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Social Anhedonia and Schizotypy in a Community Sample: The Maryland Longitudinal Study of Schizotypy

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Social anhedonia has been employed in psychometric high-risk studies to identify putative schizotypes. To date, this research has focused almost exclusively on college samples. The current study sought to examine the validity of social anhedonia as an indicator of risk for schizophrenia-spectrum disorders within a community sample. Furthermore, we evaluated the role of other individual difference variables in accounting for variable clinical severity within the social anhedonia group including trait affectivity, social support, and family environment. Following the mailed questionnaire screening of 2434 eighteen-year olds, laboratory assessments were conducted with individuals identified as being high in social anhedonia (n = 86) and a comparison sample (n = 89). Compared with the control group, individuals in the social anhedonia group were found to have higher rates of mood disorders, elevated schizophrenia-spectrum personality disorder characteristics, greater negative symptom characteristics, and lower global functioning. Individuals within the social anhedonia group also reported greater trait negative affectivity, lower positive affectivity, less social support, and more family conflict. Low social support and problematic family environment were found to be related to elevations in spectrum personality disorder characteristics and poorer functioning within the social anhedonia group. These cross-sectional findings from a community sample provide further support for social anhedonia as a possible indicator of schizotypy.

Key words: schizotypy/anhedonia/schizophrenia/personality/traits/vulnerability

The reduced ability to experience pleasure from social relationships (social anhedonia) is a core feature of schizophrenia and has been proposed to be a possible indicator for the genetic liability to develop this disorder. Meehl[1] theorized that social anhedonia is a feature of schizotypy, the personality organization that emerged in individuals with the genetic diathesis for schizophrenia. Consistent with this conjecture, social anhedonia has been found to be elevated within schizophrenia,[2–5] appears to be relatively stable over time and clinical status,[4,6] and is elevated in the unaffected relatives of individuals with schizophrenia.[7,8]

Based on Meehl's[1] early views of anhedonia, research has sought to examine the use of social anhedonia as a method of identifying putative schizotypes. Utilizing a psychometric high-risk paradigm[5,9,10] nonclinical individuals, generally college students, with markedly elevated social anhedonia scores have been shown to exhibit clinical, cognitive, and physiological characteristics similar to those seen in individuals with schizophrenia and those at known genetic risk for the illness. Specifically, cross-sectional studies have found that individuals with elevated social anhedonia scores demonstrate clinical characteristics consistent with risk for schizophrenia-spectrum disorders[1] including schizoid social withdrawal[10]; elevated schizotypal, schizoid, and paranoid personality disorder symptoms[10–13]; increased psychotic-like experiences[10,12,14]; and cognitive slippage.[15] Cognitive deficits[14,16–18] and psychophysiological abnormalities[19–21] similar to those seen in schizophrenia and related spectrum disorders have also been observed in individuals with elevated social anhedonia. Finally, the predictive validity of social anhedonia has been demonstrated in findings that individuals identified with the social anhedonia scale have elevated schizophrenia-spectrum personality disorders and psychotic-like experiences at 5-year[22] and 10-year follow-ups.[11]

Although highly informative, prior research has been limited by the study of nonrepresentative college samples that may not reflect the ethnic diversity and full functional range present in the general population. For example, given the small minority representation in their college sample, Chapman et al[9] only studied Caucasian subjects. Subsequent research has begun to examine the performance of measures of social anhedonia within minority samples,[12] but this research has been limited and

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continues to be restricted to college students. A potential concern with research on college samples is that students are generally atypical given their high level of functioning. Fewer than 25% of the adult population in the United States obtains a college education,[23] and those individuals attending college are significantly less likely to develop psychiatric disorders than those who do not.[24,25] Alternatively, lower IQ and low educational test scores are associated with increased risk for schizophrenia[26,27] and spectrum disorders.[28] Thus, the sole reliance on the study of college students raises concerns regarding the generalizability of findings relating social anhedonia to schizotypy.

As indicated by the results of 2 longitudinal studies,[11,22] although individuals high in social anhedonia are considered at risk for schizophrenia-spectrum disorders, it is clear that only a minority of these individuals will develop these clinical disorders. What factors determine these variable outcomes in these at-risk individuals? Prior research has been quite limited in terms of understanding this heterogeneity of outcome, typically focusing on measures of clinical deviance at baseline (eg, predicting follow-up clinical status based on severity of psychotic-like symptoms or personality disorders at baseline).[9] More recent research has failed to find that psychophysiological markers are related to outcome, at least in a 5-year follow-up.[22] Other individual differences that may potentiate the expression of schizophrenia-spectrum outcomes in individuals high in social anhedonia have only recently been considered.[13] A review of the empirical literature, including vulnerability-stress models of schizophrenia,[29,30] suggests that several individual difference variables may be useful in predicting outcomes in at-risk individuals. In particular, within the present study we focused on factors associated with reactivity to stress and the individual's social environment (which may represent either a source of stress or serve to buffer an individual from the effects of stress). These individual differences included temperamental differences in trait affectivity, social support, and the quality of the family environment.

Research on emotion and personality indicates a major factor termed negative affectivity (NA) in self-reports of mood and self-descriptions of personality.[31,32] Trait NA has been shown to be related to exposure to stress,[33,34] reactivity to stress,[34,35] and the differential use of coping strategies in response to stress.[36–38] Trait NA is highly correlated with neuroticism[39] and it has been suggested that neuroticism essentially represents individual differences in the tendency to experience negative affect.[32]

Trait NA could be informative in understanding individual variability in the development of schizophrenia-spectrum disorders.[4,29] Elevated NA has been found to be characteristic of individuals with schizophrenia,[40–44] and these elevations in NA are stable over time.[4,6] NA is a prominent premorbid feature of schizophrenia,[45] and neuroticism has been shown to be a risk factor in the development of schizophrenia.[46] Elevated trait NA and associated traits such as neuroticism are evident in schizophrenia-spectrum disorders[41] and increased trait negative affect has been shown to be related to greater severity of cognitive-perceptual and interpersonal symptoms of schizotypal personality disorder within nonclinical samples.[47]

Consistent with the view that trait NA may relate to vulnerability to stressful responding, we have shown that elevated trait NA is associated with greater stress reactivity within individuals with schizophrenia.[43] In psychometric high-risk studies with college students, trait NA is elevated in social anhedonia groups compared with controls,[48,49] and within those identified by high scores on social anhedonia, trait NA has been shown to be correlated with schizophrenia-spectrum characteristics.[13] In the present study, we hypothesized that within the social anhedonia group, elevations in dispositional NA would be associated with increased schizophrenia-spectrum personality disorder characteristics and poorer functioning.

