



Emotional Stroop performance predicts disorganization in schizophrenia

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Abstract

An examination of emotional processing in individuals with schizophrenia may aid in understanding the heterogeneous disease states of schizophrenia. An emotional Stroop test, comprising conditions separated by both emotional valence (positive, negative) and arousal (low, high), was administered to disorganized ($N=12$) and non-disorganized ($N=15$) schizophrenic and schizoaffective participants, and 22 non-patient controls. Results indicate that the performance of disorganized versus non-disorganized participants differed particularly on the negative, high arousal condition. Understanding which symptom dimensions accompany aberrant emotion processing might be useful in understanding the mechanisms involved in the exacerbation of symptoms, particularly disorganization. Such information may lead to improved treatment and prevention strategies for schizophrenia spectrum diagnoses.

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1. Introduction

Rather than comprising a single disease entity, schizophrenia may be a cluster of heterogeneous syndromes that differ in underlying structure (e.g.,

Andreasen et al., 1995). Efforts have been made toward the clarification of subtypes, encompassing more homogenous manifestations of the illness and perhaps common pathophysiology. At the descriptive level, the positive and negative symptom dimensions of schizophrenia can be broken down further into three syndromes. Negative symptoms, such as affective flattening, withdrawal, and avolition are included in a “psychomotor poverty” dimension. Positive symptoms can be divided into “reality distortion,” comprising

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hallucinations and delusions, and “disorganization,” describing attentional, conceptual, and behavioral disorganization (see Liddle, 1987; Andreasen et al., 1995, for review).

A number of theorists have attempted to refine the construct of disorganization. Based on the results of semantic priming studies, disorganization has been explained as a deficit in the ability to integrate contextual information (Hardy-Bayle et al., 2003) and in the capacity to maintain a mental set (Rosenthal et al., 1960). In addition, the phenomena associated with disorganization have been explained by deficits in working memory (Daban et al., 2003), sensory motor ability, IQ (Basso et al., 1998), selective attention (Ngan and Liddle, 2000), and theory of mind (Hardy-Bayle et al., 2003). Lastly, individuals diagnosed with higher levels of disorganization have displayed higher levels of arousal (Lapidus and Schmolling, 1975) and emotional reactivity (Burbridge and Barch, 2002).

Evidence for the last relationship, between the disorganization syndrome and abnormalities of arousal and emotional reactivity, is becoming increasingly evident. Docherty et al. (1994) categorize individuals as affectively reactive if they produce more speech errors, in the form of referential communication failure, when discussing affectively negative topics than when discussing affectively positive topics. This disruption in language production is speculated to reflect a differential responsivity to negative valence (Docherty et al., 1994). Specifically, language reactivity, during the discussion of stressful events, is greater in participants who scored higher on positive symptoms (includes both the positive and disorganization dimensions) (Docherty and Herbert, 1997), while unrelated to deficit symptoms (Cohen and Docherty, 2003). Similarly, Burbridge and Barch (2002) found that symptoms under the disorganization dimension predicted affective reactivity in language. Finally, in a study where individuals with schizophrenia rated slides on pleasantness and arousal, higher levels of disorganization was associated with lower ratings on the pleasant slides and with a more negative mood post study participation (Quirk et al., 1998). Thus, both aberrant emotional processing and emotional reactivity may be characteristic of individuals meeting criteria for the disorganized dimension of schizophrenia.

1.1. The emotional Stroop

In the current study, we examined whether aberrant emotional processing is evident in individuals with schizophrenia or schizoaffective disorder who score higher on levels of disorganization. Specifically, we compared the emotional Stroop performance of those within the schizophrenia spectrum group who scored higher in disorganization with those who scored lower. The emotional Stroop is a variant of the standard color Stroop (see Williams et al., 1996, for review). In this task, words with positive or negative emotional valence are printed in colored ink, and the participant is asked to name the color of the word while attempting to ignore the meaning of the word. Interference is measured by the delay in response time and errors in naming the color of the word. Increased response time in color naming reflects increased attention allocated toward the meaning of the word, as well as difficulty disengaging attention from it.

Few studies have examined emotional Stroop effects in schizophrenia, and none has specifically addressed the Stroop in the disorganized subtype. This is a surprising oversight given that a possible dysfunctional affective system, as suggested by the associated differential responsivity to negative valence (as cited above), may be more likely to be associated with aberrant processing on this task. Epstein et al. (1999) employed an emotional Stroop test to measure responsivity to threatening verses neutral information. Although controls showed increased mesolimbic activity to threat but not neutral stimuli, individuals with schizophrenia showed increased mesolimbic activity in both threatening and neutral contexts, reflecting heightened responsivity to neutral information. Bentall and Kaney (1989) found that individuals with persecutory delusions showed an increased response time to words with hostile content versus neutral words. Thus, it remains unclear whether a Stroop effect in schizophrenia is an effect of emotionality, negativity, arousal, or specific to hostile information.

1.2. Purpose of the current study

The purpose of the current study was to determine whether the disorganization symptom dimension is associated with abnormalities in emotional Stroop

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