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Schizotypy and clinical symptoms, cognitive function, and quality of life in individuals with a psychotic disorder

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ABSTRACT

Background: Schizotypy is a range of perceptual experiences and personality features related to risk and familial predisposition to psychosis. Despite evidence that schizotypy is related to psychosis vulnerability, very little is known about the expression of schizotypal traits in individuals with a psychotic disorder, and their relationship to clinical symptoms, cognition, and psychosocial functioning.
Methods: 59 healthy subjects and 68 patients with a psychotic disorder (47 schizophrenia spectrum disorder; 21 bipolar disorder with psychotic features) completed four schizotypy scales, the Perceptual Aberration Scale, the Revised Physical and Social Anhedonia Scales, and the Schizotypal Personality Questionnaire, a brief neuropsychological assessment, and a self-report measure of quality of life. Clinical symptoms of psychosis were quantified in patients with the Positive and Negative Syndrome Scale (PANSS).
Results: Psychosis patients scored higher than healthy subjects on all schizotypy scales. Correlations between schizotypy and PANSS scores were modest, ranging from $r = .06$ to $r = .43$, indicating that less than 20% of the variance in self-reported schizotypy overlapped with clinical symptoms. After controlling for clinical symptoms, patients with schizophrenia spectrum disorders reported higher levels of cognitive–perceptual disturbances and negative traits than patients with bipolar disorder. Elevated schizotypy was associated with lower cognitive functioning and self-reported quality of life.
Conclusions: Schizotypal personality traits are markedly elevated in psychotic disorders, especially schizophrenia spectrum disorders, relatively weakly correlated with positive and negative psychotic symptoms, and associated with greater cognitive impairment and lower quality of life. Assessing schizotypy in patients with psychosis may be useful for predicting functional outcome and differential diagnosis.

1. Introduction

Schizotypy encompasses a collection of atypical or maladaptive personality traits, odd behaviors, unconventional beliefs, and unusual cognitive and perceptual experiences. Several definitions, approaches, and structures of schizotypy have been proposed in connection with theories of psychotic disorders, primarily schizophrenia. For example, Meehl conceptualized schizotypy as a dichotomous, taxometric construct that represented genetic risk for schizophrenia ("schizogene") which, when combined with additional genetic potentiators and deleterious life experiences, leads to manifest psychosis (Meehl, 1962). Meehl's and similar models, such as Rado's, are based largely on observations that unaffected relatives of probands exhibit unusual personality characteristics and cognitive deficits similar to those observed in schizophrenia (Rado, 1956a, 1956b; Rado, 1953). Alternatively, some have posited that the expression of schizotypal characteristics varies along a continuum in the general population which is anchored at the extreme end by schizotypal personality disorder and psychosis (Linscott and Van, 2010; Allardyce et al., 2007; Kwapil et al., 2008; Kwapil et al., 2013). The dimensional approach is supported in large part by individual differences in schizotypy in the normal population and evidence that schizotypal traits correlate with many neurobiological abnormalities observed in schizophrenia, including deficits in cognition, sensorimotor gating, and perception, neurological soft signs, and elevated dopamine function (Ettinger et al., 2014; Woodward et al., 2011).

Surprisingly, relatively little is known about the expression of schizotypy in individuals with a psychotic disorder, despite the fact that models of schizotypy, regardless of type, make several testable predictions. First, if schizotypal personality traits represent stable vulnerability markers, then they should be elevated in individuals with a psychotic disorder and only weakly related to clinical symptoms, especially positive symptoms, which wax and wane over time. Horan et al. (2008) tested this hypothesis in a sample of first-episode patients examined longitudinally. Consistent with a stable vulnerability indicator, physical anhedonia was consistently elevated in schizophrenia and varied little with clinical state. Patients also exhibited consistently

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higher levels of perceptual aberrations and magical ideation; although they co-varied to some extent with clinical state over time. While informative, this investigation was limited to just schizophrenia patients and did not include additional important measures of schizotypy, such as social anhedonia (Horan et al., 2007, 2008).

A second outstanding question is the specificity of schizotypy to schizophrenia spectrum disorders. Schizotypy has been studied almost exclusively in the context of schizophrenia and is usually considered a latent risk factor specific to schizophrenia (Kwapil, 1998; Lenzenweger and Loranger, 1989a; Lyons et al., 1995). However, there is evidence that some aspects of schizotypy are elevated in individuals with psychotic bipolar disorder and their unaffected relatives (Schurhoff et al., 2005; Etain et al., 2007; Schurhoff et al., 2003; Chapman et al., 1994). Consistent with a latent vulnerability to psychosis more broadly, unaffected relatives of psychotic bipolar patients demonstrate elevated levels of disorganization (Schurhoff et al., 2005). However, in contrast to schizophrenia, physical anhedonia is not elevated in probands with psychotic bipolar disorder and their unaffected family members (Etain et al., 2007; Schurhoff et al., 2003). Similarly, the absence of significant elevations in unaffected family members suggests that among psychosis patients, perceptual aberrations may also be specific to schizophrenia (Lenzenweger and Loranger, 1989a). However, this hypothesis has not been tested.

