Social anhedonia as a predictor of the development of schizophrenia-spectrum disorders.

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Abstract:

College undergraduates (n = 34) identified by deviant scores (at least 1.96 SD above the mean) on the Revised Social Anhedonia (SocAnh) Scale (M. Eckblad, L. J. Chapman, J. P. Chapman, & M. Mishlove, 1982) were compared with control participants (n = 139) at an initial assessment and at a 10-year follow-up evaluation. Twenty-four percent of the SocAnh group were diagnosed with schizophrenia-spectrum disorders at the follow-up compared with only 1% of the control group, despite the fact that there had been no such difference between the groups at the initial assessment 10 years earlier. The SocAnh group exceeded the control group on severity of psychotic-like experiences and had poorer overall adjustment at the follow-up but not at the initial assessment. The groups did not differ on mood symptoms or substance-use disorders. Thus. the SocAnh Scale, unlike the Perceptual Aberration and Magical Ideation Scales, appears to identify individuals at specific risk for future development of schizophrenia-spectrum disorders.

Keywords: anhedonia | schizophrenia | social anhedonia | development of schizophrenia spectrum disorders | college students | 10 year follow up

Article:

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The present study investigated the usefulness of the Revised Social Anhedonia (SocAnh) Scale (Eckblad, Chapman, Chapman, & Mishlove, 1982) as a predictor of the development of schizophrenia-spectrum disorders in a 10-year longitudinal study of young adults. The participants were assessed as part of Chapman, Chapman, Kwapil, Eckblad, and Zinser's (1994) longitudinal study of psychosis proneness. The SocAnh Scale contains items that tap schizoid asociality. Therefore, it was expected that individuals identified by deviantly high scores on the scale would be at an especially heightened risk for schizophrenia-spectrum disorders and poor social adjustment.

Although a small percentage of individuals identified by the SocAnh Scale are expected to develop clinical psychosis, the majority are not expected to decompensate—although they may experience attenuated or transient symptoms consistent with schizophrenia. These symptoms are hypothesized to fall on a continuum of psychotic-like adjustment from relatively normal to schizophrenia-spectrum personality disorders to full-blown clinical psychosis. Identification of such high-risk individuals should facilitate the identification of relevant etiological factors and the development of prophylactic interventions.

Social Anhedonia and Schizophrenia- Spectrum Disorders

Disinterest in social contact and social isolation are widely described as features of the prodromal, active, and residual phases of schizophrenia, as well as being central features of schizoid and schizotypal personality disorders. The Diagnostic and Statistical Manual of Mental Disorders (DSM–IV; American Psychiatric Association, 1994) indicated that social dysfunction occurs in all phases of schizophrenia. Kraepelin (1913/1919) and Bleuler (1911/1950) described asociality as characteristic of the preschizophrenic condition. Social anhedonia played a central role in Rado's (1956) model of the development of schizophrenia, which greatly influenced Meehl's (1962) theory of schizotypy. Meehl stated that anhedonia was one of the four core symptoms of schizotypy and schizophrenia. He indicated that the anhedonia experienced by schizotypic and schizophrenic patients is primarily interpersonal. According to his original formulation, all schizophrenia-prone individuals will experience social anhedonia, along with other core symptoms. In a more recent formulation, Meehl (1990) assigned anhedonia a less central role as one of several polygenic traits that serve as potentiators of the risk of developing schizophrenia in schizotypic individuals.

The Social Anhedonia Scale

Scale Development and Revision

Chapman, Chapman, and Raulin (1976) developed the original 48-item, self-administered SocAnh Scale to measure both lack of social pleasure and social anxiety. The scale was constructed following the recommendations of Jackson (1970) for the development of personality measures. The items were designed to inquire about stable personality characteristics rather than current experiences. The original scale, however, was not an effective predictor of psychotic-like experiences. Therefore, Eckblad, Chapman, Chapman, and Mishlove (1982) revised the SocAnh Scale by removing items that tapped social anxiety and avoidant behavior and by including additional items that tapped schizoid withdrawal. Mishlove and Chapman (1985) reported that the 40-item revised SocAnh Scale has a coefficient alpha value of .79 both for male (n = 775) and for female (n = 840) participants and has only modest correlations with the Chapmans' other scales of psychosis proneness.

