Anxious attachment and emotional instability interact to predict health anxiety: An extension of the interpersonal model of health anxiety

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ABSTRACT

Health anxiety involves persistent worry about one's health and beliefs one has an illness or may contract a disease. The interpersonal model of health anxiety (Noyes et al., 2003) is a conceptual framework linking insecure attachment to health anxiety. The present study, clarified the contribution of insecure attachment to health anxiety by studying two key dimensions of insecure attachment: anxious and avoidant attachment. The unique role of insecure attachment in health anxiety was tested by controlling for emotional instability. The potential interaction between attachment insecurity and emotional instability in predicting health anxiety was also tested using hierarchical regression analyses with data from 147 undergraduates. Anxious attachment uniquely predicted health anxiety even when avoidant attachment and emotional instability were taken into account. An interaction was also observed where high anxious attachment and high emotional instability combined to predict higher health anxiety. This interaction was specific to health anxiety (versus depressive symptoms). An unexpected interaction was found where high avoidant attachment and low emotional instability combined to predict lower health anxiety. The present study extends research on health anxiety by clarifying the nature of insecure attachment in and the role of emotional instability in the interpersonal model of health anxiety.

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1. Introduction

Health anxiety (HA) involves persistent fear or worry about one's health along with beliefs one has an illness or may contract a disease (Taylor & Asmundson, 2004). HA is a common public health problem with serious personal, societal, and medical costs (Longley, Watson, & Noyes, 2005). Since the negative effects of HA are not limited to clinical populations (Hadjistavropoulos & Lawrence, 2007), HA may best be conceptualized as a dimensional construct lying on a continuum from mild to severe (Ruscio & Kaczetow, 2009).

In the present study, we adopted a dimensional HA model and studied an undergraduate sample whose average HA levels rest at the milder end of the HA continuum. Even mildly elevated HA levels are associated with decreased quality of life, increased health care utilization, and are a putative risk factor for more severe HA (Ferguson, 2004). There are also numerous, largely unanswered, calls to develop and test models explicating personality traits and interpersonal processes contributing to HA (Stuart, Noyes,

Starcevic, & Barsky, 2008). Thus, there is a clear need to expand our knowledge of milder HA levels (which we refer to as HA) so as to better understand, assess, and treat this problem.

1.1. Interpersonal model of health anxiety (IMHA)

The IMHA (Noyes et al., 2003) is a conceptual framework integrating theory and research linking interpersonal processes to HA. According to this model, HA is a pathological manifestation of insecure attachment. The IMHA asserts persons with HA were exposed to aversive experiences (e.g., serious illness) and to negative relations with early caregivers that predisposed insecure attachment and worry about health problems. The unrelenting reassurance-seeking characteristic of persons with HA is understood as an effort to reduce attachment insecurity and worry about health problems by eliciting care from others (e.g., physicians or family members). Because persons with HA experience chronic attachment insecurity, their reassurance-seeking is often unrelenting—despite repeated reassurance by others.

Unrelenting reassurance-seeking is postulated to bring about conflict with others that contributes to alienation from others; conflict and alienation are thought to confirm or to magnify

attachment insecurity in persons with HA. Both attachment insecurity and a distressing sense of alienation from others are also proposed to amplify worry about health problems in persons with HA. In trying to alleviate such worry, persons with HA are believed to once again seek reassurance from others and a vicious cycle of reassurance-seeking, alienation, and worry is repeated amid an already chronic pattern of attachment insecurity and worry about health (MacSwain et al., 2009; Noyes et al., 2003).

Though initial tests of the IMHA appear promising (Noyes et al., 2003), not all studies clearly support this model (Fortenberry & Wiebe, 2007). In particular, despite the central theoretical importance of attachment insecurity to the IMHA, the nature of attachment insecurity in this model is in need of empirical validation. In the present study, we examined two key domains of attachment insecurity—anxious and avoidant attachment—and tested which of these domains is most relevant to the IMHA. We also tested if anxious and/or avoidant attachment are linked to HA after controlling for emotional instability, a robust, higher-order predictor of HA (Longley et al., 2005). In addition, we extended the IMHA by proposing and testing a trait-by-trait synergy we believe is uniquely important to HA where high levels of insecure attachment interact with high levels of emotional instability to foster HA.