Given the conjectured reduced hedonic capacity of social anhedonia, we also predicted diminished levels of trait positive affect (PA) in the social anhedonia group. Trait PA is highly correlated with extraversion, and it has been proposed that extraversion reflects individual differences in the propensity to experience PA.[32,39] Prior research has found reduced trait PA and lower levels of associated traits such as extraversion in schizophrenia,[4,6,40,43] schizotypal personality disorder,[50,51] and in college student samples of individuals high in social anhedonia.[48,49] The role of trait PA in adaptive responding, and the quantity and quality of social engagement, has been demonstrated in other studies of nonclinical samples.[52–54] Thus, we hypothesized that lower levels of trait PA might be associated with more severe symptoms and poorer functioning in the social anhedonia group.

In addition to dispositional individual differences in affectivity, the social environment is important to consider in understanding variable outcomes in at-risk populations. A general consensus has emerged that supportive social relationships are related to positive outcomes[55] and protect against mental disorders including schizophrenia.[56–59] Social support is hypothesized to act as a buffer against the effects of stress through a variety of mechanisms including the provision of resources, encouraging adaptive coping or positive health behaviors, as well as direct physiological processes.[60–63]

Discussing the potential role of social anhedonia in the development of schizophrenia-spectrum disorders, investigators[9,11] have suggested that a lack of social contact and support might be important in that social support may provide an opportunity to assess the validity of an individual's ideas and perceptions. This social support

and feedback may be especially critical for individuals experiencing cognitive slippage and psychotic-like experiences.[11] Consistent with this conjecture, preliminary findings in a college sample have indicated that individuals with elevated social anhedonia report significantly less social support and less social coping than do controls.[13] Thus, converging findings suggest that the lack of social support may potentiate clinical outcomes within individuals identified with extreme scores on social anhedonia.

Beyond the general availability of social support, the specific nature of one's family environment has been shown to be an important factor in the course of schizophrenia, as reflected in research on the construct of expressed emotion (EE).[64,65] Families characterized by hostility and critical attitudes toward family members with schizophrenia have been found to be at significantly greater risk of relapse.[66] Adverse family environments have also been found to be predictive of schizophrenia-spectrum outcomes in adoptees at high genetic risk.[67] The influence of family environment is not unique to schizophrenia, and EE has been shown to be prognostically important in a variety of other disorders.[68] More broadly, in nonclinical samples family support is associated with better adaptation during times of transition and more adaptive responses to stress.[69,70] To date, we are aware of only 1 college student study examining how family environment might be altered in socially anhedonic individuals,[10] and no study has examined how family environment might be related to general functioning or clinical characteristics within these putative schizotypes.

In this article we present baseline findings from a longitudinal study developed to address the above concerns within a representative community sample. The Maryland Longitudinal Study of Schizotypy (MLSS) utilized random-digit-dial methods to identify 18-year olds in the community. From the large, racially diverse sample that completed screening questionnaires ($n = 2426$), individuals scoring high on social anhedonia and demographically matched nonanhedonic participants were selected for laboratory assessments. First, we examined clinical diagnostic characteristics to examine the hypothesis that compared with the control group the social anhedonia group would evidence elevations in schizophrenia-spectrum personality disorder characteristics and related features including negative symptoms and functional impairment. Second, we expected that the social anhedonia group would be associated with increased trait NA and decreased trait PA. Third, we examined the hypothesis that the social anhedonia group would report more impoverished social support than the controls and that the social anhedonia group would view their family environment as less positive than did the control group. Finally, analyses were conducted to determine if individual differences in traits, social support, and family environment were related to cross-sectional assessments of clinical characteristics and general functioning within those individuals high in social anhedonia. Specifically, we expected that high trait NA, low trait PA, lower social support and more conflictual family environments would be associated with more severe clinical symptoms and poorer overall functioning within the social anhedonia group.

Methods

Participant Pool

The present study utilized data from the MLSS. The MLSS is a 3-year longitudinal study examining clinical, cognitive, affective, and social aspects of functioning in a social anhedonia group recruited from the community. The present study focuses on the baseline analyses of this investigation. Other articles have examined behavioral[71] and neuropsychological functioning[72] within the MLSS. Three-year follow-up results will be examined in a separate report. This research was approved by the University of Maryland Institutional Review Board; all participants provided written informed consent.

The MLSS is based on a community sample recruited using random-digit-dial methods. Commercially available databases were used to select those neighborhoods that contained residential housing within the recruitment area. The MLSS contracted with a university-affiliated survey research center to identify 18-year olds from within a 20-mile radius of the College Park campus. This recruitment area allowed us to identify individuals from a wide range of urban and suburban settings including racially diverse populations within a commuting distance from the University laboratory where direct assessments would be conducted. Initial screening for participation involved phone calls to identify households with an 18-year old willing to complete a brief screening questionnaire. Screening occurred in 2 waves, in 2001 and 2002.

The initial mailed screening consisted of a "Feelings and Preferences Scale" that included intermixed items from the 40-item Revised Social Anhedonia Scale (SocAnh Scale) (M. L. Eckblad, L. J. Chapman, J. P. Chapman, M. Mishlove, "The Revised Social Anhedonia Scale," unpublished test, 1982), as well as the 35-item Perceptual Aberrations Scale (PerAb),[73] and 30-item Magical Ideation Scale (MagicId).[74] The PerAb measures distortions in the perception of one's own body and the environment. The MagicId measures beliefs about causation that are not normative. The PerAb and MagicId measures were included to allow selection of comparison subjects who were not deviant on a range of schizotypy or psychosis-proneness traits and to allow for an assessment of the role of these traits in the clinical characteristics observed within the social anhedonia group. Finally, in order to identify invalid responding, we included the Infrequency

Scale (L. J. Chapman, J. P. Chapman, "Infrequency Scale," unpublished test, 1983) and individuals who endorsed 3 or more items in the unexpected direction were excluded from the study.

Following the identification (using phone calls) of 18-year olds (n = 3498) willing to complete the screening questionnaire, packets were then mailed with consent forms, other questionnaires, and stamped self-addressed return envelopes. This initial sample comprised 50% women and had a large minority representation (63% non-Caucasian). To enhance response rates, monetary incentives were provided[75] with partial payment of $5 included in the initial mailing and the balance of payment sent when completed questionnaires were returned (total compensation = $15). Participants received multiple reminders including phone calls, postcards, and finally a duplicate questionnaire pack.

