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Sources of somatization: Exploring the roles of insecurity in relationships and styles of anger experience and expression

Liang Liu

Shiri Cohen

Marc S. Schulz
mschulz@brynmawr.edu

Robert J. Waldinger

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Abstract

Research has shown strong connections between insecure attachment in close relationships and somatization. In addition, studies have demonstrated connections between somatic symptoms and anger experience and expression. In this study, we integrate perspectives from these two literatures by testing the hypothesis that proneness to anger and suppression of anger mediate the link between insecurity in relationships and somatization. Between 2000 and 2003, a community-based sample of 101 couples in a large U.S. city completed self-report measures, including the Somatic Symptom Inventory, the Relationship Scales Questionnaire, the Multidimensional Anger Inventory, the Revised Conflict Tactics Scale, and the Beck Depression Inventory. Controlling for age, income, and recent intimate partner violence, analyses showed that the link between insecure attachment and somatization was partially mediated by anger proneness for men and by anger suppression for women. Findings are consistent with the hypothesis that men who are insecurely attached are more prone to experience anger that in turn fosters somatization. For women, findings suggest that insecure attachment may influence adult levels of somatization by fostering suppression of anger expression. Specific clinical interventions that help patients manage and express angry feelings more adaptively may reduce insecurely attached individuals' vulnerability to medically unexplained somatic symptoms.

Introduction

Between 22% and 58% of patients in primary care settings complain of physical symptoms that have no medical basis or are discordant with the degree of illness indicated by objective tests or observable signs (Fink, Sorensen, Engberg et al., 1999). The development and persistence of these unexplained symptoms is commonly termed *somatization*. Clarifying the factors that contribute to the development and maintenance of these medically unexplained symptoms and the pathways from those risk factors to somatization has the potential to inform the design of better treatment strategies for individuals with somatic complaints.

Previous research has shown that individuals who have insecure models of attachment to significant others report higher levels of somatic symptoms (Ciechanowski, Walker, Katon, & Russo, 2002; Noyes, Stuart, Langbehn, Happel, Longley, Muller et al., 2003; Taylor, Mann, White, & Goldberg, 2000; Wearden, Lamberton, Crook, & Walsh, 2005). Insecure attachment has been found to mediate the link between childhood trauma and adult symptom reporting (Waldinger, Schulz, Barsky, & Ahern, 2006). However, the mechanisms by which insecure attachment might be linked to somatization are poorly understood, and this study extends previous research by examining that link. In other research, proneness to experiencing negative emotions and suppression of negative emotions have been associated with somatoform disorders (Koh, Kim, Kim, & Park, 2005; Watson, 1989). The current study tests the hypothesis that anger proneness and suppression of anger mediate the link between insecure attachment and somatization – that is, that insecure attachment styles may foster greater proneness to experience anger and to suppress angry feelings, and that these in turn

may foster somatization.

Attachment and somatic symptoms

Attachment theory, which explores the impact of early experiences with caregivers on subsequent interpersonal behaviors and perceptions, is a useful conceptual framework for understanding the development of somatic symptoms in adults (Ciechanowski, Walker, Katon et al., 2002). Bowlby (1969) first proposed that repeated interactions between infants and their caregivers prompt infants to develop models or expectations of how important people will respond to their attempts to seek care when they are in physical or emotional distress. Based on Bowlby's theory, Bartholomew and Horowitz (1991) empirically validated a classification system of adult attachment styles. This two-dimensional system describes individuals with respect to their views of self and their views of others on whom they rely for closeness and support. Scores on these dimensions produce four possible attachment prototypes. People with a *secure attachment style* tend to report consistently reliable caregiving in childhood, have a positive view of self and others, and are comfortable depending on others. Adults with a *preoccupied attachment style* report having had caregivers who responded inconsistently to their needs. This inconsistency is hypothesized to foster the development of a negative image of the self as unlovable, along with the expectation that others are able but not always willing to provide support (Bartholomew & Horowitz, 1991; Waldinger, Schulz, Barsky et al., 2006). Individuals with a *dismissing attachment style* typically recall experiencing unresponsive caregivers, resulting in the need to see themselves as self-sufficient because others cannot be relied on. By contrast, *fearfully attached* people typically report rejecting experiences with caregivers, resulting in negative images of both

self and others. They long for closeness but fear rejection and, as a result, vacillate between approach and avoidance behaviors when attempting to get close to others.

