

Attachment and Its Relationship to Anxiety Sensitivity

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Abstract This study examined the role of anxiety sensitivity (AS) in relation to attachment as measured by the Experiences in Close Relationships-Revised (ECR-R) and the inventory of Parent and Peer Attachment (IPPA). We also examined how well attachment variables, anxiety sensitivity, and trait anxiety predicted panic symptoms as measured by the Panic Disorder Severity Scale (PDSS). Three hundred forty-three participants completed a series of self-report measures assessing attachment perceptions, anxiety sensitivity, trait anxiety, and panic symptom frequency and severity. The study hypotheses were tested in several hierarchical regression analyses that examined the relationship between attachment perceptions and anxiety sensitivity while controlling for sex and trait anxiety. Another study hypothesis tested the relationship between attachment perceptions and panic symptom frequency and severity while controlling for sex, anxiety sensitivity, and trait anxiety. Only attachment Anxiety was a significant predictor of anxiety sensitivity after controlling for sex and trait anxiety. The best predictors of panic symptoms were trait anxiety and anxiety sensitivity. None of the attachment variables significantly predicted panic symptoms. Significant differences found across attachment groupings for anxiety sensitivity. The current study found support for the findings of Weems et al. (2002) and Watt et al. (2005) and extended these results to two different attachment measures.

Keywords Anxiety sensitivity · Attachment · Panic symptoms

Introduction

Bowlby's (1973, 1980, 1982) attachment theory provides the ground work to examine the attachment relationship across the life span. Bowlby emphasized the linkage between caregiver (typically the biological parent) and infant as crucial in the development of the attachment system. The attachment system describes a complex set of interactions between caregiver and child centered on proximity and the probability that the caregiver will be responsive to the child's signal for contact. As a result, consistency of caregiver responsiveness encourages the development of feelings of security within the child whereas threatening, hostile, and rejecting interactions may lead to maladaptive attachment. Ainsworth et al. (1978) further articulated attachment theory by developing an assessment procedure that effectively characterized the child's responses when confronted with a "strange situation" into three attachment styles. Secure attachment describes children that respond in a "secure" manner, one which enables the child to operate at a comfortable distance from the parent when conditions of threat or distress to the attachment system are deactivated. By comparison, "avoidant" attachment characterizes the reaction to parents who are persistently unreliable or inconsistent in their response to attachment signals; the child avoids rather than seeks the parents and adopts a position of pseudo-independence and explores the environment with or without parental assistance. The "ambivalent" style is exhibited by a child who cannot find a comfortable proximity from the parents and their attachment needs are both aroused and frustrated (Cassidy and Berlin 1994). As a result, the ambivalent child was not capable of finding security in either

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attachment or avoidance. In general, attachment style differences revealed the individual's ability to use the attachment relationship to seek security and explore the environment.

Hazan and Shaver (1987) extended Bowlby's concept of "attachment representations" or "internal working models" to adult romantic relationships. Internal working models guide behavior within the context of relationships with parents and influence the development of a "prototype" for behavior in later relationships (Bretherton 1985; Main et al. 1985). Bartholomew (1990) and Bartholomew and Horowitz (1991) proposed a four-category model that retains the categories originally described as secure and anxious-ambivalent but conceptualized that the avoidant pattern described by Hazan and Shaver (1987) be divided into two discrete dimensions of fearful-avoidant and dismissing-avoidant. Furthermore, the four attachment styles are based upon the underlying dimensions of the relationship with self and the relationship with others (See Table 1). As a result, individual differences in adult representation of their parental relationships (Main et al. 1985) and adult romantic relationships (Collins and Read 1990; Hazan and Shaver 1987) are attributed to the primary distinctions in the self and other models. Fraley and Shaver (2000) have suggested that because of the developmental assumptions of the attachment model it might be better to view attachment within the same theoretical framework across the lifespan. As a result, they proposed that the model of self may be best represented by anxiety and the model of others may best be represented by avoidance. Fraley and Shaver's (2000) nuanced change allows for the integration of information from social and personality theories but also acknowledges contextual/environmental influences.

Diverging from the self and other models, Armsden and Greenberg (1987) developed an attachment security instrument that measures both parental and peer attachment through self-report (Inventory of Parent and Peer Attachment or IPPA). The IPPA generates three subscales: *Trust*, *Communication*, and *Alienation*. Unfortunately, Armsden

and Greenberg (1987) did not classify individual styles in a way that allows for discrimination among the different types of insecure attachment. Rather the IPPA provides information about the extent and quality of involvement with parents and peers and classifies individuals as either securely or insecurely attached. A substantial body of literature links parent and peer attachment with psychological and health related outcomes. For example, Papini et al. (1991) examined a group of 231 young adolescents (mean age = 12.8) and found that when perceived attachment to the mother was greatest the respondent reported little social anxiety. Papini et al. (1991) results suggest that stronger attachment to parents may act as a buffer against anxiety and depressive feelings that may be associated with the shift into adulthood. In a later study, Parade et al. (2010) assessed 172 college freshmen women at two time points (mean age = 18.09, $SD = .033$). Participants completed parental attachment measures (IPPA) before their fall enrollment and again at the end of the fall semester assessing their ability at developing close relationships. Results showed that initial secure attachment was positively associated with ease in developing friendships for both minority and white college freshman. Further, secure attachment predicted relationship satisfaction with minority but not with white participants. Students who demonstrated greater attachment security to their parents reported stronger friendship bonds at fall semester's end. In summary, Papini et al. (1991) and Parade et al. (2010) provided evidence suggesting a link between parental and peer attachment and social anxiety. As a consequence, secure attachment promotes more effective social functioning while insecure attachment is more strongly associated with maladroit social functioning.

Attachment as a Risk Factor for Anxiety Disorders

Research has provided support for insecure attachment as a risk factor in the development of anxiety disorders. Manassis and Bradley (1994) theorize that insecure attachment offers an

Table 1 A modified four-category model of attachment (Bartholomew 1990; Bartholomew and Horowitz 1991)

		Anxiety (Model of Self)	
		Positive	Negative
Avoidance (Model of Others)	Positive	Secure Values intimate relationships; is able to maintain relationships without loss of autonomy or self. Has a positive view of both self and others.	Preoccupied Values personal independence while denying the importance of emotional bonds. Has a positive view of self but a negative view of others.
	Negative	Dismissing Values personal independence while denying the importance of emotional bonds. Has a positive view of self but a negative view of others	Fearful Avoids emotional relationships due to fear of rejection. Has a negative view of both self and others.

environment that influences and promotes the development and maintenance of trait anxiety over time. Insecure attachment has been found to be a risk factor for the development of anxiety disorders in children (Manassis et al. 1994; Warren et al. 1997). Muris et al. (2001) found that securely attached adolescents (based upon IPPA scores) endorsed significantly lower anxiety scores compared to insecurely attached adolescents. Muris and Meesters (2002) in a study with 280 young adolescents (ages ranged from 11 to 15) and their parents also found that insecure attachment (based upon the Attachment Questionnaire for Children) was strongly tied to behavioral inhibition with insecure attachment being associated with higher levels of behavioral inhibition. Adolescents that demonstrated insecure attachments and/or high levels of behavioral inhibition also demonstrated higher levels of anxiety-related symptoms.

Costa and Weems (2005) tested a model of the association between maternal and child anxiety and evaluated attachment and perception of maternal control as possible mediators of the association. The authors found a significant relationship between maternal and child anxiety. Findings showed that maternal anxious attachment beliefs were significantly associated with both child and maternal anxiety. However, the avoidant attachment dimensions were significantly associated with child and maternal attachment in males only. In summary, there is research to support the link between insecure attachment and the subsequent development of anxiety disorders.