A total of 2434 eighteen-year olds completed the mailed screening questionnaire. This response rate (70%) is comparable to other survey assessments utilizing incentives.[75] Among the initially identified pool of participants who were sent screening questionnaires, men (57%) were less likely than women (70%) to return the questionnaire, $\chi^2(1, 3498) = 72.03$, $P < .001$. Minority status was also associated with lower response rates (59% for minority participants vs 71% for Caucasians), $\chi^2(1, 3498) = 49.05$, $P < .001$. However, the sample providing completed questionnaires remained racially diverse: 42% Caucasian, 36.3% African American, 8.9% Asian, 10% Hispanic, and 12.1% Other (0.7% refused to identify race). Educational achievement was also broadly represented in the sample returning the screening questionnaire, with 50.4% of the sample taking at least some college courses (ranging from part-time enrollment in community college to full-time college), 38.7% still in high school, 7.7% not currently in school, 3.2% in some other educational setting (eg, technical or trade school), and 0.1% refused to provide this information.

Participant Selection

Two methods were used to select putative schizotypes based on social anhedonia scores. The first method involved identifying individuals falling at least 1.9 SDs above the SocAnh Scale mean (n = 72). This selection method has been established in previous studies.[9,11,21] Prior research[76] has shown significant racial group differences on the SocAnh Scale, with Caucasians having the lowest mean scores, as well as significant gender differences, with men scoring higher than women. Thus, SD cut-offs were determined separately for each gender and Caucasian vs other racial groups (other racial groups were collapsed into 1 minority category as some racial groups were too small to conduct individual analyses). Using the SD cut-off, we identified 72 individuals assigned to the social anhedonia group. The second selection method involved using the taxometric method of maximum covariate analysis (MAXCOV-HITMAX).[77] The taxometric method was utilized in order to identify individuals who have a high probability of being within a social anhedonia latent class (presumed to be schizotypes[8,79]) but who may not have met the extreme score criteria using the SD cut-off. Individuals with Bayesian probabilities greater than or equal to 0.50 were assigned to the social anhedonia taxon group.[78,79] This taxometric procedure identified an additional 14 social anhedonic participants not already identified using the SD cut-off (16.3% of the social anhedonia group). Across the 2 methods (SD and taxometrics), 86 individuals with high social anhedonia were recruited to participate in the laboratory phase of this study.

One question that arises is whether the 86 individuals with elevated social anhedonia who agreed to participate in laboratory assessments may have differed from those approached but who refused participation in the study (n = 46; 34.8% of those social anhedonics contacted). Specifically, might individuals with anhedonia who were more deviant have been less likely to agree to participate in the laboratory assessments? We examined this question by comparing Chapman scale scores (obtained during the initial mailed screening) for participants and refusers within the social anhedonia group. Comparisons of t test between participants and refusers indicated no differences in social anhedonia scores, $t(130) = -.378$, $P > .05$. Similarly, there were no differences between socially anhedonic participants and refusers on the Chapman scales of MagicID or PerAb (P values >.05). These results suggest that among individuals with social anhedonia, those agreeing to participate in laboratory assessments did not represent a less deviant group compared with refusers (at least as measured by the self-reported schizotypy traits administered in the mailed screening).

The control group consisted of 89 individuals without elevated scores on the SocAnh Scale (ie, scores less than 0.50 SDs above the SocAnh Scale mean, again determined separately for each gender and race group, and Bayesian probabilities of being in the social anhedonia taxon below 0.50). An additional inclusion criterion specified that control participants not score higher than 0.50 SDs above the mean on the PerAb[73] or MagicId[74] scales of psychosis proneness. Given previous findings that Caucasians tend to score lower than minority groups on the SocAnh Scale and that men tend to score higher than women on the SocAnh Scale,[76] in selecting control participants, efforts were made to match available control participants to the SocAnh group on gender and race.

Following participant selection and recruitment, participants were administered additional questionnaires, diagnostic interviews, symptom ratings, and family ratings, as well as neuropsychological measures during a laboratory assessment. Following completion of the

study tasks, participants were provided with diagnostic feedback and clinical referrals if warranted. Participants received $100 for their participation.

Assessment of Diagnostic Status

Axis I Psychopathology. Participants were not screened for diagnostic status prior to inclusion in the study. During the laboratory assessment phase of the study, Axis I diagnoses were determined using the Structured Clinical Interview for *DSM-IV* Axis I Disorders—Research Version (SCID-I).[80] The SCID is a semistructured interview that provides a thorough coverage of current psychotic disorders and past psychiatric history. Modules covering mood, psychotic, and alcohol- and substance-use disorders were administered. SCID interviews were conducted by advanced doctoral students.

Schizophrenia-Spectrum Symptom Ratings. The International Personality Disorders Examination (IPDE)[81] is a semistructured interview that yields both categorical and dimensional ratings of Axis II disorders (each symptom item is rated on a 3-point scale: 0 = not present; 1 = subthreshold; 2 = threshold). The IPDE was administered to assess schizoid, schizotypal, and paranoid personality disorders, consisting of items related to unusual thinking or beliefs, unusual perceptual experiences, suspicious or paranoid ideation, inappropriate or constricted affect, odd or eccentric behavior or appearance, impaired social relationships, and social anxiety. The same advanced doctoral students who conducted the SCID interviews conducted the IPDE interviews. A number of studies have used the IPDE for the assessment of schizophrenia-spectrum disorders in putatively psychosis-prone individuals.[9,11,13]

Negative Symptom Characteristics. Negative symptom characteristics were rated with the Schedule for the Deficit Syndrome (SDS).[82] Deficit symptoms rated by the SDS include Restricted Affect, Diminished Emotional Range, Poverty of Speech, Curbing of Interests, Diminished Sense of Purpose, and Diminished Social Drive. Each domain is rated on a 5-point scale (0 = absent/normal to 4 = severe). Standardized probe questions were used to assess each domain. Final SDS ratings were made at the conclusion of the diagnostic interview, and raters considered observed behavior from across diagnostic and symptom assessments (ie, SCID, IPDE, and SDS). The SDS has been shown to have adequate interrater agreement and internal consistency.[82] Given our use of this measure in a nonclinical sample of young adults, we utilized ratings to obtain a dimensional index of negative symptom characteristics (rather than a dichotomized ratings of presence vs absence of the deficit syndrome) based on the sum of the 6 SDS items. Dimensional ratings of SDS symptom severity have been employed in prior studies,[83] and dimensional ratings from the SDS have been shown to have high correlations with dimensional ratings obtained with other negative symptom instruments.[84] Internal consistency of this scale within the full sample was adequate ($\alpha = .70$).

