Research Article

THE HIGH-NOVELTY-SEEKING, IMPULSIVE SUBTYPE OF GENERALIZED SOCIAL ANXIETY DISORDER

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This study examined potential subgroups of patients with generalized social anxiety disorder (SAD) based on novelty-seeking tendencies. Eighty-two outpatients with DSM-IV generalized SAD were recruited from an outpatient anxiety clinic and assessed with the Tridimensional Personality Questionnaire. The novelty-seeking subscales, reflecting risk-prone and disinhibited behavior tendencies, served as dependent measures in a series of cluster analysis procedures. Two qualitatively different SAD subgroups were identified: (1) low novelty-seeking tendencies and (2) high-novelty-seeking tendencies. These groups did not differ in social anxiety symptom severity. Women were less likely to be classified in the high-novelty-seeking group. Clinician severity ratings for comorbid substance use disorders were greater in the highnovelty-seeking group. These findings contribute to growing evidence for the heterogeneity of SAD. High-novelty-seeking, risk-prone, and disinhibited behavior tendencies are a characteristic feature of a distinct subgroup. Depression and Anxiety 25:535-541, 2008. Published 2008 Wilev-Liss. Inc.

Key words: social phobia; novelty seeking; impulsivity; self-control; subtyping

INTRODUCTION

As social anxiety disorder (SAD) has been recognized officially as a diagnostic entity [American Psychiatric Association, 1980], consideration was given to heterogeneity and possible subtypes. Most of this work has focused on the number and types of feared and avoided social situations [Heimberg et al., 1993; Kessler et al., 1998; Turner et al., 1992]. Other researchers attempted to derive alternative, theoretically based, and empirically supported subtyping strategies [Hofmann et al., 2004; Kachin et al., 2001]. Some of this work suggests that people with SAD vary in their appetitive orientation and other personality dimensions related to the behavioral inhibition and activation systems [Gray and McNaughton, 1996]. Although SAD is commonly associated with behavioral inhibition, there is also some evidence to suggest that, at least for some people, SAD is related to less excitable reactions to pleasant stimuli [Garner et al., 2006], diminished positive affect and exploratory behavior [Kashdan, 2007], and less activation of biological processes linked to reward sensitivity, approach behavior, and positive affect [e.g., dopaminergic agents, left prefrontal cortex activity; Schneier et al., 2002]. Taken together, there is evidence suggesting that SAD involves both a bias toward the recognition and avoidance of social threat and a compromised biologically based approach system. However, the research on SAD and novelty and reward seeking is in its infancy. This study examined potential subgroups of patients with generalized SAD based on novelty-seeking tendencies and impulsive decision-making.

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An approach-avoidance framework provides insight into why SAD can be associated with risk-prone behavior tendencies. Dominant cognitive-behavioral models emphasize socially anxious individuals' prevention focus in terms of being hypersensitive to the likelihood and cost of negative outcomes [Clark and Wells, 1995; Rapee and Heimberg, 1997]. This prevention focus explains prototypical avoidance behaviors such as safety behaviors that minimize the potential of social rejection. The majority of people with generalized SAD use avoidance, inhibition, and passivity to cope with the presence or absence of social threat cues. Yet some people use alternative strategies that are more approach-based in form such as impulsive and exploratory tendencies. A reliance on risk-prone strategies to make progress toward the goal of avoiding rejection and unwanted anxious reactions is non-obvious because it does not fit the shy, inhibited, behavioral prototype of SAD. For example, a person with SAD may proactively seek out new people to talk to at parties and talk rapidly and impulsively as a way of avoiding monotony and trying to control the flow of social situations. Being sociable, impulsive, and disinhibited can serve as a way to escape anxious feelings and acute self-awareness. This behavior style is qualitatively different from the prototypical strategy of behavioral inhibition. Despite their difference in form, both behavior strategies may serve the same immediate function of limiting social threat and anxious reactions [Kashdan, 2007].

