfulness*, 1–10. doi:10.1007/s12671-016-0590-0.
- Lo, Y., Mendell, N. R., & Rubin, D. B. (2001). Testing the number of components in a normal mixture. *Biometrika*, 88(3), 767–778.
- Mikulincer, M., & Shaver, P. R. (2005). Attachment theory and emotions in close relationships: exploring the attachment-related dynamics of emotional reactions to relational events. *Personal Relationships*, 12(2), 149–168. doi:10.1111/j.1350-4126.2005.00108.x.
- Mikulincer, M., & Shaver, P. R. (2012). Adult attachment orientations and relationship processes. *Journal of Family Theory & Review*, 4(4), 259–274. doi:10.1111/j.1756-2589.2012.00142.x.
- Miller, P. J., & Rempel, J. K. (2004). Trust and partner-enhancing attributions in close relationships. *Personality and Social Psychology Bulletin*, 30(6), 695–705. doi:10.1177/0146167203262803.
- Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus user's guide* (Seventh ed.). Los Angeles, CA: Muthén & Muthén.
- Parker, S. C., Watson, B. W., Epel, E. S., & Siegel, D. J. (2015). The science of presence: a central mediator of the interpersonal benefits of mindfulness. In K. W. Brown, R. M. Ryan, & J. D. Creswell (Eds.), *Handbook of mindfulness: theory, research, and practice* (pp. 245–265). New York, NY: The Guilford Press.
- Pearce, Z. J., & Halford, W. (2008). Do attributions mediate the association between attachment and negative couple communication? *Personal Relationships*, 15, 155–170. doi:10.1111/j.1475-6811.2008.00191.x.
- Pearson, M. R., Lawless, A. K., Brown, D. B., & Bravo, A. J. (2015). Mindfulness and emotional outcomes: identifying subgroups of college students using latent profile analysis. *Personality and Individual Differences*, 76, 33–38. doi:10.1016/j.paid.2014.11.009.
- Pepping, C. A., O'Donovan, A., & Davis, P. J. (2014). The differential relationship between mindfulness and attachment in experienced and inexperienced meditators. *Mindfulness*, 5(4), 392–399. doi:10.1007/s12671-012-0193-3.
- Peters, C. L. O., & Enders, C. (2002). A primer for the estimation of structural equation models in the presence of missing data: maximum likelihood algorithms. *Journal of Targeting Measurement and Analysis for Marketing*, 11(1), 81–95.
- Sato, T. (2005). The Eysenck personality questionnaire brief version: factor structure and reliability. *The Journal of Psychology*, 139(6), 545–552. doi:10.3200/JRLP.139.6.545-552.
- Schwarz, G. (1978). Estimating the dimension of a model. *Annals of Statistics*, 6(2), 461–464.
- Sclove, S. L. (1987). Application of model-selection criteria to some problems in multivariate analysis. *Psychometrika*, 52(3), 333–343.
- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: new procedures and recommendations. *Psychological Methods*, 7(4), 422–445. doi:10.1037/1082-989X.7.4.422.
- Siegel, D. J. (2007). *The mindful brain: reflection and attunement in the cultivation of well-being*. New York, NY: WW Norton & Company.
- Sümer, N., & Cozzarelli, C. (2004). The impact of adult attachment on partner and self-attributions and relationship quality. *Personal Relationships*, 11(3), 355–371.
- Tan, L. B., Lo, B. C., & Macrae, C. N. (2014). Brief mindfulness meditation improves mental state attribution and empathizing. *PloS One*, 9(10), e110510.
- Vago, D. R. (2014). Mapping modalities of self-awareness in mindfulness practice: a potential mechanism for clarifying habits of mind. *Annals of the New York Academy of Sciences*, 1307(1), 28–42. doi:10.3389/fnhum.2012.00212.
- Walsh, J. J., Balint, M. G., Smolira, D. R., Fredericksen, L. K., & Madsen, S. (2009). Predicting individual differences in mindfulness: the role of trait anxiety, attachment anxiety and attentional control. *Personality and Individual Differences*, 46(2), 94–99. doi:10.1016/j.paid.2008.09.008.
- Wang, M., & Hanges, P. J. (2011). Latent class procedures: applications to organizational research. *Organizational Research Methods*, 14(1), 24–31. doi:10.1177/1094428110383988.