Cross-Sectional Findings for the SocAnh Scale

Mishlove and Chapman (1985) reported that college students identified by standard scores of 2 or above on the SocAnh Scale reported significantly poorer social adjustment and greater withdrawal than control participants. However, they indicated that evidence of a relationship of SocAnh scores with psychotic-like experiences and schizotypal symptoms in college students was mixed. Bailey, West, Widiger, and Freiman (1993) reported that among personality-disordered inpatients, scores on the SocAnh Scale were significantly correlated with ratings of schizoid and schizotypal traits. Lyons et al. (1995) found that scores on the SocAnh Scale were significantly associated with ratings of schizoid, paranoid, and avoidant personality in the relatives of schizophrenic patients. Merritt, Balogh, and DeVinney (1993) reported that 55% of a sample of college students identified by the SocAnh Scale produced Minnesota Multiphasic Personality Inventory profiles associated with schizophrenia-spectrum disorders, although they did not report comparable rates in a comparison group.

Longitudinal Findings of the SocAnh Scale as a Potentiator of Psychosis Proneness Among Magical Ideation (MagicId) Scale

Chapman et al. (1994) found that participants with deviantly high scores on the MagicId Scale (Eckblad & Chapman, 1983) who also scored above the mean on the SocAnh Scale were especially psychosis prone in middle adulthood, despite the fact that these individuals were not markedly deviant in late adolescence or early adulthood. They reported that 21% of the magical ideation–social anhedonia (MagSoc) subgroup developed a psychotic illness during a 10-year follow-up period. In addition, the MagSoc participants received significantly higher ratings of psychotic-like experiences and of schizotypal symptoms and poorer ratings of overall functioning at the follow-up assessment than did either the remaining high-risk or control participants. The MagSoc group did not have higher ratings of schizoid symptoms. Scores on the SocAnh Scale were significantly correlated with ratings of psychotic-like and schizotypal

experiences in the MagSoc group at the follow-up, despite a limited range of scores on the SocAnh Scale.

The present study investigates whether the SocAnh Scale independently predicts the development of schizophrenia-spectrum disorders, as opposed to simply potentiating the prediction of psychosis proneness by the MagicId Scale. The study also investigates whether SocAnh participants appear especially psychosis prone in adulthood, even if they are not deviant in early adulthood (as was found in the MagSoc subgroup). Finally, the study explores whether the SocAnh Scale identifies individuals who are specifically at risk for developing schizophrenia-spectrum symptoms and disorders—in contrast to the Perceptual Aberration (PerAb; Chapman, Chapman, & Raulin, 1978) and MagicId Scales, which identify individuals at heightened risk for psychoses, mood disorders, and substance-use disorders, but not specifically schizophrenia-spectrum disorders.

The advantages of using the Chapmans' longitudinal sample to examine the SocAnh Scale as a predictor of psychosis proneness is that all of the participants completed the SocAnh Scale at the start of the study and were thoroughly assessed at initial and 10-year follow-up evaluations. The limitation is that participants were not initially selected into the longitudinal study on the basis of their scores on the SocAnh Scale. Therefore, some high scorers on the SocAnh Scale also have elevated scores on other psychosis-proneness scales. Furthermore, the SocAnh participants in this study are not entirely representative of all SocAnh participants in the screening sample because they were selected from individuals who scored either above a standard score of 1.96 or below a standard score of 0.5 on other measures of psychosis proneness. Method

Participants

Participants were selected from the Chapmans' longitudinal study of psychosis proneness at the University of Wisconsin—Madison (please refer to Chapman et al., 1994, for a complete description of this project). They included 37 individuals who received a standard score of at least 1.96 on the SocAnh Scale and 143 control participants who scored less than 0.5 SD above the mean on the SocAnh, PerAb, MagicId, Impulsive Nonconformity (Noncon; Chapman et al., 1984) and Physical Anhedonia (PhyAnh; Chapman, Chapman, & Raulin, 1976) Scales. Participants were originally selected from among Caucasian college students enrolled in introductory psychology classes between 1978–1981. Individuals had participated for course credit at the initial assessment and were paid for their participation at the follow-up evaluation.