Training and Reliability. All diagnostic interviewers were Masters-level doctoral students under the supervision of a licensed clinical psychologist with extensive training and experience in clinical assessment (J.J.B.). Training involved review of *Diagnostic and Statistical Manual of Mental Disorders* criteria and readings on personality disorder assessment.[85] Raters watched training videos, role-played diagnostic interviews, and conducted initial interviews paired with a trained interviewer. Following training, videotaped interviews were regularly monitored for clinical supervision and consensus ratings (described below). Interrater agreement was not formally examined as consensus best estimate diagnostic ratings were used for the SCID, IPDE, and Global Assessment of Functioning Scale (GAF) ratings (described below). Two steps were involved in obtaining consensus ratings: First, an independent diagnostic interviewer viewed the videotaped interview and noted any symptom ratings or diagnostic discrepancies, concerns, or questions. Second, the full diagnostic record was reviewed within a consensus meeting involving the first author (J.J.B.), the original interviewer, the videotape rater/reviewer, and other graduate student assessors. The consensus meeting was used to discuss the diagnostic material (ratings and notes), issues raised in the independent video review, and to consult the videotape for further clarification. Final symptom severity ratings and diagnostic decisions were determined within the consensus meeting. Such consensus ratings have been shown to yield reliable diagnostic evaluations.[86]

Assessment of Functioning

The GAF[87,88] was used to measure overall functioning. As with the original Global Assessment Scale (GAS),[89] the GAF provides a rating of overall adjustment ranging from marked psychopathology at the low end to superior functioning at the high end. The GAS has been used in other studies of psychosis proneness.[9,22]

Parental socioeconomic status was assessed with Hollingshead and Redlich's[90] index of social position for each parent. The index is based on occupational and educational attainment and has been used in studies of psychosis proneness in college students.[9]

Trait Affectivity

Personality traits were measured with the General Temperament Survey (GTS) (L. A. Clark, D. Watson, "The General Temperament Survey," unpublished manuscript, 1990), a true-false self-report questionnaire tapping 3 major temperament domains of negative and

positive emotionality and disinhibition.[39,54,91] The GTS was completed as part of the initial mailed screening. The Negative Temperament scale of the GTS includes 28 items such as "I sometimes get too upset by minor setbacks" (keyed true). The Negative Temperament scale seeks to measure individual differences in negative emotionality and is highly correlated with neuroticism and negative affect scales.[39] The Positive Temperament scale includes 27 items such as "I often feel lively and cheerful for no good reason" (keyed true). The Positive Temperament scale broadly assesses positive emotionality and is strongly correlated with extraversion and PA scales.[39] The Disinhibition scale includes 35 items such as "I rarely, if ever, do anything reckless" (keyed false). The Disinhibition scale measures individual difference in impulsivity and risk taking. Stability coefficients over a 2-month interval have been shown to be .76, and good convergent and discriminant validity for the GTS have been demonstrated across a number of samples.[37,39,54,91,92] In the current study, high internal consistency was demonstrated for Negative Temperament (α = .91), Positive Temperament (α = .90), and Disinhibition (α = .83).

Social Support

We assessed social support with measures of (a) the number of available social support relationships, (b) general social support, and (c) support specific to the family. These questionnaires were mailed to participants prior to their scheduled laboratory assessments and were typically completed prior to arrival.

Number of Social Support Relationships. We used the brief 6-item version of the Social Support Questionnaire (SSQ)[93,94] to assess the perceived number of social supports (SSQ-N). The SSQ-N asks respondents to list all available others the individual feels he or she can turn to in times of need in each of a variety of situations (eg, "Whom can you really count on to distract you from your worries when you feel under stress?," "Who accepts you totally, including both your worst and your best points?"). For each question, the respondent lists all the people they know who they can count on for help or support in the manner described (each person's initials are listed). The score represents the total number of people listed across the 6 SSQ-N items. The SSQ-N has been shown to be reliable and to have good convergent validity.[94–96] The abbreviated SSQ-N has shown high test-retest reliability (r = .84), high internal consistency ($\alpha > .90$), and convergent validity with other measures of social support and social networks.[95,96] In a separate sample, we have found robust correlates between the SSQ-N and ratings of Cluster A personality disorders within a group of individuals high in social anhedonia.[13] Within the current sample the SSQ-N demonstrated high internal consistency (α = .87).

General Social Support. The Interpersonal Support Evaluation List (ISEL)[97] was used to assess perceived social support. The ISEL consists of four 10-item true-false subscales: *Appraisal* items assess the perceived availability of someone to talk to about one's problems ("There is really no one who can give me objective feedback about how I am handling my problems," keyed false); *Belonging* items assess the perceived availability of people with whom one can do things ("There are several different people with whom I enjoy spending time," keyed true); *Tangible* questions assess the perceived availability of material aid ("If I were sick and needed someone to drive me to the doctor, I would have trouble findings someone," keyed false); and *Self-esteem* items measure the perceived availability of a positive comparison when comparing one's self with others ("I have someone who takes pride in my accomplishments," keyed true). Given the high intercorrelations of the subscales, the total score was used in analyses. Cohen et al[97] have shown the total score to be internally consistent (α = .90) and to have good test-retest reliability (6-week test-retest r = .70). In the current study, the ISEL demonstrated high internal consistency (α = .89). The ISEL has also been shown to be sensitive to psychiatric disorders[57,97] and longitudinal studies have found the ISEL to predict the course of psychiatric disorders over and above symptomatology and personality traits.[97,98]

Family Support. An index of perceived family support was derived from 3 subscales of the Family Environment Scale (FES)[99]: *Cohesion*, the degree of commitment and support within the family (eg, "Family members really help and support one another," keyed true); *Expressiveness*, the extent to which family members are encouraged to act openly and express their feelings directly ("There are a lot of spontaneous discussions in our family," keyed true); and *Conflict*, the extent to which the expression of anger and conflict-laden interactions are characteristic of the family ("Family members often criticize each other," keyed true). Each of these subscales consists of 9 true-false items. These FES subscales have been shown to have acceptable internal consistency (Cronbach's α = .69–.78) and good construct validity.[99,100] Within the current study, high internal consistency was demonstrated for the scales of Cohesion (α = .82) and Conflict (α = .76), but was lower for *Expression* (α = .47).

Results

Analyses were conducted in 4 stages. First we examined demographic characteristics to determine if there were any group differences. Second, group differences in Axis I disorders, schizophrenia-spectrum personality disorder characteristics, and negative symptom characteristics were assessed. Third, group differences in traits,

Table 1. Demographic Characteristics at Baseline Assessment

	Social Anhedonia (n = 86)	Control (n = 89)
Percentage female	57%	53.9%
Race, n (%)		
White	38 (44.2)	40 (44.9)
African American	40 (46.5)	37 (41.6)
Hispanic	6 (7.0)	7 (7.9)
Asian	1 (1.2)	2 (2.2)
Other	1 (1.2)	3 (3.4)
Highest level of education, n (%)		
Grade 7–12 but not graduating	1 (1.1)	1 (1.2)
Graduated high school or GED	25 (29.1)	9 (10.1)
Part-time college	60 (69.8)	79 (88.8)
Global functioning, M (SD)		
Global Assessment of Functioning Scale	71.12 (16.53)	81.15 (13.13)
Parental social position, M (SD)		
Averaged parental index	41.76 (13.24)	41.40 (12.18)

Note: GED, General Equivalency Diploma.

social support, and family environment were evaluated. Finally, cross-sectional correlates of spectrum characteristics and functioning were assessed within the social anhedonia group.

