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# Anxiety sensitivity: Relations to psychopathy, DSM-IV personality disorder features, and personality traits

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## Abstract

Relatively few data are available concerning the relations between anxiety sensitivity (AS) and both abnormal and normal personality traits. In particular, little is known about the associations between AS and personality disorders, although Shostak and Peterson [Behav. Res. Ther. 28 (1990) 513.] hypothesized that AS would be negatively correlated with antisocial personality disorder (ASPD) and perhaps related conditions (e.g., psychopathy). We examined the relations between AS, as assessed by the AS Index (ASI), and measures of psychopathy/ASPD, personality disorder features, and personality traits in a sample of 104 undergraduates. The ASI was not significantly associated with global measures of psychopathy or ASPD, although it was negatively correlated in some cases with the core affective deficits of psychopathy. In addition, the ASI was positively correlated with features of several Clusters B (e.g., borderline) and C (e.g., dependent) personality disorders and with features of passive-aggressive personality disorder. In addition, the ASI was positively associated with measures of several normal-range personality traits, including trait anxiety, alienation, well being, Negative Emotionality, and Constraint. Some, although not all, of the abnormal and normal personality correlates of the ASI were attributable to the variance shared by the ASI with trait anxiety measures. Implications and limitations of the present findings for the correlates and etiology of AS are outlined. © 2001 Elsevier Science Inc. All rights reserved.

*Keywords:* Anxiety; Psychopathy; Personality; Personality disorder; Trait; Panic Disorder

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## 1. Introduction

The construct of anxiety sensitivity (AS) is hypothesized to reflect relatively stable individual differences in the fear of anxiety (Reiss, 1991). Individuals with elevated levels of AS are posited to harbor beliefs that anxiety symptoms (e.g., a rapid heart beat) have adverse consequences (e.g., a heart attack). Such individuals have been found to exhibit elevated rates of a number of anxiety disorders, particularly panic disorder (McNally, 1990, 1996), and to be susceptible to marked anxiety reactions following biological challenge procedures (e.g., hyperventilation and carbon dioxide inhalation; see McNally, 1996, for a review). In addition, evidence from several longitudinal investigations (e.g., Maller & Reiss, 1992; Schmidt, Lerew, & Jackson, 1997) suggests that AS is a predictor of subsequent panic attacks in nonclinical samples. In the adult literature, AS has generally been assessed by the AS Index (ASI), a self-report instrument measuring the extent to which individuals report being frightened by their own anxiety sensations (Reiss, Peterson, Gursky, & McNally, 1986).

Although the relation of AS to anxiety disorders has received increasing attention in recent years (see Taylor, 1999 for a review), relatively little is known concerning the associations between AS and either personality disorders or normal-range personality traits. As a consequence, little information is available concerning the links between AS and the broader personality domain. Data regarding the personality correlates of AS are important for at least three reasons (see also Lilienfeld, 1999).

First, such information may lead to a better understanding of how AS maps onto the factor space defined by higher-order and lower-order personality dimensions. Because at least some higher-order personality dimensions can be conceptualized as “source traits” (Cattell, 1950), i.e., broad underlying traits that give rise to narrower and more specific “surface traits” or lower-order dimensions, a better understanding of the relation of AS to higher-order dimensions may provide important clues regarding the etiology of AS.

Second, higher-order and lower-order personality dimensions can sometimes provide competing explanations for hypotheses in the personality domain (Watson & Clark, 1992). If an investigator proposes a hypothesis concerning the relation between a lower-order dimension and external criteria but neglects to include a measure of the higher-order dimension on which this lower-order dimension loads, the investigator may mistakenly conclude that this hypothesis has been corroborated. But in fact, the observed relation may be attributable to the influence of the unmeasured higher-order dimension (e.g., see Watson & Pennebaker, 1989 for an illustration of how the association between stressful life events and self-reported health complaints appears to be mediated by the higher-order dimension of Negative Emotionality). Consequently, an examination of higher-order dimensions can provide valuable information concerning whether the personality correlates of AS are specific to AS per se.

Third, data on the relation between AS and personality traits can provide helpful information concerning potential personality risk factors for AS. Although such data are correlational and therefore do not permit definitive causal inferences regarding the association between personality traits and AS, they can be useful for generating hypotheses to be tested in longitudinal studies, which may be better suited for drawing cause-and-effect inferences.

### *1.1. AS and normal-range personality traits*

Several investigators have recently begun to examine the relations between AS and normal-range personality traits (see Lilienfeld, 1999 for a review). All of the studies conducted thus far have relied exclusively on self-report indices of personality. At the lower-order level, the most consistent finding is that AS is moderately associated with trait anxiety, i.e., a propensity to respond anxiously to stressors (Borger, Cox, Fuentes, & Ross, 1996; Lilienfeld, Turner, & Jacob, 1993). This moderate correlation led Lilienfeld, Jacob, and Turner (1989) to suggest that a number of findings previously attributed to AS per se, such as the association between AS and panic disorder (Taylor, Koch, & McNally, 1992), might be due to trait anxiety. Nevertheless, there is compelling evidence that the ASI possesses incremental validity (Meehl, 1959) above and beyond measures of trait anxiety in the prediction of a number of clinically relevant phenomena, including panic disorder, panic attacks, and anxiety responses to hyperventilation (e.g., Brown & Cash, 1990; McNally, 1989; Rapee & Medoro, 1994; Schmidt et al., 1997). Thus, the ASI possesses reliable variance that is not shared with trait anxiety, although the nature and correlates of this unique variance are unclear. Some researchers (e.g., Lilienfeld et al., 1993) have conjectured that AS is a lower-order trait nested hierarchically within a higher-order trait anxiety dimension, although this possibility has received relatively little systematic examination. If so, one would expect AS and trait anxiety measures to be moderately correlated but AS measures to possess both unique variance and unique psychological correlates above and beyond trait anxiety measures. Because of the moderate covariation between AS and trait anxiety, it is important for researchers to examine the extent to which the correlates of AS are attributable to AS per se as opposed to trait anxiety.

A recent investigation of 220 undergraduates (Lilienfeld, 1997, 1999) provides further information regarding the lower-order and higher-order personality correlates of AS. Lilienfeld found that several measures of AS, including the ASI, were significantly, although modestly, correlated with the lower-order dimension of absorption. In addition, absorption was significantly and positively correlated with panic attack history. Absorption is a tendency to become immersed in sensory or imaginative experiences and has been found to be associated with hypnotic susceptibility (e.g., Council, Kirsch, & Hafner, 1986; Tellegen & Atkinson, 1974). Lilienfeld (1997) hypothesized that elevated absorption levels could make individuals more attuned to unpleasant and potentially frightening

internal sensations and thereby heighten their risk for anxiety disorders (e.g., panic disorder) associated with a hypersensitivity to interoceptive cues.

Lilienfeld (1997, 1999) also found that AS measures were positively correlated with the lower-order trait of alienation, which is a propensity to mistrust others and to perceive malevolent intent in others' actions (Tellegen, 1978/1982). Partial correlation analyses controlling for trait anxiety, however, suggested that these correlations were largely attributable to the variance shared by trait anxiety and alienation.