Numerous empirical studies have found associations between insecure attachment styles and increased reporting of somatic symptoms. In clinical samples, positive associations between fearful attachment style and somatization, and between preoccupied attachment and somatization have been empirically established (Ciechanowski, Walker, Katon et al., 2002; Noyes, Stuart, Langbehn et al., 2003). In university students, both fearful and preoccupied attachment styles (Wearden, Lamberton, Crook et al., 2005) have also been empirically linked to increased symptom reporting. In a community sample of 109 couples (also used in the current study), we found that fearful attachment had the strongest link with somatic complaints (Waldinger, Schulz, Barsky et al., 2006). Prior research has thus established positive links between somatization and both fearful and preoccupied attachment styles. By contrast, previous studies have not established a clear link between dismissing attachment style and somatization.

Anger proneness, anger expression and somatization

Theory and prior research suggest that anger is implicated in this link between insecure attachment style and somatization. Spielberger et al. (1985) demonstrated the importance of differentiating *anger proneness* from habitual styles of *anger expression* when examining the links among attachment, anger and somatic complaints. *Anger proneness* is defined as a tendency to experience angry feelings and is thought to be a relatively stable personality trait (Spielberger, Johnson, Russell et al., 1985). Individuals high in *anger proneness* tend to perceive a wider range of situations as anger eliciting and to experience more persistent anger

during these situations than do individuals with low *anger proneness*. Comparatively, *anger expression* refers to people's habitual modes of expressing angry feelings. Spielberger and colleagues (1985) posit two basic dimensions of anger expression, *anger-in* and *anger-out*. *Anger-in* refers to the extent to which people ruminate over and suppress angry feelings without expressing them overtly. By contrast, *anger-out* refers to the extent to which people openly express their anger to other people or to the environment.

Research has demonstrated links between styles of anger expression and symptom reporting. Koh et al (2005) surveyed 47 patients with somatoform disorders, and found that the suppression of anger was a predictor of somatic symptoms. In a sample of 644 patients with coronary heart disease (CHD), Denollet et al. (2010) found that patients who suppressed their anger were at increased risk of adverse cardiac events.

Proneness to experience anger has also been empirically associated with somatization and physical diseases such as CHD (Compare, Manzoni & Molinari, 2006). In a study of 105 patients who survived myocardial infarction, Denollet and colleagues (1995) found that somatization was positively associated with distressed personality, defined as the tendency to experience anger and other negative emotions, and to inhibit self-expression of distress (Denollet, Gidron, Vrints et al., 2010; Perbandt, Hodap, Wendt et al. 2006; Vilchinsky, Yaakov, Sigawi et al., 2011). Jellesma (2008) reported that adolescents classified as having distressed personalities reported more recent somatic complaints than those with other personality styles. In Denollet et al.'s (2010) study, they found that CHD patients' distressed personality style accounted for the link between their suppressed anger and adverse cardiac events.

Attachment styles, anger proneness and anger expression

There is also empirical support for associations between attachment style and anger proneness, and between attachment style and particular styles of anger expression. For example, Mikulincer (1998) found that in comparison to securely attached individuals, both anxious (preoccupied) and avoidant individuals (including fearful and dismissing attachment styles) were more easily angered. Additionally, anxious (preoccupied) attachment style has been empirically linked to an increased tendency to experience anger (Besser & Priel, 2009).

With respect to associations between attachment styles and anger expression, Waldinger et al (2006) theorized that the fear of driving away caregivers due to one's emotional "neediness" may prompt insecurely attached individuals to suppress the expression of anger. Consistent with this hypothesis, Kidd and Sheffield (2005) found that people classed as fearful, preoccupied and dismissing all scored higher than securely attached individuals on indices of anger suppression.

Mediating role of anger proneness and anger expression

The empirically supported associations among attachment, somatization, and both anger proneness and anger suppression in prior studies suggest that the tendency to experience anger in certain ways and the style in which anger is expressed may mediate the link between attachment (especially fearful and preoccupied attachment styles) and increased somatic symptom reporting. However, despite empirical findings suggesting a unique role for anger in the prediction of somatization, no study to date has focused on the mediational role of anger proneness in the path from attachment to somatization. Although Feeney and Ryan (1994) reported that negative emotionality (the tendency to experience negative emotions) mediated

the link between anxious attachment style and increased symptom reporting, their study did not distinguish anger from other specific negative emotions.