Demographic Characteristics

Demographic characteristics are presented in table 1. The groups did not differ in sex χ^2 (1, 175) = .16, $P > .05$, or race, χ^2 (4, 175) = 1.53, $P > .05$. The groups did differ significantly in highest level of education achieved at the time of baseline assessment, χ^2 (2, 175) =10.08, $P < .01$. Individuals with the control group had higher educational attainment than did those in the social anhedonia group, with 88.8% of controls attending some college compared with 69.8% in the social anhedonia group. The social anhedonia group had lower levels of overall functioning as reflected in GAF scores, $t(173) = 4.45$, $P < .001$, $d = .70$. There were no group differences in overall parental social position, as indexed by the average of mothers' and fathers' positions, $t(171) = -.189$, $P > 05$.

Clinical Characteristics

Lifetime rates of mood, psychotic, and substance-use disorders are presented in table 2. The social anhedonia was diagnosed with significantly higher rates of lifetime mood disorders (in particular depression) than was the control group, $\chi^2(1, 175) = 13.72$, $P < .05$. Although a lifetime history of mood disorders was present in 30.2% of individuals in the social anhedonia group, only 5 (5.8%) had a current mood disorder diagnosis (4 with current major depression and 1 with dysthymia).

Table 2. Lifetime Mood, Psychotic, and Substance-Use Disorders Occurring at Baseline Assessment

	Social Anhedonia (n = 86)	Control (n = 89)
Mood disorders		
Major depression	25 (29.1%)	8 (9%)
Dysthymia	1 (1.2%)	2 (2.2%)
Bipolar disorder	0	0
Any mood disorder	26 (30.2%)	8 (9%)
Psychotic disorders		
Delusional disorder	0	1 (1.1%)
Psychosis NOS	0	1 (1.1%)
Schizophrenia	1 (1.2%)	0
All psychotic disorders	1 (1.2%)	2 (2.2%)
Substance-use disorders (SUD)		
Alcohol-use disorder	8 (9.3%)	14 (15.7%)
Drug-use disorder	8 (9.3%)	13 (14.6%)
Any SUD	12 (14%)	17 (19.1%)

Rates of psychotic disorders did not differ between the groups, $\chi^2(1, 175) = .31$, $P > .05$, although 1 case of schizophrenia was diagnosed within the anhedonia group and 2 cases of psychotic disorder were diagnosed in the control group. There were no group differences in rates of substance-use disorders, $\chi^2(1, 175) = 1.16$, $P > .05$.

Schizophrenia-spectrum personality disorders diagnoses are presented in table 3. Participants with psychotic disorders were excluded from these analyses of personality characteristics. Although the social anhedonia group appeared to have somewhat higher rates of spectrum diagnoses (5.9%) than controls (1.1%), this difference was not significant, $\chi^2(1, 172) = .09$, $P > .01$.

Dimensional scores for spectrum disorders are also presented in table 3. Because of substantial skew (2.0–2.5) in the dimensional scores, analyses were conducted on square root–transformed data (skew of transformed data .34 to .72). Separate group × sex ANOVAs were conducted on each IPDE spectrum dimensional score. For schizotypal dimensional scores, there was a main effect for group $F_{172} = 28.76$, $P < .001$, $d = .72$, with the social anhedonia having higher scores than controls. The main effect for sex and the sex × group interaction was not significant, values for $F_{172} = .188, .190$, respectively, P values $>.05$.

A significant main effect of group for schizoid dimensional scores was obtained, $F_{172} = 33.25$, $P < .001$, $d = .77$. However, the main effect of sex and the sex × group interaction was not significant, values for $F_{172} = 0.15, 1.08$, respectively, P values $>.05$. Social anhedonia had higher schizoid scores than control participants.

A similar pattern emerged for paranoid dimensional scores, with a significant main effect for group, $F_{172} =$

Table 3. Schizophrenia-Spectrum Personality Disorders and Characteristics at Baseline Assessment

	Social Anhedonia (n = 85)	Control (n = 87)
Diagnoses		
Schizotypal	0	0
Schizoid	2 (2.4%)	0
Paranoid	3 (3.5%)	1 (1.1%)
Any spectrum diagnosis	5 (5.9%)	1 (1.1%)
Spectrum dimensional scores		
Schizotypy		
M	1.22	.33
SD	1.52	.86
Schizoid		
M	1.36	.28
SD	1.84	.71
Paranoid		
M	1.24	.47
SD	1.84	1.02
Global negative symptom score		
SDS[a]		
M	2.06	.94
SD	2.74	1.50

Note: SDS, Schedule for the Deficit Syndrome. Participants with psychotic disorder diagnoses excluded.
[a]Due to missing data, n = 84 for SDS ratings within social anhedonia group.

10.55, $P < .005$, $d = .52$, with social anhedonia participants having higher scores than control participants. The main effect of sex and the sex × group interaction for paranoid scores was not significant, values for $F_{172} = 1.04$, 0.5, respectively, P values $>.05$. Given the lack of gender differences in personality disorder characteristics, we collapsed across males and females in subsequent analyses.

Groups differed significantly in the total negative symptom score from the SDS, $t(169) = -3.32$, $P < .01$, $d = .51$. As indicated in table 3, dimensional ratings were higher in the social anhedonia group. Given that the SDS includes an item (Reduced Social Drive) that is conceptually similar to what is measured in the Social Anhedonia Scale, it could be possible that this shared content alone is driving the observed group differences (individuals in the social anhedonia group are simply scoring high on the SDS because of their endorsement of the reduced social drive item). To examine this possibility, we recomputed the SDS score based on 5 items, excluding the Reduced Social Drive item. The social anhedonia group continued to score higher than controls on the revised SDS score, $t(169) = -2.29$, $P < .05$, $d = .35$. Thus, group differences in negative symptom characteristics are not merely a consequence of shared item content across the instruments.