The self-regulatory strength model [Muraven and Baumeister, 2000] provides additional insight into why some people with SAD might be characterized by novelty-seeking, impulsivity, and disinhibited behavior patterns. This model suggests that people with SAD allocate inefficiently substantial self-control effort to regulate their anxious symptoms. This may then deplete a limited amount of self-regulatory resources used for self-control and the prevention of socially undesirable behaviors. This includes aggressive, self-destructive, and hedonistic behaviors [Tice et al., 2001; Vohs et al., 2005]. There is a high level of within-person and betweenperson variability in the amount of energy devoted to inhibiting and controlling natural emotional reactions [Kashdan and Steger, 2006] and therefore, only a subset of people with SAD may regularly expend themselves to the point of being more impulsive and risk-prone compared with their more inhibited peers.

There has been a relative absence of studies using a person-centered approach to examine potential variability in the self-regulatory strategies habitually used by people with SAD. The goal of the current study was to examine potential heterogeneity in SAD in terms of risk-averse compared with risk-prone behavior tendencies. It was hypothesized that SAD and risk-prone behavior tendencies would be a particularly impairing, resource depleting combination of internalizing and externalizing symptoms. We tested the hypothesis that there are distinct subgroups of people with generalized SAD showing high and low novelty-seeking tendencies, respectively. We expected high novelty seeking to be positively associated with substance use problems. Furthermore, we expected women to be less likely to be classified in the high compared with the low novelty-seeking SAD subgroup. This hypothesis is based on research showing that women report lower levels of sensation seeking, novelty seeking, and impulsivity [Byrnes et al., 1999; Schwartz and Rubel, 2005; Zuckerman, 1994], and impulse control problems are less prevalent in women compared with men [Moffitt et al., 2001].

METHOD

Eighty-two adult outpatients (34 women) with a primary diagnosis of SAD, generalized subtype presented for assessment and possible treatment at the Center for Anxiety and Related Disorders at Boston University. Descriptive data on the sample are reported in Table 1. As part of a National Institute of Mental Health treatment study [Hofmann, [17]2004], exclusion criteria included earlier non-response to cognitive-behavioral treatment for SAD or primary diagnoses of psychoactive substance abuse or dependence or current diagnoses of bipolar disorder, schizophrenia or other psychotic disorders, or active suicidal potential. After a complete description of the study to the subjects, written informed consent was obtained.

 TABLE 1. Sample demographic and diagnostic characteristics

Women	41.5%
Mean age	32.02 (SD = 10.61)
Ethnicity/race	%
Caucasian	86.6
Asian-American	4.9
African-American	3.7
Hispanic-American	3.7
Others	1.2
Marital status	%
Single	61.7
Married	21
Divorced	3.7
Separated	6.2
Others	7.4
Highest education received	%
High school	29.3
Associate degree	7.3
Bachelor degree	45.1
Graduate degree	18.3
At least one comorbid diagnosis	74.4
Any depressive disorder	32.9
Generalized anxiety disorder	15.9
Specific phobia	13.4
Obsessive compulsive disorder	7.3
Substance use disorders	6.1
Panic disorder	6.1
Posttraumatic stress disorder	2.4

Diagnoses were confirmed using the Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV) [DiNardo et al., 1994]. To identify the principal (i.e., most distressing and interfering) diagnosis and other comorbid conditions, each interviewer rated the severity of each diagnosis by assigning a number on a scale from 0 (absent) to 8 (very severe). A diagnosis was defined as clinically significant if the severity was 4 or greater. The principal diagnosis was defined as the disorder with the highest severity rating. Because these ADIS-IV severity ratings were only used to identify the principal and other clinically significant disorders, no inter-rater reliability coefficients of the severity ratings of diagnoses will be reported here. This interview lasted between 4 and 6 hours per participant and was conducted by advanced clinical psychology doctoral students, who were unaware of the objective of this study. No inter-rater reliability data for the ADIS-IV-L were collected from the study sample. However, an earlier study from our clinic that used the identical training and administration procedure with most of the same clinicians showed high inter-rater reliability for diagnosing social phobia (κ : 0.77) and other diagnoses [Brown et al., 2001]. The κ coefficients for the other anxiety diagnoses ranged between .67 (generalized anxiety disorders) and .86 (specific phobias), and between .22 (dysthymia) and .72 (major depressive disorder) for mood disorders [Brown et al., 2001].