1.2. Insecure attachment in HA

The IMHA proposes insecure attachment underlies HA. However, the nature of this insecure attachment is described in only general terms and needs clarification (MacSwain et al., 2009). Noyes et al. (2003) found two forms of insecure attachment, fearful and dismissing, are uniquely related to HA. Using a single-item measure to classify participants into distinct attachment categories, Wearden, Perryman, and Ward (2006) found the category of preoccupied attachment was uniquely related to HA. In the years since these early studies, advances in the conceptualization and measurement of attachment have occurred. Initial models examined attachment patterns (i.e., internal working models of attachment) using a categorical typology approach measured by projective tests or interviews. However, subsequent research supports the use of dimensional models and self-report measures of attachment styles (Fraley & Shaver, 2000). Dimensional measures of attachment using multiple items are more psychometrically sound than single-item measures and equally valid predictors compared to interviews (Fraley & Shaver, 2000; Wei, Russell, Mallinckrodt, & Vogel, 2007). In the present study, we use a reliable, valid, multiple-item self-report questionnaire assessing different dimensions of insecure attachment styles, thereby incrementally advancing extant research on attachment and HA.

One empirically validated dimensional model of attachment suggests adult insecure attachment is composed of two domains: anxious and avoidant attachment (Fraley & Shaver, 2000). Persons high in anxious attachment have a persistent fear they will be rejected or abandoned by significant others; whereas persons high in avoidant attachment tend to withdraw from close relationships and are uncomfortable relying on others (Fraley & Shaver, 2000).

Although the IMHA does not specify which domain of insecure attachment is most relevant, several factors suggest anxious attachment is most important to HA. Persons high in HA are clingy and insecure. They express an inability to cope independently and worry about the supportiveness of others during time of stress (Fraley & Shaver, 2000). Thus, they seek out others during stressful experiences, such as when they are concerned about their health (Ciechanowski, Walker, Katon, & Russo, 2002). In contrast, persons high in avoidant attachment often see others as unavailable and tend to distance themselves from others during times of stress. Persons high in avoidant attachment appear less likely to express anxiety or use healthcare (Feeney & Ryan, 1994).

1.3. Anxious attachment and emotional instability

The IMHA specifies insecure attachment is a key personality trait underlying HA. However, insecure attachment alone does not fully capture the characterlogical context in which HA occurs. Emotional instability, or neuroticism, is a personality trait involving the tendency to experience negative emotions. It is a higher-order personality trait that predicts HA (Noyes et al., 2003, 2005). Persons high in emotional instability tend to express both negative emotions and somatic complaints, and appear prone to somatic complaints because they interpret normal bodily sensations as threats (Williams & Wiebe, 2000).

Although emotional instability is strongly linked to HA, emotional instability is defined entirely in terms of *intra*personal experiences (e.g., anxiety; Ode & Robinson, 2007). Given the importance of interpersonal processes in HA, we propose a trait-by-trait synergistic effect between the relational style of anxious attachment and the emotional style of emotional instability more fully describes the characterlogical underpinnings of HA. Theoretical accounts, case histories, and empirical studies suggest it is the anxiously attached and emotionally unstable person who characterizes the health anxious individual (Noyes et al., 2003). This individual is embodied by Woody Allen's character in the movie *Hannah and Her Sisters* (Greenhut & Allen, 1986) who is not only needy and dependent but also brooding and emotionally unstable. Evidence shows anxious attachment and emotional instability are correlated but distinct, with each uniquely predicting HA (Wearden et al., 2006). However, research has yet to test the interactive effect of anxious attachment and emotional instability on HA.

1.4. Hypotheses

One objective of the present study is to clarify the nature of insecure attachment underlying HA by studying two key domains of attachment insecurity—anxious and avoidant attachment. Such information will contribute to our understanding of personality traits and interpersonal processes in HA, and the IMHA. We focus on predicting the affective component of HA, which is generally agreed as the core component of HA (e.g., Salkovskis, Rimes, Warwick, & Clark, 2002). Based on theory and evidence (Fraley & Shaver, 2000; Noyes et al., 2003), we hypothesized anxious attachment (as opposed to avoidant attachment) would uniquely predict HA.