With respect to the role of anger suppression in the link between insecure attachment and somatization, Kidd and Sheffield (2005) found that a tendency toward anger suppression mediated the link between fearful attachment style and somatic complaints. However, the particular nature of their sample (predominantly female university students and staff) raises concerns about the generalizabilty of their results to an older community-based sample and to men. The present study examines *anger proneness* and *anger expression* as mediators of the association between attachment style and somatic symptom reporting in a community-based sample of couples.

Although Ainsworth et al. (1978) developed a commonly-used three-category attachment system in which dismissing and fearful styles were subsumed under the umbrella of an "avoidant" category, empirical evidence suggests that avoidant individuals use what Mikulciner and Shaver (2007) have termed *deactivating* attachment strategies, while fearful individuals are both anxious and dismissing of attachment, using both *hyper-activating* and *deactivating* strategies. Moreover, studies suggest differential links between fearful attachment and somatization, and between dismissing attachment and somatization (Kidd & Sheffield, 2005; Wearden, Lamberton, Crook et al., 2005). In light of empirical evidence supporting the distinction between avoidant and fearful individuals, we chose to investigate the four-category attachment model of Bartholomew and Horowitz in this study. We chose a dimensional rather than categorical method of assessing attachment following the path of previous studies that used attachment scores as continuous factors when testing links between

attachment and somatization, depression and expressed anger (Besser & Priel, 2009; Ciechanowski, Walker, Katon, & Russo, 2002; Haaga, Yarmus, Hubbard, Brody, Solomon, Kirk et al., 2002; Waldinger, Schulz, Barsky et al., 2006). Research has shown that some individuals manifest features of more than one attachment style, and dimensional assessment allows for incorporation of this information (Bartholomew, 1997).

Previous findings that fearful and preoccupied attachment style were associated with increased symptom reporting prompted us to explore the hypotheses that these insecure attachment styles would be associated with more suppression of anger and greater anger proneness, and that anger proneness and anger suppression would mediate the link between attachment style and somatization. In addition, we controlled for several factors that have been linked to both medical illness and somatization: age, socioeconomic status, and recent experiences of physical violence from an intimate partner (Lown & Vega, 2001; Waldinger, Schulz, Barsky et al., 2006). Finally, we examined current levels of depression both because depression is commonly associated with somatization and attachment style (Haaga, Yarmus, Hubbard, Brody, Solomon, Kirk et al., 2002; Koh, Kim, Kim et al., 2005), and because depressive symptoms may bias participants toward more negative responses to other assessments, including inventories of physical symptoms (Waldinger, Schulz, Barsky et al., 2006).

In contrast to the majority of prior studies that have been restricted to clinical samples or undergraduate populations, the present study focuses on a sample recruited from the community. Clinical samples are likely to have higher levels of medical illness, and a community sample offers the advantages of examining links between attachment and

somatization in people drawn from a wider spectrum of age and socioeconomic circumstances.

Methods

Participants

One hundred nine heterosexual couples were recruited through advertisements in the Boston, Massachusetts (USA) metropolitan area for a study of couples' communication between 2000 and 2003. A high-risk community-based sample was recruited, with oversampling of individuals who had histories of childhood abuse and couples with recent histories of domestic violence. To be eligible for participation, couples had to be married for any length of time or living together in a committed relationship for a minimum of 12 months before participating in the study and had to be fluent in English. Those who responded to advertisements were assessed with two commonly-used screening instruments for child abuse and physical violence: the Childhood Trauma Questionnaire (CTQ; Bernstein, Fink, Handelsman, & Foote, 1994) and the Revised Conflict Tactics Scale version 2 (CTS2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996).

Couples were screened by telephone interview to ascertain eligibility. IRB-approved written informed consent was obtained. Couples came to our laboratory for two sessions, during which they completed questionnaires containing the measures described below and participated in a videotaped marital discussion and individual interviews. For this study, 8 couples did not complete both laboratory sessions, resulting in complete data for 101 couples.

Measures

Demographics. Age, marital status, household income, ethnicity and education level

were obtained using written questionnaires. Mean age was 33.2 years (*SD* = 8.8) for men and 31.7 years (*SD* = 8.5) for women. The median length of couple relationships was 1.9 years (range = 0.4-30.0); 33.3% were married, and 78.2% did not have children. The ethnic makeup of the sample was 58% Caucasian, 29% African American, 8% Hispanic, 3% Asian or Pacific Islander, and 2% Native American. The median family income per year was between $30,000 and $45,000, with 19% of participants indicating that their family earned less than $15,000 and 26% indicating that they earned more than $60,000. Participants varied widely in their educational experience: 45% of participants had completed a bachelor's or more advanced degree, 17% had some post-high school education (vocational, some college, or an associate's degree), and 38% had a high school education or less.