At the higher-order level, AS has been found to be associated with the dimension of Negative Emotionality (Arrindell, 1993; Lilienfeld, 1997). Negative Emotionality is related to, although broader than, the Eysenck's (1975) construct of neuroticism and is a propensity to experience negative affects of many kinds (e.g., anxiety, guilt, anger, and mistrust; Tellegen & Waller, 1994). Both trait anxiety and alienation are lower-order markers of Negative Emotionality (Tellegen, 1978/1982).

In analyses of the undergraduate data set mentioned earlier, Lilienfeld (1999) found that the ASI, but not other AS measures, was significantly correlated with the higher-order dimension of Constraint, although this correlation was weak in magnitude ( $r = .18$ ). Constraint is a fearfulness or response inhibition dimension that is largely orthogonal to Negative Emotionality (Tellegen & Waller, 1994). Lilienfeld et al. (1993) conjectured that because Constraint is hypothetically associated with a sensitivity to threat cues (Tellegen, 1978/1982), individuals with high levels of this dimension might be particularly susceptible to developing fears of their own anxiety symptoms. Nevertheless, the low correlations between AS indices and Constraint reported by Lilienfeld call this hypothesis into question.

The relation between AS measures and extraversion also requires clarification. In a study of 94 psychiatric outpatients, Arrindell (1993) reported no significant associations between AS indices and Extraversion, as measured by the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975). In contrast, in an investigation of 320 undergraduates, Borger et al. (1996) reported that the ASI was significantly and negatively associated ( $r = -.26$ ) with Extraversion, as assessed by the Neuroticism-Extraversion-Openness Personality Inventory-Revised (Costa & McCrae, 1992), a measure of the "Big Five" taxonomy of personality traits (see Goldberg, 1993). The reasons for the discrepancy between Arrindell's findings and those of Borger et al. are unclear.

### *1.2. AS, psychopathy, and Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) personality disorders*

There appears to be no published data concerning the relation between AS and personality disorders. Nevertheless, the results of several investigations provide intriguing suggestions regarding the association between AS and certain personality disorders. On the basis of findings indicating that low AS individuals

responded to a challenge procedure (a difficult mental arithmetic task) with normal levels of physiological arousal but with little or no apparent perception of this arousal, Shostak and Peterson (1990) hypothesized that low AS individuals were prone to antisocial personality disorder (ASPD), a condition characterized by a chronic history of illegal, irresponsible, and often criminal behavior (e.g., stealing, vandalism, and physical aggression). According to Shostak and Peterson, “Under some conditions, low (anxiety) sensitivity may relate to ASPDs. If physiological arousal is not viewed as negative and/or is not processed and poor moral development or antisocial value development is present, there will be a failure to inhibit antisocial behavior” (p. 520). Peterson (1991, personal communication) similarly conjectured that psychopathic personality (psychopathy) is associated with abnormally low levels of AS. In addition, Cox, Borger, and Enns (1999), although not explicitly discussing the association between AS and psychopathy, noted that low AS individuals were often observed during interviews to be bored and indifferent. Although such reactions may stem from a variety of sources, it is worth noting that boredom proneness is commonly, although not exclusively, associated with psychopathy (Hare, 1991; Lilienfeld & Andrews, 1996).

Although ASPD and psychopathy are overlapping syndromes, the former is operationalized primarily in terms of antisocial and criminal behaviors, whereas the latter is operationalized primarily in terms of personality traits, such as lack of guilt, callousness, failure to form close emotional attachments to others, physical risk taking, boredom proneness, propensity to externalize blame, and superficial charm (Cleckley, 1941/1988; Hare, Hart, & Harpur, 1991; Lilienfeld, 1994). Indeed, factor analyses of global psychopathy measures have typically yielded two moderately correlated dimensions, the first of which (Factor 1) is associated primarily with the core affective traits of psychopathy (e.g., guiltlessness, lack of empathy, and narcissism) and the second of which (Factor 2) is associated primarily with antisocial and illegal behaviors (Harpur, Hare, & Hakstian, 1989).

With respect to features of other personality disorders, Stewart, Knize, and Pihl (1992) found that the ASI was significantly correlated with a measure of interpersonal dependency in a mixed sample of undergraduates and panic disorder patients (see also Borger et al., 1996 for data suggesting an association between the ASI and interpersonal dysfunction). These data suggest that the ASI might correlate positively with features of dependent personality disorder, a condition characterized by intense dependence on others and a willingness to subordinate one’s needs to others’ demands (American Psychiatric Association, 1994).<sup>1</sup> More broadly, the moderate association between AS measures and both Axis I anxiety disorders and trait anxiety indices (Lilienfeld et al., 1989;

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<sup>1</sup> In this manuscript, we use the term “features” to refer to both signs and symptoms of psychopathological conditions. Thus, the phrase “features of disorder *X*” refers to the number of signs and symptoms of disorder *X* exhibited by participants.

McNally, 1996) might lead one to expect the former measures to be associated with features of other Cluster C (anxious and fearful) personality disorders in the DSM-IV (APA, 1994), which in addition to dependent personality disorder are avoidant and obsessive-compulsive personality disorders.

### *1.3. Goals of the present study*

The present investigation, which like several other recent investigations of the personality correlates of AS (Borger et al., 1996; Lilienfeld, 1997, 1999), was conducted with undergraduates, was undertaken to examine in greater detail the relations between the construct of AS, as assessed by the ASI, and indices of personality disorders and personality traits. Although undergraduate samples are characterized by several disadvantages, such as a potentially restricted range on measures of psychopathy and perhaps other personality disorders, these samples have the advantage of being relatively free of severe Axis I disorders (e.g., major depressive disorder, alcohol dependence), which have been found in some studies to distort the reporting of enduring personality traits and personality disorder features (e.g., see Loranger et al., 1991 for data on state-trait artifacts and their detrimental impact on personality disorder assessment). In addition, as there is increasing evidence that psychopathic personality traits can be meaningfully assessed in nonclinical (e.g., undergraduate) samples (Lilienfeld, 1998), the present investigation afforded an opportunity to examine the relations between AS and psychopathic features in a sample free of the problematic effects (e.g., fatigue, resentment, alienation) of incarceration and institutionalization (see also Widom, 1977).

More specifically, the primary goals our study were fivefold. First, we examined Shostak and Peterson's (1990) hypothesis that AS would be negatively associated with psychopathy, ASPD, or both. If low levels of AS were found to be characteristic of one or both of these syndromes, this would suggest that the relation between AS and maladjustment is curvilinear (Cox et al., 1999), with both high and low AS levels being associated with different forms of psychopathology (anxiety disorders and psychopathy/ASPD, respectively). In view of evidence that psychopathy is multidimensional (Lilienfeld & Andrews, 1996), for exploratory purposes, we also examined the relation between AS and specific components of psychopathy, such as physical fearlessness, callousness, and a tendency to externalize blame (see Measures). In addition, for exploratory purposes, we examined the relation between the ASI and the two primary underlying dimensions of psychopathy (Harpur et al., 1989) in order to clarify whether AS was differentially associated with either the core affective deficits of psychopathy (Factor 1) or its concomitant antisocial and criminal behaviors (Factor 2).