Supplementing the ADIS-IV-L, the generalized SAD subtype was defined based on the patient's subjective anxiety ratings of the 24 social situations from the Liebowitz Social Anxiety Scale [LSAS; Liebowitz, 1987]. Holt et al. [1992] categorized the LSAS items into four different domains: Formal speaking/interaction, informal speaking/interaction, assertive interaction, and observation by others. In this study, patients were considered part of the "generalized subtype" if they rated one or more social situations from each domain as at least inducing moderate levels of fear (rating of 2 or higher on a 0-3-point scale). All other patients were classified as "non-generalized" and not included in this study. Earlier studies showed that a similar method can distinguish reliably between high and low social anxiety and other measures of psychopathology consistent with the empirical and theoretical literature on the generalized subtype [e.g., Hofmann et al., 1999; Hofmann and Bitran, in press; Hofmann and DiBartolo, 2000; Hofmann and Roth, 1996]. A comparison between the subtyping procedure based on this LSAS method and a simple clinical impression showed that the former was superior to the latter in distinguishing high and low socially anxious individuals [Baker et al., 2002].

The LSAS [Liebowitz, 1987] is a frequently used instrument that assesses both fear and avoidance across a number of social situations. The scale consists of 24 items each depicting different social situations. The LSAS was designed originally as a clinician-administered measure. For each situation, the clinician is asked to rate the patient's level of fear and avoidance on a 4-point Likert scale. The scale shows good psychometric properties [e.g., Heimberg et al., 1999]. A selfreport version of the LSAS shows similarly good measurement characteristics [Baker et al., 2002; Fresco et al., 2001]. The two versions of the LSAS are identical aside from their mode of administration. It was used only in this study to define SAD subtypes.

The Social Phobia and Anxiety Inventory [SPAI; Turner et al., 1989] is a 109-item self-report measure designed to assess the severity of SAD symptoms across various situational contexts. Individuals are asked to respond to questions regarding how much they are generally bothered by particular situations and symptoms. The SPAI has agoraphobia and social phobia subscales, and the difference score was used after subtracting the agoraphobia from the social phobia subscale score. There is evidence that the SPAI has good convergent and discriminant validity, and excellent sensitivity and specificity in classifying people with probable SAD diagnoses [Beidel et al., 1989].

The 100-item Tridimensional Personality Questionnaire [TPQ; Cloninger, 1987] was used to assess three personality traits: novelty seeking, reward dependence, and harm avoidance. These three personality dimensions are believed to be genetically independent and associated with specific behavioral response patterns. Novelty seeking is characterized by exploratory activity and aversion to monotony (e.g., "I often try new things just for fun or thrills, even if most people think it is a waste of time). Reward dependence involves the maintenance of reward-inducing behavior and reduction of behavior that elicits punishment (e.g., "People find it easy to come to me for help, sympathy, and warm understanding"). Harm avoidance reflects a tendency toward behavioral inhibition to avoid punishment, novel stimuli, and non-reward (e.g., "Usually, I am more worried than most people that something might go wrong in the future"). This study specifically examined the novelty-seeking subscales because they are associated with behavioral activation, including excitement and exploratory behavior responses to potential rewards, impulsivity, and intolerance of structure and monotony. a coefficients for the Exploratory Excitability ($\alpha = .74$), Impulsivity $(\alpha = .75)$, Extravagance $(\alpha = .85)$, and Disorderliness $(\alpha = .61)$ novelty-seeking subscales were acceptable. α coefficients for the four harm avoidance subscales were acceptable ($\alpha = .72-.90$). Measures of reward dependence were not relevant to this study. The TPQ has been shown to have good psychometric properties in earlier studies [Cloninger et al., 1991; Giancola et al., 1994; Sher et al., 1995].

RESULTS

We examined the possible heterogeneity of SAD in terms of novelty-seeking tendencies. We conducted

