Anxiety and depression symptoms in psychometrically identified schizotypy

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Abstract:

The neurodevelopmental vulnerability for schizophrenia appears to be expressed across a dynamic continuum of adjustment referred to as schizotypy. This model suggests that nonpsychotic schizotypic individuals should exhibit mild and transient forms of symptoms seen in full-blown schizophrenia. Given that depression and anxiety are reported to be comorbid with schizophrenia, the present study examined the relationship of psychometrically defined schizotypy with symptoms of depression and anxiety in a college student sample ($n = 1258$). A series of confirmatory factor analyses indicated that a three-factor solution of positive schizotypy, negative schizotypy, and negative affect provided the best solution for self-report measures of schizotypy, anxiety, and depression. As hypothesized, the model indicated that symptoms of depression and anxiety are more strongly associated with the positive-symptom dimension of schizotypy than with the negative-symptom dimension. This is consistent with studies of schizophrenic patients and longitudinal findings that positive-symptom schizotypes are at risk for both mood and non-mood psychotic disorders, while negative-symptom schizotypes appear more specifically at risk for schizophrenia-spectrum disorders.

Keywords: schizotypy | schizophrenia | anxiety | depression | psychology

Article:

1. Introduction

1.1. Schizophrenia and schizotypy

The present study examined the relationship of psychometrically defined schizotypy with symptoms of depression and anxiety in a college student sample. Following Meehl (e.g., 1990), schizotypy is defined as the personality organization that conveys the risk for schizophrenia. Schizotypy is presumed to result from processes of neural dysmaturation, consistent with the theories of Andreasen (1999), Keshavan (1997),Murray and Lewis (1987), and Weinberger (1987). It is assumed that the majority of schizotypes will never decompensate, although they may demonstrate mild and/or transient signs of schizophrenia including neurocognitive and biobehavioral deficits, clinical and subclinical symptoms, and social impairment. This formulation suggests that schizotypy is expressed on a dynamic continuum ranging from relative psychological health to subclinical deviance to schizophrenia-spectrum personality disorders to full-blown schizophrenia, with severity contingent on the interaction of biopsychosocial factors (Gooding and Iacono, 1995). Since compensated schizotypes are hypothesized to share a common neurodevelopmental pathway with schizophrenia patients, it is expected that they will exhibit subclinical and clinical forms of the cognitive, emotional, and behavioral features of schizophrenia.

Schizotypy has been described as a multidimensional construct consisting of two or more factors. Consistent with multidimensional models of schizophrenia, candidate factors include positive schizotypy, negative schizotypy, cognitive disorganization, paranoia, and nonconformity (e.g., [Claridge et al., 1996],[Mason et al., 1997], [Raine et al., 1994], [Stefanis et al., 2002] and [Vollema and van den Bosch, 1995]). Positive and negative symptom schizotypy are the most consistently replicated factors. While there is not a universally agreed upon latent structure of schizotypy, the proposed factors appear consistent with those hypothesized to comprise schizophrenia, including positive, negative, and disorganized dimensions (e.g.,[Arndt et al., 1991], [Bilder et al., 1985], [Liddle, 1987] and [Peralta et al., 1992]). Findings of parallel facture structures add empirical support to the hypothesis that the neurodevelopmental vulnerability to schizophrenia is expressed across the continuum of schizotypy.

1.2. Relationship of schizophrenia with mood and anxiety symptoms

Mood and anxiety symptoms are frequently present in patients with schizophrenia and related conditions. While these symptoms are often considered associated features and do not warrant a separate diagnosis, rates of comorbid depression and anxiety disorders are elevated in patients with schizophrenia according to the Diagnostic and Statistical Manual-4th Edition-Text Revision (DSM-IV-TR; American Psychiatric Association, 2000). Investigations of mood symptoms in schizophrenic patients have found rates of depressive symptoms in 30–75% of psychiatric inpatients ([Bottlender et al., 2000], [Elk et al., 1986],[Koreen et al., 1993] and [Möller and von Serssen, 1981]) Additionally, Martin et al. (1985) found that nearly 60% of patients with schizophrenia had experienced a depressive syndrome at some time during the course of their illness. This overlap has been acknowledged by the inclusion of the provisional diagnosis of postpsychotic depressive disorder of schizophrenia in DSM-IV-TR.