Ninety-two percent (34 out of 37) of the SocAnh participants and 97% (139 out of 143) of the control participants were reassessed at the 10-year follow-up. Table 1 provides demographic information for the groups at the follow-up. Among the reinterviewed SocAnh participants, 47% had scored deviantly high (standard score of 1.96 or above) on the PerAb Scale, MagicId Scale, or both; 29% had scored deviantly high on the PhyAnh Scale; and 15% had scored deviantly

high on the Noncon Scale. None of the control participants had deviantly high scores on these scales.

Table 1
Demographic Information for the SocAnh and Control Groups at the Follow-Up Interview

	SocAnh		Control	
Variable	*M*	*SD*	*M*	*SD*
Age	30.1	2.6	30.0	1.9
Father's social position	33.4	16.4	30.6	15.4
Years of education	16.3	1.9	16.5	1.5
Years to follow-up	10.8	1.0	10.6	0.9

Note. For the SocAnh group, $n = 34$. For the control group, $n = 139$. Social position is a weighted composite rating of education and occupation for which higher scores indicate poorer accomplishment. SocAnh = social anhedonia.

Demographic Information for the SocAnh and Control Groups at the Follow-Up Interview

Materials and Procedures

Initial evaluation

Participants had been administered a comprehensive diagnostic interview following the mass screening. The initial interview consisted of a modified version of the Schedule for Affective Disorders and Schizophrenia—Lifetime Version (SADS–L; Spitzer & Endicott, 1977) and the Social Adjustment Scale (Weissman & Paykel, 1974). The SADS–L was modified to obtain additional information about psychotic-like experiences. Sufficient information was obtained in the initial interview to retrospectively make DSM–IV diagnoses of schizotypal and schizoid personality disorder but not of paranoid personality disorder.

Ten-year follow-up evaluation

The follow-up interview consisted of a modified version of the SADS-L and portions of Loranger's (1988) Personality Disorder Exam (PDE) that assess schizotypal, schizoid, and paranoid personality disorders. The PDE provides diagnoses of personality disorders as well as trait ratings of the disorders. The diagnostic interview assessed psychopathology and functioning dating back to the time of the initial testing. Participants were assessed on two measures of overall functioning: the Hollingshead (1957) Two-Factor Index of Social Position and the Global Adjustment Scale (GAS; Endicott, Spitzer, Fleiss, & Cohen, 1976). The Index of Social Position is a weighted composite measure of occupation and education (with higher scores indicating lower social position). The GAS is a rating of overall adjustment ranging from marked psychopathology at the low end to superior functioning at the high end. Participants were also questioned concerning family history of psychopathology.

I used the Wisconsin Manual for Assessing Psychotic-Like Experiences (Chapman & Chapman, 1980; Kwapil, Chapman, Chapman, & Miller, 1996) to assess the degree of deviancy of psychotic symptoms and psychotic-like experiences at both assessments. The manual provides criteria for rating seven classes of experiences on a continuum ranging from normal to markedly psychotic. The classes of experiences include (a) transmission of thoughts, (b) passivity experiences, (c) auditory experiences, (d) thought withdrawal, (e) aberrant beliefs, (f) visual experiences, and (g) olfactory experiences.

The diagnostic interviews lasted approximately 2 hr and were tape-recorded. The interviews, scoring, and diagnoses were conducted by psychologists and advanced-level graduate students with extensive training. The interviewers and raters were unaware of participants' group membership.