an iterative series of cluster analyses in SPSS [SPSS, Chicago, IL] to increase the reliability of our results (two-step cluster procedure using agglomerative hierarchical clustering for producing cluster solutions, further confirmed by hierarchical cluster analysis using Ward's method, and K-means for more precise iterative clustering to compensate for poor initial clustering steps). Due to unequal item length, the four noveltyseeking subscales were transformed into z scores before the analyses. The SPSS' two-step cluster procedure was used, with the Bayesian information criterion (BIC) as an objective stopping rule/algorithm to determine the optimal number of groups/clusters. A two-cluster solution was found optimal based on the lowest BIC value (247.43), which was superior to a one-cluster (BIC value = 260.60) and three-cluster (BIC value increased to 258.60) solutions. Note that a 10-point difference in BICs between competing models translates into 150:1 odds favoring the smaller BIC value [Raftery, 1995]. Thus, our results show extensive support for the twoover one- and three-cluster solutions. Further support was evidenced by the results of hierarchical cluster analysis, showing a marked increase in the agglomeration coefficient values after the two-cluster solution. Combining clusters into a two-cluster solution led to a coefficient value increase of 88.35 compared with a prior increase of 37.89. On plotting these values on a graph, we found a notable "flattening" trend after the three-cluster solution [Aldenderfer and Blashfield, 1984]. There was a 91.45% agreement of case classification between the two clustering algorithms. Finally, a twocluster solution was specified and supported in six iterations using K-means cluster analysis. Each of the four novelty-seeking subscales contributed substantial variance to determining the clusters (F ratios > 13.00, P < .001). Thus, several strategies pointed to the appropriateness of a two-cluster solution.

The first cluster was characterized by high-novelty-seeking (n = 34; 41.5% of sample) and the second cluster by low novelty seeking (n = 48; 58.5% of sample). A series of *t* tests was used to compare the high- and low-novelty-seeking groups on each of the four novelty-seeking subscales of the TPQ. Both groups significantly differed from each other on Exploratory Excitability, t(80) = 7.12, P < .001, Impulsivity, t(80) = 8.22, P < .001, Extravagance, t(80) = 3.64, P < .001, and Disorderliness, t(80) = 4.61, P < .001.

A series of t tests was used to compare the high- and low-novelty-seeking groups with normative data on TPQ novelty-seeking subscales. Figure 1 shows the personality profiles of the two clusters compared with normative data (n = 326) on the TPQ [Cloninger et al., 1991]. As predicted, the high-novelty-seeking group reported greater scores on the Exploratory Excitability, t(358) = 3.65, P < .001, Impulsivity, t(358) = 4.89, P < .001, Extravagance, t(358) = 3.70, P < .001, and Disorderliness, t(358) = 2.94, P < .001, subscales compared to the normative sample. The low-novelty-seeking group reported lower scores on the Exploratory



Figure 1. Mean raw scores for each of the novelty-seeking subscales of the Tridimensional Personality Questionnaire for two social anxiety disorder cluster groups. N = 34 for high-novelty-seeking SAD group and 48 for low-novelty-seeking SAD group. NS1 = Exploratory Excitability; NS2 = Impulsive-ness; NS3 = Extravagance; NS4 = Disorderliness. Normative data for the United States are from prior published data [Cloninger et al., 1991]; the data for women in the normative sample are virtually identical to that for the men.

Excitability, t(372) = 4.47, P < .001, and the Impulsivity, t(372) = 4.05, P < .001, subscales compared with the normative sample. However, the low-novelty–seeking group did not differ significantly from the normative sample on the two subscales that are less relevant to the construct of social anxiety: spending money carelessly for immediate gratification (Extravagance), and failing to attend to conventional rules and regulations (Disorderliness) (P = .61 and .05, respectively).

There are data to support the accuracy of labeling the distinct generalized SAD subgroups as high and low in novelty seeking, respectively. For those people in the high-novelty-seeking group, a moderate percentage scored at least 1.5 standard deviations above the mean of the normative sample or outside of the normal range on each novelty-seeking subscale: 29.4% for Exploratory Excitability, 26.5% for Impulsiveness, 26.5% for Extravagance, and 17.6% for Disorderliness. Similarly, for those people in the low-novelty-seeking group, a modest percentage scored at least 1.5 standard deviations below the mean of the normative sample on each novelty-seeking subscale: 20.8% for Exploratory Excitability, 20.8% for Impulsiveness, 6.3% for Extravagance, and 4.2% for Disorderliness.