Somatic symptoms. Current somatization was assessed using the Somatic Symptom Inventory (SSI; Lipman, Covi, & Shapiro, 1977). The SSI is a self-report questionnaire composed of 26 bodily complaints drawn from the hypochondriasis scale of the Minnesota Multiphasic Personality Inventory and the Hopkins Symptom Checklist somatization scale (Lipman, Covi, & Shapiro, 1977). The test-retest reliability and convergent and external validity of the SSI have been established (Barsky, Wyshak, & Klerman, 1990; Weinstein, Berwick, Goldman, Murphy, & Barsky, 1989). In this study, Cronbach's alpha indexing internal consistency was 0.89. SSI scores have been associated with the number of medically unexplained symptoms in the patient's medical record, physician ratings of patient somatization, and the diagnosis of somatization disorder (Barsky, Wyshak, Latham, & Klerman, 1991; Barsky, Cleary, Sarnie, & Klerman, 1993; Barsky, Wyshak, & Klerman, 1986).

Attachment style. Attachment style was measured using the Relationship Scales Questionnaire (RSQ; Griffin & Bartholomew, 1994). The RSQ is a 30-item questionnaire based on the four category model of adult attachment described above. Participants rate each item on a 5-point Likert-type scale reflecting the degree to which each item is characteristic of them. The RSQ has demonstrated good reliability and convergent validity (Bartholomew & Horowitz, 1991). Continuous scores on the four attachment subscales— secure, dismissing, fearful, and preoccupied— were derived by computing the mean rating for items on each scale.

Anger proneness and anger expression. Anger proneness and habitual modes of anger expression were assessed using the Multidimensional Anger Inventory (MAI; Siegel, 1986). The MAI is a 38-item self-report questionnaire designed to measure multiple aspects of anger experience and expression. Participants rated how well each of the items described themselves on a 5-point Likert-type scale ranging from *completely untrue of you* (1) to *completely true of you* (5). We used continuous scores on two factor-analytically derived subscales indexing anger expression, Anger-in and Anger-out, and on one subscale indexing anger-proneness, Anger Arousal (Mikulincer, 1998). Scores were computed by averaging participants' ratings for items on each subscale. As described above, Anger-in refers to the extent to which people mentally stew over angry feelings without expressing them overtly and is an index of the degree to which individuals tend to suppress anger. By contrast, Anger-out concerns the extent to which people express their anger overtly. Anger Arousal refers to one's proneness to experience angry feelings generally. The MAI has demonstrated adequate test-retest reliability, high internal consistency (Mikulincer, 1998; Siegel, 1986),

and external validity (Siegel, 1986).

Intimate Partner Violence. The presence or absence of intimate partner violence was assessed using the CTS2 (Straus, Hamby, Boney-McCoy et al., 1996). The CTS2 is a 78-item self-report questionnaire asking about the frequency and severity of participants' behaviors towards their romantic partners in the past year. Participants were categorized as violent if at a minimum they or their partner reported that they had engaged in two instances of behaviors such as slapping or shoving the partner or twisting the partner's arm or hair. The CTS2 has demonstrated good reliability and good discriminant and construct validity (Straus, Hamby, Boney-McCoy et al., 1996).

Depressive Symptoms. Depressive symptoms were measured using the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The BDI is a 21-item self-report scale that is commonly used to assess cognitive, affective, and somatic depressive symptoms that have occurred over the previous week. This scale measures depressive symptoms but is not a diagnostic tool to assess major depressive disorder. It has acceptable test-retest reliability in nonclinical populations and demonstrates concurrent validity in clinical and nonclinical samples (Beck, Ward, Mendelson et al., 1961).

Results

In this sample of 109 couples, the mean somatization (SSI) scores were 1.75 (SD = 0.52) for women and 1.56 (SD = 0.43) for men. Paired *T*- tests revealed that women reported more somatic symptoms ($t = -3.96$, $df = 106$, $p < .001$), and higher scores on the preoccupied attachment scale than men ($t = -2.50$, $df = 99$, $p = .014$). No significant differences were found between genders on the other attachment subscales, on Anger-in, Anger-out or on

Anger Arousal. Thirteen percent of women and 4% of men reported moderate to severe levels of depression (i.e., BDI scores greater than 19).