Anxiety Sensitivity as a Risk Factor for Anxiety Disorders

Correspondingly, anxiety sensitivity (AS) has been defined as the fear of anxiety symptoms established on an individual's belief that these symptoms have detrimental social and physical consequences (AS; Reiss et al. 1986). Anxiety sensitivity has been linked to the occurrence of spontaneous panic attacks (Donnell and McNally 1990) and in the growth and maintenance of anxiety disorders (Lau et al. 1996) and as such is considered a risk factor for the development of anxiety disorders. Weems et al. (2002) first suggested that cognitive styles of insecurely attached persons may foster the distorted encoding of anxiety-related symptoms and the consequent growth of high anxiety sensitivity. Chorpita and Barlow (1998) have suggested that greater research attention needs to be focused on how developmental processes may lead to the growth of adult anxiety conditions.

The Link between Attachment and Anxiety Sensitivity

Weems et al. (2002) first examined the relationship between attachment styles and anxiety sensitivity. Their study used samples of both high school ($n = 203$) and university students ($n = 324$). They assessed attachment styles with the Experience in Close Relationships Questionnaire (ECR;

Brennan et al. 1998) and anxiety sensitivity with the 16-item Anxiety Sensitivity Index (ASI, Peterson and Reiss 1992). The results showed that individuals classified as insecure (Preoccupied and Fearful) endorsed significantly higher ASI scores than securely attached respondents in both samples.

Watt et al. (2005) replicated and extended the work of Weems et al. (2002) by measuring the relationship between “close” attachments, as defined by the Experiences in Close Relationships Questionnaire, Relationship Questionnaire (RQ, Bartholomew and Horowitz 1991), the Relationship Scales Questionnaire (RSQ, Griffin and Bartholomew 1994) and the State-Trait Anxiety Inventory-Trait Scale. Two hundred twenty-six undergraduates completed self-reported measures of attachment and anxiety sensitivity. Results showed that Preoccupied and Fearfully attached participants, defined by both attachment measures, endorsed greater levels of anxiety sensitivity than either Secure or Dismissing participants. Regression analyses demonstrated that the “model of self” dimensions for both attachment measures explained unique variance in anxiety sensitivity above trait anxiety. Watt et al. (2005) argued that close relationship attachment may be more critical in determining who might provide assistance during an anxiety episode.

Austin et al. (2006) explored the relationship among anxiety sensitivity, attachments styles, and catastrophic misinterpretation (e. g. misinterpretation of autonomic arousal stimuli as cues to a potential psychological or physical crisis) in a sample of 69 first year university students (65 women; 4 men). Participants were divided into two groups; non anxious control and nonclinical panickers. The nonclinical panickers experienced at least one spontaneous panic attack in the previous 2 years and indicated mild or no worry about future panic attacks. The results failed to support the idea that insecurely attached participants would misinterpret ambiguous stimuli as more harm-related than securely attached participants. However, non-clinical panickers made significantly more harm-related judgments of interoceptive stimuli than non-anxious controls. Austin et al. (2006) also found, in opposition to Weems et al. (2002), no difference in anxiety sensitivity between insecure and securely attached respondents. As a way of explaining this discordant finding Austin et al. suggested that the attachment questionnaires developed by Hazan and Shaver (1987) may have contributed to the lack of significance because of the discreet categories subjects were forced to choose from and that only three of the four possible attachment styles were adequately represented.

Similarly, Viana and Rabian (2008) examined the relationship, among anxiety sensitivity, perceived attachment to parents and peers (assessed with the IPPA), current worry and generalized anxiety disorder (GAD symptoms, e. g. worry). Viana and Rabian tested the potential mediating effect of anxiety sensitivity with a sample of 94 non-clinical worriers. The author's hypothesized that anxiety sensitivity mediated the

effects of attachment along with worry and GAD symptoms. Results showed that since anxiety sensitivity mediated the relationship between attachment, current worry, and GAD symptoms it suggests that attachment alienation from both peers and mother contributes to the development of catastrophic fears related to anxiety symptoms.

The Present Study

Our approach was conceptually similar to previous studies that have examined the role of attachment and anxiety sensitivity (Weems et al. 2002; Watt et al. 2005). In keeping with past research (Weems et al. 2002; Watt et al. 2005) we expect that insecurely attached individuals will demonstrate higher levels of anxiety sensitivity than securely attached individuals based on ECR-R scores. More specifically we predicted that individuals identified as either Preoccupied or Fearfully attached will have significantly higher anxiety sensitivity than Securely attached individuals.

- H1a The combined grouping of Preoccupied or Fearfully attached individuals will demonstrate significantly higher anxiety sensitivity levels than Securely attached individuals.
- H1b Fearfully attached individuals will demonstrate significantly higher anxiety sensitivity levels than Securely attached individuals.
- H1c Preoccupied attached individuals will demonstrate significantly higher anxiety sensitivity levels than Securely attached individuals.

We also predicted that Dismissively attached individuals will show lower anxiety sensitivity than a combined group of Fearful and Preoccupied attached individuals.

- H1d Dismissively attached individuals will demonstrate significantly lower anxiety sensitivity levels than a combined group of Fearful and Preoccupied attached individuals.

As there seems to be no previous guidance that suggest that there would be significant differences between secure and dismissingly attached individuals we predicted that given the nature of Secure and Dismissing individual that they would collectively show lower anxiety sensitivity levels that combined group of Fearful and Preoccupied attached individuals.

- H1e A combined group of Secure and Dismissively attached individuals will demonstrate significantly lower anxiety sensitivity levels than a combined group of Fearful and Preoccupied attached individuals.

Although sex differences have not been a primary focus of this research we have an interest in characterizing the interplay between attachments types and sex on anxiety sensitivity total scores following the findings of Weems et al. (2002). Weems et al. indicated significantly higher differences on the anxiety sensitivity index scores favoring males in fearful and preoccupied attachment groups. Thus we sought to examine sex differences in these data to further clarify the results obtained by Weems et al. (2002) and Watt et al. (2005).

- H2a; b Fearful and Preoccupied men will demonstrate significantly higher anxiety sensitivity levels than women.

Previous research (Hale et al. 2006; Scher and Stein 2003; van Eijck et al. 2012; Viana and Rabian 2008) primed the decision to assess anxiety sensitivity index scores among high, medium, and low IPPA-Alienation levels across parents and peers. In addition, Scher and Stein (2003) found, using regression analysis, that “parental threatening, hostile, and rejecting behaviors” predicted significant variance in anxiety sensitivity scores. It is hypothesized that IPPA-Alienation levels will show differences in anxiety sensitivity across parents and peers.

- H3a; b; c Individuals classified as low, medium, and high according to the IPPA-Alienation scale scores will demonstrate significantly different anxiety sensitivity levels across mother, father, and peers.

Finally, several hypotheses examined the relationships among demographic variables (age, sex/gender), trait anxiety, and attachment variables (ECR-R and IPPA) and anxiety sensitivity. It was hypothesized that the attachment variables would be significant predictors of anxiety sensitivity.

- H4a When controlling for sex and trait anxiety attachment anxiety and attachment avoidance will be significant predictors of anxiety sensitivity, such that as levels of anxiety sensitivity increase, attachment anxiety and avoidance increase.

- H4b It is predicted that when controlling for sex and trait anxiety mother, father, and peer Alienation will be significant predictors of anxiety sensitivity, such that as levels of anxiety sensitivity increase, mother, father, and peer Alienation increase.

Further, regression analysis also examined the relationships among demographic variables (sex/gender), trait anxiety, attachment variables (ECR-R and IPPA) and Panic Disorder

Severity Scale scores. Once more, it was hypothesized that the attachment variables would significantly predict panic symptom scores.

- H5a When controlling for sex, trait anxiety, and anxiety sensitivity, attachment anxiety and attachment avoidance will be significant predictors of panic symptoms, such that as levels of panic symptoms increase, attachment anxiety and avoidance increase.
- H5b It is predicted that when controlling for sex, trait anxiety, and anxiety sensitivity mother, father, and peer Alienation will be significant predictors of panic symptoms, such that as levels of panic symptoms increase, mother, father, and peer Alienation increase.