Statistical Method

One difficulty with examining the usefulness of the SocAnh Scale as a predictor of psychosis proneness in this longitudinal sample was that most SocAnh participants had elevated scores on other psychosis-proneness scales. This fact is a special concern for individuals who have elevated scores on the PerAb and MagicId Scales, which Chapman et al. (1994) reported are useful predictors of psychosis proneness. In order to address the possible confounding effects of elevated PerAb and MagicId scores among SocAnh participants, I computed regression analyses in which scores on the PerAb and the MagicId Scales were initially entered, followed by a code denoting membership in the SocAnh or control group. This conservative strategy should have removed variance from the SocAnh group that was unique to elevated scores on the PerAb and MagicId Scales. The decision to enter PerAb before MagicId was arbitrary because the purpose was to remove the effects of the two scales prior to entering the coding for SocAnh or control group membership. Scores on the Noncon and PhyAnh Scales were not entered into these regression equations because of the previous finding (Chapman et al., 1994) that these scales do not appear to be useful predictors of schizophrenia-spectrum disorders or psychosis proneness in former college students. Fisher's exact test was calculated when the data were categorical, although this comparison does not remove the effects of the PerAb and MagicId Scales. To control for such effects, I recomputed many of these analyses with the PerMag participants removed from the SocAnh group.

Results

Psychopathology and Adjustment at the Initial Assessment

Consistent with earlier cross-sectional findings, the SocAnh group was not especially deviant at the initial assessment. The SocAnh and control groups did not differ on the proportion of participants diagnosed with any schizophrenia-spectrum disorders at the initial assessment (3% to 0%). None of the participants were psychotic at the time of the initial assessment, and the SocAnh and control participants did not differ on ratings of psychotic-like experiences. Table 2

presents, for each of eight dependent measures, the increments in R2 accounted for by the coding for SocAnh- and control-group membership. As expected, the SocAnh group exceeded the control participants on ratings of schizotypal symptoms, and they reported poorer overall social adjustment. Only 1 SocAnh participant and no control participants were diagnosed with a schizophrenia-spectrum personality disorder (schizoid personality disorder). The SocAnh group experienced more severe depressive symptoms but did not differ from the control participants on the severity of manic symptoms. The groups did not differ on proportion of individuals diagnosed with substance-use disorders (SocAnh = 11%, control = 11%) or on ratings of alcohol or drug use with the effects of the PerAb and MagicId Scale scores removed.

Table 2
Increment in R^2 Due to SocAnh Group Membership at the Initial Assessment After the Removal of the Effects of the PerAb and MagicId Scales

Dependent measure	PerAb (df = 1, 178)	MagicId (df = 1, 177)	SocAnh (df = 1, 176)
Psychotic-like experience	.286***	.014	.001
Schizotypy	.385***	.017*	.077***
Mania	.140***	.004	.001
Depression	.159***	.001	.023*
SAS Overall	.143***	.012	.203***
SAS Work	.049**	.025*	.001
SAS Leisure	.100***	.021*	.233***
SAS Family	.108***	.000	.193***

Note. PerAb = score on the Perceptual Aberration Scale; MagicId = score on the Magical Ideation Scale; SocAnh = coding for group membership in the social anhedonia and control groups; SAS = Social Adjustment Scale.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Increment in R 2Due to SocAnh Group Membership at the Initial Assessment After the Removal of the Effects of the PerAb and MagicId Scales

Psychopathology and Adjustment at the Follow-Up Assessment

Schizophrenia-spectrum disorders and symptoms

Contrary to the findings at the initial interview, the SocAnh group experienced marked problems of adjustment and psychopathology at the 10-year follow-up assessment. The SocAnh group exceeded the control group on the proportion of participants diagnosed with any schizophrenia-spectrum disorder at the follow-up (24% and 1%, respectively; Fisher's exact test, $p < .001$). This comparison remained significant even when the 16 SocAnh participants who qualified for the PerMag group were omitted (28% and 1%, respectively; Fisher's exact test, $p < .001$).

Two SocAnh participants (6%) and 1 control participant (1%) had developed psychotic illnesses by the time of the follow-up assessment (Fisher's exact test, $p < .10$). The control participant was diagnosed with schizophrenia, chronic, residual type, whereas the SocAnh participants were

diagnosed with schizophrenia, chronic, undifferentiated type, and psychotic disorder not otherwise specified (NOS). The patient with psychotic disorder NOS experienced prominent bizarre delusions and hallucinations but did not suffer the significant impairment in functioning that is required for a diagnosis of schizophrenia.