Correlations among Variables in the Mediational Model

Pearson correlations revealed that somatic symptom scores were significantly linked in the expected directions with secure, fearful and preoccupied attachment for women and with secure, fearful and dismissing attachment for men[1] (see Table 1). For both women and men, SSI scores were significantly associated with Anger-in and Anger Arousal but not Anger-out. For women, Anger-in was significantly correlated with secure (r = -.44, p < .001), fearful (r =.50, p < .001), and preoccupied attachment (r = .39, p < .001). Anger Arousal was also significantly associated with secure (r = -.33, p = .001), fearful (r = .37, p < .001), and preoccupied attachment (r = .34, p < .001). For men, Anger-in was significantly linked with secure (r = -.22, p = .025), fearful (r =.40, p < .001) and preoccupied attachment (r =.32, p = .001), and Anger Arousal was significantly correlated with secure (r = -.25, p = .01), fearful (r = .35, p < .001) and preoccupied attachment styles (r =.24, p = .017). These results indicated that the requisite conditions identified by Baron and Kenney (1986) were met for testing whether Anger-in and Anger Arousal would mediate the link between attachment style and somatic symptom reporting, but that testing the meditational role of Anger-out was not warranted.

[1] An alternative approach to analyzing these data is the implementation of an Actor-Partner Interdependence Model (APIM) which explicitly accounts for the dependencies among intimate partners (Cook & Kenny, 2005). The results of these analyses confirm the presence of links between one's own fearful attachment style and one's own somatization for both men and women. Interestingly, the APIM showed that men's and women's fearful attachment styles were not significantly correlated.

Links between potential confounding variables and somatization were also examined. As shown in Table 1, age was significantly correlated with SSI scores for men but not for women, whereas physical victimization by partner and annual household income was significantly linked with SSI scores for women but not for men. These contextual variables were therefore included as covariates in subsequent analyses to control for their potential confounding influence. Current level of depressive symptomatology was also significantly correlated with SSI scores for both women and men. Depressive symptomatology was incorporated as a final step in subsequent analyses to see if basic associations remained unchanged after its addition.

Testing the Mediational Model

Mediational analyses were carried out according to the guidelines established by Baron and Kenny (1986) and elaborated by Kraemer et al (2001). Follow-up Sobel tests were conducted to test the significance of mediation. Table 2 and Table 3 present the results of hierarchical regressions testing whether Anger Arousal and Anger-in mediate link between attachment style and somatization. Age, household income, and history of recent intimate partner violence were introduced in step 1 as covariates and accounted for 6% and 19% of the variance in somatization, respectively, for men and women. In step 2, all four attachment styles were included and explained an additional 17% and 8% of the variance, respectively, for men and women. For both men and women, only fearful attachment was significantly linked with SSI scores after controlling for all other variables in the model. As Table 2 shows, Anger Arousal was entered in step 3. For women, Anger Arousal explained an additional 4% of the variance and attenuated the regression coefficient for attachment style-somatization

relationship. A Sobel z test revealed that Anger Arousal was a significant mediator for the attachment – somatization link ($z_{Sobel} = 2.59$, $p < 0.01$). However, fearful attachment remained a significant predictor of somatization even after controlling for Anger Arousal, indicating that for women Anger Arousal was a partial mediator of the attachment-somatization link. For men, the addition of Anger Arousal in step 3 explained an additional 9% of the variance in somatic complaints and reduced the regression coefficient for fearful attachment to non-significance. A statistically significant Sobel z test ($z_{Sobel} = 2.12$, $p = 0.03$) supported the conclusion that for men Anger Arousal mediated the association between attachment style and somatization. In Step 4, current level of depression was added to see if basic associations remained unchanged even after accounting for depressive symptomatology. For men, addition of current depressive symptoms did not explain a significant amount of additional variance; the standardized regression coefficient for Anger Arousal remained essentially unchanged. For women, depressive symptoms explained another 7% of the variance in somatization. The standardized regression coefficient for fearful attachment was reduced somewhat but remained marginally significant, and the regression coefficient for Anger Arousal was no longer statistically significant. This suggests that for women current depression and fearful attachment are independently linked with somatization, but that for men current depression is not linked with somatization once attachment and Anger Arousal are accounted for. The final regression models explained 38% of the variance in women's SSI scores and 34% of the variance in men's SSI scores.