Many of the symptom features of schizophrenia-spectrum disorders overlap with symptom features of depression (e.g., social withdrawal, anhedonia) and anxiety (e.g., worry, concentration difficulties). Notably, depression and anxiety appear to share a number of

phenotypic similarities with the negative symptom dimension of schizophrenia. However, anxiety and depression appear to be more strongly associated with the positive factor of schizophrenia than the negative factor ([Emsley et al., 1999] and [Lysaker et al., 1995]), suggesting that negative symptom schizophrenia reflects a relative deficit in affect that is inconsistent with the experience of anxiety and depression. For example, Drake et al. (2004) found that paranoia (a positive symptom) predicted elevated depression in schizophrenia and spectrum disorder patients. Furthermore, positive symptoms of schizophrenia and mood symptoms tend to indicate a better prognosis in schizophrenia, while negative symptoms are associated with a poorer prognosis (e.g.,Oosthuizen et al., 2002).

The notion that the vulnerability to schizophrenia is expressed across the continuum of schizotypy suggests that schizotypic individuals who do not decompensate may nonetheless experience clinical and subclinical forms of the psychopathology seen in schizophrenic patients, including elevated rates of mood and anxiety symptoms and disorders. Additionally, DSM-IV-TR indicates that over half of all patients with schizotypal personality disorder experience at least one episode of major depression. Baron and Gruen (1991) reported that relatives of patients with schizophrenia experienced elevated rates of major depressive disorder, regardless of the presence of schizophrenia-spectrum psychopathology, and Cardno et al. (1999) suggested that there is a common liability between mood and non-mood psychotic disorders.

A number of studies examining anxiety and mood symptoms or disorders in psychometrically identified schizotypic individuals have found that, consistent with reports in schizophrenia patients, anxiety and depression appear to be more strongly associated with positive schizotypy than with negative schizotypy.Lenzenweger and Loranger (1989) administered the Perceptual Aberration Scale (Chapman et al., 1978), a psychometric measure of positive schizotypy, to nonpsychotic psychiatric patients, and evaluated them using structured interviews for Axis I and Axis II disorders. Subjects were also rated on anxiety, depression, social competence, and severity of illness. They found that scores on the Perceptual Aberration Scale were significantly correlated with anxiety and depression. [Chapman et al., 1994a] and [Chapman et al., 1994b]reported significantly higher rates of major depressive disorder in schizotypic participants identified by elevated scores on the Perceptual Aberration Scale and Magical Ideation Scale (Eckblad and Chapman, 1983), both measures of positive schizotypy, compared to control participants at baseline and 10-year follow-up assessments. Day and Peters (1999) reported that anxiety and depression were correlated with positive symptom factors on the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE; Mason et al., 1995) including Unusual Experiences and Cognitive Distortions, and with the Schizotypal Personality Scale (STA; Claridge and Broks, 1984), which assesses positive symptoms. Nunn et al. (2001) found that scores on the Impulsivity Nonconformity factor of the O-LIFE were positively correlated with anxiety and depression in nonpsychotic undergraduates. In contrast, questionnaires that assess negative schizotypy, such as the Physical Anhedonia Scale (Chapman et al., 1976) and the Revised Social Anhedonia Scale (Eckblad et al., 1982) were not associated cross-sectionally or at 10-year reassessments with mood disorders ([Chapman et al., 1994a], [Chapman et al., 1994b] and [Kwapil, 1998]).

1.3. Goals and hypotheses of the present study

The goals of the current study were to examine the dimensional structure of schizotypy in a large sample of nonpsychotic young adults and to examine the relationship of symptoms of depression and anxiety with these dimensions of schizotypy. While college graduates exhibit a slightly lower lifetime prevalence of schizophrenia than the general population (Robins et al., 1984), they appear to provide an appropriate sample for a preliminary examination of the relationship of schizotypy with depression and anxiety, as longitudinal studies have reported that psychometrically identified schizotypic college students are at heightened risk for developing mood and non-mood psychotic disorders and schizophrenia-spectrum illnesses (e.g., [Chapman et al., 1994a], [Chapman et al., 1994b] and [Kwapil, 1998]). In the present study, it is hypothesized that, a) psychometrically assessed schizotypy in nonpsychotic adults will yield a factor structure similar to that seen in schizophrenia, with two prominent factors emerging: a positive symptom factor and a negative symptom factor, b) consistent with findings from the schizophrenia literature, schizotypy will be positively associated with symptoms of depression and anxiety, and c) depression and anxiety symptoms will have a stronger association with the positive symptom factor than with the negative symptom factor of schizotypy.