Second, we examined the relations between the ASI and features of DSM-IV personality disorders other than ASPD. Because we used undergraduate participants, we focused on dimensional (i.e., continuous) rather than categorical (i.e., diagnostic) measures of these disorders. Based on previous findings, we predicted

that the ASI would be positively associated with features of Cluster C personality disorders, including dependent personality disorder, but negligibly associated with features of Clusters A (odd and eccentric) and B (dramatic, emotional, and erratic) personality disorders. Exploratory analyses were conducted to examine the relations between the ASI and the two personality disorders listed in the Appendix of DSM-IV, viz., passive–aggressive (negativistic) and depressive personality disorders (APA, 1994).

Third, we examined the relations between the AS and both lower-order and higher-order dimensions of personality in an effort to replicate the findings of Lilienfeld (1997, 1999). Specifically, based on previous findings, we predicted positive associations between the ASI and trait anxiety, absorption, alienation, Negative Emotionality, and Constraint. In addition, for exploratory purposes, we examined the relation between the ASI and other lower-order and higher-order personality traits.

Fourth, as noted earlier, all of the extant data on the personality correlates of AS measures (e.g., Borger et al., 1996; Lilienfeld, 1997) derive from studies using self-report indices. As a consequence, it is difficult to exclude the possibility that findings on the personality correlates of AS are attributable at least partly to method covariance (Campbell & Fiske, 1959). The present investigation represents an attempt to remedy this shortcoming by supplementing data on self-reported personality traits with corroborative personality ratings from peers. Peer data may be especially crucial in the assessment of psychopathic individuals, who often fail to appreciate the impact of their behavior on others (Grove & Tellegen, 1991; Lilienfeld, 1994).

Fifth and finally, we examined the relations between the AS and measures of personality after controlling statistically for measures of trait anxiety. These analyses should shed light on the extent to which both the abnormal and normal personality correlates of AS are attributable to the variance shared by AS and trait anxiety as opposed to the unique variance possessed by AS per se. In addition, these analyses could provide data consistent with a hierarchical model of the relation between AS and trait anxiety (Lilienfeld et al., 1993) by demonstrating that a measure of AS shares unique variance with psychologically meaningful correlates (e.g., measures of personality and personality disorders) above and beyond trait anxiety indices.

## **2. Method**

### *2.1. Participants*

Participants were 114 undergraduates at a large private university in the southeast United States. Ten participants were excluded because of excessive missing data on the ASI (i.e., more than one item), and an additional two participants were excluded because of elevated scores on either of two validity

scales, the Deviant Responding (DR;  $>19$ ) and the Variable Response Inconsistency (VRIN;  $>52$ ) scales of the Psychopathic Personality Inventory (PPI; see Measures), leaving a total of 102 participants for the analyses reported here. Of these remaining participants, 46 were male and 56 were female. Their mean age was 19.33 (S.D. = 2.38). Seventy-four (72.5%) were Caucasian, 13 (12.7%) were African American, 11 (10.8%) were Asian American, and 2 (2%) were Hispanic. The remaining two participants reported their ethnicity as “Other.”

## 2.2. Procedure

Participants completed a packet of self-report measures (see Measures) individually in a private laboratory room. These measures were administered in fixed order. A research assistant was on hand in an adjoining room to clarify potentially ambiguous items. The final self-report measure administered, the Personality Diagnostic Questionnaire, DSM-IV Version (PDQ-4), was taken by each subject on a computer. The Psychopathy Checklist: Screening Version (PCL:SV), which was the sole interview given to participants, was administered by a trained undergraduate or graduate research assistant. Participants also completed a number of laboratory measures assessing sensitivity to threat cues (Lilienfeld et al., 1998), which are not presented here. All participants received course credit in an introductory psychology class in return for their participation.

At the conclusion of the testing session, participants were asked to nominate three individuals to complete ratings on their personality traits and behaviors and to provide these individuals' names and addresses. Participants were asked to nominate individuals (a) who had known them for a long period of time and (b) with whom they were not currently romantically involved. The peer-rating questionnaire was mailed to the first two individuals nominated by the participant and was sent to the third individual only if no other peer-rating questionnaires for that participant had been received. To increase the likelihood that the peers would constitute a relatively homogeneous group (e.g., friends and roommates), personality rating packets were not mailed to the relatively small number of nominated peers who lived out of town. Peers were assured of the confidentiality of their responses in a letter mailed along with the personality rating packet and they returned their completed packets by mail via a self-addressed stamped envelope. Peers were paid US\$2 for their participation. At least one peer rating was obtained for 63 of the 102 participants (62%).<sup>2</sup> For participants in which two peer ratings were received, responses were averaged.

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<sup>2</sup> Participants for whom peer ratings were unavailable did not differ significantly ( $p < .05$ ) from other participants on age, gender, or ethnicity, on the ASI and PCL:SV, or on any of the self-report measures of psychopathy/ASPD or personality traits. Nevertheless, the former group was significantly more likely to report features of depressive personality disorder (see Measures; point biserial  $r = .22$ ,  $p < .05$ ). Given the large number of correlations examined, however, this correlation may be due to Type I error.



### 2.3. Measures

#### 2.3.1. Assessment of AS and trait anxiety

**2.3.1.1. AS Index.** The ASI (Reiss et al., 1986) is a 16-item questionnaire, consisting of items in a 1–5 Likert-type format, which assesses the extent to which participants report being frightened by their own anxiety symptoms (i.e., a rapid heart beat). As noted earlier, the ASI has demonstrated convergent validity with measures of anxiety disorders, including panic disorder (see McNally, 1996 for a review), as well as predictive validity for future panic attacks in nonclinical samples (e.g., Schmidt et al., 1997). The internal consistency (Cronbach's  $\alpha$ ) of the ASI in this sample was .82.

**2.3.1.2. State-Trait Anxiety Inventory, Trait form (STAI-T).** The STAI-T (Spielberger, Gorsuch, & Lushene, 1970) is a measure of trait anxiety, which consists of 20 items assessing enduring symptoms of anxiety. The STAI-T correlates highly with other self-report measures of Negative Emotionality (Watson & Clark, 1984) and differentiates patients with anxiety disorders from normals (Taylor et al., 1992). The internal consistency of the STAI-T was .91.

#### 2.3.2. Assessment of psychopathy

**2.3.2.1. Psychopathy Checklist: Screening Version.** The PCL:SV (Hart, Cox, & Hare, 1995) is a semistructured interview designed largely to permit the assessment of psychopathy in nonclinical samples. It consists of 12 items modeled closely after those on the more comprehensive Psychopathy Checklist-Revised (PCL-R), which is the most extensively validated measure of psychopathy (Hare, 1991). Unlike the PCL-R, the PCL:SV does not contain items scored entirely on the basis of file data and is therefore suitable for use outside of prison settings. The PCL:SV total score has been found to exhibit high (0.95 and 0.93) interrater reliabilities in undergraduate males and females, respectively (Forth, Brown, Hart, & Hare, 1996). Furthermore, the PCL:SV has been reported to correlate highly ( $r=.80$ ) with the PCL-R and to be associated in theoretically predicted directions with self-report measures of substance use (Forth et al., 1996) and indices of psychopathy and antisocial behavior (Hart et al., 1995).