Method

Participants

Participants were 343 students (143 males and 199 females) recruited from the Psychology Department's undergraduate research pool and the general university community. Participants ranged in age from 17 to 46; the mean age was 21.01 ($SD = 2.73$, $M_{Men} = 21.27$, $SD = 3.35$; $M_{Women} = 20.82$, $SD = 2.16$). The racial composition of the sample was 78.7% ($n = 270$) non-Hispanic white, 9.9% ($n = 34$) African-American, 5.0% ($n = 17$) Hispanic, 2.9% ($n = 10$) Asian or Pacific Islander, .6% ($n = 2$) Native American or Alaskan native, and 2.9% ($n = 10$) was unspecified. Participants received either research credit or extra credit for their participation. This research was approved by the institutional review board, and each participant's written consent was obtained following a short explanation of the research process. Most participants were single, never married (95.0%) while 2.3% were married and 1.2% were divorced or separated. Approximately 98% of the participants were undergraduates while the rest were graduate students or unspecified. When asked which parent they felt more attached to 71.8% indicated that they felt more attached to mother by comparison 20.9% indicated that they felt more attached to their father.

Measures

Experiences in Close Relationships-Revised (ECR-R; Fraley et al. 2000). The ECR-R is a self-report attachment measure that consists of 36 items. Items use a 7-point Likert scale (1 = disagree strongly and 7 = agree strongly). The ECR-R consists of two subscales. *Model of Self* (Anxiety) is defined as anxiety related rejection and thoughts of unworthiness in

interpersonal relationships. An example of an item representing this scale is "I'm afraid that I will lose my partner's love." *Model of Others* (Avoidance) is defined by difficulties with interpersonal trust and avoidance of interpersonal closeness. An example of an item representing the Avoidance subscale is "I prefer not to show a partner how I feel deep down". The scales are scored on a continuum and represent attachment-related anxiety and avoidance. Participants were classified into attachment categories with the ECR-R because of its correspondence to Bartholomew's taxonomy (Brennan et al. 1998). Previous work demonstrated high internal consistency with coefficient alphas of 0.95 and 0.93 representing Anxiety and Avoidance subscales respectively (Sibley et al. 2005; Sibley and Liu 2004). Coefficient alphas in this study were .93 and .94 for the Anxiety and Avoidance subscales.

Inventory of Parent and Peer Attachment (IPPA; Armsden and Greenberg 1987). The IPPA is a 75-item inventory that assesses affective and cognitive dimensions of current attachment relationships of college students. The IPPA is distributed across three scales, (each with 25 items), that measure attachment to mother, father, and peers. Three broad dimensions assess the degree of mutual trust, quality of communication, and extent of anger and alienation. Participants rated their degree of mutual trust, communication quality, and alienation using a 5-point Likert scale that ranged from 1 (almost never or never true) to 5 (almost always or always true) indicating their level of agreement with each statement about their relationship quality with both parents and peers. Sample Trust items include "My mother respects my feelings." or "My friends understand me." Sample Communication items include "My mother can tell when I'm upset about something" or "I like to get my friend's point of view on things I'm concerned about. Alienation items tap into feelings represented by anger and isolation (e. g., "Talking over my problems with my mother makes me feel ashamed or foolish." or "My friends don't understand what I'm going through these days.") Both trust and communication are associated with positive markers of attachment quality while alienation is a clear negative sign of attachment quality. Armsden and Greenberg (1987) have reported test-retest reliability of .93 over 3 weeks. Internal consistency values in previous studies for mother, father, and peer attachment ranged from .87 to .92. Coefficient alpha for the IPPA mother, father, and peer Trust was .90, .92, .92; IPPA mother, father, and peer Communication .90, .91, .90, and IPPA mother, father, and peer Alienation subscales ranged from .79, .79, .69 respectively. In this study we only used the Alienation subscales because they more clearly represented negative signs of attachment.

Anxiety Sensitivity Index (ASI; Peterson and Reiss 1992). The ASI is a 16-item self report scale that measures the degree to which an individual believes the experience of anxiety has harmful consequences. Responses are based on a 5-point Likert scale ranging from 0 (very little) to 4 (very much).

Total scores range from 0 to 64. An example item from the ASI is “When I notice my heart is beating rapidly, I worry that I might have a heart attack”. ASI scores of 25 and higher have been used as a cutoff to suggest possible problems and scores over 30 to indicate possible panic disorder and severe psychopathologies. In this study 239 participants fell below the cutoff ($M = 14.46$, $SD = 4.49$) while 100 fell at or above the cutoff ($M = 33.59$, $SD = 7.96$). Coefficient alpha for the full scale ASI was .88. Coefficient alphas for Physical, Psychological, and Social Concerns subscales were .83, .78, and .49 respectively.

State Trait Anxiety Inventory (STAI; Spielberger et al. 1983). The State Trait Anxiety Inventory (STAI) is a 40-item self-report scale that measures participants degree of State and Trait anxiety. STAI items are rated on a 4-point Likert scale (State, 1 = Not at all to 4 = Very much so; Trait, 1 = Almost never and 4 = Almost always). Scores for each scale ranged from 20 to 80. Higher scores indicate greater tendencies to experience tensions, high levels of autonomic nervous system activity, and a greater tendency to evaluate situations as threatening. The STAI has two scales measuring State (right now, in the moment) and Trait (how they generally feel) anxiety. An example of an item included on the State anxiety scale is “I am tense.” An example of an item taken from the Trait anxiety scale is “I feel that difficulties are piling up so that I cannot overcome them.” Barnes et al. (2002) reported mean coefficient alpha for the STAI-State of .92 and mean test-retest reliability of .70 and STAI-Trait mean coefficient alpha of .89 with mean test-retest reliability of .88. Coefficient alphas for this study were .93 for STAI-State and .92 for STAI-Trait. The STAI-Trait scale will be used in this study primarily as a covariate since some have suggested that the ASI is highly related to trait anxiety.

Panic Disorder Severity Scale (PDSS; Shear et al. 1997, Shear et al. 2001). The Panic Disorder Severity Scale is a series of seven clinical interview questions that have been arranged into a series of self-report questions. Questions are coded on a 5-point scale indicating symptom severity (0 = No panic or limited symptom episodes through 4 = Extreme, full panic attacks occur more than once a day, more days than not.). Total scores range from 0 to 45. An example of an item included on the PDSS is “In the past month, how many full panic attacks did you experience (four or more symptoms)?” The PDSS has been useful in predicting the future onset of panic disorder. Coefficient alpha for the PDSS was reported at .88 (Shear et al. 2001) with test-retest reliability of .71. Coefficient alpha in the current study was .90.

Procedure

Participants first read and signed an informed consent. They then completed a series of questionnaires that sought information on age, gender, race, family structure, and familial history

of anxiety or panic disorders. They also completed the Anxiety Sensitivity Index, Experiences in Close Relationships-Revised scale, the Inventory of Parent and Peer Attachment, the State Trait Anxiety Inventory and the Panic Disorder Severity Scale. Attachment styles were derived based on scores from the ECR-R and the Inventory of Parent and Peer Attachment and were used to classify participants into attachment style groups. The current study focused only on the findings specifically related to attachment styles and anxiety sensitivity.

Results

This study sought to test the relationships between anxiety sensitivity measured by the Anxiety Sensitivity Index and two widely used attachment measures: Experiences in Close Relationships-Revised and the Inventory of Parent and Peer attachment Alienation subscale. Hypotheses tested the relationship between attachment styles derived from both the ECR-R and the IPPA and the Anxiety Sensitivity Index.