2. Method

2.1. Participants

The final sample included 260 male and 998 female college undergraduates enrolled in introductory psychology courses at the University of North Carolina at Greensboro. The mean age of the sample was 19.4 (SD = 3.7). The sample was 75.5% Caucasian and 24.5% African American. Males and females did not differ on age or ethnic composition.

2.2. Materials

Participants were administered the Perceptual Aberration, Magical Ideation, Revised Social Anhedonia, and Physical Anhedonia Scales, the Beck Anxiety Inventory (BAI; Beck and Steer, 1993), the Beck Depression Inventory-II (BDI; Beck et al., 1996), and a 13-item infrequency scale (Chapman and Chapman, 1983) that was designed to screen out subjects who responded in a random or "fake-bad" manner.

2.2.1. Schizotypy scales

The schizotypy scales consist of four true–false self-report questionnaires that assess schizophrenic-like beliefs and experiences. The Perceptual Aberration Scale contains 35 items that assess schizophrenic-like perceptual experiences and bodily distortions. The Magical Ideation Scale contains 30 items that tap a belief in implausible or invalid causality. The Revised Social Anhedonia Scale is comprised of 40 items that assess asociality and indifference regarding interpersonal relationships. The Physical Anhedonia Scale includes 61 items that tap deficits in sensory and aesthetic pleasure. The Perceptual Aberration and Magical Ideation Scales tap positive schizotypy, the Physical Anhedonia Scale assesses negative schizotypy, and the Revised Social Anhedonia Scale appears to tap aspects of both dimensions of schizotypy.

2.2.2. Beck depression inventory

The BDI is a 21 item questionnaire that assesses state depression during the past week. Items are rated from zero, indicating that the symptom was not endorsed, to three, indicating that the symptom is prominently experienced.

2.2.3. Beck anxiety inventory

The BAI is a 21-item questionnaire that assesses state anxiety during the past week. As with the BDI, each item is rated from zero to three with higher scores indicating more severe anxiety symptoms.

2.3. Procedure

Participants completed the above measures, as well as other measures not included in the present study, as part of the Department of Psychology mass screening. The assessment lasted between 1-1/2 and 2 h. Participants who endorsed three or more items on the infrequency scale (5.1%) or who failed to complete all of the items were excluded from the analyses (7.2%). Students received course credit for their participation.

3. Results

3.1. Descriptive statistics

Table 1 contains descriptive statistics for each of the scales separately by gender. Scores on the schizotypy scales were converted to standard scores based on normative data from 644 male and 1835 female college students enrolled at the University of North Carolina at Greensboro (Kwapil et al., 2002). The alpha level was set at .001 due to the large sample size in order to minimize Type I errors and to reduce the likelihood of reporting statistically significant but inconsequential findings. For the sake of brevity, analyses are presented for the male and female participants combined, as the results were substantively unchanged when computed separately by sex.

Table 1. Descriptive data for the schizotypy, depression, and anxiety measures

	Mean	SD	Alpha	Skew	Kurtosis
Males (n = 260)					
Psychosis-proneness scales					
Perceptual aberration	5.7	5.0	.85	1.7	4.5
Magical ideation	9.1	5.6	.84	0.6	− 0.2
Social anhedonia	10.5	6.9	.88	1.3	2.0
Physical anhedonia	16.1	8.7	.88	0.6	− 0.2
Beck Depression Inventory	6.2	5.8	.92	1.6	3.3
Beck Anxiety Inventory	10.9	9.9	.91	1.4	2.0
Females (n = 998)					

	Mean	SD	Alpha	Skew	Kurtosis
Psychosis-proneness scales					
Perceptual aberration	5.4	5.2	.87	1.9	5.1
Magical ideation	9.0	5.5	.83	0.7	0.1
Social anhedonia	8.0	5.9	.86	1.3	2.2
Physical anhedonia	12.2	6.7	.83	0.8	0.6
Beck Depression Inventory	7.3	6.4	.90	1.6	3.5
Beck Anxiety Inventory	12.5	10.3	.91	1.1	1.1

Alpha=coefficient alpha internal consistency reliability.

