



ELSEVIER

Contents lists available at [SciVerse ScienceDirect](http://www.sciencedirect.com)

Psychiatry Research

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

Abnormal functioning of the semantic network in schizophrenia patients with thought disorganization. An exemplar production task

Gildas Brébion*, Christian Stephan-Otto, Elena Huerta-Ramos, Judith Usall, Susana Ochoa, Mercedes Roca, Helena Abellán-Vega, Josep-Maria Haro

Unit of Research and Development, Parc Sanitari Sant Joan de Déu and CIBERSAM, Barcelona, Spain

ARTICLE INFO

Article history:

Received 20 March 2012

Received in revised form

25 July 2012

Accepted 10 August 2012

Keywords:

Schizophrenia

Thought disorganization

Affective flattening

Semantic activation

ABSTRACT

Numerous studies have indicated that thought disorganization in schizophrenia is associated with an enhanced semantic priming effect. This suggests abnormal functioning of the semantic network in these patients, with disinhibited spreading of semantic activation. We investigated whether thought disorganization is also associated with atypical responses in the production of semantic category exemplars. An exemplar production task was administered to 43 patients with schizophrenia and 24 healthy controls. The names of 16 semantic categories were provided, and the participants were requested to produce an exemplar for each category. The typicality of the response was rated according to norms. Higher ratings of thought disorganization were associated with the production of more atypical exemplars. In addition, the patients with high thought disorganization scores were significantly more atypical in their responses than were the healthy controls. In contrast, the patients with low thought disorganization scores were equivalent to the healthy controls. Higher ratings of affective flattening were associated with the production of less atypical exemplars. The results corroborate, within a different paradigm than semantic priming, the theory that thought disorganization is associated with faster and more distant connections within the semantic network. This effect is counteracted by affective flattening.

© 2012 Elsevier Ireland Ltd. All rights reserved.

1. Introduction

Various semantic disorders have been described in patients with schizophrenia. One type of such disorders is overinclusive thinking, which suggests broadening of semantic category boundaries. Chen et al. (1994) used a category judgment task, and observed a tendency in schizophrenia patients to accept an excessive number of items as members of the given categories. These patients appeared to process words that were clearly outside the category but nonetheless related to it (e.g., *aeroplane* for the category BIRD) as if they were just on the borderline of belonging to this category. This semantic abnormality was revealed by the pattern of their response times for the different types of stimulus. Both patients and healthy controls required longer times to make a category decision for the atypical (*turkey*) than for the typical (*robin*) exemplars, and even longer times to judge the items that were borderline for the category (*penguin*). The healthy controls were fast in judging the outside-but-related items (*aeroplane*) as not belonging to the category. In contrast, the

patients needed even longer times to judge the outside-but-related items than the borderline items. This suggests that, while they more or less accepted the borderline items as category members, they hesitated as to whether the outside-but-related items belonged to the given semantic category or not. In addition, the patients classified as members of the categories a greater number of borderline exemplars and outside items than did the healthy controls.

In previous research (Brébion et al., 2010), we attempted to corroborate, with a different paradigm, the Chen et al. (1994) finding of a broadening of semantic category boundaries in schizophrenia. We asked the participants to produce exemplars from various semantic categories, and the typicality of the exemplars produced was rated according to norms. It was assumed that, in a disrupted semantic network with more inclusive categories, the items that are only weakly related to the core concept are immediately available, leading to the production of atypical exemplars. As expected, the patients' responses were atypical compared to those produced by the healthy control group. Incidentally, the results also revealed that higher verbal IQ was associated with more typical responses in the patient group, although this was not observed in the healthy controls. We interpreted this association as suggesting that high premorbid verbal IQ might be protective of the observed

* Correspondence to: Unit of Research and Development, PSSJD, C. Doctor Antoni Pujadas 42, 08830 Sant Boi de Llobregat, Barcelona, Spain.

E-mail address: gildas.brebion@pssjd.org (G. Brébion).

semantic deterioration. Our finding of more atypical responses in patients was compatible with that of Kiang and Kutas (2006), who administered a semantic fluency task to non-clinical participants. They observed that higher schizotypy scores were associated with the production of more atypical exemplars of the category “Fruits”. Thus, the underlying semantic abnormality might exist generally along the schizophrenia spectrum. However, Elvevåg et al. (2002) failed to replicate the Chen et al. (1994) finding of broader categories in patients. These inconsistent results underscore the need to investigate the clinical and sociodemographic factors that might affect semantic performance. Hui et al. (2012) recently suggested that abnormal performance in the semantic categorization task might be observed only in the acute state of psychosis.

Semantic abnormalities might be a basis for certain symptoms observed in schizophrenia, notably thought disorders (Goldberg et al., 1998). More particularly, thought disorders have been posited to stem from dysfunctional spreading of automatic activation within the semantic network (Spitzer, 1997). Numerous studies have reported an association between thought disorders and enhanced semantic priming, which reflects abnormally fast or far-reaching spreading of activation among the related concepts (Gouzoulis-Mayfrank et al., 2003; Moritz et al., 2003; Quelen et al., 2005; Kreher et al., 2008, 2009; Pomarol-Clotet et al., 2008; Kiefer et al., 2009).