Finally, the associations between elevated schizotypy, cognitive impairment, and psychosocial functioning in healthy subjects and unaffected family members implies that schizotypy will also correlate with these measures in psychosis patients (Cochrane et al., 2012; Delawalla et al., 2006; Cohen and Davis, 2009). While cognitive impairment and limitations in psychosocial functioning are core features of psychosis, the link between these factors and schizotypy has not been investigated in patients.

To test these predictions, we: 1) compared schizotypal personality traits between healthy individuals and patients with a psychotic disorder and examined the extent to which clinical symptoms overlap with schizotypy; 2) compared schizotypal personality traits between schizophrenia spectrum disorders and bipolar disorder with psychotic features; and 3) examined the relationship between schizotypy, cognitive function, and quality of life in individuals with a psychotic disorder.

2. Methods

2.1. Participants

68 individuals with a psychotic disorder (i.e., schizophrenia spectrum disorders, bipolar disorder with psychotic features) and 59 healthy subjects were included in this investigation. Study participants were drawn from a repository of clinical and cognitive data collected on individuals with a primary psychotic disorder and healthy subjects recruited at the Vanderbilt University Department of Psychiatry. The study was approved by the Vanderbilt University Institutional Review Board. All study participants provided written informed consent prior to contributing data to the repository. Psychosis patients were recruited through the Vanderbilt Psychotic Disorders Program at Vanderbilt Psychiatric Hospital (Nashville, TN), and healthy subjects were recruited from Nashville and the surrounding area via advertisement and word-of-mouth. Subjects were included in the current investigation if they were diagnosed with a schizophrenia spectrum disorder (i.e., schizophrenia, schizoaffective disorder) or bipolar disorder with psychotic features (hereafter referred to as “psychotic bipolar disorder”), or were a healthy subject and completed at least one of the self-report schizotypy questionnaires described in the Procedures section. Diagnoses were established, or ruled out in the case of healthy subjects, using the Structured Clinical Interview for the DSM-IV-TR (SCID: First et al., 1996). The exclusion criteria included: age less than 16 or greater than 65, pre-morbid intellect less than 70, estimated using the Wechsler Test of Adult Reading (WTAR: Wechsler, 2001) and/or history of intellectual disability, presence of a systemic medical illness or CNS disorder (e.g., multiple sclerosis, epilepsy), reported pregnancy or lactation, history of significant head trauma, psychotropic drug use (healthy subjects only), and active substance abuse within the past 1 month.

2.2. Study procedures

Subjects completed at least one of the following self-report schizotypy scales: Perceptual Aberration Scale (PAS: Chapman et al., 1978), Revised Physical Anhedonia Scale (RPAS: Chapman et al., 1976), Revised Social Anhedonia Scale (RSAS: Chapman et al., 1976) and the Schizotypal Personality Questionnaire (SPQ: Raine, 1991). Subjects were also administered the Screen for Cognitive Impairment in Psychiatry (SCIP: Purdon, 2005). The SCIP is a brief neuropsychological battery that includes a word list learning test of verbal memory analogous to the Hopkins Verbal Learning Test (Brandt and Benedict, 2001), a version of the Auditory Consonant Trigrams working memory test, phonemic verbal fluency test of executive functioning, and a processing speed measure modeled after the Coding sub-test from the Wechsler Adult Intelligence Scales (Wechsler, 1997). Raw scores for each SCIP subtest were converted to Z-scores using published norms and averaged to create a composite Z-score of overall cognitive functioning, which served as the primary dependent variable in the statistical analyses (Purdon, 2005). Psychosis patients also completed the self-report Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q: Endicott et al., 1993). We used an abbreviated, 18-item version of the scale designed to specifically assess quality of life in patients with mood disorders, schizoaffective disorder, and schizophrenia (Ritsner et al., 2005).

2.3. Statistical analysis

Group differences in continuous and categorical variables were examined with independent groups t-test (corrected for violations of equal variances when indicated by significant Levene's test) and chi-square test, respectively. Differences between healthy subjects and psychosis patients in the schizotypy questionnaire scores were examined using univariate ANOVAs with the following a-priori contrasts: 1) healthy subjects vs. all psychosis; 2) healthy subjects vs. schizophrenia spectrum disorders; and 3) healthy subjects vs. psychotic bipolar disorder. We used the Bonferroni method to correct for multiple comparisons. Specifically, the critical alpha was set to $p = .0125$ (i.e., .05/4) to control for the number of univariate ANOVAs performed.

Correlations between schizotypy and clinical symptoms (i.e., PANSS) were examined with Pearson's correlations. The critical alpha for the correlations was set to $p = .0042$ to control for the number of correlations performed (i.e., $p = .05/12 = \sim.0042$). Differences in the expression of schizotypy between schizophrenia spectrum disorders and psychotic bipolar disorder were examined using univariate ANOVAs with PANSS positive, negative, and general scales entered as covariates to control for clinical symptoms. The relationships between schizotypy, and cognition and quality of life were examined using partial correlation analyses with PANSS positive, negative, and general scores entered as covariates. Age and education were also included as covariates in the partial correlation analysis examining the relationship between schizotypy and cognitive functioning. The critical alpha for the correlations of cognition and quality of life was set to $p = .0125$ to control for the number of correlations performed for each measure (i.e., $p = .05/4 = .0125$).

3. Results

Demographic data, schizotypy, and neuropsychological test scores along with clinical variables (i.e., duration of illness, PANSS scores) and quality of life data for healthy subjects and psychosis patients are presented in Table 1.