Like the PCL-R (see Harpur et al., 1989), the PCL:SV yields both a total score and scores on two factor analytically derived scales. Factor 1 (“emotional detachment”; Patrick, Bradley, & Lang, 1993) comprises such traits as absence of remorse, callousness, and egocentricity and assesses many of the core personality features of psychopathy as delineated by Cleckley (1941/1988) in his classic description of psychopathy. Factor 2 (“antisocial behavior”; Patrick et al., 1993) comprises chronic irresponsible and illegal behaviors, such as early

conduct problems and adult legal offenses, and assesses many of the features of DSM-IV ASPD (APA, 1994).

Research assistants were trained in the administration of the PCL:SV by the first author. PCL:SV training involved (a) familiarization with the characteristics of psychopathy as delineated by Cleckley (1941/1988), (b) observing and scoring six videotapes (five students, one prisoner) who had been administered the PCL:SV, and (c) reviewing these scores with the first author and other interviewers being trained on the PCL:SV. The internal consistency of the total PCL:SV score was .72; the internal consistencies of PCL:SV Factors 1 and 2 were .62 and .46, respectively. In addition, in the present sample, the total score on the PCL:SV correlated ( $r = .46, p < .001$ ) with the total scores on all three (sic) other self-report measures of psychopathy (viz., the PPI, Self-Report Psychopathy Measure-II (SRP), and Primary Psychopathy Scale; see below), providing evidence for its convergent validity. In contrast, the PCL:SV total score was essentially uncorrelated ( $r = .05, ns$ ) with peer-rated Cleckley psychopathy (see below).

*2.3.2.2. Psychopathic Personality Inventory.* The PPI was developed by Lilienfeld (1990) to assess the principal personality traits of psychopathy as described by Cleckley (1941/1988) and others, including guiltlessness, callousness, dishonesty, manipulativeness, absence of anxiety, risk taking, and superficial charm. It consists of 187 items measured on a four-point Likert-type scale. In addition to a total score, which is interpretable as an index of global psychopathy, the PPI consists of eight factor-analytically developed subscales assessing various components of psychopathy. The PPI Stress Immunity subscale was of particular relevance to the present study, as it appears to be a measure of trait anxiety in reverse (Lilienfeld & Andrews, 1996). The eight subscales of the PPI, along with one sample item from each subscale, are:

*Machiavellian Egocentricity* (30 items) ["I always look out for my own interests before worrying about those of the other guy" (True)]

*Social Potency* (24 items) ["Even when others are upset with me, I can usually win them over with my charm" (True)]

*Coldheartedness* (21 items) ["I have had 'crushes' on people that were so intense that they were painful" (False)]

*Fearlessness* (19 items) ["Making a parachute jump would really frighten me" (False)]

*Impulsive Nonconformity* (17 items) ["I sometimes question authority figures 'just for the hell of it'" (True)]

*Blame Externalization* (18 items) ["I usually feel that people give me the credit I deserve" (False)]

*Carefree Nonplanfulness* (20 items) ["I often make the same errors in judgment over and over again" (True)]

*Stress Immunity* (11 items) [“I can remain calm in situations that would make many other people panic” (True)].

Following the principal component analyses of Wilson, Frick, and Clements (1999; see also Lilienfeld, 1990 for factor analyses yielding comparable results), the eight subscales of the PPI were assigned to higher-order dimensions representing Factors 1 and 2, respectively. Specifically, Social Potency, Coldheartedness, Fearlessness, Impulsive Nonconformity, and Stress Immunity were combined into a PPI Factor 1 score, while Machiavellian Egocentricity, Blame Externalization, and Carefree Nonplanfulness were combined into a PPI Factor 2 score (Wilson et al., 1999). These two factors were used to operationalize the core affective deficits of psychopathy and its associated antisocial behaviors, respectively. Although PPI Factor 2 does not consist of items explicitly assessing antisocial behaviors, it appears to be associated with poor impulse control and other Factor 2 characteristics (see Lilienfeld & Andrews, 1996).

The PPI also contains several validity scales, two of which were used to exclude participants with questionable protocols (see Participants). The first, the DR scale, consists of 10 items with extremely low endorsement frequencies and was designed to assess malingering and careless or random responding. This scale was designed to be relatively independent of psychopathology in that it consists of items that, although bizarre, are not characteristic of any known form of psychological disturbance (e.g., “When I am under stress, I sometimes see large, red, rectangular shapes moving in front of my eyes”). The second, the VRIN scale, which was modeled after Tellegen’s (1978/1982) VRIN scale, consists of item pairs with relatively high ( $r > .30$ ) intercorrelations. Scores on this scale are obtained by taking the absolute value of the difference between the items in each pair and summing across pairs. The VRIN scale is designed to detect careless or inconsistent responding (see Tellegen, 1988).

The PPI total score correlates moderately to highly with self-report, structured interview and peer-rated measures of antisocial behavior and psychopathy, including the PCL-R (Lilienfeld & Andrews, 1996; Poythress, Edens, & Lilienfeld, 1998), as well as with self-report and peer-rated measures of personality traits relevant to psychopathy (e.g., physical risk taking and absence of social anxiety; Lilienfeld & Andrews, 1996). The PPI total score also possesses incremental validity above and beyond a number of commonly used measures of psychopathy and antisocial behavior in the prediction of both peer-rated and interviewer-rated Cleckley (1941/1988) psychopathy (Lilienfeld & Andrews, 1996). The internal consistency of the PPI total score was .93, and the internal consistencies of the PPI subscales ranged from .76 to .91.

**2.3.2.3. Self-Report Psychopathy Scale-II.** This 60-item measure was developed by Hare et al. (see Hare, 1985) to be a self-report analogue of the PCL-R. It was

devised using a combination of rational, internal consistency and empirical approaches (the latter using total scores on the PCL, the precursor of the PCL-R, as a criterion). Like the PCL-R, the SRP-II consists of two factors. Because the items on these two factors were selected only if they correlated highly with one of the two factors of the PCL, these factors comprise only a small portion of the SRP-II item pool. SRP-II Factor 1 (nine items) assesses callousness, guiltlessness, and other core affective features of psychopathy, whereas SRP-II Factor 2 (13 items) assesses a chronic antisocial lifestyle.

The SRP-II correlates moderately and positively with the PCL:SV total score (Forth et al., 1996) and with self-report indices of empathy (negatively) and narcissism (positively; Zagon & Jackson, 1994). The internal consistency of the SRP-II total score was .91, while the internal consistencies of SRP-II Factors 1 and 2 were .59 and .72, respectively.