Building on past research (Wearden et al., 2006), we also hypothesized anxious attachment would still predict HA after emotional instability was taken into account. Emotional instability is positively associated with anxious attachment and HA (Wearden et al., 2006) and therefore provides a stringent test of the unique contribution of anxious attachment to HA.

Another objective of our study was to test a trait-by-trait interaction model. HA research is limited by a lack of conceptual integration of proposed contributors to HA. In contrast, we draw together complementary literatures into an integrative framework that asserts anxious attachment and emotional instability represent a relational and emotional style that, when paired together, are especially likely to foster HA. Thus, we hypothesized high levels of anxious attachment and high levels of emotional instability would significantly interact to predict HA.

Finally, we explored if the interaction between anxious attachment and emotional instability is specific to HA as compared to a commonly co-occurring construct, depressive symptoms. This specific analysis represents an important first step in determining if the hypothesized synergy between anxious attachment and emotional instability specifically predicts HA.

2. Method

2.1. Participants

A sample of 147 undergraduates (122 women; 25 men) from Dalhousie University completed self-report questionnaires. Participants averaged 20.46 years of age (SD = 3.78) and 2.03 years of university education (SD = 1.38); 57.1% of participants were in a romantic relationship; 76.2% were Caucasian.

2.2. Measures

2.2.1. Experiences in close relationships-revised questionnaire (ECR-R)
The ECR-R (Fraley, Waller, & Brennan, 2000) is a 36-item scale involving two 18-item subscales measuring anxious attachment (e.g., "I'm afraid that I will lose my partner's love") and avoidant attachment (e.g., "I prefer not to be too close to romantic partners") in emotionally intimate relationships. Using a scale from 1 (*strongly disagree*) to 7 (*strongly agree*), participants report how they "generally experience relationships, not just in what is happening in a current relationship." For all measures in our study, higher scores signify higher levels of a construct. Research supports the reliability and validity of both subscales (Wei et al., 2007).

2.2.2. Big five inventory: neuroticism subscale (BFI-N)
The BFI-N (Benet-Martinez & John, 1998) is an 8-item scale measuring emotional instability (e.g., "I see myself as someone who can be moody") using a scale from 1 (*disagree strongly*) to 5 (*agree strongly*). Studies indicate the BFI-N is reliable and valid (Benet-Martinez & John, 1998).

2.2.3. Multidimensional inventory of hypochondriacal traits: hypochondriacal worry subscale (MIHT-HW)
The MIHT-HW and SHAI-IL (see below) assess the affective component of HA. The MIHT-HW (Longley et al., 2005) is a 7-item scale measuring hypochondriacal worry (e.g., "I worry a lot about my health"). Participants respond on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Research supports the validity and reliability of the MIHT-HW (MacSwain et al., 2009; Stewart, Sherry, Watt, Grant, & Hadjistavropoulos, 2008).

2.2.4. Short health anxiety inventory: illness likelihood subscale (SHAI-IL)
The SHAI-IL (Salkovskis et al., 2002) is a 10-item scale measuring worry about acquiring a major illness (Abramowitz, Deacon, & Valentiner, 2007). Participants respond on a scale from 0 (e.g., "I do not worry about my health") to 3 (e.g., "I spend most of my time worrying about my health"). Evidence suggests the SHAI-IL is reliable and valid (Abramowitz et al., 2007).

2.2.5. Center for epidemiological studies depression scale (CES-D)
The CES-D (Radloff, 1977) is a 20-item scale measuring depressive symptoms (e.g., "I felt sad"). Participants respond on a scale from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). Studies support the validity and reliability of the CES-D (Skorikov & VanderVoort, 2003).

2.3. Procedure

Participants were recruited via flyers posted on campus and the Department of Psychology participant pool. Study participants received either $5 or a 1% bonus added to a psychology course grade. Participation was anonymous and voluntary.