3.2. Correlational analyses

Table 2 contains the zero-order correlations between scores on the schizotypy scales, the BDI, and the BAI. Consistent with previous findings (Chapman et al., 1982), the Perceptual Aberration and Magical Ideation Scales were significantly correlated, as were the Social Anhedonia and Physical Anhedonia scales. The Physical Anhedonia Scale was not correlated with Perceptual Aberration or Magical Ideation scores. The Social Anhedonia Scale was significantly, though modestly, correlated with the Perceptual Aberration and Magical Ideation Scales-consistent with the finding that Social Anhedonia taps aspects of both positive and negative schizotypy. The BDI and the BAI were significantly correlated, and were correlated with all four schizotypy scales. However the correlation of the depression and anxiety measures with the Physical Anhedonia Scale was rather modest compared to the correlations with the other schizotypy scales (.17 and .12, respectively). We also examined whether curvilinear components accounted for significant variance over-and-above the linear relationships between negative affect and schizotypy. The quadratic components were significant, albeit modest, in the relationships of the BAI with the Perceptual Aberration and Social Anhedonia Scales indicating a flattening of this relationship at high levels of these schizotypy scales. None of the quadratic components in the other relationships accounted for significant variance over that of the linear component.

Table 2. Zero-order correlations among schizotypy, depression, and anxiety measures ($n = 1254$)

	PerAb	MagId	PhyAnh	SocAnh	BDI	BAI
PerAb	1.00					
MagId	.67[□]	1.00				
PhyAnh	− .01	− .12[□]	1.00			
SocAnh	.36[□]	.25[□]	.38[□]	1.00		
BDI	.36[□]	.27[□]	.17[□]	.36[□]	1.00	

	PerAb	MagId	PhyAnh	SocAnh	BDI	BAI
BAI	.34□	.36□	.12□	.24□	.48□	1.00

PerAb = Perceptual Aberration Scale; MagId = Magical Ideation Scale; PhyAnh = Physical Anhedonia Scale; SocAnh = Revised Social Anhedonia Scale; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory.

$p < .001$.

3.3. Confirmatory factor analyses

Confirmatory factor analyses were conducted to examine the factor structure of schizotypy and its relationship with ratings of anxiety and depression. The sample size ($n = 1258$) and the number of participants per observable variable was sufficient for conducting confirmatory factor analyses following recommendations of Anderson and Gerbing (1984) and Bentler and Chou (1987). Following the recommendations of Little et al. (2002), the items for each of the schizotypy scales were divided into three "parcels" in order to produce more robust estimates. The residuals from each parcel within a schizotypy scale were allowed to correlate given the common source. Goodness of fit was assessed using multiple indicators listed in Table 3, including the Goodness of Fit Index (GFI), Adjusted GFI, Normed Fit Index (NFI), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and the chi-square statistic. Adequate fit of the model to the data is generally indicated by fit indices greater than .95, RMSEA less than .05, and nonsignificant chi-square statistics ([Bentler and Bonnet, 1980] and [Browne and Cudeck, 1993])—although with a sample size this large, it is unlikely to report a nonsignificant chi-square value. We tested four models based upon a priori hypotheses to examine factor structure. The first (default) model did not differentiate an underlying factor structure for schizotypy, anxiety, or depression—letting all the variables load on a generic psychopathology factor. As seen in Table 3, the fit for this model was poor. The second model included a nondifferentiated schizotypy factor with loadings from all four schizotypy scales and a "general negative affect" factor with loadings from the BDI and BAI. This model also failed to provide adequate fit for the data. The third model included a positive schizotypy factor with loadings from the Perceptual Aberration and Magical Ideations Scales, a negative schizotypy factor with loadings from the Revised Social Anhedonia and Physical Anhedonia Scales, and the general negative affect factor. This model provided improved fit for the data, but still failed to provide adequate fit. The final model was the same as the previous, except that the Revised Social Anhedonia Scale was allowed to load on both of the schizotypy factors. This three-factor model provided an excellent fit for the data. Given that the models were nested, the change in chi-square and degrees of freedom were evaluated with each successive model. In every case the subsequent model provided significantly improved fit over the preceding model. Note that in both of the three-factor models, the negative affect factor was more strongly associated with positive schizotypy than negative schizotypy. Fig. 1 contains the standardized coefficients for the final three-factor model.

