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Schizotypal traits and cognitive function in healthy adults

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Abstract

Growing evidence has shown that psychometrically identified schizotypes among student populations have subtle cognitive impairments in several domains such as attention, working memory and executive function, but the possible association between psychometric schizotypy in adult populations and cognitive function has not been well documented. Here we examined the association between schizotypal traits as assessed by the Schizotypal Personality Questionnaire (SPQ) and cognitive function including memory, attention, executive function, and general intelligence in 124 healthy adults. Cognitive functioning was assessed with the Wechsler Memory Scale-Revised (WMS-R), the Wechsler Adult Intelligence Scale-Revised (WAIS-R), and the Wisconsin Card Sorting Test (WCST). SPQ scores showed a significant inverse correlation with verbal IQ and the information, comprehension and similarities subtests. No correlation was found between SPQ scores and memory, attention, performance IQ, or executive functioning. These results indicate that schizotypal traits in healthy adults are associated with verbal IQ decrements, suggesting that schizotypal traits themselves, even at a non-clinical level, may play unfavorable roles in cognitive functioning, which is in line with the viewpoint that schizotypy is on a continuum with normality, with its extreme form being clinically expressed as schizophrenia.

Keywords: Schizotypal personality; Cognitive function; Healthy adults

1. Introduction

Schizotypal personality and schizophrenia have been suggested to share common genetic (Siever and Davis, 2004; Lin et al., 2005), neuroimaging (Dickey et al., 2002), neurophysiological (Siever and Davis, 2004; Kiang and Kutas, 2005), and neurocognitive (Spaulding et al., 1989; Siever and Davis, 2004) abnormalities.

Generalized neurocognitive deficits, with profound deficits in certain areas such as verbal memory and learning (Saykin et al., 1991; Heinrichs and Zakzanis, 1998), are established as part of the core pathophysiology of schizophrenia and considered to have a major impact on patients' daily lives (Green, 1996). Patients with schizotypal personality disorder (SPD) also demonstrate cognitive impairments in several domains including verbal memory and learning (Voglmaier et al., 1997; Siever et al., 2002; Mitropoulou et al., 2005), working memory (Roitman et al., 2000; Siever et al., 2002; Mitropoulou et al., 2005) and executive functioning as assessed with the Wisonsin Card Sorting Test (Trestman et al., 1995; Voglmaier et al., 1997; Diforio et al., 2000). In addition,

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unaffected biological relatives of patients with schizophrenia have been shown to display cognitive impairments in areas such as verbal memory (Faraone et al., 1995; Toomey et al., 1998), attention (Keefe et al., 1997; Schubert and McNeil, 2005) and executive function (Faraone et al., 1995; Toomey et al., 1998); however, in studies of the association between schizotypy and neurocognition among first degree relatives of persons with schizophrenia, results are somewhat mixed such that some investigators have reported inverse relationships between schizotypy and neurocognitive functioning (e.g., Conklin et al., 2002), while others have found no or only weak association (e.g., Laurent et al., 2000).

Besides the studies of patients with SPD and of biological relatives of schizophrenia, those of psychometric schizotypes have drawn more and more attention from schizophrenia/schizotypy researchers as a promising endophenotypic approach to schizophrenia. Examining schizotypal traits in the non-clinical population is important to elucidate the predisposition to schizophrenia as these traits are not confounded by treatment or psychosocial consequences of psychiatric diagnoses (Mednick and McNeil, 1968), and as such, a large number of studies have investigated the relationship between schizotypy and neurocognitive functioning using non-clinical student populations (e.g., Lenzenweger and Korfine, 1994; Park and McTigue, 1997; Lenzenweger and Gold, 2000; Dinn et al., 2002; Spitznagel and Suhr, 2004; Gooding et al., 2006; Jahshan and Sergi, 2007). Most of these psychometric schizotypy studies targeting students have found inverse relationships between schizotypal traits and neurocognitive functions including sustained attention (Lenzenweger, 2001; Gooding et al., 2006), spatial working memory (Park and McTigue, 1997) and executive functioning assessed with the Wisconsin Card Sorting Test (Lenzenweger and Korfine, 1994; Daneluzzo et al., 1998; Gooding et al., 1999). In contrast, relatively few studies (Chen et al., 1997, 1998) have used other populations, such as community-based adults, to examine the relationship between schizotypy and neurocognition. From the standpoint of a "fully dimensional" approach (i.e., the individual differences approach) to schizotypy as proposed by Claridge and Beech (1995), it is considered to be important to examine such relationship among various populations. Based on the assumption that the degree to which individuals in the general population exhibit schizotypal traits varies on a continuum (Kendler et al., 1991), it can be predicted that the findings of inverse associations between schizotypy and cognitive function obtained by the studies using student populations would be extended, if not of the same magnitude, to the studies using adult populations.

With regard to general intellectual function, while patients with schizophrenia have been shown to have compromised intellectual ability compared with healthy people (Heinrichs and Zakzanis, 1998; Dickinson et al., 2004), there have been few explicit schizotypy studies on this issue. On the other hand, several lines of evidence have demonstrated the positive association between schizotypy and verbal creativity, or abnormal typicality of verbal response (Miller and Chapman, 1983; Folley and Park, 2005; Kiang and Kutas, 2006), indicating that schizotypy may be related to altered verbal abilities. This may in turn suggest that schizotypy might be associated with some impairments in standardized neuropsychological tests which assess verbal intelligence, such as the Wechsler Adult Intelligence Scale.

The present study aimed to examine the possible association between schizotypal traits as assessed with the Schizotypal Personality Questionnaire (SPQ, Raine, 1991) and a wide range of cognitive functions including memory, attention, executive function, and general intelligence in healthy adults from the general population.

2. Methods

2.1. Subjects

One hundred and twenty-four healthy volunteers were recruited from hospital staff and their associates through flyers and by word of mouth, and also from the community through local newspaper advertisements and our website announcement. A portion of the subjects was from our previous sample (Hori et al., 2006). Participants were interviewed for enrollment using the Japanese version of the Mini-International Neuropsychiatric Interview (MINI, Sheehan et al., 1998; Otsubo et al., 2005) by a research psychiatrist (H.H.), and only those who demonstrated no history of psychiatric illness or contact with psychiatric services were enrolled in this study. Participants were excluded if they had a prior medical history of central nervous system disease or severe head injury. Those who had one or more first-degree relatives with a psychiatric disease were also excluded. All subjects were biologically unrelated Japanese who resided in the Western part of Metropolitan Tokyo. Written informed consent was obtained from all subjects and the study was approved by the ethics committee of the National Center of Neurology and Psychiatry (NCNP), Japan. The Japanese version of the SPQ translated by Fujiwara (1993) was used in the present study. The questionnaire was distributed to participants at our laboratory. Each participant was allowed to take as much time as needed to complete the questionnaire, which was then returned to us by mail or by hand.