Table 4. Self-report Trait Measures

	Social Anhedonia (n = 86)	Control (n = 89)
Chapman scales		
Social anhedonia		
M	24.26	8.12
SD	5.58	3.49
Magical Ideation		
M	9.93	6.53
SD	5.68	2.74
Perceptual aberration		
M	6.85	2.66
SD	5.44	2.06
General Temperament Scale		
Trait positive affect		
M	13.41	18.79
SD	6.67	5.59
Trait negative affect		
M	18.09	12.15
SD	6.81	5.78
Trait disinhibition		
M	14.44	13.22
SD	6.60	6.01

Role of Axis I Disorders. Given current mood, psychotic disorder, and substance-use disorders within the sample, we sought to examine the impact of these diagnoses on findings relating to current functioning and schizophrenia-spectrum characteristics. Participants with current diagnoses of mood (depression or dysthymia), psychotic disorders, and alcohol- and drug-use disorders were excluded from group comparisons, and the above analyses were repeated. Identical group differences were obtained as reported above. Compared with the control group, social anhedonia participants reported poorer overall functioning on the GAF ($P < .001$); greater ratings of schizotypal, schizoid, and paranoid personality disorder characteristics (all P values $<.01$); and elevated negative symptom characteristics ($P < .01$). These findings indicate that group differences in functioning and clinical characteristics are not attributable to current Axis I disorders.

Traits

Descriptive statistics for trait measures are presented in table 4. As expected given the group selection criteria, at the time of the initial screening the social anhedonic group reported significantly greater scores on the SocAnh Scale than did controls, $t(173) = -23.03$, $P < .001$, $d = 3.47$. As expected given the selection criteria for controls, comparisons on scores of MagicId indicated that social anhedonia participants had significant elevations on this scale compared with controls, $t(173) = -5.07$, $P < .001$, $d = .76$. Similarly, compared with the

Table 5. Social Support and Family Environment Measures

	Social Anhedonia (n = 86)	Control (n = 89)
Social support, number		
M	17.45	23.89
SD	9.55	11.28
Interpersonal Support Evaluation List		
M	25.29	32.63
SD	6.18	3.43
Family Environment Scale		
Cohesion		
M	4.64	6.14
SD	2.80	2.58
Conflict		
M	4.50	3.53
SD	2.45	2.30
Expression		
M	4.02	3.53
SD	1.83	2.30

control group, the social anhedonia group had higher scores on the PerAb, $t(173) = -6.77$, $P < .001$, $d = 1.02$. Thus, social anhedonia participants had elevations on self-reported positive schizotypy traits compared with control participants.

A multivariate analysis of variance (MANOVA) was conducted on the GTS subscales of Trait PA, Trait NA, and Disinhibition. The MANOVA was significant, $F_{171} = 19.09$, $P < .001$. Significant univariate group differences were found for Trait PA, $F_{174} = 33.79$, $P < .001$, $d = .87$, with lower scores in the social anhedonia group. Control participants had significantly lower Trait NA compared with social anhedonia participants, $F_{174} = 38.89$, $P < .001$, $d = .94$. There were no group differences in Disinhibition, $F_{174} = 1.60$, $P > .05$, $d = .19$.

Group comparisons of the GTS subscales were also conducted excluding those participants with current Axis I disorders (depression, dysthymia, psychosis, and substance-use disorders). The same pattern of results was obtained as with the full sample with social anhedonia participants evidencing greater trait NA and less trait PA than control participants (P values $<.001$). Thus, group differences in NA and PA were not attributable to current Axis I diagnoses.

Social and Family Measures

Group comparisons were conducted on the number of social supports reported on the SSQ-N and general perceived social support as reported on the ISEL (see table 5). Social anhedonia participants reported significantly fewer social supports (SSQ-N) than did control participants, $t(169) = 4.02$, $P < .001$, $d = .62$. The social anhedonia group also reported significantly less perceived social support (ISEL) compared with the control group, $t(169) = 9.67$, $P < .001$, $d = 1.47$. In order to examine the role of current mood, psychotic, and substance-use disorders on social measures, participants with current Axis I disorders were excluded from analyses. Results were identical to the full sample with the social anhedonia group reporting fewer social supports and less perceived social support (P values $<.005$).

A MANOVA was conducted on the 3 subscales of the FES: Cohesion, Expressiveness, and Conflict. The MANOVA was significant, $F_{3,170} = 4.80$, $P < .005$. Univariate group comparisons indicated that, compared with control participants, social anhedonia participants reported significantly less Cohesion, $F_{1,174} = 13.43$, $P < .001$, $d = .56$, and significantly greater Conflict, $F_{1,174} = 7.19$, $P < .01$, $d = .41$. There were no group differences in Expressiveness, $F_{1,174} = 2.23$, $P > .05$, $d = .24$. These results indicate that compared with the control group, individuals in the social anhedonia group had fewer social relations that provide support and perceive their families as less helpful and supportive and as having greater conflict. Results for the FES scales were unaltered when participants with current mood, psychotic, and substance-use disorders were excluded from group comparisons. In those individuals without current Axis I disorders, compared with controls, social anhedonia participants reported less cohesion and greater conflict within their families (P values $<.05$).

Role of Other Putative Schizotypy Traits. The social anhedonia group was selected irrespective of scores on the PerAb and MagicId, whereas membership within the control group required low scores on these other schizotypy measures. Thus, there is a question as to the role that these positive schizotypy traits might play in the observed group findings. To examine this issue we selected those participants within the social anhedonia group whose scores on MagicId and PerAb were within the range of scores obtained within the control group. This ''pure'' social anhedonia group ($n = 42$) did not differ from controls in sex, χ^2 (1, 129) = .003, $P > .05$, or race, χ^2 (4, 175) = 2.81, $P > .05$. The 2 groups did not differ on MagicId, t (127) = 1.03, $P > .05$, nor did they differ on PerAb, $t(127) = -1.75$, $P > .05$. Group comparisons were again conducted on clinical, trait, and social variables. All clinical symptom (IDPE and SDS scales) and functioning (GAF) group comparisons for the full sample were replicated using the pure social anhedonia group (all P values $<.05$). Similarly, the same pattern of group differences was obtained on trait measures (GTS), with the ''pure social anhedonia'' group reporting lower trait PA and higher NA compared with controls (P values $<.05$). Finally, we examined group differences obtained on the social and family measures. Again, the pure social anhedonia group still reported fewer social supports (SSQ-N) and lower perceived social support (ISEL) compared with controls (P values $<.05$). The only group differences not replicated was that the pure social anhedonia group

Table 6. Correlates of Schizophrenia-Spectrum Ratings and Functioning within Social Anhedonics ($n = 85$)

