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# Cognitive functions in schizotypal personality disorder

Kristin S. Cadenhead *, William Perry, Kathy Shafer, David L. Braff

*Department of Psychiatry, University of California, San Diego, 9500 Gilman Drive, La Jolla, CA 92093-0804, USA*

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**Abstract**

*Objective*: Schizophrenia spectrum subjects have cognitive deficits in a variety of domains. Schizotypal personality disordered (SPD) subjects do not have many of the confounds seen in schizophrenic patients, but may have the same pattern of cognitive deficits in attention and executive functioning. *Hypotheses*: We hypothesized that SPD subjects would have impairments on measures of attention, abstract reasoning, cognitive inhibition, working memory and verbal recognition memory when compared to normal subjects, and that these deficits would be intermediate to those observed in schizophrenic patients. *Method*: SPD subjects ($N=20$) were compared to age-, gender- and education-matched schizophrenic patients ($N=20$) and normal comparison subjects ($N=20$) on a battery of cognitive measures. *Results*: The data were analyzed using standard statistical methods, including effect sizes. Using a conservative alpha level of 0.01, schizophrenic patients had deficits on many of these measures compared to normal subjects. Although the SPD subjects did not significantly differ from normal comparison subjects at the $p<0.01$ level, there were trends ($p<0.019$–$0.028$) toward impairment on measures of working memory and general intellectual functioning. On further effect size analyses, SPD subjects performed intermediate to normals and schizophrenic patients on measures of attention, abstract reasoning, cognitive inhibition, verbal working memory, recognition memory, and general intellectual functioning, with moderate to large effect sizes separating groups. *Conclusions*: These results suggest that SPD subjects have possible widespread cognitive deficits that are of lesser magnitude than those observed in schizophrenic patients. 

*Keywords:* Cogitive deficit; Cognitive function; Schizophrenia; Schizotypal personality disorder

## 1. Introduction

Schizophrenic patients have cognitive deficits on tasks that involve attention, abstract reasoning, language, and memory (Braff et al., 1991; Saykin et al., 1991; Gold et al., 1997). Chapman and Chapman (1978) noted that the identification of disorder-specific 'differential deficits' in schizophrenic patients can be difficult, because they tend to have generalized deficits on tasks that exceed a minimal threshold of difficulty. In addition, schizophrenic subjects are often acutely symptomatic, on psychotropic medication and chronically ill at the time of testing, which may lead to confounding factors such as poor motivation and impaired task-focus (Lencz et al., 1995).

Schizotypal personality disordered (SPD) subjects are thought to be phenomenologically and perhaps phenotypically related to schizophrenia based on genetic (Kendler et al., 1994), informa-

* Corresponding author. Tel: +1-619-543-2484; Fax: +1-619-543-2493; e-mail: Kcadenhead@ucsd.edu

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tion processing (Braff, 1981; Cadenhead et al., 1993), neuroimaging (Rotter et al., 1991) and neurochemical studies (Siever et al., 1993). The DSM-IV criteria for SPD are based on those symptoms that appear most commonly in relatives of schizophrenic patients and during the prodromal phase of schizophrenia, in order to identify individuals who are phenotypically linked to schizophrenia (APA, 1994). Because SPD subjects are not psychotic, are frequently unmedicated and not chronically institutionalized, they do not have many of the potential confounds noted in studies of schizophrenic patients. If individuals with SPD have some genetic vulnerability for schizophrenia, they may demonstrate a pattern of cognitive deficits that are similar to those observed in schizophrenia, providing insight into the primary (versus generalized) deficits of schizophrenia-spectrum patients.

The study of cognitive dysfunction in schizophrenia-spectrum subjects has included the evaluation of schizophrenic patients, SPD subjects, relatives of schizophrenic patients and 'psychosis prone' subjects (who score high on psychometric tests for schizotypy). The few studies of subjects who meet the DSM criteria for SPD have primarily involved measures of attention and executive functions, such as shifting of cognitive set or abstract reasoning, language, learning and memory (Lyons et al., 1991; Thaker et al., 1991; Trestman et al., 1995; Lees Roitman et al., 1997; Voglmaier et al., 1997). Trestman et al. (1995) found that SPD subjects had abnormalities on tests of executive functioning [Wisconsin Card Sorting Test (WCST) and Trail-making Part B] but normal performance on tests of general intellectual functioning [Wechsler Adult Intelligence Scale—Revised (WAIS-R) Block Design and Vocabulary]. Voglmaier et al. (1997) also found cognitive deficits in a community sample of SPD subjects on tests of abstract reasoning (WCST) and verbal learning and memory as measured by the California Verbal Learning Test (CVLT) and a trend toward differences in Verbal IQ (WAIS-R) when compared to normals.

Relatives of schizophrenic patients, who, like SPD subjects, are thought to express some level of intermediate phenotypes, have deficits that are less severe than those seen in schizophrenic patients on measures of attention, abstract reasoning, learning and language functions (Franke et al., 1992; Cannon et al., 1994; Keefe et al., 1994; Goldberg et al., 1995). It is important to note that those family members with the greatest impairment on the cognitive tasks have greater numbers of SPD traits (Cannon et al., 1994; Keefe et al., 1994). The 'psychosis-prone' groups may differ phenomenologically from subjects diagnosed with SPD because they are identified based on high scores on psychometric tests rather than on the direct expression of symptoms observed during diagnostic interviews (Chapman et al., 1994; Cadenhead et al., 1996). These hypothetically 'psychosis prone' subjects have been shown to have deficits on measures of cognitive inhibition and abstraction such as on the Stroop and WCST (Beech et al., 1989; Lenzenweger and Korfine, 1994) and less lateralized cerebral functioning as measured by the Recognition Memory Test (RMT) (Gruzelier and Doig, 1996).

The aim of the current study was to replicate and extend the existing literature on the cognitive performance of DSM-IV diagnosed SPD subjects. We assessed SPD subjects on a battery of cognitive measures that represent cognitive domains that have been identified previously as impaired in schizophrenic patients and the broader schizophrenia-spectrum individuals. We expected to replicate previous findings of impaired abstract reasoning in SPD subjects using the Wisconsin Card Sorting Test (WCST) (Trestman et al., 1995; Voglmaier et al., 1997). Additionally, we predicted deficits on measures of auditory attention (Seashore Rhythm Test), cognitive inhibition (Stroop), verbal working memory (Letter Number Span) and recognition memory (RMT) that have yet to be studied in SPD but have been found to be deficient in schizophrenic patients (Gruzelier and Hammond, 1976; Abramczyk et al., 1983; Braff et al., 1991; Gold et al., 1997). The SPD subjects were demographically matched to normal comparison subjects and schizophrenic patients to avoid differences in cognitive performance related to age, education and gender (Heaton et al., 1986; Bilder, 1992; Perry et al., 1995). (1) We predicated that there would be no differences between SPD and normal