Sample Characteristics

Table 2 presents the means and standard deviations of all the variables of interest (e.g., ASI, IPPA, STAI-State, STAI-Trait). T-tests revealed significant sex differences for ECR-R Anxiety $t(329) = -1.976$, $p = .046$, Cohen's $d = 0.220$; ASI-Total $t(336) = -3.186$, $p = .002$, Cohen's $d = 0.351$; ASI-Physical Concerns subscale $t(335) = -4.04$, $p < .0001$, Cohen's $d = 0.446$; ASI-Social Concerns $t(336) = -2.512$, $p = .012$, Cohen's $d = 0.277$; STAI-Trait $t(334) = -3.908$, $p < .0001$, Cohen's $d = 0.432$; and the Panic Disorder Severity Scale (PDSS; Shear et al. 1997) $t(318.862) = -2.248$, $p = .025$, Cohen's $d = 0.244$ (degrees of freedom corrected for unequal variances). There were no significant differences between men and women for either the ECR-R Avoidance scale, ASI - Psychological Concerns scale, or age ($t(329) = 0.485$, $p = .628$, Cohen's $d = 0.054$; and $t(276.311) = -0.80$, $p = .936$, Cohen's $d = 0.009$ (degrees of freedom corrected for unequal variances), $t(226.03) = -1.411$, $p = .16$, Cohen's $d = 0.17$ (degrees of freedom corrected for unequal variances), respectively.

Prior to evaluating the effects of individual attachment variables on anxiety sensitivity the relationship among the attachment measures and anxiety sensitivity were estimated through both zero-order and partial correlations. Table 3 presents these data (zero-ordered correlations in the lower triangle and partial correlations in the upper triangle) and shows that the ECR-R Anxiety scale demonstrated moderate to strong associations with all of the anxiety sensitivity measures. The relationships between the ECR-R Anxiety scale and the anxiety sensitivity measures ranged from .485 to .345. The relationships between

Table 2 Means and standard deviations for all study measures by attachment category and sex

	Secure		Fearful		Preoccupied		Dismissing		Total	
	M n = 54	F n = 81	M n = 30	F n = 47	M n = 16	F n = 35	M n = 39	F n = 34	M n = 145	F n = 199
ASI - Total	13.70 (8.05)	17.77 (8.55)	24.57 (10.62)	25.34 (8.92)	22.69 (10.77)	27.31 (13.77)	15.46 (10.41)	19.82 (9.76)	17.99 (10.88)	21.56 (10.67)
ASI - Phy	0.72 (0.66)	1.08 (0.71)	1.46 (0.73)	1.49 (0.64)	1.20 (0.64)	1.71 (1.02)	0.76 (0.78)	1.17 (0.75)	0.97 (0.78)	1.30 (0.80)
ASI - Psy	0.44 (0.61)	0.50 (0.53)	1.20 (1.06)	1.06 (0.87)	1.27 (1.19)	1.22 (0.99)	0.68 (0.78)	0.76 (0.72)	0.80 (0.93)	0.80 (0.80)
ASI - Social	1.55 (0.56)	1.78 (0.63)	2.05 (0.62)	2.30 (0.59)	2.03 (0.75)	2.23 (0.87)	1.81 (0.85)	1.87 (0.60)	1.81 (0.71)	1.99 (0.70)
STAI-Trait	30.44 (7.53)	35.37 (10.36)	44.24 (10.63)	46.70 (10.21)	40.88 (8.58)	50.34 (12.57)	34.84 (8.77)	37.03 (9.96)	36.24 (10.37)	40.95 (12.28)
PDSS	7.76 (2.38)	8.77 (2.63)	9.47 (4.30)	10.06 (3.63)	10.25 (3.75)	11.40 (5.17)	8.87 (3.72)	9.59 (4.21)	8.85 (3.61)	9.66 (3.79)
ECR-R-Anxiety	1.97 (0.73)	2.11 (0.69)	4.11 (0.68)	4.10 (0.63)	4.53 (0.62)	4.52 (0.66)	2.26 (0.62)	2.45 (0.55)	2.81 (1.23)	3.07 (1.22)
ECR-R-Avoidance	2.02 (0.52)	1.88 (0.59)	3.80 (0.39)	4.02 (0.76)	2.30 (0.65)	2.44 (0.54)	3.98 (0.86)	4.18 (0.84)	2.98 (1.11)	2.89 (1.22)
IPPA M Total	98.20 (17.51)	103.69 (19.48)	92.57 (11.08)	97.79 (18.08)	96.88 (19.51)	94.03 (20.17)	95.82 (11.54)	97.29 (16.81)	95.63 (15.05)	99.60 (19.03)
IPPA F Total	88.87 (18.46)	87.73 (23.38)	81.90 (23.41)	78.20 (24.44)	83.56 (21.82)	82.77 (24.66)	85.33 (20.18)	86.70 (19.94)	85.51 (20.17)	84.53 (23.51)
IPPA P Total	103.00 (11.30)	107.84 (13.14)	90.03 (14.26)	99.40 (14.50)	96.13 (13.30)	102.77 (12.94)	95.10 (11.75)	100.91 (14.43)	96.69 (13.49)	103.54 (14.12)
IPPA-MT	42.15 (7.59)	43.72 (7.35)	40.20 (5.79)	41.74 (7.79)	42.75 (7.30)	40.97 (7.29)	42.18 (4.78)	41.79 (6.69)	41.63 (6.48)	42.46 (7.34)
IPPA-MC	31.96 (7.47)	36.44 (8.37)	32.30 (5.02)	34.30 (7.21)	33.19 (8.11)	32.91 (8.49)	31.41 (5.69)	32.53 (7.15)	31.88 (6.53)	34.67 (8.01)
IPPA-MA	24.09 (4.02)	23.53 (4.98)	20.07 (3.28)	21.74 (4.69)	20.94 (5.93)	20.14 (5.78)	22.23 (4.41)	22.97 (4.31)	22.12 (4.54)	22.47 (5.09)
IPPA-FT	39.09 (8.24)	38.49 (10.38)	35.66 (10.60)	34.44 (10.87)	37.75 (9.97)	37.23 (9.04)	37.28 (9.88)	39.45 (7.79)	37.56 (9.35)	37.51 (9.96)
IPPA-FC	27.79 (7.52)	28.17 (9.17)	27.89 (7.39)	25.53 (9.19)	25.50 (9.85)	26.71 (10.79)	26.39 (8.80)	26.58 (8.68)	27.11 (8.04)	27.06 (9.40)
IPPA-FA	21.98 (4.97)	21.08 (5.70)	20.00 (4.07)	18.22 (5.83)	20.31 (4.95)	18.83 (6.08)	21.67 (4.63)	20.67 (4.92)	21.19 (4.65)	19.96 (5.78)
IPPA-PT	43.85 (5.10)	45.53 (5.66)	37.97 (6.53)	41.89 (6.68)	42.53 (6.84)	43.37 (6.15)	41.13 (5.80)	42.76 (6.92)	41.43 (6.38)	43.70 (6.41)
IPPA-PC	31.81 (4.91)	35.46 (4.85)	28.60 (5.63)	33.26 (4.65)	31.80 (5.37)	34.71 (4.27)	27.90 (5.99)	31.88 (5.56)	29.83 (5.68)	34.09 (5.07)
IPPA-PA	27.33 (4.29)	26.85 (4.25)	23.47 (4.44)	24.26 (4.92)	21.80 (2.88)	24.69 (4.12)	26.08 (4.09)	26.26 (3.81)	25.44 (4.54)	25.75 (4.44)
Age	21.10 (2.84)	20.66 (1.67)	20.86 (2.02)	21.00 (2.77)	20.59 (1.56)	20.86 (2.34)	22.72 (5.49)	20.74 (2.07)	21.42 (3.57)	20.80 (2.14)

