Schizophrenia Research xxx (2015) xxx–xxx

Contents lists available at ScienceDirect

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres

Neurocognitive insight and objective cognitive functioning in schizophrenia

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ARTICLE INFO

Article history:
Received 2 November 2015
Received in revised form 8 January 2016
Accepted 11 January 2016
Available online xxxx

Keywords:
Cognition
Awareness
Psychosis
Functional capacity

ABSTRACT

Neurocognitive impairment is a core component of schizophrenia affecting everyday functioning; the extent to which individuals with schizophrenia show awareness of neurocognitive impairment (neurocognitive insight) is unclear. This study investigated neurocognitive insight and examined the cross-sectional relationships between neurocognitive insight and objective neurocognition and functional capacity performance in a large outpatient sample.

214 participants with schizophrenia-spectrum disorders completed measures of neurocognition, functional capacity, and self-reported neurocognitive problems. Latent profile analysis classified participants with regard to neuropsychological performance and self-report of neurocognitive problems. The resulting classes were then compared on executive functioning performance, functional capacity performance, and psychiatric symptom severity.

More than three quarters of the sample demonstrated objective neurocognitive impairment (global deficit score ≥ 0.50). Among the participants with neurocognitive impairment, 54% were classified as having "impaired" neurocognitive insight (i.e., reporting few neurocognitive problems despite having objective neurocognitive impairment). Participants with impaired vs. intact neurocognitive insight did not differ on executive functioning measures or measures of functional capacity or negative symptom severity, but those with intact neurocognitive insight reported higher levels of positive and depressive symptoms.

A substantial portion of individuals with schizophrenia and objectively measured neurocognitive dysfunction appear unaware of their deficits. Patient self-report of neurocognitive problems, therefore, is not likely to reliably assess neurocognition. Difficulty self-identifying neurocognitive impairment appears to be unrelated to executive functioning, negative symptoms, and functional capacity. For those with intact neurocognitive insight, improving depressive and psychotic symptoms may be a valuable target to reduce illness burden.

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1. Introduction

Little doubt remains regarding the significance of cognitive dysfunction in schizophrenia. Empirical evidence has consistently demonstrated stable, enduring deficits in attention, processing speed, working memory, learning, and executive function (Heaton et al., 2001; Heinrichs and Zakzanis, 1998), and that domain-specific deficits are relative and exist against a backdrop of generalized dysfunction (Heinrichs and Zakzanis, 1998). Furthermore, a critical link has been identified between cognitive impairment and functional outcome; that is, neuropsychological dysfunction affects performance of real-world everyday activities that are necessary to live independently in the community (Green et al., 2000).

Several types of insight, or awareness of dysfunction, have been described in schizophrenia. Clinical insight refers to awareness of psychotic illness (Amador et al., 1993). Metacognition is a broad term that generally refers to "thinking about thinking"; conceptually, it is related to but not synonymous with neurocognition (Lysaker et al., 2011a). Two subtypes of metacognition include cognitive insight, which refers to awareness of "mistakes in thinking" such as jumping to conclusions or catastrophizing (Beck et al., 2004), and neurocognitive insight,

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http://dx.doi.org/10.1016/j.schres.2016.01.021
0920-9964/Published by Elsevier B.V.

defined as awareness of neuropsychological dysfunction (e.g., impaired attention, memory, problem-solving) (Medalia and Thysen, 2008) expressed through subjective cognitive complaints (Stip et al., 2003).

The domains of clinical and cognitive insight in schizophrenia and their relationships with neurocognition have been extensively investigated (Nair et al., 2014). For example, several studies demonstrated that greater clinical and cognitive insight was associated with better executive functioning (Aleman et al., 2006; Burton et al., 2011; Larøi et al., 2000; Medalia and Thysen, 2010; Monteiro et al., 2008; Mysore et al., 2007; Orfei et al., 2010; Shad et al., 2004; Simon et al., 2009), lending support to the view that poor insight in schizophrenia may be a function of specific prefrontally-mediated neurocognitive deficits rather than a global deficit in neuropsychological functioning (Shad et al., 2004).

Clinical and cognitive insight have also been studied in relation to psychiatric symptomatology and functioning. Better clinical insight is modestly associated with less severe positive and negative symptoms but more severe depressive symptoms (Mintz et al., 2003; McEvoy et al., 2006; Sabbag et al., 2012; Wiffen et al., 2010). Some data suggest that good cognitive insight is related to less severe positive symptoms (Bora et al., 2007; but see also Greenberger and Serper, 2010). In terms of functioning, good clinical insight is associated with improved functional skills ratings (Schwartz et al., 1997).

