



## Does social cognition influence the relation between neurocognitive deficits and vocational functioning in schizophrenia?

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### Abstract

Research on barriers to treatment and rehabilitation readiness in people with schizophrenia, especially focusing on risk factors of poor outcome in social and vocational functioning, has focused on the role of social cognition and neurocognition. Others have hypothesized that social cognition (i.e., encoding and understanding of social cues guided by social schemas or scripts) may be one mediator between basic neurocognition and functional outcome. Our study analyzes data from 133 DSM-IV schizophrenic inpatients on a rehabilitation ward using structural equation modeling (SEM) to test whether social cognition has a stronger and more direct influence on vocational functioning than nonsocial cognition. The results supported the hypothesized model; that is, 25% of work-related social skills could be explained by social cognition and nonsocial cognition. The direct impact of nonsocial cognition on vocational functioning was smaller than the impact of social cognition on work-related social skills. Nevertheless, an overwhelming proportion of social cognition (83%) could be explained by nonsocial cognition.

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### 1. Introduction

While the development of atypical neuroleptic agents (Keefe et al., 1999; Meltzer and McGurk, 1999) and problem-focused psychosocial interven-

tions (Heinssen et al., 2000) has shown substantial progress, psychosocial outcome in schizophrenia remains limited for some patients. Therefore, research has begun to identify and address barriers to treatment and rehabilitation readiness. Cognitive deficits (e.g., vigilance, verbal memory and executive functioning) have been identified as limits to community functioning and the ability of schizophrenic patients to benefit from psychiatric rehabilitation interventions (Green, 1996; Green et al., 2000; Green

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and Nuechterlein, 1999). However, we know very little about how neurocognition is related to functional outcome. Research seeking mediators between neurocognition and functional outcome may help to clarify this relationship. The identification of mediating variables will help to provide a theoretical framework for understanding the relationship between neurocognition and functional outcome. These mediators might then suggest targets of therapeutic interventions.

Social cognition has been hypothesized as one promising mediator between basic neurocognition and functional outcome (Green et al., 2000; Green and Nuechterlein, 1999; Kee et al., 1998). Social cognition can be understood as “the mental operations underlying social interactions, which include the human ability to perceive the intentions and dispositions of others” (Brothers, 1990). Social cognition differs from nonsocial cognition in a number of ways (Holyoak and Gordon, 1984; Ostrom, 1984; Penn et al., 1997), suggesting that social and nonsocial cognition may be independent constructs. In contrast to nonsocial stimuli, like letters, words, numbers and inanimate objects used in neuropsychological assessments, social stimuli tend to be mutable over time rather than to be static, are personally relevant, have context-dependent meanings (e.g., roles, goals of interlocutors) and act as their own causal agents (Fiske and Taylor, 1991; Fiske et al., 1991; Fiske, 1995). This does not mean that social cognition and nonsocial cognition are completely independent. Recent conceptualizations of social cognition have emphasized the interaction between social knowledge structures (like prior social schemata or scripts) and information-processing mechanisms in determining cognitive and behavioral outcomes in social situations (Crick and Dodge, 1994). Encoding and processing of social information may depend on attention (i.e., discrimination of relevant and irrelevant social cues over a longer period of time), working memory capacity (i.e., ability to represent and rehearse relevant context information) and executive functioning (cognitive flexibility: ability to generate, test and revise different hypotheses concerning the meaning of social situations; Silverstein, 1997). These assumptions are supported by empirical findings in schizophrenia; social cognitive processing

skills, for example, have been shown to be significantly associated with attentional processes (Corrigan et al., 1992; Kee et al., 1998; Toomey et al., 1999), verbal memory (Corrigan et al., 1994; Corrigan, 1997), working memory (Carlson et al., 1999) and prefrontal functioning (Brunet et al., 2000; Gallagher et al., 2000; Happe et al., 1996).

The assumption that neurocognition influences community functioning in a more indirect way, and that social cognition may play a critical role in the prediction of community functioning, is supported by three bodies of empirical research. First, correlations of neurocognition and functional outcome are moderate at best (Green, 1996; Green and Nuechterlein, 1999). Second, cognitive training programs rarely generalize to more ecologically valid abilities (Corrigan and Storzach, 1993; Green, 1993; Vauth et al., 2000, 2001a). Third, the correlation between social cognition and functional outcome was demonstrated; for example, social skills deficits that limit community functioning were found to be independent of symptomatology (Penn et al., 1997) but did correlate with deficits in the processing of social information (Bellack et al., 1989; Morrison et al., 1988; Motak, 1997). Some studies even found a stronger association of social skills with measures of social cognition than with nonsocial cognition (Corrigan and Toomey, 1995; Penn et al., 1996).

Occupational functioning is another important functional outcome (Cook and Razzano, 2000). Poorer overall social skills (Johnstone et al., 1990), inability to communicate, and lack of overall social adjustment have all been found to be associated with diminished vocational functioning in schizophrenia. In addition, premorbid cognitive-perceptual functions (such as reading, arithmetic functions and articulation of thoughts) were associated with work dysfunction (Silverstein et al., 1991). Work behavior is also associated with verbal memory, vigilance and executive functioning (Bryson et al., 1998; Lysaker et al., 1995; McGurk et al., 2000). Note, however, that the role of social cognition in vocational functioning is so far unexplored. Given this limitation, this study compares the goodness of fit of two models on work behavior. Either (1) nonsocial cognition has a direct and stronger impact on functional outcome than social cognition or (2) nonsocial cognition may

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