IPPA Inventory of Parent and Peer Attachment, *IPPA-MT* Mother Trust, *IPPA-MC* Mother Communication, *IPPA-MA* Mother Alienation, *IPPA-FT* Father Trust, *IPPA-FC* Father Communication, *IPPA-FA* Father Alienation, *IPPA-PT* Peer Trust, *IPPA-PC* Peer Communication, *IPPA-PA* Peer Alienation, *ASI-Total* Anxiety Sensitivity Index-Total, *ASI-Phy* Anxiety Sensitivity Index-Physical Concerns, *ASI-Psy* Anxiety Sensitivity Index-Psychological Concerns, *ASI-Soc* Anxiety Sensitivity Index-Social Concerns, *PDSS* Panic Disorder Severity Scale, *STAI-T* State Trait Anxiety Inventory-Trait Scale, *ECR-R Anxiety* Experience in Close Relationships-Anxiety Scale, *ECR-R Avoidance* Experience in Close Relationships-Avoidance Scale

the ECR-R Avoidance scale and the various measures of anxiety sensitivity were much weaker ranging from .196 to .124. Because some have suggested that the ASI is indistinct from trait anxiety (Lilienfeld et al. 1989; Orsillo et al. 1994) another analysis was performed removing the effect of trait anxiety from the previously obtained correlations in order to account for unique variance between the attachment measures and anxiety sensitivity. Partial correlation (Controlling for STAI-

T) demonstrated that ECR-R attachment facets accounted for unique variance in ASI total and subscale scores after trait anxiety was controlled. As a consequence all of the associations between attachment anxiety and ASI facets remained statistically significant after controlling for trait anxiety. In contrast, none of the ECR-R Avoidance and ASI measures remained statistically significant. A similar pattern of results emerged between the IPPA-alienation measures and the ASI

Table 3 Zero-order and partial (upper triangle, controlling for STAI-T) correlations between ASI scores and attachment variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 ASI Total	1.00	0.905**	0.725**	0.695**	0.192**	0.028	0.056	0.074	0.031	0.017	0.043	-0.078	-0.014	0.047	-0.058
2 ASI-Phy	0.935**	1.00	0.485**	0.446**	0.135*	-0.022	0.066	0.117*	0.055	-0.007	0.036	-0.063	-0.022	0.066	-0.024
3 ASI - Psy	0.812**	0.653**	1.00	0.361**	0.161**	0.044	0.043	-0.003	0.027	0.010	0.007	-0.067	-0.035	-0.028	-0.065
4 ASI - Soc	0.713**	0.536**	0.472**	1.00	0.190**	0.088	0.006	0.010	-0.031	0.070	0.061	-0.054	0.037	0.044	-0.067
5 ECR-R-Anxiety	0.485**	0.416**	0.466**	0.345**	1.00	0.162**	0.017	0.036	-0.066	-0.120*	-0.097	-0.192**	-0.018	0.090	-0.118*
6 ECR-R-Avoidance	0.180**	0.124*	0.196**	0.173**	0.305**	1.00	-0.116*	-0.186**	-0.127*	-0.120*	-0.146**	-0.096	-0.213**	-0.278**	-0.021
7 IPPA-M/T	-0.072	-0.053	-0.077	-0.072	-0.110*	-0.156**	1.00	0.790**	0.689**	0.172**	0.108*	0.066	0.113*	0.144**	0.022
8 IPPA-M/C	-0.001	0.044	-0.056	-0.031	-0.036	-0.189**	0.789**	1.00	0.662**	0.147**	0.183**	0.085	0.121*	0.200**	0.046
9 IPPA-M/A	-0.197**	-0.155**	-0.202**	-0.160**	-0.272**	-0.197**	0.700**	0.650**	1.00	0.272**	0.221**	0.246**	0.144**	0.085	0.217**
10 IPPA-F/T	-0.022	-0.030	-0.024	0.022	-0.146**	-0.146**	0.183**	0.148**	0.279**	1.00	0.799**	0.728**	0.139**	0.067	0.047
11 IPPA-F/C	0.045	0.040	0.019	0.058	-0.080	-0.143**	0.116**	0.189**	0.210**	0.796**	1.00	0.708**	0.050	0.067	-0.014
12 IPPA-F/A	-0.188**	-0.169**	-0.174**	-0.128*	-0.276**	-0.148**	0.109*	0.111*	0.305**	0.722**	0.691**	1.00	0.065	-0.017	0.185**
13 IPPA-P/T	-0.146**	-0.139**	-0.161**	-0.052	-0.168**	-0.271**	0.164**	0.139**	0.215**	0.170**	0.048	0.103	1.00	0.801**	0.485**
14 IPPA-P/C	-0.001	0.019	-0.062	0.014	0.030	-0.284**	0.151**	0.193**	0.106*	0.090	0.066	-0.004	0.797**	1.00	0.362**
15 IPPA-P/A	-0.295**	-0.247**	-0.296**	-0.206**	-0.340**	-0.137**	0.110	0.078	0.339**	0.084	-0.013	0.253**	0.524**	0.358**	1.00

IPPA-M Inventory of Parent and Peer Attachment-Mother, IPPA-F Inventory of Parent and Peer Attachment-Father, IPPA-P Inventory of Parent and Peer Attachment-Peers, IPPA-M/T Inventory of Parent and Peer Attachment-Mother Trust Subscale, IPPA-F/T Inventory of Parent and Peer Attachment-Father Trust Subscale, IPPA-P/T Inventory of Parent and Peer Attachment-Peers Trust Subscale, IPPA-M/C Inventory of Parent and Peer Attachment-Mother Communication Subscale, IPPA-F/C Inventory of Parent and Peer Attachment-Father Communication Subscale, IPPA-P/C Inventory of Parent and Peer Attachment-Peers Communication Subscale, IPPA-M/A Inventory of Parent and Peer Attachment-Mother Alienation Subscale, IPPA-F/A Inventory of Parent and Peer Attachment-Father Alienation Subscale, IPPA-P/A Inventory of Parent and Peer Attachment-Peers Alienation Subscale, ASI-Phy Anxiety Sensitivity Index – Physical Concerns, ASI-Psy Anxiety Sensitivity Index – Psychological Concerns, ASI-Soc Anxiety Sensitivity Index – Social Concerns, ASI-Total Anxiety Sensitivity Index – Total, Partial correlations controlling for STAI-T above the diagonal
* $p < 0.05$. ** $p < 0.01$. STAI-Trait Scale = ($M = 38.39$, $SD = 11.50$)

measures. None of the relationships retained statistical significance once STAI-Trait was statistically controlled. These results suggest that ECR-R Avoidance and mother, father, and peer Alienation measures share variance with trait anxiety. As a consequence these results question whether ECR-R Avoidance and IPPA-Alienation possess incremental validity beyond trait anxiety.

Attachment Measures

Participants were classified into attachment categories using the ECR-R. Individuals classified as securely attached represented the majority of participants at 38.5%, those identified as Fearfully attached represented 22.7%, while Preoccupied and Dismissively attached individuals represented 14.3% and 21.3% respectively. Eight individuals did not receive an attachment status (2.3%) because they either did not complete the ECR-R or completed the measure incorrectly. Likewise, attachments styles using the IPPA were designated as either secure or insecurely attached for parents and peers. Attachment to mother included 40% represented as securely, 32% as insecurely, and 28% were unclassified. Attachment to father was slightly better with 43% designated as secure, 32% as insecure, and 25% as unclassified. Attachment styles for peers were 36% as secure, 29% as insecure and 35% as unclassified. When the convergence between attachment measures were compared approximately 53.3% of those designated as securely attached were also designated as securely attached by IPPA mother attachment. Similar values were obtained for father (50.4%) and peers (48.2%).

