

Double-decision lexical tasks in thought-disordered schizophrenic patients: A path towards cognitive remediation?

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Abstract

It has been shown that schizophrenics have certain difficulties in the processing of semantic context. These difficulties have usually been evaluated using lexical decision tasks with semantic priming. In this study, we chose to examine the idea of an abnormality in the early stages of semantic context processing in thought-disordered schizophrenics using two double lexical decision tasks: one with a high (25%) and one with a low (15%) proportion of related words to assess the participants' competency in controlled and possibly also more automatic context processing. The results obtained in 40 control participants and 40 schizophrenic patients revealed no significant differences in the amplitude of semantic priming between the two groups. These results suggest that, in the disorganized schizophrenic subjects evaluated in this study, the context processing processes mobilized by the employed tasks were unimpaired.

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1. Introduction

Context processing deficits in schizophrenic patients have been the object of frequent studies over the last 10 years (Cohen, Barch, Carter, & Servan-Schreiber, 1999; Cohen & Servan-Schreiber, 1992; Goldberg et al., 1998; Hardy-Baylé, Sarfati, & Passerieux, 2003; Spitzer, 1997). These cognitive anomalies have been particularly well studied using lexical decision tasks with semantic priming. The results obtained from schizophrenia patients have been somewhat mixed.

The lexical decision task (LDT) evaluates context processing on-line, and the results can be interpreted in terms of attentional theories (Posner & Snyder, 1975) distinguishing between automatic and controlled processes. According to these studies, automatic processing gives rise to automatic spreading activation of words

that are related in semantic memory and occurs rapidly without any intention or awareness on the part of the subject (Meyer & Schvaneveldt, 1971). In contrast, the controlled processes require cognitive effort and attention, are performed slowly, and inhibit unrelated information in the semantic lexicon. The literature describes two types of controlled processes frequently observed in LDT: an expectancy generation strategy (subjects read the prime and generate the target) (Neely, 1976, 1977) and a postlexical checking strategy in which subjects assess the semantic relation between the prime and target before making their decision on the target (de Groot, 1984; de Groot, Thomassen, & Hudson, 1986; Lorch, Balota, & Stamm, 1986; Shelton & Martin, 1992).

In any case, and whatever the type of processes involved (automatic or controlled), it has been observed that the time taken to recognize a target word preceded by a semantically unrelated prime is longer than the time taken to recognize a target word preceded by a related prime (semantic priming).

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Several experimental variables can be manipulated to identify the nature of the cognitive processes involved in a lexical decision task. First, the Stimulus Onset-Asynchrony (SOA), i.e., the temporal interval between the prime and the target stimuli. Second, the degree of structuring of the verbal material, particularly the proportion of related words influences the effectiveness of the two controlled processes but has no impact on automatic spreading.

Two principal hypotheses have been proposed concerning the types of abnormalities observed in schizophrenic patients when performing an LDT (for a review, see Hardy-Baylé et al., 2003; Minzenberg, Ober, & Vinogradov, 2002). First, studies have concluded that thought-disordered schizophrenics exhibit hyperactivation of associations in the mental lexicon (presence of hyperpriming) in line with the hypothesis of abnormalities in automatic processes (Kwapil, Hegley, Chapman, & Chapman, 1990; Manschreck et al., 1988; Moritz, Woodward, Koppers, Lausen, & Schickel, 2002; Spitzer, 1993; Spitzer, Braun, Hermle, & Maier, 1993; Spitzer, Braun, Maier, Hermle, & Maher, 1993; Spitzer et al., 1994; Weisbrod, Maier, Harig, Himmelsbach, & Spitzer, 1998). Second, various studies have shown a reduction or an absence of semantic priming in schizophrenic subjects and these observations have been interpreted in terms of a controlled context processing deficit, and more specifically in terms of disorders of the postlexical checking strategy in these patients (Besche et al., 1997; Ober, Vinogradov, & Shenaut, 1995, 1997; Passerieux, Hardy-Baylé, & Widlöcher, 1995; Passerieux et al., 1997; Vinogradov, Ober, & Shenaut, 1992). More specifically, this abnormality has been observed in thought-disordered schizophrenics (Besche et al., 1997; Henik, Priel, & Umansky, 1992; Henik, Nissinov, Priel, & Umansky, 1995; Passerieux et al., 1997). Finally, some studies have indicated the presence of a normal semantic priming effect in schizophrenic patients (Chapin, Vann, Lycaki, Josef, & Meyendorff, 1989; Chapin, McCown, Vann, Kenney, & Youssef, 1992), including thought-disordered patients (Blum & Freides, 1995).

A rereading of the literature on semantic priming in schizophrenic patients enables us to make certain suggestions that may explain these results more comprehensively. First, we can consider the clinical types of schizophrenic patients: disturbances in semantic priming seem to be associated with the presence of thought disorders in schizophrenic subjects (Aloia et al., 1998; Besche et al., 1997; Henik et al., 1992, 1995; Kwapil et al., 1990; Manschreck et al., 1988; Moritz et al., 2002; Passerieux et al., 1995, 1997; Spitzer, Braun, Maier, et al., 1993; Spitzer et al., 1994; Weisbrod et al., 1998). For this reason, we postulated the existence of a specific cognitive processing deficit in these patients and, consequently, only thought-disordered schizophrenic patients were involved in our study.

Second, the proportion of related words in lexical decision tasks is another important factor: when this proportion is low (less than about 20% of the total verbal material), semantic priming abnormalities are observed in schizophrenic patients (Henik et al., 1992; Manschreck et al., 1988; Ober et al., 1995, Ober, Vinogradov, & Shenaut, 1997; Passerieux et al., 1995, 1997; Spitzer, Braun, Hermle, et al., 1993; Spitzer, Braun, Maier, et al., 1993; Vinogradov et al., 1992; Weisbrod et al., 1998), and especially in thought-disordered schizophrenic patients. This contrasts with the absence of certain semantic priming disorders when this proportion is higher (more than about 20% of the total verbal material) (Barch et al., 1996; Blum & Freides, 1995; Chapin et al., 1989, 1992). However, some exceptional data are reported in the literature because certain studies have found abnormal semantic priming in schizophrenics despite the use of lexical decision, identification or pronunciation tasks containing a high proportion of related words (Aloia et al., 1998; Besche et al., 1997; Manschreck et al., 1988). However, these results relate to schizophrenic patients with very high levels of thought disorder. The essential role of the degree of structuring of the verbal material in the semantic priming deficit is an important argument for the controlled nature of the deficient processes in schizophrenics. In an earlier study, we showed that increasing the proportion of related words during a lexical decision task allows disorganized schizophrenics to improve the use of their semantic processing strategies (Besche-Richard & Passerieux, 2003).

Here, we used two double lexical decision tasks in which the stimuli were presented simultaneously. This paradigm has been used twice with schizophrenic patients by Chapin et al. (1989, 1992) who observed an equivalent semantic priming effect in schizophrenic and normal subjects. These authors interpreted their results as arguing in favor of the preservation of initial sensory-perceptual and automatic processing. Nevertheless, these studies included a large proportion of related words and there was no subgroup of schizophrenics with thought disorders. Here, and in order to specify the nature of the cognitive processes involved in a double lexical decision task, we decided to evaluate the effects of varying the proportions of related words on controls' and schizophrenics' performances. Two proportions of related words, one high (25%) and one low (15%) were used.

2. Methods

2.1. Participants

The participants consisted of 40 control subjects: 20 for the double LDT with 25% related words (Experiment 1) with 11 men and 9 women (age: 33 ± 4 ; years of education: 12.5 ± 2.86), and 20 for the double LDT with

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