*2.3.2.4. Primary Psychopathy Scale.* This 16-item measure was developed by Levenson, Kiehl, and Fitzpatrick (1995) to assess the core emotional deficits of psychopathy in noninstitutionalized samples and was designed as a self-report analogue of Factor 1 of the PCL-R.<sup>3</sup> Levenson et al. reported that the Primary Psychopathy Scale correlated positively and significantly with several components of sensation seeking and negatively and significantly with a measure of harm-avoidance. The internal consistency of the Primary Psychopathy Scale was .87.

*2.3.2.5. Peer-rated Cleckley psychopathy.* The questionnaire packet sent to peers contained a 20-item measure of Cleckley psychopathy adapted from the work of Harkness (1992). Peers were instructed to complete each item if possible but to leave an item blank if they had “no idea” whether it applied to the person being rated. This measure correlates moderately and significantly with self-report indexes of psychopathy, including the PPI (Lilienfeld & Andrews, 1996). The internal consistency of the peer-rated Cleckley Psychopathy Scale was .76.

### *2.3.3. Assessment of features of other personality disorders*

*2.3.3.1. PDQ-4 (Hyler, 1996).* This self-report measure, which was administered by computer, assesses the DSM-IV criteria for the 10 personality disorders listed in the text of DSM-IV (including ASPD), as well as two additional personality disorders listed in the Appendix of DSM-IV, viz., passive-aggressive and depressive personality disorders. The scales of the PDQ-4's predecessor, the PDQ-R (Hyler & Reider, 1987), which was designed to assess the DSM-III-R criteria for personality disorders, have generally demonstrated moderate convergent validity with structured interview diagnoses

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<sup>3</sup> Levenson et al. (1995) also developed a Secondary Psychopathy Scale that was designed as a self-report analogue of Factor 2 of the PCL-R, but this scale was not administered in the present study because of time constraints.

of personality disorders (Hyler, Skodol, Kellman, Oldham, & Rosnick, 1990; Hyler, Skodol, Oldham, Kellman, & Doidge, 1992). Nevertheless, a recently published paper suggests that the convergent validity of the PDQ-4 with structured interview diagnoses is questionable except for the antisocial and dependent personality disorder scales (Fossati et al., 1998). Moreover, because the PDQ-R yields a large number of false positives when structured interviews are used as the “criterion,” this measure is better viewed as a screening device than as a diagnostic measure. As a consequence, the PDQ-4 scales, including the ASPD scale, were not used to generate categorical diagnoses of personality disorders and were analyzed using dimensional (i.e., continuous) scores only.

#### *2.3.4. Assessment of normal-range personality traits*

##### *2.3.4.1. Multidimensional Personality Questionnaire-Short Form (MPQ-SF).*

The scales of the MPQ-SF were developed by Tellegen (1978/1982) to approximate the scales of the full (300 item) MPQ. The MPQ-SF consists of 33 items, with three items for each of the 11 MPQ lower-order scales (see next paragraph). Scores on the three higher-order scales were calculated by unit weighting and summing scores on the lower-order scales that load most highly on each higher-order dimension (see Tellegen, 1978/1982). The full MPQ scales have demonstrated a promising pattern of convergent and discriminant correlations with peer ratings of personality (Tellegen & Waller, 1994) and theoretically meaningful relations with the MMPI clinical scales (DiLalla, Gottesman, Carey, & Vogler, 1993; see Tellegen & Waller, 1994 for additional construct validity data on the MPQ).

The MPQ contains 11 lower-order scales derived from item-level factor analyses. Well-being, Achievement, Social Potency, and Social Closeness (the latter two scales assess different components of extraversion) load primarily on Positive Emotionality. Stress Reaction, Alienation, and Aggression load primarily on Negative Emotionality. Harmavoidance, Control (vs. Impulsiveness), and Traditionalism load primarily on Constraint. Absorption does not load primarily on any single higher-order factor (Tellegen, 1978/1982). The Stress Reaction scale is a measure of anxiety proneness and was used in this study as an alternative index of trait anxiety.

The MPQ also consists of three largely uncorrelated higher-order dimensions derived from factor analyses of the 11 lower-order dimensions: Positive Emotionality, Negative Emotionality, and Constraint, which correspond to the “Big Three” dimensions identified in many omnibus personality measures (Waller, Lilienfeld, Tellegen, & Lykken, 1991). The constructs of Negative Emotionality and Constraint were described in Introduction. The construct of Positive Emotionality reflects a propensity to experience positive affects of many kinds (e.g., emotional well-being, social intimacy) and is related to, although broader than, Eysenck and Eysenck’s (1975) extraversion construct.

The MPQ-SF lower-order and higher-order scales exhibit a theoretically meaningful pattern of correlations with the PPI subscales and with MMPI measures of psychopathy (Lilienfeld, 1996; Lilienfeld & Andrews, 1996). The internal consistencies of the three MPQ-SF higher-order factors ranged from .64 to .79, while the internal consistencies of the 11 MPQ-SF lower-order factors ranged from .53 to .75.

*2.3.4.2. Peer MPQ-SF.* The personality packet mailed to peers also contained 33 items modeled closely after those on the self-report MPQ-SF and similarly yielded information on the 11 lower-order and 3 higher-order dimensions of the MPQ. As in the case of the peer-rated Cleckley Psychopathy Scale, respondents were encouraged to answer all items but to leave an item blank if they had “no idea” whether the item applied to the person being rated. Because of excessive missing data (one or more items missing for the majority of participants), data on the MPQ Absorption scale were omitted from the analyses.<sup>4</sup> The Peer MPQ-SF scales have been reported to correlate in theoretically predicted directions with the subscales of the PPI (Lilienfeld & Andrews, 1996). The internal consistencies of the MPQ-SF higher-order scales ranged from .70 to .82. With the exception of the Aggression and Traditionalism scales, whose internal consistencies were .37, the internal consistencies of the Peer MPQ-SF lower-order scales ranged from .50 to .80.

### 3. Results

Because the principal abnormal and normal personality correlates of ASI were with few exceptions similar in males and females, Tables 1–4 present data for both sexes combined. The correlations between the ASI, on the one hand, and measures of psychopathy and ASPD, on the other, are displayed in Table 1. As can be seen in Table 1, all correlations between the ASI, on the one hand, and total psychopathy and ASPD scores, on the other, were low and non-significant. The correlations between the ASI and both the PPI total score and PCL:SV Factor 1 were marginally significant ( $.05 < p < .10$ ), although the latter correlation was in the opposite direction from prediction (i.e., positive).<sup>5</sup> In contrast, the ASI correlated negatively and significantly with the Factor 1 scales

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<sup>4</sup> Complete peer data on the Peer MPQ-SF Absorption scale were available for only 27 participants. Most peers omitted one or more of the three Absorption scale items, presumably because this scale consists of items that are highly inferential and require an intimate knowledge of the target’s internal states (e.g., “His or her thoughts often come as images or pictures, sounds, textures, or smells may have distinctive colors for him or her”).