There is less known about neurocognitive insight. Instruments to directly measure neurocognitive insight have been created to assess awareness of cognitive deficits in comparison to actual performance on cognitive tests, as well as to allow reliable measurement of patients' or caregivers' opinions about a patient's degree of neurocognitive deficit (Keefe et al., 2006; Medalia and Thysen, 2010; Stip et al., 2003). Although the literature on neurocognitive insight is limited, there is some evidence that individuals with schizophrenia have poorer insight into their neurocognitive symptoms than their clinical symptoms, prompting researchers to encourage that they be addressed separately in treatment (Medalia and Thysen, 2010). For example, a 2011 review indicated that 14 of 26 published studies found no correlation between objective cognitive performance and subjective cognitive complaints (Homayoun et al., 2011). Another study reported that 95% of participants were cognitively impaired, though more than half of the sample had no awareness of cognitive dysfunction (Medalia and Thysen, 2008). Still other researchers have concluded that even when patients express cognitive difficulties, their specific complaints do not align with the cognitive domains tested (Prouteau et al., 2004). To date, no consistent evidence has emerged to suggest that neurocognitive insight or self-reported cognitive functioning converges with objective global or composite cognitive performance (Durand et al., 2015; Gould et al., 2015; Johnson et al., 2011; Keefe et al., 2006, 2015; Medalia et al., 2008; Medalia and Lim, 2004; Moritz et al., 2004; Poletti et al., 2012; Saperstein et al., 2012). Surprisingly few studies have examined the link between neurocognitive insight and executive functioning specifically; those that did reported negative findings from relatively small samples using one subtest from the same cognitive battery (Brief Assessment of Cognition Scale) (Medalia and Thysen, 2008; Poletti et al., 2012).

Similarly, the relationship between neurocognitive insight and everyday functioning has not been extensively examined; in a previous analysis of this database, greater discrepancies between self-reported and clinician-rated cognitive functioning were associated with poorer everyday outcomes as rated by clinicians (Gould et al., 2015). Another published study determined that metacognitive mastery was associated with functional competence in comprehension/planning (Lysaker et al., 2011b).

Despite the apparent lack of association between neurocognitive insight and objective global cognitive performance, numerous studies have demonstrated that greater self-report of cognitive problems is significantly related to increased depression and anxiety (Durand et al., 2015; Medalia et al., 2008; Moritz et al., 2004; Sabbag et al., 2012; Saperstein et al., 2012). The relationship between neurocognitive insight and negative symptoms has not been fully examined; one study suggested no significant relationship (Medalia and Thysen, 2010). Furthermore, a recent study showed that higher rates of self-reported cognitive complaints were associated with lower treatment utilization, suggesting that clinicians may need to target those at risk for drop out with more intensive follow-up care, compensatory strategies, and psychoeducation (Gooding et al., 2012).

In summary, despite the known cognitive dysfunction associated with schizophrenia, the extent to which affected individuals show awareness of such impairment is unclear as are its performance-based correlates. The aims of this study were to explore neurocognitive insight among a large, multi-site sample of individuals diagnosed with schizophrenia and demonstrating objective cognitive impairment, and to evaluate cross-sectional relationships between neurocognitive insight and objective cognitive and functional capacity performance. Given the equivocal evidence regarding the relationship between insight and executive functioning, the first hypothesis was that participants with impaired neurocognitive insight would demonstrate domain-specific impairment in executive functioning. We also hypothesized that participants with impaired neurocognitive insight would demonstrate poorer functional capacity, and that individuals with impaired neurocognitive insight would have more severe negative symptoms but less severe depressive symptoms (Sabbag et al., 2012).

2. Method

2.1. Participants

These analyses were conducted as part of the larger Validating Everyday Real-World Outcomes Study (VALERO) Phase II, which aimed to identify the determinants of impaired self-assessment in schizophrenia. Participants included 214 individuals diagnosed with schizophrenia or schizoaffective disorder receiving outpatient care at one of three sites: UCSD Outpatient Psychiatric Services ($n = 100$), the University of Miami Miller School of Medicine ($n = 79$), and Skyland Trail Rehabilitation Services in Atlanta ($n = 35$). Participants were enrolled in the VALERO II parent study that was approved by each site's institutional review board. On average, participants were 41 years old and had completed 12 years of education; the majority of the sample was male, Caucasian, diagnosed with schizophrenia, and prescribed antipsychotic medication (Table 1).

Table 1
Demographic and clinical features of the full sample and the neurocognitively impaired sample.

	Full sample ($n = 214$)	Neurocognitively impaired sample ($n = 168$)
	Mean (SD) or %	Mean (SD) or %
Age, years	41.2 (12.4)	42.7 (12.3)
Education, years	12.3 (2.2)	12.1 (2.1)
% male	65.4	67.3
% Caucasian	54.7	51.2
% Hispanic ethnicity	23.4	21.4
% African American	36.0	40.5
% schizophrenia (vs. schizoaffective)	58.2	63.0
% prescribed antipsychotic medication	98.1	98.2
% living independently	73.3	72.6
% employed	9.8	10.1
% never married	53.2	50.3
PANSS positive symptoms total	15.7 (5.5)	16.1 (5.7)
PANSS negative symptoms total	15.7 (6.1)	16.2 (6.3)
BDI-II total	15.3 (11.7)	15.0 (11.6)

Note. BDI-II = Beck Depression Inventory, second edition; PANSS = Positive and Negative Syndrome Scale.

Please cite this article as: Burton, C.Z., et al., Neurocognitive insight and objective cognitive functioning in schizophrenia, Schizophr. Res. (2015), http://dx.doi.org/10.1016/j.schres.2016.01.021