	IPDE Dimensional Scores			
	Schizotypal	Schizoid	Paranoid	GAF
Psychosis-Proneness Scales				
Magical Ideation	.17	.01	.28*	−.27*
Perceptual Aberration	.01	.03	.08	−.38**
General Temperament Scale				
Trait positive affect	−.11	−.19	.13	.12
Trait negative affect	.08	.04	.19	−.30**
Trait disinhibition	.05	−.11	.03	−.13
Social Support				
Number of social supports (SSQ-N)	−.06	−.25*	−.29**	.31**
Perceived social support (ISEL)	−.41***	−.50***	−.37***	.50***
Family Environment Scale				
Cohesion	−.16	−.16	−.25*	.31***
Conflict	.02	−.02	.20	−.22*
Expression	−.28*	−.14	−.08	.19

Note: Participants with psychotic disorder diagnoses excluded. IPDE, International Personality Disorder Examination; GAF, Global Assessment of Functioning Scale; SSQ-N, Social Support Questionnaire; ISEL, Interpersonal Support Evaluation List.
*$P < .05$. **$P < .01$. ***$P < .005$.

did not differ from the control group on any of the FES scales (all P values $>.05$). These results indicate that group findings demonstrating increased clinical severity, greater functional impairment, as well as trait and social support differences in the social anhedonia group are not solely attributable to traits tapped by magical ideation and perceptual aberration (traits elevated in the full social anhedonia group).

Correlates of Clinical Characteristics Within Social Anhedonia

We hypothesized that the clinical heterogeneity within social anhedonia participants would be associated with individual differences in traits, social support, and family environment. In order to examine this hypothesis, correlational analyses were conducted between these individual difference variables, IPDE dimensional scores (representing symptom severity) and GAF ratings (representing functional impairment). Correlations are presented in table 6.

Psychosis-Proneness Scales. MagicId was significantly correlated with paranoid dimensional scores ($r = .28$, $P < .05$) but not with schizotypal or schizoid scores (P values $>.05$). PerAb scores were uncorrelated with any IPDE scale (P values $>.05$). With regard to general functioning, both MagicId and PerAb were negatively correlated with GAF scores (r values $= -.27, -.38$, P values $<.05$, respectively). Thus, only MagicId was related to schizophrenia-spectrum symptomatology within the social anhedonia group, but this was limited to paranoid characteristics. Both the psychosis-proneness measures were related to general functioning, with greater perceptual aberration and magical ideation related to poorer functioning.

Temperament. As can be seen in table 6, within the social anhedonia group there were no significant correlations between trait PA, NA, or Disinhibition, and IPDE scores (P values $>.05$). Overall functioning was correlated with trait NA ($r = -.30$, P values $<.01$), but not with trait PA or Disinhibition (P values $>.05$). Thus, broad affective traits were unrelated to the cross-sectional clinical ratings of schizophrenia-spectrum characteristics, but greater Trait NA was associated with poorer current functioning within social anhedonia participants.

Social Support. Reported number of social supports was negatively correlated with IPDE schizoid ($r = -.25$, $P < .05$) and paranoid ($r = -.29$, $P < .01$) dimensional ratings but was uncorrelated with schizotypal dimensional scores (P values $>.05$). Perceived social support as indexed by the ISEL was significantly negatively correlated with all IPDE scales (range of r values $= -.37$ to $-.50$; P values $<.005$). Better global functioning was significantly correlated with more social support relationships ($r = .31$, P values $<.01$) and greater perceived social support (ISEL, $r = .50$, $P < .005$). Thus, greater number of social supports and greater perceived social support were related to lower schizophrenia-spectrum characteristics and were related to better general functioning within the social anhedonia group.

Family Environment. IPDE dimensional schizotypal ratings were negatively correlated with family Expression ($r = -.28$, $P < .05$), and paranoid ratings were negatively

correlated with family Cohesion ($r = -.25$, $P < .05$). No other IPDE ratings were associated with family environment; notably there were no correlations between the IPDE and family Conflict. Higher general functioning was associated with greater family cohesion ($r = .31$, $P < .005$), whereas lower global functioning was related to greater family conflict ($r = -.22$, $P < .05$).

Discussion

This study sought to examine the validity of social anhedonia as an indicator of risk for schizophrenia-spectrum disorders within a representative community sample. Furthermore, we evaluated the role of other individual difference variables in accounting for variable clinical severity within social anhedonia participants including trait affectivity, social support, and family environment. The MLSS successfully recruited a racially diverse sample with 55% of participants from minority groups. Further, the finding that social anhedonia participants were less likely than controls to attend college highlights the benefits of utilizing a community sample.

As hypothesized, social anhedonia participants were found to have elevated dimensional ratings of schizotypal, schizoid, and paranoid personality disorders. Although rates of schizophrenia-spectrum diagnoses were elevated in the social anhedonia group (5.9%) compared with the control group (1.1%), the groups did not differ in spectrum diagnoses. Additionally, social anhedonia participants evidenced elevated ratings of negative symptoms. These findings indicate that social anhedonia successfully identifies individuals with current elevations in both positive and negative schizotypy characteristics. These results are consistent with prior studies reporting increased schizophrenia-spectrum characteristics within social anhedonia participants during a cross-sectional assessment.[10–13] The lack of group differences in full-spectrum diagnoses may be attributable to the relatively young age of this sample (18–19 years) and will require future assessments to determine if personality disorder diagnoses increase with age.

Examining Axis I disorders, social anhedonia participants had elevations in lifetime mood disorders of depression and dysthymia (31.4% vs 9% in control participant). Prior college studies have reported mixed results concerning depression and social anhedonia. Kwapil[11] found more severe depressive symptoms in social anhedonia participants compared with controls during an initial baseline assessment, whereas another study[10] failed to find differences between a social anhedonia group and a control group in history of depression. Higher rates of depression within the MLSS may reflect sampling differences with this community sample evidencing greater clinical severity compared with college samples.

One issue that arises in the interpretation of these findings is the extent to which elevated anhedonia is reflecting diminished hedonic responding as a result of transient depression vs the conjectured enduring anhedonia related to schizotypy.[6] However, this did not seem to be the case in the present study as current mood disorders (depression and dysthymia) had a more modest rate of 5.8% within social anhedonia participants. Additionally, we examined group differences in spectrum characteristics and other individual differences excluding participants with current Axis I disorders (mood, psychotic, and substance-use diagnoses) and found that group findings were unaltered. Thus, findings relating to spectrum characteristics, trait affectivity, social support, and family environment within social anhedonia participants are not attributable to current Axis I pathology. Although this strategy permits the consideration of group findings without the presence of depression and other disorders, other studies would suggest that the interpretation of Axis I disorders as purely nuisance characteristics in the study of schizotypy is problematic. Depression and other affective symptomatology are frequent in high-risk samples and in the prodrome of schizophrenia,[101,102] and adolescent Axis I disorders have been shown to be predictive of schizophrenia-spectrum personality disorders in adulthood.[103] As the MLSS conducts planned follow-up assessments, we will be able to examine the role of baseline psychopathology in the trajectory of future clinical characteristics and functioning.