<sup>5</sup> Subsidiary analyses revealed that the marginally significant negative correlation between the ASI and PPI total score was largely attributable to the inclusion of the Stress Immunity scale within the PPI. When Stress Immunity items were removed from the PPI, the correlation between the ASI and PPI no longer approached significance ( $r = -.10$ ).

Table 1

Zero-order and partial (controlling for STAI-T) correlations between the ASI and measures of psychopathy and ASPD

Measure of psychopathy and ASPD	<i>r</i> (partial <i>r</i> in parentheses)
PCL:SV Total score	.11 (.10)
PCL:SV Factor 1	.18**** (.15)
PCL:SV Factor 2	.03 (.04)
PPI Total score	-.18**** (-.02)
PPI Factor 1	-.37*** (-.13)
PPI Factor 2	.21* (.14)
SRP-II Total score	-.12 (.10)
SRP-II Factor 1	-.44**** (-.22*)
SRP-II Factor 2	.04 (.11)
Primary Psychopathy Scale	.13 (.16)
Peer-rated Cleckley psychopathy	-.03 (.01)
PDQ-IV ASPD Scale	-.10 (-.05)

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

\*\*\*\*  $.05 < p < .10$ .

of both the PPI and SRP-II. The correlation between the ASI and PPI Factor 2 was positive and significant, whereas the correlation between the ASI and SRP-II Factor 2 was negligible.

Table 2 presents the correlations between the ASI and the eight subscales of the PPI. The ASI correlated negatively and significantly with PPI Social Potency, Fearlessness, and Stress Immunity. The correlations with PPI Coldheartedness and PPI Blame Externalization, which were negative and positive, respectively, were marginally significant.

Table 3 displays the correlations between the ASI and features of DSM-IV personality disorders other than ASPD. The correlations between the ASI and

Table 2

Zero-order and partial (controlling for STAI-T scores) correlations between the ASI and PPI subscales

PPI subscale	<i>r</i> (partial <i>r</i> in parentheses)
Machiavellian Egocentricity	.14 (.18****)
Social Potency	-.23* (.06)
Coldheartedness	-.18**** (-.14)
Fearlessness	-.25* (-.11)
Impulsive Nonconformity	-.06 (-.02)
Blame Externalization	.18**** (-.01)
Carefree Nonplanfulness	.16 (.06)
Stress Immunity	-.50*** (-.29**)

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

\*\*\*\*  $.05 < p < .10$ .

Table 3

Zero-order and partial (controlling for STAI-T scores) correlations between the ASI and DSM-IV personality disorder features as measured by the PDQ-4

PDQ-4 personality disorder scale	<i>r</i> (partial <i>r</i> in parentheses)
Cluster A	
Paranoid personality disorder	.17****
Schizoid personality disorder	.06 (–.04)
Schizotypal personality disorder	–.03 (–.10)
Cluster B	
Borderline personality disorder	.32*** (.14)
Histrionic personality disorder	.23* (.18)
Narcissistic personality disorder	.11 (.11)
Cluster C	
Avoidant personality disorder	.30** (.08)
Dependent personality disorder	.39*** (.28**)
Obsessive-compulsive personality disorder	.11 (.07)
Disorders in the DSM-IV Appendix	
Passive–aggressive personality disorder	.27** (.21*)
Depressive personality disorder	.14 (–.15)

Data on the PDQ-4 ASPD scale are displayed in Table 1.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

\*\*\*\*  $.05 < p < .10$ .

features of borderline, histrionic, avoidant, dependent, and passive–aggressive personality disorders were positive and significant, while the correlation between the ASI and features of paranoid personality disorder was positive and marginally significant.

The correlations between the ASI and (a) the STAI-T, (b) the MPQ-SF scales, and (c) the peer MPQ-SF scales are presented in Table 4. As predicted, the ASI was moderately and significantly positively correlated with the STAI-T. The ASI was significantly correlated with several lower-order scales of the MPQ-SF, including Well-being (negatively) and Stress Reaction, Alienation, and Harmavoidance (positively). Contrary to prediction, the ASI was not significantly associated with MPQ-SF Absorption. At the higher-order level, the ASI was significantly and negatively associated with MPQ-SF Positive Emotionality and significantly and positively associated with MPQ-SF Negative Emotionality and Constraint. With the exception of the positive correlation between the ASI and peer-rated MPQ-SF Stress Reaction, none of the correlations between the ASI and peer-rated MPQ-SF scales was significant. The positive correlations between the ASI and peer-rated MPQ-SF Alienation and Negative Affectivity, however, approached significance.

Tables 1–4 also display the correlations between the ASI and other variables after controlling for STAI-T scores by means of partial correlation. As can be seen in Table 1, the correlations between the ASI and global psychopathy/ASPD measures remained nonsignificant after controlling for STAI-T scores. With the



Table 4

Zero-order and partial (controlling for STAI-T scores) correlations between the ASI and normal-range personality trait measures

Personality measure	<i>r</i> (partial <i>r</i> in parentheses)	
	Self-report	Peer
STAI-T	.46***	
MPQ-SF scales		
Lower-order scales		
Well-being	-.31*** (.03)	-.11 (.05)
Achievement	-.07 (.00)	.03 (.06)
Social Potency	-.15 (.10)	-.03 (.05)
Social Closeness	-.12 (.05)	-.01 (.14)
Stress Reaction	.40*** (.13)	.26* (.04)
Alienation	.34*** (.11)	.25**** (.07)
Aggression	.02 (.08)	-.08 (-.18)
Harmavoidance	.25* (.14)	.15 (.03)
Control (vs. Impulsiveness)	.13 (.10)	-.11 (-.11)
Traditionalism	.10 (.10)	-.08 (-.04)
Absorption	-.02 (.00)	
Higher-order scales		
Positive Emotionality	-.23* (.08)	.02 (.19)
Negative Emotionality	.40*** (.17****)	.24 (.02)
Constraint	.21* (.14)	-.05 (-.10)

Peer data were not collected for the STAI-T. Peer data on MPQ-SF Absorption are omitted because of excessive missing data.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

\*\*\*\*  $.05 < p < .10$ .

exception of the negative correlation between the ASI and SRP-II Factor 1, none of the partial correlations between the ASI and psychopathy factor scores was significant. The results in Table 2 indicate that the association between the ASI and PPI Stress Immunity remained significant after partialling, whereas the association between the ASI and the PPI Social Potency and Fearlessness subscales did not. The association between the ASI and PPI Machiavellian Egocentricity approached significance. Table 3 reveals that only the correlations between the ASI and dependent and passive-aggressive personality disorder features remained significant after controlling for STAI-T scores. The partial correlation between the ASI and histrionic personality disorder features was marginally significant. The results in Table 4 demonstrate that none of the correlations between the ASI and MPQ-SF lower- and higher-order scales remained significant after controlling for STAI-T scores, although the partial correlation between the ASI and Negative Emotionality was marginally significant. None of the correlations between the ASI and peer MPQ-SF lower- and higher-order scales approached significance after controlling for STAI-T scores.