Are there differences in Panic Disorder Severity Scale scores across anxiety sensitivity categories? Two categories were constructed based on anxiety sensitivity total scores. First, according to Peterson and Reiss (1992) a clinical cutoff score of 25 or higher on anxiety sensitivity total scores was established. This was used as an indicator of possible problems due to its strong relationship with clinically meaningful psychopathology and is similar to criteria used by Watt et al. (2005). A one-way ANOVA between high and low ASI groups based on a median split of ASI total scores ($MDN = 19$) with PDSS scores as the dependent variable was conducted to compare the effect of panic symptoms was significant ($F(1, 336) = 62.459$, $p < .0001$, $\eta_p^2 = 0.157$; $M_{Low} = 10.01$, $SD_{Low} = 2.168$, $M_{High} = 13.64$, $SD_{High} = 5.516$). A second ANOVA based on a clinical cut off score of 24 with PDSS scores as the dependent variable also revealed significant group differences ($F(1, 336) = 85.091$, $p < .0001$, $\eta_p^2 = 0.202$; $M_{Low} = 10.53$, $SD_{Low} = 2.717$, $M_{High} = 15.05$, $SD_{High} = 6.303$).

Attachment and Anxiety Sensitivity

Based upon past research we predicted that insecurely attached individuals would demonstrate higher levels of anxiety

sensitivity than securely attached individuals based on ECR-R scores. An initial test to evaluate the homogeneity of the variances revealed a significant difference ($F(3, 328) = 5.817$, $p < .001$) as a consequence we used corrected unequal variances between attachment style groups. The results of a priori *planned comparisons* between Secure and combined insecure groups (Fearful and Preoccupied) was statistically significant providing support for hypothesis 1a ($t(150.937) = -7.019$, $p < .0001$, Cohen's $d = 0.927$; $M(\text{Secure}) = 16.25$, ($SD = 8.57$), $M(\text{Fearful} + \text{Preoccupied}) = 25.39$ ($SD = 11.05$).

In addition, another set of a priori *planned comparisons* were performed to examine the relationship between Secure and Fearful attachment groups statistically significant differences between the Secure and Fearful attachment groups providing support for hypothesis 1b ($t(148.60) = -6.67$, $p < .0001$, Cohen's $d = 0.979$; $M(\text{Secure}) = 16.25$, ($SD = 8.57$) $M(\text{Fearful}) = 24.99$, ($SD = 9.51$). Hypothesis 1c assessed a priori *planned comparisons* between the Secure and Preoccupied attachment groups yielded a significant difference ($t(63.593) = -4.812$, $p < .0001$, Cohen's $d = 0.911$; $M(\text{Secure}) = 16.25$, ($SD = 8.57$), $M(\text{Preoccupied}) = 26.02$ ($SD = 13.22$) supporting the hypothesis.

Hypothesis 1d assessed the difference between Dismissive and a combined Fearful and Preoccupied grouping. Results from the planned comparison were significant and provided support for the hypothesis ($t(144.304) = -6.655$, $p < .0001$, Cohen's $d = 0.874$; $M(\text{Secure} + \text{Dismissive}) = 16.69$ ($SD = 9.21$), $M(\text{Fearful} + \text{Preoccupied}) = 25.39$ ($SD = 11.05$). Hypothesis 1e examined the difference between Dismissive and a combined Fearful and Preoccupied grouping. The planned comparison was significant providing support for the prediction ($t(147.81) = -4.94$, $p < .0001$, Cohen's $d = 0.733$; $M(\text{Dismissive}) = 17.49$, ($SD = 10.28$) $M(\text{Fearful} + \text{Preoccupied}) = 25.39$ ($SD = 11.05$).

Are there sex/Gender Differences in Anxiety Sensitivity Scores?

Hypothesis 2a and 2b predicted that there would be significant differences between Fearful and Preoccupied men and women on anxiety sensitivity scores. The results of a priori *planned comparisons* between Fearful men and women produced a nonsignificant relationship providing no support for hypothesis 2a ($F(1, 323) = 0.152$, $p < .697$, $\eta_p^2 = 0.000$; $M_{Men}(\text{Fearful}) = 24.45$ ($SD = 10.465$), $M_{Women}(\text{Fearful}) = 25.34$ ($SD = 8.921$). Hypothesis 2b was tested and no significant differences between Preoccupied women and men on anxiety sensitivity scores were found providing no support for the prediction ($F(1, 323) = 2.306$, $p < 0.130$, $\eta_p^2 = 0.007$; $M_{Men}(\text{Preoccupied}) = 22.80$ ($SD = 11.143$), $M_{Women}(\text{Preoccupied}) = 27.44$ ($SD = 13.953$).

IPPA Attachment Alienation Differences across Parents and Peers

Hypotheses 3a, 3b, and 3c involving IPPA Alienation across mother, father, and peers were evaluated next and revealed significant differences in IPPA Alienation for mothers, fathers, and peers providing support for hypothesis 3a, 3b, and 3c ($F(2, 336) = 5.281, p < 0.006, \eta_p^2 = 0.03; M_{Low}=18.39, SD_{Low}=10.14, M_{Medium}=22.05, SD_{Medium}=11.598, M_{High}=23.00, SD_{High} = 10.849$; father's Alienation $F(2, 324) = 6.362, p < 0.002, \eta_p^2 = 0.038; M_{Low} = 18.05, SD_{Low} = 9.80, M_{Medium} = 21.08, SD_{Medium} = 10.71, M_{High} = 24.85, SD_{High} = 13.716$); peers Alienation ($F(2, 335) = 14.821, p < .0001, \eta_p^2 = 0.081; M_{Low} = 16.52, SD_{Low} = 9.763, M_{Medium} = 20.61, SD_{Medium} = 10.396, M_{High} = 28.52, SD_{High} = 13.125$). Posthoc comparisons across Alienation groups using Tukey's LSD revealed significant differences ($\alpha = .05$) between low and medium alienation groups for mothers. Tukey's LSD revealed significant differences between low and medium and high alienation groups for fathers. Significant posthoc peer alienation differences were revealed between low and medium and high alienation and between medium and high groups. Taken together these results suggest that parent and peer attachment Alienation exerts a weak but significant effect on anxiety sensitivity.

Prediction of Anxiety Sensitivity Outcomes

Hypotheses 4a and 4b were assessed using a series of hierarchical multiple regression analyses to predict anxiety sensitivity scores (total and subscales). How well the attachment variables would predict anxiety sensitivity scores after controlling for sex/gender, and trait anxiety was of particular interest. In each regression equation sex/gender was entered at step one, followed by trait anxiety at step two, then followed by attachment anxiety and avoidance at steps three. A similar structure was utilized with mother, father, and peer Alienation entered at step three.

Because a total of four or five significance tests were conducted for each regression model, the Bonferroni adjustment was applied, establishing a significance level of .01 (α of .05, divided by 4 or 5). In addition to adjusting for type I error multicollinearity was evaluated using the variance inflation factor. The variance inflation factor (VIF) is a prescribed method that is commonly used to identify multicollinearity. The rule of thumb is that a VIF exceeding ten indicates significant multicollinearity problems. The VIFs calculated for this study were all within the accepted range (VIF values ranged from 1.06 to 1.71) demonstrating minimal multicollinearity in this analysis (Belsley et al. 2005) Similar VIF values were found in the remaining regression analyses.

In the first set of regression models significant results were obtained for each model with R^2 ranging from

.374 to .165. Trait anxiety and attachment Anxiety significantly predicted anxiety sensitivity in all of the models. In contrast, attachment Avoidance was not a significant predictor for any of the anxiety sensitivity outcome variables. Regression analyses are summarized in Table 4. An additional set of analyses replaced attachment Anxiety and Avoidance with mother, father, and peer Alienation scores. Once again all of the regression models were statistically significant with R^2 ranging from .32 to .16. Trait anxiety was a significant predictor of anxiety sensitivity in all of the models (see Table 5). Mother, father, and peer Alienation were not significant predictors in any of the models. As a consequence Hypothesis 4a received mixed support in that attachment Anxiety was a significant predictor of anxiety sensitivity while attachment Avoidance was not. However, Hypothesis 4b received no support in that mother, father, and peer Alienation did not significantly predict anxiety sensitivity.