Table 3 shows results of similar models in which Anger-in is tested as a mediator of the link between attachment and somatization. For women, Anger-in explained an additional 8%

of the variance and reduced the regression coefficient for fearful attachment to non-significance. Together with the results of a Sobel z test ($z_{Sobel} = 3.34$, $p = 0.0008$), these results support the hypothesis that Anger-in mediates the link between attachment style and somatization for women. In order to test whether the mediation effects of Anger-in and Anger Arousal were independent mediators for women, Anger-in and Anger Arousal were simultaneously introduced into the model in step 3 (Armitage & Harris, 2006), and Anger-in was the only significant mediator for the path from attachment style to somatization. For men, the addition of Anger-in scores in step 3 did not explain a significant amount of additional variance. Neither did it substantially reduce the regression coefficient for fearful attachment. Thus, for men only fearful attachment style made an independent contribution to predicting SSI scores and Anger-in did not act as a mediator of that link. In step 4, current level of depression was added as a covariate. For men, depressive symptomatology did not explain a significant amount of additional variance. Moreover, the block of four attachment variables explained a significant amount of variance in somatization for men, but none of the four had a significant independent link with somatization after accounting for the influence of all the variables in the model. For women, depressive symptoms explained an additional 6% of the variance in somatization. The standardized regression coefficient for Anger-in was reduced somewhat but remained marginally significant. This indicates that for women the mediating role of Anger-in was, to some degree, independent of depressive symptomatology. The final regression models explained 41% of the variance in women's SSI scores and 27% of the variance in men's SSI scores.

Discussion

Our initial analyses replicated the independent associations found in previous studies between adult attachment style and somatization, adult attachment style and anger proneness and suppression, and anger proneness and suppression and somatization. When we considered all 4 attachment styles in the same model, we found that for both men and women, only fearful attachment was significantly linked with somatization. Although prior research (Ciechanowski, Walker, Katon et al., 2002; Wearden, Lamberton, Crook et al., 2005) has found a significant link between preoccupied attachment and increased symptom reporting, no such link was present after controlling for scores on the other 3 attachment subscales. This may be due to the covariance between fearful and preoccupied scores (r = .30, p =.002).

The main findings of this study were that, in a community-based sample, proneness to anger partially mediated the link between fearful attachment and somatization for men, whereas for women this link was partially mediated by anger suppression. How might we understand these meditational effects? Fearful attachment is based on an image of the self as unworthy of love from others and an image of caregivers as unreliable and even dangerous. Research suggests that fearfully attached individuals typically have a history of repeated rejection by caregivers (Bartholomew & Horowitz, 1991). Due to previous rejection, fearfully attached adults may be more prone to anger than secure or preoccupied individuals, who typically have more positive expectations of caregivers. At the same time, the sense that overt expression of anger makes one less lovable and might drive away or anger one's partner may prompt fearfully attached individuals to suppress angry feelings in order to maintain the tie to the needed other. For women in particular, the stifling of angry feelings may prompt a compensatory focus on bodily sensations and may even result in increased sympathetic

activation leading to additional somatic complaints. This is consistent with Gross & Levenson's (1997) studies on the physiological effects of the suppression of negative emotions. The link between anger suppression and somatization was present for men as well but was less strong. Further research is warranted to understand how it is that proneness to anger may be particularly salient for men in explaining the link between fearful attachment and somatization. Socialized gender stereotypes which posit men as more likely to experience anger and more comfortable with anger expression do not appear to operate as an explanation for our sample, as evidenced by the absence of significant gender differences in Anger-in, Anger-out and Anger Arousal scores. One possible explanation might be hormonal differences. For example, prior research suggests that more frequent and prolonged angry experiences may lead to higher levels of testosterone in men, which might in turn increase men's vulnerability to somatic symptoms and health problems through fostering more high risk behaviors such as smoking, or drug or alcohol abuse (Booth, Johnson, & Granger, 1999; Compare, Manzoni & Molinari, 2006; Herrero, Gadea, Rodriguez-Alarcon, Espert, & Salvador, 2010).