Parallel analyses to those presented in Tables 1–4 using PPI Stress Immunity and MPQ Stress Reaction scores as covariates yielded very similar results to those found with the STAI-T, although slight suppressor effects were observed for two of the PCL:SV variables. When PPI Stress Immunity scores were used as a covariate, the correlations between the ASI and both PCL:SV total and Factor 1 scores became significant ( $r$ 's = .21 and .23, respectively; both  $p$ 's < .05). When MPQ Stress Reaction scores were used as a covariate, the correlation between the ASI and PCL:SV Factor 1 became significant ( $r = .21, p < .05$ ).

#### 4. Discussion

In this investigation, we examined the relation between AS, as assessed by the ASI, and scores on a variety of measures of psychopathy/ASPD, DSM-IV personality disorders, and normal-range personality traits. Contrary to the predictions of Shostak and Peterson (1990), ASI scores were not significantly negatively associated with global indexes of psychopathy or ASPD.

Although it might be argued that the use of an undergraduate sample resulted in a restricted range of scores on indices of psychopathy and ASPD and thus attenuated genuine negative correlations between the ASI and both psychopathy and ASPD, this explanation appears somewhat unlikely for two reasons. First, several of the correlations between the ASI and total scores on psychopathy/ASPD measures were positive, although nonsignificant. Most notably, this was the case for the correlation between the ASI and PCL:SV Factor 1. Moreover, this correlation became significant in two subsidiary analyses after controlling for trait anxiety levels as assessed by the PPI Stress Immunity and MPQ-SF Stress Reaction scales, respectively. The fact that several correlations between the ASI and psychopathy/ASPD were positive argues against the possibility that our negative findings can be explained entirely in terms of range restriction.

Second, in subsidiary analyses not reported here, the correlations among psychopathy/ASPD measures themselves were moderate or even large in magnitude (e.g., the correlation between the PPI and SRP-II total scores was  $r = .88, p < .001$ ), as was the correlation between the ASI and trait anxiety indices (e.g., the correlation between the ASI and STAI-T was  $r = .46, p < .001$ ). These findings indicate that adequate variance was present in most of the measures of (a) psychopathy and ASPD and (b) AS and trait anxiety to produce substantial covariance within each of these two domains. Moreover, the standard deviations of PPI total scores (40.60), SRP-II total scores (39.32), and Primary Psychopathy Scale (7.40) scores were comparable to, and in general slightly higher than, those in previously published data on these measures in nonclinical samples (e.g., see Levenson et al., 1995; Lilienfeld & Andrews, 1996; Zagon & Jackson, 1994), while the standard deviation of ASI total scores (8.32) was similar, although slightly lower, than the standard deviation of 9.11 reported in the ASI manual for

general population samples (Peterson & Reiss, 1992).<sup>6</sup> Nevertheless, the standard deviations for the PCL:SV (2.84) and PCL:SV Factors 1 and 2 (1.63 and 1.56) were considerably lower than those reported by Forth et al. (1996) in their sample of university students, suggesting that the range restriction cannot be ruled out as an explanation for the nonsignificant correlations between the ASI and both the PCL:SV and its component factors.

It might also be argued that the associations between the ASI and global psychopathy/ASPD indices are detectable only at extreme (i.e., clinical) levels of the latter measures. To examine this possibility, we conducted subsidiary curvilinear multiple regression analyses in which ASI scores were regressed on the squared products of the total scores on the total scores on the PCL:SV, PPI, SRP-II, peer-rated Cleckley Psychopathy Scale, and PDQ-IV ASPD Scale. In none of these five analyses did the addition of a squared term produce significant increments in variance above and beyond the main effects of total psychopathy or ASPD scores, suggesting that the relations between the ASI and total psychopathy/ASPD measures were negligible throughout the full range of scores on the latter measures. It is nonetheless conceivable that negative associations between AS and psychopathy/ASPD would emerge only at levels of the latter variables more extreme than represented in our sample. This possibility merits examination in more severely affected groups, such as prison or psychiatric samples.

Nevertheless, our findings provide some evidence for an amended form of Shostak and Peterson's (1990) hypothesis, because in two of four cases (i.e., the PPI and SRP-II Factor 1 scores), the ASI correlated negatively and significantly with measures of the core emotional deficits of psychopathy. These findings offer support for the contention that low AS scorers possess many of the affective characteristics of psychopathy, such as guiltlessness and lack of empathy. In addition, these findings are consistent with the traditional concept of "primary" psychopathy (Karpman, 1948; Lykken, 1995) as a condition marked by a relative absence of anxiety. Cleckley (1941/1988) similarly regarded the psychopath as deficient in anxiety, although recent research has not consistently borne out this conjecture (Schmitt & Newman, 1999).

These findings also offer preliminary evidence for the possibility (Cox et al., 1999) that the association between AS and psychopathology is curvilinear. Nevertheless, the extent to which the negative correlations between AS and Factor 1 traits are attributable to AS per se as opposed to trait anxiety requires clarification, because these correlations decreased in magnitude (and, in the case of PPI Factor 2, became nonsignificant) after controlling for STAI-T scores. This issue merits additional investigation because previous researchers (e.g., Harpur et al., 1989) have reported significant negative correlations between trait anxiety and Factor 1 characteristics (but see Schmitt & Newman,

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<sup>6</sup> In addition, the standard deviation of PPI scores in this sample was comparable, although slightly lower, than the standard deviation of PPI scores (45.78) in a recently published sample of jail inmates (Poythress et al., 1998).

1999). In addition, because the correlations between the ASI and the two other measures of these core affective characteristics (e.g., PCL:SV Factor 1 and the Levenson Primary Psychopathy Scale) were actually nonsignificantly positive, the reasons for the discrepancies found here require examination in future research. Because both significant negative correlations with the ASI were found with self-report indices of Factor 1 traits, the role of method covariance will be important to exclude.

We found that the ASI was significantly associated with features of several DSM-IV personality disorders. Because the convergent validity of several PDQ-4 personality disorder scales may be problematic (Fossati et al., 1998), however, these findings should be replicated with structured interview measures. As predicted, the ASI was significantly and positively related to features of avoidant and dependent personality disorders, two conditions in Cluster C of Axis II, although it was not significantly associated with features of the other Cluster C condition, viz., obsessive-compulsive personality disorder. In addition, the ASI was significantly and positively correlated with features of passive–aggressive personality disorder, which was a Cluster C condition in DSM-III-R (APA, 1987) before it was relegated to the Appendix of DSM-IV. The correlations with dependent and passive–aggressive personality disorder features remained significant after controlling for STAI-T scores, suggesting that the variance possessed by AS that is not shared with trait anxiety is uniquely related to these two conditions.

The association between the ASI and dependent personality disorder is consistent with the findings of Stewart et al. (1992), who reported that ASI scores were positively associated with interpersonal dependency. The reasons for this relation, however, require clarification. It is unknown, for example, whether AS predisposes to higher levels of dependency, whether dependency predisposes to higher levels of AS, or whether the association between these two constructs is attributable to an unmeasured third variable. Subsidiary analyses not reported here revealed that the relation between the ASI and dependent personality disorder remained significant even after controlling for MPQ-SF Negative Emotionality scores, suggesting that this relation is not due to the influence of a general emotional maladjustment or distress dimension.

