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Schizophrenia Research 75 (2005) 183–192

SCHIZOPHRENIA RESEARCH

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The course and clinical correlates of dysfunctions in visual perceptual organization in schizophrenia during the remission of psychotic symptoms

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Received 24 June 2004; received in revised form 26 October 2004; accepted 3 November 2004
Available online 22 December 2004

Abstract

This study evaluated deficits in visual perceptual organization in schizophrenia over the course of inpatient treatment, in relation to the remission of particular psychotic symptoms. Disorganized (n=14) and non-disorganized (n=33) schizophrenia patients were tested upon admission to an inpatient psychiatric unit, and again after 3 weeks of treatment, on two measures of visual perceptual organization. Performance of schizophrenia patients was compared to groups of patients with psychotic disorders other than schizophrenia (n=19) and non-psychotic psychiatric disorders (n=25). Symptom ratings were collected at both assessment points. Deficits in visual perceptual organization were observed for both tasks in disorganized schizophrenia patients at index and these deficits improved during the course of treatment. Moreover, improvement in visual perceptual organization correlated significantly with reductions in disorganized symptoms in the schizophrenia group. We interpret these data as further support for the hypothesis that the disorganization syndrome in schizophrenia reflects a widespread deficit in the cognitive coordination of contextually related stimuli, leading to dysfunctional organization of stimulus features in vision, thought and language.

Keywords: Vision; Perceptual organization; Disorganization; Context; Cognitive coordination

1. Introduction

In recent years, a number of theories have pointed out the critical role of deficits in context-processing for the understanding of cognitive dysfunctions in

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doi:10.1016/j.schres.2004.11.005

schizophrenia (Cohen and Servan-Schreiber, 1992; Phillips and Silverstein, 2003). A broad distinction can be made between definitions of context which emphasize context-processing mediated through working memory (WM) (Cohen and Servan-Schreiber, 1992) and those that include effects of concurrent stimulus driven context (Phillips and Silverstein, 2003) as, for example, during perceptual organization. Perceptual organization of stimulus elements into coherent object representations is a paradigmatic example of the influence of concurrent context upon cognition as demonstrated by the fact that the surrounding visual context changes the perception of a stimulus while the stimulus elements remain basically the same.

Forms of context-processing differ also in their relationship to the symptoms of schizophrenia. There is evidence to suggest, for example, that context-processing mediated through WM is a stable trait-marker of the disorder. Barch et al. (2003) studied context-processing in a longitudinal design with the AX version of the Continuous Performance Test (CPT) (Rosvold et al., 1956), a working memory based measure of post-attentive context-processing. Deficits were found in both neuroleptic naïve, first episode schizophrenia patients as well as in patients with non-schizophrenia psychotic disorders at first assessment. After 4 weeks of medication treatment, context-processing improved in the non-schizophrenia psychotic comparison group but not in the schizophrenia group. In contrast to definitions of WM based context-processing, deficits in perceptual context-processing have been consistently linked to the disorganization syndrome (Phillips and Silverstein, 2003), suggesting that dysfunctional context-processing in perceptual organization is state related, and is linked to specific clinical symptoms of schizophrenia over the course of the disorder.

In the present study, we sought to further address this relationship through administering two robust measures of perceptual organization to patients with a range of psychotic disorders at admission to an inpatient psychiatric unit and prior to discharge. At both assessments, psychotic symptoms were assessed to examine the course of cognitive dysfunctions during the remission of psychotic symptoms and their relationship with specific psychotic syndromes. Based on our previous findings, which indicated a close link between the disorganization syndrome and deficits perceptual organization, we hypothesized that deficits in perceptual organization may change over the course of the disorder. Specifically, we predicted that changes in perceptual organization will covary with the changes in disorganization in schizophrenia patients.

2. Method

2.1. Participants

Four groups of patients participated in the study: (1) a disorganized schizophrenia (DS) group consisting of 14 patients with schizophrenia and schizoaffective disorder; (2) a non-disorganized schizophrenia (NDS) group of 33 patients with schizophrenia and schizoaffective disorder; (3) a psychotic disorders other than schizophrenia or schizoaffective disorder (PNS) group (n=19); and (4) a non-psychotic psychiatric group (PC) group (n=25). Schizophrenia and schizoaffective patients were recruited from an acute inpatient program for psychotic disorders and were assigned into disorganized and non-disorganized groups based on their score on the Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1986) item ‘conceptual disorganization’. Patients who received a rating higher than 3 (mild) on this item were assigned to the ‘disorganized’ group whereas patients who scored lower than 3 were assigned to the ‘non-disorganized’ group. The PNS group was recruited from an inpatient program for acute psychotic disorders, and included individuals with different diagnoses, such as psychotic disorder not otherwise specified (n=2), substance induced psychotic disorder (n=5), and mood disorders with psychotic features (n=12). The PC group was comprised of patients with personality disorders (n=10), substance abuse (n=10) and mood disorders (n=5). Twelve of these patients were recruited from inpatient units. Potential subjects with histories of vision disorders, closed head injury, mental retardation, or neurological syndromes were excluded from the study.