Table 3 presents the rates of schizophrenia-spectrum personality disorders both for the entire SocAnh and control groups and for the SocAnh group with the PerMag participants omitted. In both cases, the SocAnh group exceeded the control group on the proportion of individuals diagnosed with each of the schizophrenia-spectrum personality disorders (despite the loss of statistical power in the latter analyses).

Table 3
Rates (in Percentages) of Schizophrenia-Spectrum Personality Disorders at the Follow-Up Assessment

Dependent measure	SocAnh	Control
Comparison including the entire SocAnh group		
Any spectrum personality disorder	21***	1
Schizotypal personality disorder	9**	0
Schizoid personality disorder	9*	1
Paranoid personality disorder	15***	0
Comparison omitting PerMag participants from the SocAnh group		
Any spectrum personality disorder	28***	1
Schizotypal personality disorder	11*	0
Schizoid personality disorder	17**	1
Paranoid personality disorder	17**	0

Note. For the entire SocAnh and control groups, n = 34 and 139, respectively. For the SocAnh group without PerMag participants and the control group, n = 19 and 139, respectively. SocAnh = social anhedonia; PerMag = participants who qualified for the Perceptual Aberration–Magical Ideation group.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Rules (in Percentages)of Schizophrenia-Spectrum Personality Disorders at the Follow-Up Assessment

The 18 SocAnh participants who did not qualify for the PerMag group did not differ from the control group on the PerAb Scale score (SocAnh: M = −.09, SD = .87; control: M = −.47, SD = .47) or on the MagicId Scale score (SocAnh: M = −.70, SD = .86; control: M = −.47, SD = .56). These findings indicate that the deviance of the remaining SocAnh participants was not due to the effects of elevated PerMag Scale scores. Furthermore, the point-biserial correlations of spectrum disorder (present and absent) with PerAb score (r = .08) and with MagicId score (r = .08) were computed for the SocAnh participants. Neither comparison was statistically significant.

Table 4 presents the variance accounted for by the coding for SocAnh- and control-group membership for ratings at the follow-up assessment. Contrary to the findings at the initial

interview, the SocAnh group exceeded the control group at the follow-up on the rating of highest psychotic-like experience, after removing the effects of PerAb and MagicId Scale scores. The SocAnh group also exceeded the control group on the severity of PDE schizotypal, schizoid, and paranoid dimensional scores. The groups did not differ on percentage of participants who reported having first- or second-degree relatives with psychotic illnesses (SocAnh = 9%, control = 5%).

Table 4
Increment in R^2 Due to SocAnh Group Membership at the Follow-Up Assessment After the Removal of the Effects of the PerAb and MagicId Scales

Dependent measure	PerAb (df = 1, 171)	MagicId (df = 1, 170)	SocAnh (df = 1, 169)
Psychotic-like experience	.300***	.012	.022*
Schizotypal dimensional score	.155***	.002	.149***
Schizoid dimensional score	.001	.003	.185***
Paranoid dimensional score	.170***	.003	.064***
Global Adjustment Scale	.103***	.001	.040**
Social position	.004	.027*	.004
Relationship quality	.040**	.031*	.050***
Mania	.073***	.003	.002
Depression	.097***	.002	.014

Note. PerAb = score on the Perceptual Aberration Scale; MagicId = score on the Magical Ideation Scale; SocAnh = coding for group membership in the social anhedonia and control groups.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Increment in R 2Due to SocAnh Group Membership at the Follow-Up Assessment After the Removal of the Effects of the PerAb and MagicId Scales

Overall functioning and relationships

The SocAnh group was rated significantly poorer than the control group on the GAS measure of overall functioning, after removing the effects of PerAb and MagicId Scale scores. The groups did not differ on Hollingshead's (1957) measure of social position or years of education. The groups differed on the proportion of individuals who had ever been married (SocAnh = 38%, control = 68%; Fisher's exact test, $p < .01$). This comparison remained significant even when the PerMag participants were omitted from the SocAnh group (SocAnh = 39%, control = 68%; Fisher's exact test, $p < .05$). The groups did not differ on the rate of divorce among participants who had ever been married. Among SocAnh participants, 21% indicated that they neither married nor had dated during the past 2 months, compared with only 5% of the control group (Fisher's exact test, $p < .001$). As shown in Table 4, SocAnh participants had significantly lower ratings on a 6-point scale of the quality of intimate relationships. Twenty-four percent of the SocAnh group and 4% of the control group reported poor relationship quality (scores of 1–3;

Fisher's exact test, $p < .01$). This comparison remained significant even when the PerMag participants were omitted (SocAnh = 33%, control = 4%; Fisher's exact test, $p < .001$).