3. Results

3.1. Descriptive statistics and bivariate correlations

Means (see Table 1) fell within one standard deviation of values from previous studies of undergraduates using our measures (e.g., Longley et al., 2005; Skorikov & VanderVoort, 2003). This suggests means from our study are generally consistent with research involving comparable samples. Alpha reliabilities for all scales were adequate (α > .80; see Table 1).

Anxious attachment and emotional instability were correlated with one another and with HA (see Table 1). Anxious and avoidant attachment were correlated, whereas avoidant attachment was unrelated to emotional instability and to HA. Hypochondriacal worry and illness likelihood were intercorrelated; and anxious attachment, emotional instability, avoidant attachment, and illness likelihood (but not hypochondriacal worry) were correlated with depressive symptoms. Of our demographic variables, only gender and relationship status were correlated with study variables and were therefore included as covariates in subsequent analyses.

3.2. Hierarchical regression analyses with interaction

3.2.1. Anxious attachment
Two hierarchical regression analyses with interaction tested if anxious attachment and emotional instability interacted to predict HA measured by either hypochondriacal worry or illness likelihood (see Table 2). In all analyses, gender and relationship status were included as predictor variables to account for their influence. Predictor variables were entered in the following sequence: gender and relationship status (Step 1), avoidant attachment, anxious attachment, emotional instability (Step 2), and anxious attachment × emotional instability (Step 3). To protect against multicollinearity, predictor variables were centered (Aiken & West, 1991). Demographic variables and avoidant attachment did not predict significant variance in hypochondriacal worry or illness likelihood. As hypothesized, anxious attachment and emotional instability independently predicted hypochondriacal worry and illness likelihood. Moreover, the interaction of anxious attachment and emotional instability provided significant incremental information in predicting both hypochondriacal worry and illness likelihood. These interactions indicate the association between anxious attachment and HA changes depending on the level of emotional instability.

To elucidate our two significant interactions, we determined the slopes of the regression of HA on anxious attachment at high and low levels of emotional instability (Aiken & West, 1991). When predicting hypochondriacal worry, the slope for the high level of emotional instability was significant, β = 0.12, $t(1,140)$ = 3.52, p < .001; the slope for the low level of emotional instability was nonsignificant, β = 0.03, $t(1,140)$ = 0.63, p > .05 (Fig. 1). When predicting illness likelihood, the slope for the high level of emotional instability was significant, β = 0.08, $t(1,140)$ = 4.08, p < .001; the slope for the low level of emotional instability was nonsignificant, β = 0.02, $t(1,140)$ = 0.81, p > .05 (Fig. 2). As Figs. 1 and 2 show, persons with high levels of emotional instability experienced increased HA as anxious attachment levels increased.

To test the specificity of the anxious attachment by emotional instability interaction, a hierarchical regression analysis with interaction was conducted predicting depressive symptoms. Being single, anxious attachment, and emotional instability independently predicted depressive symptoms. However, anxious attachment and emotional instability did not significantly interact to predict depressive symptoms (see Table 2).

Table 1
Descriptive statistics, alpha reliabilities, and bivariate correlations.

Variable	1	2	3	4	5	6	7	8
1. Anxious attachment	–	.48***	.50***	.35**	.46***	.56***	.05	−.44***
2. Emotional instability		–	.08	.43***	.53***	.46***	.28**	−.16
3. Avoidant attachment			–	.00	.15	.26**	−.08	−.39***
4. Hypochondriacal worry				–	.73***	.15	.03	−.07
5. Illness likelihood					–	.38***	.05	−.07
6. Depressive symptoms						–	.07	−.24**
7. Gender							–	−.06
8. Relationship status								–
M	53.91	23.16	51.16	18.67	7.19	15.52		
SD	20.49	6.24	17.78	5.87	3.97	10.54		
α	.93	.80	.93	.81	.85	.92		

Note: For gender, 0 = men; 1 = women; for relationship status, 0 = not in a romantic relationship; 1 = in a romantic relationship.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 2
Hierarchical regression analyses with interaction.