We also examined whether the two novelty-seeking groups and the normative sample differed on the harm avoidance subscales. In comparisons between the highand low-novelty-seeking groups, lower scores were found for the high-novelty-seeking group on the Fear of Uncertainty, t(80) = 3.10, P = .003, and Shyness with Strangers, t(79) = 2.40, P = .02, subscales; no significant differences were found on the other two harm avoidance subscales (P > .10). As shown in Figure 1, both novelty-seeking groups had significantly greater harm avoidance subscale scores (Cluster 1, M = 4.94-6.26, SD = 1.03-2.63; Cluster 2, M = 5.98-7.15, SD = .81-2.44) than the normative sample (M = 2.1-3.7, SD = 1.9 to 2.2) (P < .001). To determine whether the two novelty-seeking groups were merely the result of differences in social anxiety severity, we conducted a series of t tests on SPAI scores and ADIS-IV SAD clinician severity ratings. The two groups did not differ significantly on the SPAI or ADIS-IV SAD clinician severity ratings (P = .63 and .13, respectively).

To examine the validity of our groups, we used a series of χ^2 and t tests to test hypotheses that women would be less likely to be classified in the highnovelty-seeking group and substance use disorders would be more frequent and severe in the highnovelty-seeking group. As predicted, women were less likely to be in the high-novelty-seeking group (26.5%), whereas men were relatively evenly distributed in the high (52.1%) and low (47.9%) novelty-seeking groups, $\chi^{2}(1, 82) = 5.38, P = .02$. Although there were no differences in the prevalence of comorbid substance use disorders in the high compared to low-novelty-seeking groups (9 versus 4%, respectively), the ADIS-IV subjective units of distress (SUD) clinician severity ratings were significantly greater in the high compared to low-novelty-seeking group (P = .03).

DISCUSSION

These findings provide preliminary support for an alternative approach to subtyping SAD. We found evidence for the existence of two distinct subgroups of generalized SAD. The first group was characterized by elevated social fears and avoidance patterns and low novelty seeking, whereas the second group was characterized by high-novelty-seeking tendencies. These groups did not differ in social anxiety severity and impairment. Fitting with research on sex differences in sensation seeking and the prevalence of externalizing disorders, women were less likely to be classified in the novelty-seeking SAD subgroup. These findings point to alternative approaches to subtyping people with generalized SAD, beyond those focusing on the number and type of feared or avoided social situations. Our findings are consistent with prior cluster analytic findings in SAD [Kachin et al., 2001] and non-clinical [Kashdan et al., 2007] samples, and theoretical accounts [Hofmann et al., 2004; Kashdan, 2007].

Because impulsivity, unpredictability, and hostility are associated with excessive novelty seeking [Cloninger, 1987], it is conceivable that self-destructive behaviors such as aggression and substance abuse are more common and problematic in this subgroup of people with generalized SAD. Our data provided initial support to show that the severity of substance use problems is greater in the high-novelty–seeking SAD subgroup. However, our sample may not have been optimal to test this prediction because patients with coprincipal diagnoses of psychoactive substance abuse or dependence were excluded for reasons unrelated to the present study. Due to the number of tests in the current study, these findings require replication.

Concerns about the generalizability of our findings are minimized by the convergence with two related empirical studies using cluster analytic techniques to classify socially anxious individuals [Kachin et al., 2001; Kashdan et al., 2007]. One study determined whether it was possible to identify empirically subtypes of SAD based on interpersonal behavior tendencies along the dimensions of dominance-submissiveness and nurturance-cold-heartedness [Kachin et al., 2001]. There was support for two groups with the first characterized by prototypical avoidant and submissive behaviors and the second by dominant and hostile behaviors. Importantly, this interpersonal classification scheme showed incremental validity over the use of the DSM-based classification of generalized and non-generalized SAD subtypes. Also, the two groups did not differ in social anxiety severity or impairment from these symptoms.

A second study determined whether people can be distinguished as a function of social anxiety levels and threat and reward appraisals for various types of risktaking behaviors [e.g., unsafe sex, aggression, drug use; Kashdan et al., 2007]. Support was found for three qualitatively distinct groups. One group was defined by low social anxiety and the other two groups were characterized by moderate social anxiety but divergent risk-taking appraisals. An approach-oriented group was characterized by strong recognition of rewards for risktaking; an avoidance-oriented group was characterized by the strongest anxiety appraisals and minimal recognition of rewards for risk-taking. The combination of moderate social anxiety and an approach orientation to risk-taking was shown to be the most impaired group as defined by greater difficulties in managing undesirable emotions, less satisfying relationships, and greater internal conflict in terms of recognizing substantial threats and rewards for the same activity. In addition, over the course of 3 months, the approach-oriented group reported more frequent unsafe sexual practices, aggression, and substance abuse than the other groups.