Mood disorder

The SocAnh and control groups did not differ on the proportion of participants diagnosed with bipolar or depressive disorders or on the severity of manic or depressive symptoms at the follow-up evaluation.

Substance use

The groups did not differ on proportion of individuals diagnosed with substance-use disorders during the follow-up period (SocAnh = 27%, control = 18%). Likewise, the groups did not differ on ratings of substance use at the follow-up assessment, with the effects of PerAb and MagicId Scale scores removed.

Psychiatric treatment

The groups did not differ on the proportion of individuals who had sought any outpatient mental health treatment at the time of the follow-up assessment (SocAnh = 41%, control = 37%). Two SocAnh participants reported psychiatric hospitalizations (because of schizophrenia and bulimia, respectively), whereas 1 control participant did so (because of schizophrenia; Fisher's exact test, $p < .10$).

Predictors of Schizophrenia-Spectrum Disorders in the SocAnh Group

SocAnh participants with schizophrenia-spectrum disorders at the follow-up ($n = 8$) were compared with the remaining SocAnh group members ($n = 26$) on scores and ratings from the initial assessment in an attempt to identify additional predictors of the development of schizophrenia-spectrum disorders. These comparisons are summarized in Table 5. The subgroups did not differ significantly on mean scores on any of the psychosis-proneness scales. Likewise, the subgroups did not differ on ratings of psychotic-like experiences or schizotypal symptoms or demonstrate a clear pattern of differences on social adjustment at the initial interview. However, these comparisons were based on relatively small sample sizes.

Table 5
Comparisons of SocAnh Participants Diagnosed With Schizophrenia-Spectrum Disorders at the Follow-Up and Remaining SocAnh Participants on Measures From the Initial Assessment

Scale and rating	SocAnh with spectrum disorders		SocAnh without spectrum disorders	
	M	*SD*	*M*	*SD*
Psychosis-proneness scales				
Social Anhedonia Scale	3.15	0.78	2.85	0.91
Perceptual Aberration Scale	1.44	1.84	1.16	1.64
Magical Ideation Scale	0.67	1.58	0.41	1.48
Impulsive-Nonconformity Scale	0.54	1.21	0.60	1.49
Physical Anhedonia Scale	1.00	1.37	1.23	1.96
Ratings at the initial interview				
Psychotic-like experiences	3.25	2.43	1.85	2.27
Schizotypal symptoms	5.38	4.17	4.85	3.76
Overall social adjustment	4.12†	0.64	3.54	1.07

Note. For SocAnh with spectrum disorders, $n = 8$. For SocAnh without spectrum disorders, $n = 26$. SocAnh = social anhedonia.
† $p < .10$.

Comparisons of SocAnh Participants Diagnosed With Schizophrenia-Spectrum Disorders at the Follow-Up and Remaining SocAnh Participants on Measures From the Initial Assessment

Both of the SocAnh participants who developed psychosis had deviantly high scores on the PerAb and MagicId Scales, although none of the other SocAnh participants with schizophrenia-spectrum disorders had deviant scores on these scales. Similarly, both of the SocAnh participants who developed psychosis at the 10-year follow-up had psychotic-like experience ratings of 4 or above at the initial interview. Kwapil, Chapman, and Chapman (in press) reported that ratings of this magnitude are predictive of significant risk for psychosis in college students. Among the SocAnh participants who developed spectrum disorders, 50% (4 out of 8) had ratings of 4 or above at the initial interview, compared with 27% of the remaining SocAnh participants. However, this comparison was not statistically significant (Fisher's exact test, p = .39).