Table 3. Confirmatory factor analyses of schizotypy, anxiety, and depression

Model	GFI	AGFI	NFI	CFI	RMSEA	RMSEA CI	χ^2 (df)	p-value	$\Delta\chi^2$ (Δdf)	p-value
Unidimensional	.87	.80	.89	.89	.108	.102–.114	1031.2 (66)	< .001		
Two-factor[a]	.88	.81	.90	.91	.100	.094–.106	885.9 (65)	< .001	145.3 (1)	< .001
Three-factor[b]	.97	.96	.97	.98	.047	.041–.054	240.1 (63)	< .001	645.8 (2)	< .001
Three-factor[c]	.99	.97	.99	.99	.031	.024–.038	133.2 (60)	< .001	107.7 (3)	< .001

Model	GFI	AGFI	NFI	CFI	RMSEA	RMSEA CI	χ^2 (df)	p-value
Factor invariance across sex and ethnicity								
Unconstrained	.96	.94	.96	.99	.018	.013–.022	336.2 (240)	<.001
Regression weights constrained	.96	.94	.96	.99	.018	.013–.022	390.4 (282)	< .001
Structural covariances constrained	.95	.93	.95	.98	.021	.017–.025	467.7 (300)	< .001

FI = Goodness of Fit Index, AGFI = Adjusted Goodness of Fit Index, NFI = Normed Fit Index, CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation, RMSEA CI = 90% Confidence Interval for RMSEA.

a General schizotypy factor (with loadings from the Perceptual Aberration, Magical Ideation, Physical Anhedonia, and Revised Social Anhedonia Scales); Negative affect factor (with loadings from the Beck Depression and Beck Anxiety Inventories).

b Positive schizotypy factor (with loadings from the Perceptual Aberration and Magical Ideation Scales); Negative schizotypy factor (with loadings from the Revised Social Anhedonia and Physical Anhedonia Scales); Negative affect factor (with loadings from the Beck Depression and Beck Anxiety Inventories).

c Positive schizotypy factor (with loadings from the Perceptual Aberration, Magical Ideation and Revised Social Anhedonia Scales); Negative schizotypy factor (with loadings from the Revised Social Anhedonia and Physical Anhedonia Scales); Negative affect factor (with loadings from the Beck Depression and Beck Anxiety Inventories).

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Fig. 1. Three factor solution with standardized coefficients.

3.4. Factor invariance across sex and ethnicity

In order to test the invariance of the factor structure across sex and ethnicity, a multi-group, multi-model comparison was conducted using the final three-factor structure reported above. In the first model, the subscales were allowed to load freely on the schizotypy factors for each of the four sex-by-ethnicity groups (e.g., African American females). In the second model, the regression weights (but not the structural covariances) were constrained to be identical across the four sex/ethnicity groups. The final model was the most restrictive in that it constrained the factor variances and covariance, in addition to the regression weights across the four groups. As seen in Table 3, the two constrained models fit the data equally as well as the model in which the factor loadings were allowed to vary freely, supporting the comparability of the factor structure across sex and ethnicity.

3.5. Bootstrap procedures

As noted in Table 1, the distributions of scores departed from normality. Following the recommendation ofWilcox and Muska (2001), the correlations reported in Table 2 and the final confirmatory factor analysis model reported in Table 3 were computed using bootstrap procedures. In each case, the analysis was computed using 1000 bootstrap samples, and the difference (bias) between the original coefficients and the bootstrapped coefficients was determined. In every analysis, all 1000 bootstrap samples were usable. The bias values for the correlations presented in Table 2 ranged from -0.002 to 0.001, supporting the original estimates. Likewise, the bias was minimal for the standardized regression weights (bias range: -0.001 to 0.0005) and the correlation coefficients (-0.003 to -0.001) in the confirmatory factor analysis. The results of the bootstrap analyses support the findings of the original analyses.