Turning to trait characteristics, as hypothesized, social anhedonia participants reported significantly elevated trait NA and significantly lower trait PA compared with controls. There were no group differences in trait disinhibition. The finding of elevated NA is consistent with findings of increased trait NA/neuroticism in schizophrenia,[4,6] schizotypal personality disorder,[50,51] and studies of social anhedonia within college students.[13,48,49] Similarly, diminished PA in social anhedonia participants fits with findings of low trait PA/extraversion in schizophrenia,[4,6] schizotypal personality disorder,[50,51] and college studies of social anhedonia.[48,49]

Importantly, it should be noted that this pattern of trait affectivity is not unique to schizophrenia, or related spectrum personality disorders, and has been identified in Axis I disorders such as depression[51,104,105] and social anxiety[104,105] as well as in other personality disorders.[50] However, in the present study, when participants with current mood, psychotic, and substance-use disorders were excluded from the current sample, social anhedonia participants continued to differ from control participants in elevated NA and diminished PA. Thus, group differences in affectivity cannot be attributed to current Axis I disorders, and this finding appears consistent with the conjecture that increased NA and decreased PA reflect enduring individual differences within social anhedonia participants (though this conjecture will best be tested in longitudinal assessments).

As hypothesized, measures of social relationships consistently differentiated the social anhedonia group from the control group. Social anhedonia participants reported fewer social supports and reported less perceived social support than did control participants. Focusing on family relationships, social anhedonia participants described their families as less cohesive, less helpful and supportive, and as having greater conflict than did controls. There were no group differences in ratings of family expressiveness, the degree to which family members openly express their feelings. These findings replicate prior reports in college samples of reduced social relationships and lower social support in social anhedonia participants[10,13] and elaborate on prior reports of poorer family adjustment related to social anhedonia.[10]

Together with the findings of elevated paranoid personality disorder features within the social anhedonia group, results from self-reports of social support and family environment indicate that individuals with social anhedonia do not merely experience their social environments with disinterest and disengagement. Rather, the picture that emerges is of individuals with high social anhedonia being aware of their lack of social support and experiencing their families as more conflictual. Further, the elevated paranoid personality characteristics indicate that these individuals are more likely to perceive others' actions and intentions as malicious. Given the latter finding, it is important to note that although ratings of family environment suggest more problematic family environments for the social anhedonia group, these are self-reports that might be influenced by personality pathology and may not necessarily reflect the perceptions or behavior of family members. Collateral reports of other family members and direct observation of family interaction—as have been employed in studies of schizophrenia[106,107]—would provide useful insights regarding how individuals high in social anhedonia interact with and respond to family members.

One goal of the MLSS is to better understand variability in clinical outcomes within individuals with social anhedonia by examining individual differences in other traits (affective and psychosis proneness), social support, and family environment. Cross-sectional analyses were used as a preliminary test to determine if these individual differences were related to severity of clinical characteristics (spectrum characteristics and overall functioning) within the social anhedonia group. With regard to other measures of psychosis proneness, it was notable that within the social anhedonia group, perceptual aberration was unrelated to dimensional ratings of schizotypal, schizoid, or paranoid personality disorder. Magical ideation was only related to paranoid ratings such that greater MagicId was moderately associated with greater paranoid severity. Both these psychosis-proneness measures were significantly correlated with worse overall functioning in the social anhedonia group.

The subgroup analyses with pure social anhedonia and the correlational findings with the full social anhedonia group showing a lack of an association between perceptual aberration and any of the spectrum ratings, and the finding that magical ideation was only associated with paranoid (but not schizotypal) characteristics are all inconsistent with speculation by Meehl[108] that social anhedonia's relationship to schizotypy might be a secondary consequence of anhedonia's association with other schizotypal traits. Our results are consistent with other cross-sectional[13] and longitudinal[11] findings and also are in line with taxometric findings indicating that the latent structure of social anhedonia is not merely secondary to positive schizotypy traits.[79] However, the present results are limited because they are cross-sectional. The possible additive role of perceptual aberration and especially magical ideation[10,109] within the social anhedonia group will need to be examined longitudinally.

Contrary to expectations, although there were group differences in measures of trait affectivity, these traits were unrelated to spectrum characteristics within the social anhedonia group. These findings are not consistent with our recent report of trait NA correlating with dimensional spectrum ratings in a college sample of individuals high in social anhedonia.[13] Higher trait NA was associated with lower ratings of overall functioning, with a medium effect size. However, after controlling for positive schizotypy traits of perceptual aberration and magical ideation, trait NA was no longer associated with overall functioning. Thus, cross-sectionally, trait NA does not appear to be an independent contributor to functioning within individuals high in social anhedonia. These null results within individuals high in social anhedonia may in part be due to the restricted range within this group. Longitudinal assessments within the MLSS will allow for the determination of how trait affectivity is related to future clinical outcomes.

Within the social anhedonia group, having fewer social supports was associated with greater schizoid and paranoid characteristics as well as with worse general functioning. Less perceived social support was related to higher ratings of schizotypy, schizoid, and paranoid personality characteristics and was related to worse overall functioning. Effect sizes were consistently of medium, $r = -.37$, to large magnitude, $r = .50$.[110] Consistent with our hypotheses, these results indicate that social support may prove to be informative in understanding the variable clinical outcomes within individuals high in social anhedonia.

The contributions of family environment to variability in clinical severity were less consistent than observed for general social support. Greater family cohesion was related to lower paranoid ratings and better overall functioning. Greater conflict within the family was related to less overall functioning but was not related to any

schizophrenia-spectrum personality disorder characteristics. Less family expressivity was associated with greater schizotypal ratings. Of course, the cross-sectional results limit interpretation because it is unclear if social and family difficulties lead to, or are a consequence of, symptoms. Longitudinal findings will permit an examination of whether social support and family environment independently contribute to clinical outcomes, above and beyond baseline symptoms.

Caution is warranted in the interpretation of the current findings. Although the findings of elevated schizophrenia-spectrum characteristics are consistent with the hypothesized role of social anhedonia as an indicator of risk, these results are cross-sectional. The critical issue concerns the predictive validity of social anhedonia.[11,22] Prior longitudinal research on other psychometric measures presumed to tap schizotypy has found instead that broader psychosis was being predicted by these traits.[9] Additionally, recent studies have indicated the dynamic nature of personality traits including the decline of schizophrenia-spectrum personality disorder symptoms during development in young adulthood.[103] The MLSS includes a 3-year follow-up evaluation with further planned assessments to evaluate our participants as they move through young adulthood.

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