Deviancy in SocAnh Participants Who Did Not Qualify for Schizophrenia-Spectrum Disorders

To determine whether the overall deviancy of the SocAnh group was simply due to the participants who developed schizophrenia-spectrum disorders at the follow-up, the SocAnh participants who did not receive spectrum diagnoses (n = 26) were compared with the control group on symptom ratings at the follow-up assessment. Table 6 presents the increments in R2 accounted for by the coding for SocAnh- and control-group membership, with the effects of the PerAb and MagicId Scales removed. Even without the inclusion of the SocAnh participants diagnosed with schizophrenia-spectrum disorders, the SocAnh group exceeded the control group on the severity of schizoid and schizotypal symptoms and psychotic-like experiences.

Table 6
Increment in R_2 Due to Group Membership for SocAnh Participants Who Did Not Qualify for Schizophrenia-Spectrum Disorders and Control Participants

Dependent measure	PerAb (df = 1, 163)	MagicId (df = 1, 162)	SocAnh (df = 1, 161)
Psychotic-like experience	.167***	.009	.028*
Schizotypal dimensional score	.095***	.003	.093***
Schizoid dimensional score	.001	.001	.090***
Paranoid dimensional score	.123***	.003	.019†
Global Adjustment Scale	.056**	.001	.012

Note. PerAb = score on the Perceptual Aberration Scale; MagicId = score on the Magical Ideation Scale; SocAnh = coding for group membership in the social anhedonia and control groups.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Increment in R 2Due to Group Membership for SocAnh Participants Who Did Not Qualify for Schizophrenia-Spectrum Disorders and Control Participants

Discussion

College students identified by deviantly high scores on the SocAnh Scale did not have heightened rates of schizophrenia-spectrum disorders in late adolescence or early adulthood and did not appear especially psychosis prone at that time. Ten years later, however, these individuals suffered from significantly higher rates of schizophrenia-spectrum disorders than did control participants. Numerous reports (e.g., Kety, Rosenthal, Wender, & Schulsinger, 1968; Kendler, 1988; Gottesman, 1991) have supported a familial-genetic relationship between schizophrenia-spectrum disorders and schizophrenia. Prediction of schizophrenia-spectrum disorders by the SocAnh Scale was not improved by the use of other psychosis-proneness scales or symptom ratings from the initial assessment. However, the combination of MagicId and SocAnh Scales appears to identify increased risk for the development of psychosis (Kwapil, Miller, Zinser, Chapman, & Chapman, 1997).

Social anhedonia is only one facet of the loss of pleasure experienced by schizophrenic patients and schizophrenia-prone individuals. Meehl (1964) vividly described the deficits in social, physical, intellectual, and aesthetic pleasures encountered by schizotypic individuals. In contrast to the present findings for the SocAnh Scale, Chapman et al. (1994) reported that the PhyAnh Scale did not predict schizophrenia-spectrum disorders at a 10-year follow-up. However, numerous studies have reported cross-sectionally that participants identified by the PhyAnh Scale exhibit cognitive, social, and psychophysiological deficits similar to those seen in schizophrenic patients (e.g., Edell & Chapman, 1979; Haberman, Chapman, Numbers, & McFall, 1979; Miller, 1986; Simons, MacMillan, & Ireland, 1982). In addition, the New York

High-Risk Project (Erlenmeyer-Kimling et al., 1993; Freedman, Rock, Roberts, Cornblatt, & Erlenmeyer-Kimling, 1998) reported that high scores on the PhyAnh Scale are associated with poor social adjustment and with the development of psychosis in female participants.

The finding that the SocAnh group showed heightened rates of schizophrenia-spectrum disorders and psychotic-like experiences at the follow-up but not at the initial assessment suggests that effects of social anhedonia may compound as the individual experiences an ongoing lack of social support. At the initial assessment, undergraduate participants generally had just recently left their families of origin, and, therefore, the SocAnh individuals may not yet have experienced a lack of social support. Presumably, the SocAnh participants experienced decreasing levels of social contact and support as they moved from their families of origin to the university and ultimately to living independently. Social contact provides individuals with emotional support and with an opportunity to assess the validity of their ideas and perceptions. Social support and feedback appear especially crucial for individuals who are experiencing cognitive slippage and psychotic-like experiences.