In this study, we had no independent measures of physical health and so could not distinguish between symptom reporting that was consistent with demonstrable medical illness and symptom reporting that was not. Even with measures of medical morbidity, establishing whether reported symptoms are out of proportion to physical findings is a difficult task and an ever-present problem in the study of somatization. For this reason, we controlled in our analyses for the potential influence of factors that are associated empirically with medical illness: age, socioeconomic status, and being the victim of intimate partner violence (Lown &

Vega, 2001).

This study replicated the strong positive association found in prior research between women's symptom reporting and their recent experience of intimate partner violence (Lown & Vega, 2001; Próspero & Kim, 2009). Of note is that even after accounting for partner violence (which accounted for 19% of the variance in women's somatic symptom reporting), fearful attachment, anger suppression and anger proneness remained significant predictors of somatization.

Due to the correlational links between depression and attachment style, and depression and somatization (Haaga, Yarmus, Hubbard et al., 2002; Koh, Kim, Kim et al., 2005), inclusion of depressive symptoms in the final step of our regressions provided a particularly stringent test of our models. In this sample, correlations between depression and attachment scales ranged in magnitude from 0.34 to 0.53. The correlations between depressive symptoms and Anger-in were 0.40 for men and 0.50 for women. The associations between depressive symptoms and Anger Arousal were 0.47 and 0.51, respectively, for men and women. Individuals who are currently depressed are likely to show a negative response bias across most measures, and this bias may inflate connections found between measures. Thus, it is noteworthy that introduction of depressive symptoms into the regression models did not significantly change the central findings of the study.

This study has several limitations. First, the cross-sectional design establishes associations but cannot determine causality. Although the path from insecure attachment to adult somatic complaints makes sense temporally, other explanations are also possible. For example, somatization may lead to disappointing interpersonal experiences, and in turn,

foster insecure adult attachment (Waldinger, Schulz, Barsky et al., 2006). Prospective studies are needed to shed light on causal relationships among attachment, anger expression style and somatization.

Second, in the current study only self-reports of somatic symptoms were used. An ever-present problem in the study of somatization is how to distinguish between symptom reporting that is consistent with demonstrable medical illness and symptom reporting that is not. In this study, we had no independent measures of physical health. Nor do we have health care utilization data on our community sample and so we are unable to examine how attachment status may be related to care seeking. Hence, we could not establish that SSI scores reflected symptoms that lacked a demonstrable medical basis. Even with measures of medical morbidity, establishing whether reported symptoms are out of proportion to physical findings is a difficult task. Moreover, it has been empirically validated that individuals with an avoidant (including dismissing and fearful) attachment style are not willing to acknowledge distress and therefore do not score highly on symptom and anger self-report measures, even though they may actually have angry feelings or physical symptoms (Kotler, Buzwell, Romeo et al., 1994; Mikulincer, 1998). All these factors imply that relationships between attachment style and more objective health measures may be different. Despite our efforts to control for variables associated with medical illness, the SSI scores undoubtedly reflect some degree of actual medical morbidity as well as somatization. A crucial direction for future research on the role of anger experience and expression in the path from insecure attachment to somatization is to incorporate indices of objective health.

Third, in the present study we selected individuals who at the very least were able to

establish intimate relationships. They might be higher functioning and generally healthier than a more mixed population that included individuals who have difficulty fostering close relationships with romantic partners. Moreover, we oversampled couples in which one or both partners had histories of abuse in childhood. Thus, we must be circumspect about the generalizability of our findings to the general population. It is important for future studies to explore the same meditational model in couples without histories of childhood abuse.

Fourth, although prior research suggests that both insecure attachment and somatization are associated with individual personality style (Brennan & Shaver, 1998; Gustafson & Kallmen, 1990), we did not assess personality in our sample. A study incorporating measures of attachment, personality style, and somatization would allow for examination of maladaptive personality traits as a possible link in the path from attachment style to adult somatization.

Clinical Implications

Research revealing mechanisms by which insecure attachment and somatization are linked may help inform the psychiatric treatment of insecurely attached individuals who report medically unexplained physical symptoms. Because attachment style is a personal characteristic that tends to persist throughout life (Waldinger, Schulz, Barsky et al., 2006) and may be difficult to change, it might be more productive for therapists to focus on potentially modifiable factors such as fostering more adaptive ways of managing anger. Consistent with Pennebaker's (1993) proposition that writing or talking about upsetting experiences and emotions is psychologically and physically beneficial, our findings suggest that fearfully attached women with somatic complaints might benefit from interventions that teach them to

express anger in more adaptive ways rather than stifling it when confronted with anger-eliciting situations. For fearfully attached men, finding feasible ways to decrease their exposure to anger-eliciting situations or to help reduce the level of angry feelings may reduce their vulnerability to medically unexplained somatic symptoms. This is consistent with the strategies proposed by treatments such as emotionally focused couple therapy that ameliorate the deleterious effects of insecure attachment styles through work with affect regulation (Johnson & Whiffen, 1999).