Variable	β	ΔR^2	ΔF
Predicting hypochondriacal worry			
Step 1		.01	0.42
Gender	.02		
Relationship status	−.07		
Step 2		.23	14.22***
Anxious attachment	.29**		
Emotional instability	.33***		
Avoidant attachment	−.16		
Step 3		.03	4.71*
Anxious attachment × emotional instability	.17*		
Predicting illness likelihood			
Step 1		.01	0.54
Gender	.05		
Relationship status	−.07		
Step 2		.35	25.03***
Anxious attachment	.31**		
Emotional instability	.42***		
Avoidant attachment	.01		
Step 3		.03	5.94*
Anxious attachment × emotional instability	.17*		
Predicting depressive symptoms			
Step 1		.06	4.76*
Gender	.05		
Relationship status	−.24**		
Step 2		.30	22.43***
Anxious attachment	.43***		
Emotional instability	.26**		
Avoidant attachment	.02		
Step 3		.01	1.58
Anxious attachment × emotional instability	−.09		

Note: For gender, 0 = men; 1 = women; for relationship status, 0 = not in a romantic relationship; 1 in a romantic relationship. For Step 1, df = 2, 144; for Step 2, df = 3, 141; for Step 3, df = 1, 140.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Fig. 1. Anxious attachment interacting with emotional instability to predict hypochondriacal worry.

Fig. 2. Anxious attachment interacting with emotional instability to predict illness likelihood.

3.2.2. Avoidant attachment

A hierarchical regression analysis with interaction tested if avoidant attachment and emotional instability interacted to predict HA. Steps 1 and 2 are identical to results reported in Section 3.2.1. For step 3, contrary to our hypothesis, the interaction of avoidant attachment and emotional instability significantly predicted hypochondriacal worry, $\beta = .20$, $p < .01$, $R^2\Delta = .04$, $\Delta F(1,140) = 7.75$, $p < .01$. The interaction did not, however, predict illness likelihood, $\beta = .13$, $p > .05$, $R^2\Delta = .02$, $\Delta F(1,140) = 3.57$, $p > .05$ or depressive symptoms, $\beta = .02$, $p > .05$, $R^2\Delta = .00$, $\Delta F(1,140) = .05$, $p > .05$. Using the aforementioned procedure for testing simple slopes, we tested the significant interaction of
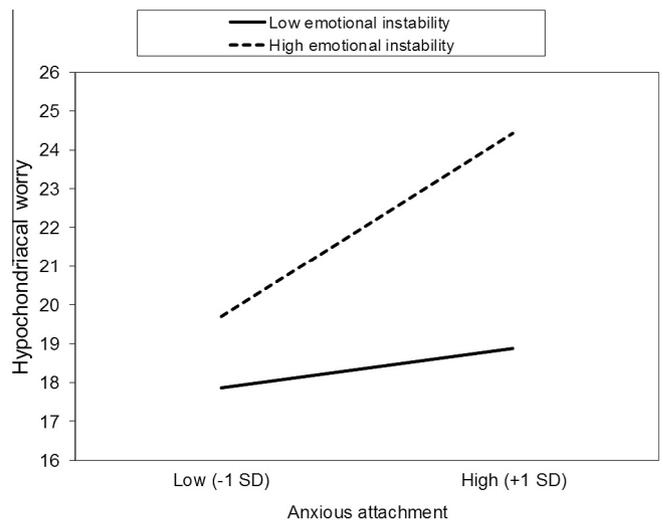
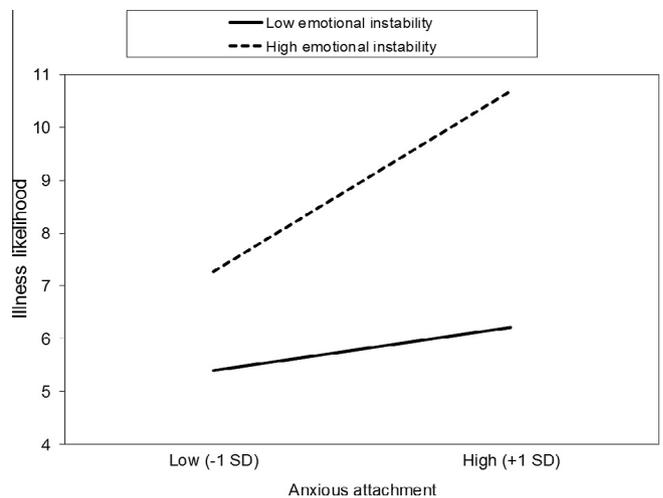avoidant attachment and emotional instability in predicting hypochondriacal worry. The slope for the high level of emotional instability was nonsignificant, $\beta = .02$, $t(1,140) = 0.50$, $p > .05$; the slope
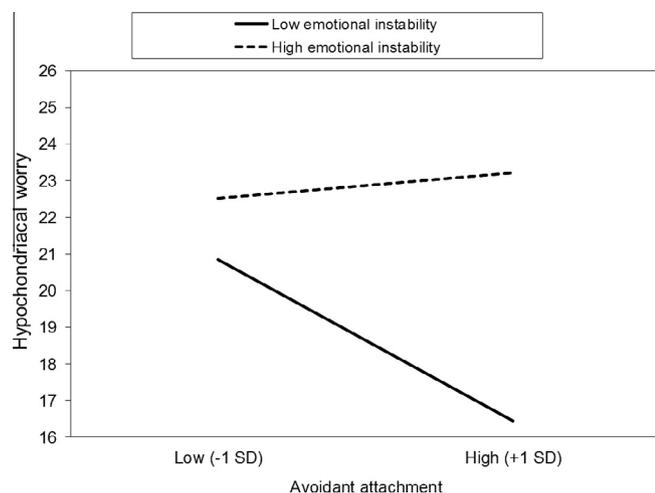
Fig. 3. Avoidant attachment interacting with emotional instability to predict hypochondriacal worry.