The SocAnh group exceeded the control group on the rate of individuals suffering from any schizophrenia-spectrum disorder at the follow-up, and they demonstrated a trend toward a higher rate of clinical psychosis. However, at the time of the 10-year assessment, participants in the longitudinal study still had approximately 50% of their risk remaining for developing schizophrenia (Slater & Cowie, 1971). Furthermore, one might expect that individuals in our sample would tend to have a relatively late age of initial psychotic episode because they were functioning well enough during their adolescence to enroll in a major university.

SocAnh and Schizophrenia-Like Adjustment

The deviancies of the SocAnh group differ sharply from those found by Chapman et al. (1994) for the PerMag group. Chapman et al. (1994) reported that the PerMag group experienced marked psychotic-like adjustment at the 10-year follow-up, characterized by heightened rates of mood and nonmood psychosis, more severe psychotic-like and schizotypal symptoms, and poorer overall adjustment. In addition, participants in the PerMag group were also found to be at elevated risk for major depression, bipolar disorder, drug and alcohol abuse, and borderline personality disorder symptoms. Individuals identified by the SocAnh Scale appear to be at more specific risk for a schizophrenia-spectrum disorders and schizophrenia-like adjustment. SocAnh is the only group identified by the Chapmans' psychosis-proneness scales who had elevated rates of paranoid, schizotypal, and schizoid personality disorders at the 10-year follow-up. PerMag participants have been found repeatedly not to have a schizoid social adjustment, and removal of PerMag participants from the SocAnh group on measures of social functioning tended to strengthen, rather than diminish, findings for the SocAnh group.

The finding that SocAnh participants do not have elevated levels of mood disorders at the 10-year follow-up suggests that the scale taps anhedonia that is related to schizoid withdrawal, not

to mood syndromes. This finding is consistent with recent formulations that schizotypal symptoms in the absence of comorbid mood symptoms may be more specifically related to the schizophrenia spectrum, whereas schizotypal symptoms comorbid with borderline personality symptoms or mood symptoms do not appear to be indicative of specific risk for schizophrenia (Battaglia, Bernardeschi, Franchini, Bellodi, & Smeraldi, 1995; Silverman et al., 1993).

SocAnh and Negative Symptoms

Evidence from studies with schizophrenic patients indicates that higher scores on the SocAnh Scale are associated with negative symptoms, such as diminished emotional range, avolition, and diminished social drive (Kirkpatrick & Buchanan, 1990). Similarly, studies of SocAnh participants drawn from nonpatient samples have found deficits in social competency consistent with the social impairment seen in patients with negative symptoms. SocAnh participants in the present study exceeded control participants on the severity of psychotic-like experiences. However, these experiences are primarily milder forms of positive symptoms of schizophrenia. Future studies should investigate negative symptoms of clinical and subclinical deviancy in SocAnh participants.

Limitations of the Present Study

The results of the present study should be regarded as preliminary given its design limitations—specifically that many of the participants in the SocAnh group scored deviantly high on other measures of psychosis proneness and that the SocAnh group is not entirely representative of SocAnh participants in the screening sample. However, conservative statistical analyses were conducted to minimize the effects of PerAb and MagicId traits in the SocAnh group.

Reassessment of the present sample after they have moved through the window of greatest risk for developing schizophrenia should make it possible to determine whether these individuals continue to demonstrate a worsening course and whether they are at heightened risk for developing schizophrenia. Replication of these longitudinal findings should also be attempted in an independent sample to ensure that the findings were not due to elevated scores on other psychosis-proneness scales. Future studies of this and other SocAnh samples should investigate negative symptoms of clinical and subclinical deviancy because such symptoms may be more characteristic of these individuals' premorbid functioning than positive psychotic-like experiences. Furthermore, future studies should include SocAnh participants selected from a sample more representative of the general population than are college students. Finally, the time frame during which SocAnh participants begin to experience schizophrenia-spectrum symptoms and the variables that precipitate such symptoms should be examined.

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