Taken together, these data show that people with social anxiety difficulties are not homogeneous and, in fact, can be differentiated by novelty-seeking tendencies, risk-taking, and disinhibited behavior patterns. Moreover, the non-obvious risk-prone group of people with SAD seems to show more psychological and social problems than their prototypical shy and inhibited peers.

Interpretative caveats to this study's findings include the exclusive focus on the generalized subtype of SAD, reliance on self-report data, and limitations of cross-sectional data. Despite these limitations, these preliminary findings are of high heuristic value. The existence of two novelty-seeking subgroups may provide especially fertile ground for continued research on the phenomenology (at cognitive, behavioral, affective, interpersonal, and biological levels of analysis), etiology, maintenance, and treatment of generalized SAD.

We conclude that high-novelty-seeking and riskprone behavior characterizes a subgroup of people with generalized SAD. This may suggest that some patients with SAD engage in risk-taking and disinhibited behaviors to strategically regulate their distress. As our study was cross-sectional, we can only speculate on the function of these behavior patterns that are not typically associated with SAD. Although excessive behavioral inhibition and impulsive, risk-prone behaviors differ in form, their function in the context of SAD may be the same: to temporarily avoid negative evaluation and unwanted anxious feelings and thoughts [Kashdan, 2007]. Alternatively, those people who engage in risk-taking and disinhibited behaviors may be at increased risk for developing SAD because of the cumulative negative social consequences of their actions. Longitudinal research designs are needed to address the temporal sequence and directionality of these relations.

This study also offers tentative suggestions for intervention. The high-novelty-seeking subgroup of generalized SAD seems to show particular vulnerabilities that could benefit from intervention. Their riskprone, impulsive acts might lead to adverse psychological consequences including disruptions in the social relationships that they are desperately trying to develop and maintain. Efficacious behavioral activation treatment modules focus on the reduction of avoidance behaviors with low reinforcement value and increasing approach behaviors with high reinforcement value to enhance positive experiences [Hopko et al., 2003]. Yet, besides attending to approach-avoidance behavioral distinctions and whether or not they lead to positive outcomes, consideration should be given to motives and context. For example, being motivated to impulsively engage in sex with strangers to satisfy the need for belonging does not necessarily lead to the mostdesired outcomes, often leading to short-term boosts in positive effect that can detract from long-term wellbeing (e.g., non-contingent affection from one-night stands, transmission of diseases). The efficacy of behavioral activation might be supplemented by modules addressing acceptance, value clarification, and self-determination [Greenberg and Safran, 1987; Wilson and Murrell, 2004]. This includes learning the motives behind risk-prone behavioral patterns and regulatory strategies. Patients can be asked to clarify their values in different life domains, develop concrete goals, and pathways that are congruent with these values, and devote daily efforts to make progress toward these goals. A reliance on extreme novelty seeking can occur at the expense of devoting more time and effort to other personally meaningful areas of living such as family, friendship, work, or spirituality. Despite the viable theoretical framework for this approach, these treatment approaches require thorough empirical investigation.

The present findings are consistent with the notion of attending to both approach and avoidance processes in the same investigation to understand heterogeneity in the phenomenology of generalized SAD. Results from other studies indicate that SAD is inversely related to positive emotions, positive life events, and neurotransmitters and cortical activity relevant to appetitive activity [e.g., dopaminergic agents; Kashdan, 2007; Kashdan and Steger, 2006; Schneier et al., 2000; Tiihonen et al., 1997]. Yet, the merging of SAD groups with qualitatively distinct patterns of novelty seeking and impulsivity may have given rise to misleading conclusions in earlier research programs. The current findings might explain the cooccurrence of SAD, substance use, and other maladaptive patterns that are not typically associated with social anxiety (such as impulsivity and aggression). These results can be extremely useful in future examinations of the behavioral and neurobiological processes associated with SAD, and sensitivity to particular stimuli and interventions.

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