4. Discussion

Clinical observation, as well as epidemiological and laboratory studies, have established that anxiety and depressive symptoms and disorders are frequently comorbid with schizophrenia and spectrum disorders. Furthermore, such symptoms appear to be more strongly associated with positive than negative dimensions of schizophrenia. Consistent with these relationships, the present study found that self-reported depressive and anxious symptoms are positively associated with psychometric ratings of schizotypy in a large, nonclinical sample, and that they are more highly associated with positive symptom than negative symptom schizotypy. The present findings, along with clinical observation, are consistent with the notion that both positive schizotypy and anxiety/depression involve dysregulation of affect—especially regarding the experience of negative affect. Negative schizotypy, on the other hand, involves a diminution of affective tone and response. While the present study is descriptive and correlational, it provides impetus for laboratory study of the nature of these relationships. Note that consistent with numerous empirical findings (e.g.,[Brown et al., 2001] and [Clark and Watson, 1991]), we hypothesized and found that anxiety and depression would load on a common factor. However, the exact relationship of depression and anxiety remains an intriguing controversy separate from the goals of the present investigation (e.g., Maser and Cloninger, 1990).

The confirmatory factor analyses indicated that the best fitting model consisted of two separate factors of schizotypy (positive and negative), and a third factor of negative affect (with loadings of symptoms of anxiety and depression). The present findings support the view of schizotypy as a multidimensional construct (e.g., Vollema and van den Bosch, 1995) that coexists with an affective/anxious dimension in the realm of normal individual differences. These findings are consistent with the idea that schizophrenia reflects the extreme manifestation of a continuum of schizotypy. This model is based upon the idea that the neurodevelopmental vulnerability to schizophrenia is expressed across the continuum of schizotypy. It is expected that the same spectrum of cognitive, emotional, and behavioral dysfunctions should be expressed across schizotypy, with increasing severity towards the schizophrenic end of the continuum. In other words, core clinical and subclinical features of schizophrenia, such as cognitive/perceptual impairments and negative symptoms will be found across the dimension of schizotypy. Likewise, comorbid and associated features of schizophrenia, such as anxiety and depression, are also expected to be found at higher rates among schizotypic individuals. Consistent with previous cross-sectional and longitudinal studies (e.g.,[Chapman et al., 1994a], [Chapman et al., 1994b] and [Lenzenweger and Loranger, 1989]), the present findings support the use of psychometric screening inventories for assessing schizotypy.

The finding that the confirmatory factor analyses only identified positive and negative dimensions of schizotypy was not meant to imply that there are only two factors underlying the construct. Positive and negative symptom dimensions are the most widely reported factors of schizotypy and schizophrenia; however, our focus on these factors admittedly reflects the nature of the measures administered. There is ample evidence supporting a cognitive disorganization factor ([Claridge et al., 1996], [Reynolds et al., 2000] and [Vollema and Hoijtink, 2000]) and a paranoid factor (Stefanis et al., 2004), although there is considerably less clarity regarding the number and nature of additional factors, such as a nonconformity factor ([Chapman et al., 1994a], [Chapman et al., 1994b], [Claridge et al., 1996] and [Mason et al., 1997]).

Current models of schizotypy tend to be divided between views that schizotypy is taxonic in nature, based initially on work by Meehl (e.g., Meehl, 1990), and views of schizotypy as a normally distributed personality trait, popularized by Claridge (e.g., Claridge, 1997). The present study suggests that there are linear relationships between psychometric measures of schizotypy and measures of anxiety and depression. However, this does not necessarily imply that there is meaningful variance related to schizotypy across the range of scores. Ultimately, it is beyond the scope of this work to disentangle this complicated issue.