for the low level of emotional instability was significant and negative, $\beta = -0.12$, $t(1,140) = -3.23$, $p < .01$. Persons with low levels of emotional instability experienced decreased hypochondriacal worry as avoidant attachment levels increased (see Fig. 3). This pattern indicates those with a personality pattern involving low emotional instability (i.e., high stability) and high avoidant attachment are at the lowest risk of experiencing hypochondriacal worry.

4. Discussion

We tested which of two key domains of attachment insecurity—anxious and avoidant attachment—is central to HA and the IMHA. Consistent with hypotheses, anxious attachment (but not avoidant attachment) uniquely predicted HA, even when emotional instability was taken into account. Additionally, as hypothesized, we found persons high in anxious attachment and high in emotional instability had the highest levels of HA. This trait-by-trait interaction was specific in predicting HA versus depressive symptoms. We found an unexpected significant interaction wherein high avoidant attachment and low emotional instability had the lowest levels of hypochondriacal worry (but not illness likelihood). Our study advances HA research, and the IMHA, by clarifying the nature of insecure attachment in HA and refining our understanding of the role of emotional instability in HA.

4.1. Anxious versus avoidant attachment

The IMHA proposes insecure attachment underlies HA, but to date, differences between anxious and avoidant attachment in understanding HA have not been explored. Theoretical accounts and case studies describing the personality traits and interpersonal processes of persons high in HA suggest a clingy and needy style of relating to others (Noyes et al., 2003). Correspondingly, the anxiously attached person presents with fears of abandonment and rejection, an anxious over-concern for others, and a dependent style in relating to others. In contrast, the avoidantly attached person tends to avoid relying on others, to be independent and to withdraw from others under stress (Fraley & Shaver, 2000).

Our results confirmed our hypotheses, theoretical accounts, and clinical observations suggesting HA is associated with an anxious attachment, but not avoidant attachment. Our findings are consistent with Noyes et al.'s (2003) proposal that insecure attachment style is linked to HA and refines their proposal by clarifying the

nature of insecure attachment. Future research may investigate whether avoidant attachment is related to other forms of anxiety with features of interpersonal withdrawal, such as social phobia.