Contrary to prediction, the ASI was significantly correlated with features of two Cluster B conditions, namely borderline and histrionic personality disorders, although these correlations became nonsignificant (in the former case, marginally significant) after controlling for STAI-T scores.<sup>7</sup> These findings suggest that the covariation between AS and measures of borderline and

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<sup>7</sup> The correlations between the ASI and borderline personality disorder features remained significant, however, after controlling for PPI Stress Immunity scores and after controlling for MPQ-SF Stress Reaction scores. In contrast, neither of the partial correlations between the ASI and histrionic personality features remained significant after controlling for PPI Stress Immunity or MPQ-SF Stress Reaction scores.

histrionic personality disorders is at least partly attributable to the variance shared by AS and trait anxiety.

As predicted, the ASI was positively correlated with self-report measures of trait anxiety, alienation, Negative Emotionality, and Constraint as assessed by the MPQ-SF. As in the study by Lilienfeld (1999), however, the positive correlations between the ASI and both alienation and Constraint became nonsignificant after controlling for trait anxiety levels. The nonsignificant partial correlation with Constraint calls into question the conjecture (Lilienfeld et al., 1993) that AS, or at least the component of AS that does not overlap with trait anxiety, is associated with a heightened sensitivity to threat cues. The ASI was negatively and significantly correlated with well being as measured by the MPQ-SF, although this correlation again appeared attributable to the variance that the ASI shares with trait anxiety indices.

The present findings offer mixed evidence concerning the relation between the ASI and extraversion/introversion. On the one hand, the ASI was significantly and negatively associated with the PPI Social Potency subscale, although this correlation became nonsignificant after controlling for STAI-T scores. This subscale appears to measure what Tellegen and Waller (1994) have referred to as the “agentic” (i.e., surgent) component of extraversion. In contrast, the ASI was not significantly related to either social potency or social closeness (the latter measures what Tellegen and Waller, 1994 have referred to as the “communal” component of extraversion) as assessed by both the MPQ-SF self-report and peer-rating versions. On balance, the present findings do not suggest that ASI scores are strongly related to introversion, although further investigation of this issue is warranted.

Contrary to prediction, the ASI was not significantly associated with the MPQ-SF Absorption scale. This finding represents a failure to replicate the findings of Lilienfeld (1997, 1999), who reported that several AS measures were significantly, albeit modestly, positively correlated with absorption. This negative finding is open to at least two explanations. First, the absorption measure used by Lilienfeld was derived from the full MPQ (Tellegen, 1978/1982) and consisted of 20 items. In contrast, the MPQ-SF Absorption measure used in this study consisted of only three items and does not provide detailed coverage of certain characteristics potentially relevant to AS (e.g., self-focused attention). It is therefore possible that our negative findings were attributable to the use of a suboptimal index of absorption. Second, it is possible that Lilienfeld’s findings represent Type I errors that did not withstand replication in the current sample. Further examination of the association between AS and absorption in both nonclinical and clinical samples should help to distinguish between these two possibilities.

The ASI was positively correlated with peer-rated stress reaction, alienation, and Negative Emotionality, although the latter two correlations were only marginally significant. To our knowledge, these findings represent the first evidence that ASI scores are associated with personality traits as assessed by

observers and suggest that the previously reported association between the ASI and trait anxiety indices (e.g., Lilienfeld et al., 1993) is not attributable to method covariance resulting from the shared use of a self-report format.

It is important to note that our principal positive findings cannot plausibly be attributed to Type I error. Even had a highly conservative Bonferroni correction been applied to correct for the total number of zero-order correlations examined (viz., 59), the zero-order correlations between the ASI and trait anxiety indices and measures of well being, alienation, Negative Emotionality, PPI Factor I, SRP-II Factor 1, and dependent personality features would have remained significant at the revised  $\alpha$  level of .0009, and the correlation between the ASI and borderline personality features would have become marginally significant. The correlations in Tables 1–4 were not Bonferroni-corrected, however, in view of recent arguments by statisticians (e.g., Schmidt, 1992; Sedlmeier & Gigerenzer, 1989) that Bonferroni correction and similar  $\alpha$ -adjustment procedures are often ill-advised because of their markedly increased Type 2 error rate. Nevertheless, the large number of correlations examined here underscores the importance of replicating our findings in independent samples.

Four limitations of the present results and conclusions should be noted. First, because we operationalized AS in terms of only one measure (viz., the ASI), our findings are subject to monooperation bias (Cook & Campbell, 1979). Because multiple operationalization of constructs often leads to increases in construct validity (Cole, Howard, & Maxwell, 1981), the present results may underestimate the relations between the AS construct and at least some personality variables. Although previous research suggests that the correlations between AS and personality measures (e.g., trait anxiety, Negative Emotionality) are relatively consistent across several different indices of AS (Lilienfeld, 1999), our conclusions would be buttressed by the inclusion of measures of AS other than the ASI, such as the Agoraphobic Cognitions Questionnaire and Body Sensations Questionnaire (Chambless, Caputo, Bright, & Gallagher, 1984). It should be noted, however, that although the latter two measures correlate moderately with the ASI (Lilienfeld, 1997), they may assess the cognitions experienced “on line” during intense anxiety more than preexisting beliefs regarding the adverse consequences of anxiety (Asmundson, Norton, Lanthier, & Cox, 1996; Peterson & Plehn, 1999).

Second, because of space limitations, we elected not to present data on the relation between ASI subscales and measures of psychopathology and personality. Such data could provide useful information concerning the components of AS that are differentially associated with psychologically meaningful correlates. Factor analyses of the ASI have typically revealed a hierarchical structure, with three lower-order factors of physical, mental, and social concerns nested within a higher-order AS factor (Zinbarg, Mohlman, & Hong, 1999). Analyses of our data not presented here suggest that these lower-order factors exhibit differential relations with certain personality disorder features. For example, the physical and

mental concern factors tend to correlate negatively and significantly with indices assessing Factor 1 traits of psychopathy, whereas the social concerns factor tends to correlate negligibly with these traits. We plan to present data on the personality and psychopathological correlates of the ASI lower-order factors in this and additional samples in a forthcoming article.

Third, because our findings are based entirely on undergraduates, it will be important to ascertain the extent to which our conclusions apply to more severely affected samples, particularly those with high rates of anxiety disorders, personality disorders, or both. Such investigations should help to establish the replicability of our results and their generalizability to samples characterized by more extreme levels of some of the personality variables (e.g., trait anxiety) examined here.

Fourth and finally, like the investigation of Lilienfeld (1997, 1999), this study examined the “Big Three” dimensions of personality, a taxonomy that has not gone unchallenged (e.g., Goldberg, 1993). Further investigation of the correlates of AS using alternative taxonomies of personality, such as the “Big Five” (e.g., Borger et al., 1996), should help to provide both a clearer picture of the personality correlates of AS and clues to the etiology of this still enigmatic individual difference variable.

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