The results of current study suggest that anger proneness and anger suppression play important roles in the link between insecure attachment style and somatization. Our findings point to the potential value of assessing anger proneness and habitual modes of anger expression in patients with somatic complaints. Specific treatment strategies that teach adaptive ways of expressing anger directly and help anger-prone individuals to lessen the frequency and intensity of angry feelings may help reducing vulnerability to medically unexplained symptoms.

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Table 1

Pearson correlations between somatization and age, income, intimate partner violence, depression, attachment and indices of anger experience and expression

	Somatic complaints			
	Women		Men	
	r	*p*	*r*	*p*
Age	.06	.57	.20	.03
Mean annual income	-.24	.01	-.03	.75
Partner's violence	.36	<.001	.02	.81
Current level of depression	.53	<.001	.34	<.001
Secure attachment	-.28	.005	-.28	.005
Fearful attachment	.39	<.001	.36	<.001
Preoccupied attachment	.20	.04	-.06	.52
Dismissing attachment	.07	.48	.23	.022
Anger-in	.51	<.001	.22	.029
Anger-out	-.18	.08	.01	.90
Anger Arousal	.44	<.001	.36	<.001

Table 2

Hierarchical regression analysis for meditational model of Anger Arousal

	Somatization score			
	Women		*Men*	
	β	$\triangle R^2$	β	$\triangle R^2$
Step 1		.19**		.06
Age	-.01		.23*	
Income	-.16†		.003	
Partner's violence	.36**		.12	
Step 2		.08*		.17**
Age	-.05		.26**	
Income	-.07		.03	
Partner's violence	.34**		.15	
Secure attachment	.08		-.08	
Fearful attachment	.33*		.31*	
Preoccupied attachment	.05		-.10	
Dismissing attachment	.02		.08	
Step 3		.04*		.09**
Age	-.02		.31**	
Income	-.05		-.01	
Partner's violence	.28**		.12	
Secure attachment	.09		-.03	

Fearful attachment	.28*		.18	
Preoccupied attachment	.01		-.16	
Dismissing attachment	.02		.14	
Anger Arousal	.25*		.34**	
Step 4		.07**		.02
Age	-.02		.31**	
Income	-.01		-.004	
Partner's violence	.26**		.11	
Secure attachment	.13		-.03	
Fearful attachment	.21†		.16	
Preoccupied attachment	-.01		-.16	
Dismissing attachment	.03		.13	
Anger Arousal	.13		.32**	
Current depression	.34**		.07	

†$p < 0.1$; *$p < 0.05$; **$p < 0.01$

Note: *β's reported here are standardized regression coefficients*

Table 3

Hierarchical regression analysis for meditational model of Anger-in

	Somatization score			
	Women		*Men*	
	β	$\triangle R^2$	β	$\triangle R^2$
Step 1		.19**		.06
Age	-.01		.23*	
Income	-.16†		.003	
Partner's violence	.36**		.12	
Step 2		.08*		.17**
Age	-.05		.26**	
Income	-.07		.03	
Partner's violence	.34**		.15	
Secure attachment	.08		-.08	
Fearful attachment	.33*		.31*	
Preoccupied attachment	.05		-.10	
Dismissing attachment	.02		.08	
Step 3		.08**		.02
Age	.01		.28**	
Income	-.07		.03	
Partner's violence	.27**		.14	
Secure attachment	.11		-.07	

Fearful attachment	.19		.25†	
Preoccupied attachment	-.01		-.10	
Dismissing attachment	.03		.08	
Anger-in	.36**		.16	
Step 4		.06**		.02
Age	.01		.27**	
Income	-.02		.04	
Partner's violence	.26**		.11	
Secure attachment	.14		-.06	
Fearful attachment	.16		.19	
Preoccupied attachment	-.02		-.14	
Dismissing attachment	.03		.08	
Anger-in	.23†		.12	
Current depression	.30**		.17	

†$p < 0.1$; *$p < 0.05$; **$p < 0.01$

Note: *β's reported here are standardized regression coefficients*