4.2. Anxious attachment versus emotional instability

Congruent with hypotheses, anxious attachment and emotional instability were both uniquely related to HA. Given research linking emotional instability to HA (Wearden et al., 2006), our regression analyses controlling for emotional instability suggest a unique and important role for anxious attachment in HA, consistent with the IMHA. Our results reflect the distinction between anxious attachment and emotional instability. Anxious attachment is primarily a relational trait involving neediness, clinginess, and dependency, whereas emotional instability is primarily an affective trait involving negative emotionality. These traits measure different aspects of personality, which we, and others (Noyes et al., 2003), assert both contribute to HA.

4.3. Anxious attachment interacting with emotional instability

Further analysis of the association between anxious attachment and emotional instability suggested their relationship is synergistic. While the direct effects of anxious attachment and emotional instability were consistent with existing research (Wearden et al., 2006), this is the first study, of which we are aware, to empirically demonstrate their interactive effects.

Specifically, our study found persons with the most intense levels of HA were not only clingy and needy (high in anxious attachment) but also emotionally intense and labile (high in emotional instability). Emotional instability appears to amplify the influence of anxious attachment on HA. Persons high in both anxious attachment and emotional instability may end up in a social-emotional bind. They have more emotional distress but fewer perceived abilities and interpersonal resources to deal with this distress. Although not directly tested in our study, this combination of traits is perhaps what contributes to the dysfunctional affect regulation strategies (e.g., health complaints or excessive reassurance-seeking) seen in persons high in HA.

We also showed the specificity of the interactive effect of anxious attachment and emotional instability in predicting HA versus depressive symptoms. While both anxious attachment and emotional instability predicted HA and depressive symptoms, the interaction between anxious attachment and emotional instability only predicted HA. Thus, while persons who have a clingy, dependent relational style and who are prone to negative emotions may experience both depressive symptoms and HA, the synergistic combination of anxious attachment and emotional instability appears particularly important to HA.

Contrary to hypotheses, we also identified persons with high levels of avoidant attachment and low levels of emotional instability had the lowest levels of hypochondriacal worry. Although not hypothesized, this interaction is generally consistent with our assertions that avoidant attachment is not the prime form of insecure attachment in HA. Increases in avoidant attachment were associated with less, rather than more, HA, at least among emotionally stable individuals. Overall, our results suggest people with a relational style involving withdrawing from others (i.e., high avoidant attachment) who do not experience intense, negative emotions (i.e., low emotional instability) are unlikely to experience HA. Caution is also clearly needed in interpreting this unexpected interaction, especially since this interaction was observed in predicting hypochondriacal worry but not illness likelihood. This inconsistency raises questions about whether there is a robust trait-by-trait interaction between avoidant attachment and emotional instability in predicting HA.

4.4. Limitations and future directions

Our study involved self-report questionnaires administered to a non-clinical sample of mostly female, Caucasian undergraduates. It is unclear if our results generalize to other populations (e.g., persons with severe HA). Future studies might consider using multiple methods (e.g., interviews and questionnaires) and multiple sources (e.g., informant and self-reports) to address potential biases accompanying our mono-source, mono-method design (e.g., defensive responding). Additionally, our cross-sectional design does not illuminate questions regarding directionality. Longitudinal research is needed to clarify if anxious attachment and emotional instability represent antecedents, concomitants, or consequences of HA. Future research might also continue to focus on questions of specificity by examining whether anxious attachment and emotional instability interact to predict HA only or a range of anxiety-linked difficulties (e.g., panic). Finally, although our study proposed, tested, and supported one theoretically-driven interactional model in relation to the affective component of HA (health-related worry), another promising future direction is to test the observed trait-by-trait interaction in relation to other key aspects of the IMHA such as reassurance seeking.

4.5. Conclusions

Theoretical accounts and case histories have long suggested anxious attachment and emotional instability are centrally involved in HA. Indeed, the classic "Woody-Allen-prototype" of a person high in HA involves a needy relational style combined with a negative emotional style. Our study extends and refines existing work on HA by suggesting it is chronically accessible abandonment concerns (anxious attachment)—combined with a dispositional tendency toward powerful, negative emotions (emotional instability)—that predisposes HA. These results provide a foundation for researching, conceptualizing, assessing, and treating HA.

Acknowledgments

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