Prediction of Panic Disorder Severity Scale Outcomes

Hypotheses 5a and 5b were assessed using two regression analyses to best predict panic-related symptoms as measured by the Panic Disorder Severity Scale. The analysis first evaluated the effect of the, sex/gender, trait anxiety was entered at step 2, followed at step 3 by ASI-total score, then ECR-R Anxiety, and ECR-R Avoidance were entered at step 4. The second regression analysis used mother, father, and peer Alienation dimensions derived from the IPPA instead of the attachment Anxiety and Avoidance measures. Results are displayed in Tables 6 and 7 respectively. A total of five or six significance tests were conducted for any set of regression analyses, the Bonferroni adjustment was applied, establishing a significance level of .01 or .008 (α of .05, divided by $.05/5 = .01$ or $.05/6 = .008$). In addition to adjusting for type I error multicollinearity was also assessed using the variance inflation factor. The VIFs calculated for these regressions were all within the accepted range (VIF values ranged from 1.06 to 2.20). A significant regression equation was obtained ($F(5, 323) = 29.04, p < .0001$), with an R^2 of .31. Only trait anxiety and anxiety sensitivity were significant predictors of panic-related symptoms. Neither attachment Anxiety or Avoidance proved to be significant predictors of panic symptoms. The second regression equation which used the three IPPA Alienation scales also demonstrated a significant regression eq. ($F(6, 317) = 25.40, p < .0001$), with an R^2 of .325. Once more trait anxiety and anxiety sensitivity were significant predictors of panic-related symptoms (see Table 7). None of the IPPA-Alienation measures significantly predicted panic symptoms. The results do not provide support for either Hypothesis 6a or 6b which predicted that

Table 4 Summary of hierarchical regression analyses predicting anxiety sensitivity I total, ASI-physical concerns, ASI-psychological concerns, and ASI-social concerns using ECR-R anxiety and avoidance

Predictor	ASI-Total		ASI-Physical		ASI-Psychological		ASI-Social	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	0.033		0.051		.000		0.023	
Sex		0.059		0.113		-0.099		0.088
Step 2	0.313		0.249		.325		0.109	
STAI-T		0.445***		0.425***		0.460***		0.194**
Step 3	0.027		0.016		0.024		0.032	
ECR-R Anxiety		0.209**		0.160**		0.193**		0.205**
ECR-R Avoidance		-0.004		-0.043		0.017		0.058
Total R ²	0.374		0.316		0.350		0.165	
n	328		328		328		328	

ASI-Total $F(4, 324) = 48.39, p < .0001$

ASI-Physical $F(4, 324) = 37.46, p < .0001$

ASI-Psychological $F(4, 324) = 43.66, p < .0001$

ASI-Social $F(4, 324) = 15.98, p < .0001$

ASI Anxiety Sensitivity Index, STAI-T State Trait Anxiety Inventory–Trait Scale, ECR-R Experiences in Close Relationships Inventory

** .01, *** < .0001

attachment Anxiety and Avoidance as well as mother, father, and peer Alienation would be significant predictors of panic symptoms. However, these results offer further evidence for the differentiation of trait anxiety from anxiety sensitivity and their distinct ability to predict panic symptoms in a nonclinical general population.

Discussion

This study examined the relationship between attachment and anxiety sensitivity. The initial impetus was to extend the work of Weems et al. (2002), and Watt et al. (2005) who examined the relationship between attachment and anxiety sensitivity.

Table 5 Summary of hierarchical regression analyses predicting anxiety sensitivity I total, ASI-physical concerns, ASI-psychological concerns, and ASI-social concerns using IPPA Alienation scale scores

Predictor	ASI-Total		ASI-Physical		ASI-Psychological		ASI-Social	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	0.026		0.044		.000		0.017	
Sex		0.042		0.097		-0.109		0.069
Step 2	0.310		0.251		.312		0.114	
STAI-T		0.542***		0.503***		0.544***		0.295**
Step 3	0.009		0.005		0.014		0.010	
IPPA-MA		-0.038		-0.045		-0.064		0.030
IPPA-FA		0.069		0.059		0.076		0.039
IPPA-PA		0.072		0.038		0.091		0.076
Total R ²	0.346		0.300		0.325		0.141	
n	323		323		323		323	

ASI-Total $F(5, 318) = 33.66, p < .0001$

ASI-Physical $F(5, 318) = 27.24, p < .0001$

ASI-Psychological $F(5, 318) = 30.69, p < .0001$

ASI-Social $F(5, 318) = 10.45, p < .0001$

ASI Anxiety Sensitivity Index, STAI-T State Trait Anxiety Inventory–Trait Scale, ECR-R Experiences in Close Relationships Inventory, Inventory of Parents and Peer Attachment (IPPA)-Alienation Subscales for Mother (IPPA-MA), Father (IPPA-FA), and Peers (IPPA-PA)

*** < .0001

Table 6 Hierarchical Multiple regression analysis examining the incremental contribution of trait anxiety, anxiety sensitivity and attachment anxiety and avoidance in predicting panic disorder severity scale scores

Variable	ΔR^2	B	SE	β
Step 1	0.019			
Sex		0.155	0.441	0.017
Step 2	0.189			
Trait Anxiety		0.091**	0.026	0.234
Step 3	0.101			
Anxiety Sensitivity		0.169***	0.025	0.399
Step 4	0.000			
ECR-R-Anxiety		-0.097	0.224	-0.026
ECR-R-Avoidance		-0.015	0.190	-0.004
Total R ²	0.310			
F(5, 323)	29.04***			

N = 329. Sex (0 = Male, 1 = Female); *ASI* = Anxiety Sensitivity Index, *STAI-T* State Trait Anxiety Inventory–Trait Scale, *ECR-R* Experiences in Close Relationships Inventory, Inventory of Parents and Peer Attachment (IPPA)-Alienation Subscales for Mother (IPPA-MA), Father (IPPA-FA), and Peers (IPPA-PA)

** .0004, *** < .0001

This study compared participants' responses: across four attachment groups derived from the ECR-R and across IPPA Alienation attachment for parents and peers. Like Watt et al. (2005), this study replicated and extended the Weems et al. (2002) study by including the two different attachment measures: the ECR-R and the IPPA. Conceptually the ECR-R

Table 7 Hierarchical multiple regression analysis examining the incremental contribution of trait anxiety, anxiety sensitivity and attachment variables in predicting panic disorder severity scale scores

Variable	ΔR^2	B	SE	β
Step 1	0.014			
Sex		0.091	0.454	0.010
Step 2	0.193			
STAI-T		0.086**	0.025	0.216
Step 3	0.113			
ASI		0.181***	0.024	0.423
Step 4	0.006			
IPPA-MA		0.044	0.050	0.046
IPPA-FA		-0.058	0.042	-0.069
IPPA-PA		-0.033	0.056	-0.031
Total R ²	0.325			
F(6, 317)	25.40***			

N = 324. Sex (0 = Male, 1 = Female); *ASI* Anxiety Sensitivity Index, *STAI-T* State Trait Anxiety Inventory–Trait Scale, *ECR-R* Experiences in Close Relationships Inventory, Inventory of Parents and Peer Attachment (IPPA)-Alienation Subscales for Mother (IPPA-MA), Father (IPPA-FA), and Peers (IPPA-PA) ** .0006, *** < .0001

measures attachment from the perspective of bonds that one might develop with a romantic interest while the IPPA examines attachment from the perspective that one holds toward their relationship with parents and peers. It was also important to include a measure of trait anxiety to partial out any potential overlap among trait anxiety and anxiety sensitivity or attachment measures. The current study provides additional support for the idea that securely and insecurely attached individuals differ in terms of their levels of anxiety sensitivity as measured by the Anxiety Sensitivity Index. Thus, our findings support and strengthen the research of Weems et al. (2002) and Watt et al. (2005) that found that insecurely attached individuals demonstrated significantly higher levels of anxiety sensitivity than securely attached individuals by extending the research to two additional attachment measures.