The three-factor model in which the Revised Social Anhedonia Scale loaded exclusively on the negative schizotypy factor alongside the Physical Anhedonia Scale did not provide as good a fit to the data as the final model in which the Revised Social Anhedonia Scale was allowed to load on both the positive and negative schizotypy factors. These results seem counter-intuitive given the core and apparently specific nature of anhedonia to negative schizotypy. However, this finding is consistent with the modest positive correlation of the Revised Social Anhedonia Scale with measures of positive schizotypy (e.g., Pope and Kwapil, 2000) and with clinical assessments of participants identified by deviantly high scores on this scale.Kwapil (1998) reported that socially anhedonic college students exhibited elevated rates of schizophrenia-spectrum disorders and psychotic-like (positive) symptoms at a 10-year follow-up

assessment. Similarly,Diaz et al. (2003) reported that Social Anhedonia participants exceeded control participants on ratings of both psychotic-like and negative symptoms. In both studies, the findings were independent of scores on the Perceptual Aberration and Magical Ideation Scales. These findings are especially striking considering that the items on the Revised Social Anhedonia Scale simply inquire about disinterest in social contact—none of the items assess unusual perceptual experiences or magical beliefs.

The finding that the Revised Social Anhedonia Scale taps both positive and negative schizotypy dimensions can be considered both in conceptual terms (regarding the underlying nature of schizotypy) and in methodological terms (regarding what the scale assesses). Our present findings, consistent with an established theoretical and empirical literature, support a multidimensional view of schizotypy that contains (at least) positive and negative factors. Both of the three-factor models we proposed and tested support the presence of these dimensions. Therefore, the results are consistent with current multidimensional conceptualizations of schizotypy, but raise questions about why the Revised Social Anhedonia Scale taps both of these established dimensions. We hypothesize that the relationship of the Revised Social Anhedonia Scale with measures of positive schizotypy likely reflects: a) that consistent with the original conceptualizations of Paul Meehl (1962) social anhedonia is a core feature of schizotypy, and b) that despite the fact that the scale was designed to assess social disinterest, it likely also taps social anxiety and discomfort, which involve affective dysregulation and are likely to be associated with positive schizotypy.

Conversely, the Physical Anhedonia Scale, which has a moderate positive correlation with the Revised Social Anhedonia Scale, tends to be uncorrelated or negatively correlated with scales that assess positive schizotypy (consistent with the findings in the present study). The differential pattern of relationships of Physical and Social Anhedonia with positive schizotypy is also consistent with findings from factor (e.g.,[Kendler and Hewitt, 1992] and [Venables and Bailes, 1994]) and cluster (e.g., Williams, 1994) analyses. The most striking evidence comes from a factor analysis of Venables' Schizotypy Scale (Venables et al., 1990), which indicated that, contrary to the most common finding, Physical and Social Anhedonia loaded on two separate factors (Venables and Bailes, 1994). Such a difference is also in agreement with the finding that the Social but not Physical Anhedonia significantly enhanced the predictive power of the Magical Ideation Scale for identifying risk for development psychotic disorders in a 10-year longitudinal study ([Chapman et al., 1994a] and [Chapman et al., 1994b]).

There has been considerable controversy about the emotional experience of schizophrenic and schizotypic individuals. While flattened or diminished affect is characteristic of negative symptom schizophrenia, recent findings have suggested that the emotional life of schizophrenic patients might be much richer than they report or exhibit (e.g., [Kring and Neale, 1996] and [Myin-Germeys et al., 2000]). The confirmatory factor analyses in the present study indicated that self-reported negative affect is more strongly associated with positive schizotypy than negative schizotypy. Nevertheless, the present findings indicated that both positive and negative schizotypy were significantly associated with self-reported negative affect.

Depression and anxiety are associated with a more favorable prognosis in patients with schizophrenia, as is primarily positive-symptom schizophrenia. The obvious exception to this finding is that depression is associated with an increased risk of suicidality in schizophrenia. The

general finding, however, is consistent with the fact that depression and anxiety symptoms are more closely associated with positive than negative factor schizotypy. However, the presence of depression and anxiety in premorbid or prodromal schizotypy appears to increase the risk of transition into psychosis (e.g. Yung et al., 2003). This suggests that, while positive symptoms and their correlates may be indicative of a better prognosis for patients with schizophrenia, the distress associated with affective disturbance and anxiety may hasten decompensation. Attempts to identify premorbid and prodromal individuals prior to decompensation in an effort to forestall the transition into full-blown psychosis have received increasing attention. The present findings together with recent studies suggest that early identification and prophylactic treatment strategies should include attention to symptoms of depression and anxiety, as these symptoms are associated with schizotypy and may be negative indicators of decompensation.

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