The Relationship between Anxiety Sensitivity Scores and Attachment Categories

The initial hypotheses tested, supported and strengthened the work of Weems et al. (2002) and Watt et al. (2005). Since there was an expectation based upon previous research (Watt et al. 2005; Weems et al. 2002) that there would be differences between attachment groups in anxiety sensitivity this study used a priori planned comparisons to test these relationships. First, a test between secure and combined insecure groups (Fearful and Preoccupied) demonstrated significant differences. Second, planned comparisons also revealed differences between Secure and Fearful and Secure and Preoccupied groups separately. These results cohere with previous findings (Watt et al. 2005; Weems et al. 2002) and show higher ASI mean scores for Fearful as compared to Secure groups. Further, additional planned comparison revealed a significant difference between the combined Secure and Dismissive attachment groups and a combined Fearful group (Fearful and Preoccupied). These analyses validate and further highlight the consistency of these finding now across multiple samples using different attachment measures.

In terms of the IPPA-Alienation scales, high levels of attachment alienation produced correspondingly higher levels of anxiety sensitivity across both parents and peer ratings. These results support the work of Scher and Stein (2003) who found that exposure to parental threatening and rejecting behaviors (similar to what the IPPA alienation subscale assesses) predicted anxiety sensitivity and was differentially related to ASI factors. Scher and Stein also noted that anxiety sensitivity mediated the relationship between parenting and current emotional distress as well as a history of psychological disorder symptoms. Eng and Heimberg (2006) found that individuals diagnosed with GAD reported less secure attachment to parents than controls, and this was linked to elevated alienation scores. Viana and Rabian (2008)

found significant positive relationships between anxiety sensitivity and IPPA-Alienation scores for parents and peers. Hale et al. (2006) in a study of 1106 adolescents found that perceived parental rejection and alienation were the two strongest predictors of GAD symptom scores. Exploring psychological outcomes related to the IPPA attachment security, Papini et al. (1991) noted an inverse relationship between social anxiety and attachment security. While this study did not measure symptoms of worry significant differences were evidenced on panic symptoms across mother and peer alienation. Additional analyses that focused solely on the IPPA alienation dimensions revealed significant differences across low, medium, and high alienation groups and anxiety sensitivity for both parents and peers.

How Well did the ECR-R Anxiety and Avoidance Dimension Predict Anxiety Sensitivity?

Weems et al. (2002) reported that the Model of Self (Anxiety) predicted anxiety sensitivity when controlling for anxiety symptoms and psychological distress as measured by the SCL-90. Likewise Watt et al. (2005) demonstrated that attachment anxiety predicted anxiety sensitivity when controlling for STAI trait anxiety. The current results mirror those of Weems et al. (2002) and Watt et al. (2005) for ECR-R Anxiety. ECR-R Anxiety remained statistically significant across the total score and the three ASI subscales after controlling for trait anxiety. In contrast, ECR-R Avoidance was not significant when added to the regression equation for any of the anxiety sensitivity measures when trait anxiety was controlled. It is likely that the ECR-R Avoidance measure may be more highly related to trait anxiety than once thought.

These results demonstrate that ECR-R Anxiety attachment accounts for (unique variance) in anxiety sensitivity in separate studies and are most consistent with Watt et al. (2005) who demonstrated that “Model of Self” (referenced as Anxiety in this study) predicted 9% of the unique variance in anxiety sensitivity total scores compared to these results which predicted a much weaker 2.7% of the variance in anxiety sensitivity scores.

Weems et al. (2002) suggested that Model of Self (Anxiety) and Model of Others (Avoidance) would be distinctively associated with anxiety sensitivity. Further, Watt et al. (2005) found a significant correlation between Model of Others and ASI-Psychological concerns when statistically controlling for trait anxiety and also found that Model of Others significantly predicted ASI-Psychological concerns through regression analysis. The results obtained here provide no support for ECR-R Avoidance (Model of Others) as a predictor of ASI total score or any of its subscales. Thus, this study provides no support for Weems et al. (2002) suggestion that there is a differential association between attachment dimensions measured with the ECR-R and any measure of anxiety sensitivity.

By comparison the results of this study show that ECR-R Anxiety displays a unique and distinct ability to predict ASI scores. These findings show that attachment anxiety plays a unique but limited role in predicting anxiety sensitivity that has now been demonstrated in at least three different studies. When one considers the relationships among the attachment variables and anxiety sensitivity once trait anxiety had been removed from these relationships only the relationships between ASI and ECR-R Anxiety consistently retained significance with small effect sizes. These persistently small partial correlations and standardized beta coefficients support a unique contribution to the multidimensional understanding of anxiety sensitivity. Bowlby’s (1977, p. 203) assertion that the attachment system unfolds and exemplifies human behaviors “from the cradle to the grave” is a strongly held tenet suggesting that the individual’s representational model (Model of Self-Anxiety and Model of Others-Avoidance) established in childhood continues to be influential throughout adulthood.

How Well did Attachment Variables Predict Panic Symptoms?

Regression findings revealed that the best predictors of panic symptoms are trait anxiety and anxiety sensitivity. Attachment variables did not significantly predict panic symptoms. Moreover, when the standardized betas related to anxiety sensitivity and trait anxiety are examined it suggests that anxiety sensitivity’s magnitude of effect was nearly twice that of trait anxiety. ASI scores were a more powerful predictor of panic symptoms than trait anxiety. As a consequence these results further strengthen the role that anxiety sensitivity plays in predicting panic symptoms and potentially panic disorder. While much has been written about the relationship between attachment and the development of both depression and anxiety conditions there was a disappointing lack of support for that linkage with these data. (Eng et al. 2001; Warren et al. 1997). Nevertheless, while attachment variables were not useful in predicting panic symptoms they may play a stronger role in predicting worry and generalized anxiety symptoms (Eng and Heimberg 2006; Hale et al. 2006; Newman et al. 2013) or symptoms related to social anxiety (Eng et al. 2001; Papini et al. 1991; Parade et al. 2010).

Limitations

This study is not without its limitations. First, because the data is cross-sectional in nature causal relations among the variable cannot be made. It would be important, as it was with behavioral inhibition (Kagan et al. 1987), to observe the interplay between anxiety sensitivity and attachment over time. Second, there were no markers of relationship status and relationship characteristics (e.g., satisfaction or commitment) included

which are variables that have been predictive of attachment in the early stages of relationships (see Davila and Bradbury 2001 and Davila et al. 1999). Third, while the diversity of the sample matched the demographic composition of the institution where the data was collected it is clear that greater racial diversity is needed to clarify the potential confounds that may arise from ethnic/cultural or racial differences (Sherry et al. 2013).

Finally, these data add to the literature and results obtained by Weems et al. (2002) and Watt et al. (2005) extending their previous findings of anxiety sensitivity differences across attachment styles to two additional attachment measures. These data also suggest that attachment avoidance (Model of Others) has a limited role in predicting anxiety sensitivity or panic-related symptomatology. While attachment theory primarily grew out of the psychoanalytic tradition (Shaver and Mikulincer 2005), Bowlby (1977) unequivocally stated that attachment theory is primarily rooted in ethological principles. As such it becomes important to examine more carefully the similarities and differences between attachment and anxiety sensitivity through laboratory studies and further refinement of both attachment and anxiety sensitivity measures. Further refinements in measurement will enable researchers and clinicians to develop a more complete understanding of how attachment, social behavior, anxiety sensitivity, trait anxiety and various types of anxiety disorders are developed and maintained.

Compliance with Ethical Standards

Funding This study received no internal or external funding.

Conflict of Interest Author A declares that he/she has no conflict of interest. Author B declares that he/she has no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent: Informed consent was obtained from all individual participants included in the study.

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