One could therefore assume that broadening of the semantic category boundaries is associated with thought disorganization. Contrary to our hypothesis, the atypicality of the produced exemplars was not related to the thought disorganization score in our previous study. Our schizophrenia sample included few patients with thought disorganization, though, which reduced the chance for the alleged association to be disclosed. Minor et al. (2011) used a semantic fluency task in a sample of individuals with schizotypal traits, and observed that disorganization was associated with more atypical exemplars, although the association emerged only under stressful conditions.

In Brébion et al. (2010) we also investigated the influence of negative symptoms on the typicality of the produced exemplars. Indeed, we had already observed that certain negative symptoms, such as affective flattening, emotional and social withdrawal, and anhedonia, were associated with decrement in the rate of various memory errors including intrusions, false alarms, or temporal context errors, while they did not affect the number of correct responses. These associations were counterintuitive and difficult to interpret, but nonetheless consistently observed within two independent schizophrenia samples and a broad range of memory errors (Brébion et al., 2002, 2012). Other groups have similarly reported an inverse association between negative symptoms and the number of recall intrusions (Turetsky et al., 2002; Heinrichs and McDermid Vaz, 2004). In our previous study we therefore wished to determine whether negative symptoms were also associated with less atypicality in the produced exemplars. As it turned out, significant inverse associations with affective flattening, alolia, and anhedonia were revealed. Higher ratings of these negative symptoms were associated with more typical responses. Moreover, the subgroups of patients who presented high ratings of these symptoms were equivalent to the healthy controls with regard to the typicality of their responses. In contrast, the subgroups of patients who presented none or low ratings of these symptoms were far more significantly atypical than the healthy control group. As such, these negative symptoms, repeatedly found to be associated with fewer memory errors, also appeared to be associated with a normalization of the aberrant semantic process that leads to the production of atypical category exemplars.

In the current study we attempted to replicate our previous findings of a role of high premorbid IQ and certain negative

symptoms in the typicality of the category exemplars produced by the patients. We also wished to extend these findings by evincing an association between atypical exemplars and thought disorganization. Such an association would corroborate the view that thought disorganization is related to dysfunctional spreading of semantic activation. An investigation was conducted in another independent schizophrenia sample with much higher prevalence of thought disorganization. The procedure was simplified with respect to that of the previous study. A list of 16 semantic categories was read aloud, and the subjects were merely requested to produce an example for each. We expected the patient group to be atypical in their responses, compared to the healthy control group. We also expected high premorbid verbal IQ to be inversely associated with the atypicality of the responses in patients. With regard to the associations with clinical symptoms, we expected the atypicality of the responses to be positively associated with thought disorganization. On the basis of our previous results, we also expected atypicality to be inversely associated with affective flattening, alolia, and anhedonia.

2. Methods

2.1. Subjects

Forty-three inpatients with schizophrenia (DSM-IV criteria) were recruited from the Parc Sanitari Sant Joan de Déu network of mental health services in Barcelona, Spain (see Table 1 for sociodemographic and clinical information). The inclusion criteria were as follows: age between 18 and 65, fluent in Spanish, and capable of providing informed consent. The exclusion criteria comprised current or recent alcohol or drug abuse (DSM-IV criteria), organic mental disease, mental retardation, history of brain injury, dementia, and current severe physical disease. All the patients were on antipsychotic medications.

Twenty-four healthy control participants were recruited from the community (see Table 1). They were screened by telephone interview to rule out current or recent alcohol abuse, drug abuse, or psychiatric disease, as well as severe current non-mental disease. The two groups were not significantly different in age or sex distribution. However, education level was significantly higher in the control group, as was the score on the vocabulary test TAP (Test de Acentuación de Palabras), a Spanish equivalent of the National Adult Reading Test (NART), used to assess verbal IQ.

Table 1

Sociodemographic data for the schizophrenia patients and healthy control subjects, and clinical data for the schizophrenia patients (mean and standard deviation; *p* value for the sociodemographic group comparisons).

	Schizophrenia patients (<i>n</i> =43)	Healthy controls (<i>n</i> =24)	<i>p</i> value
Age	48.0 (9.9)	47.2 (8.4)	ns
Sex	30 M, 13 F	13 M, 11 F	ns
Education level ^a	3.0 (1.3)	5.0 (1.2)	0.0001
Verbal IQ score (TAP) ^b	16.2 (5.8)	21.1 (4.9)	0.001
Thought disorganization	9.6 (5.8)	–	
Hallucinations	8.2 (5.3)	–	
Delusions	13.5 (8.5)	–	
Affective flattening	7.9 (6.3)	–	
Alolia	4.7 (3.0)	–	
Anhedonia	8.7 (3.9)	–	
Calgary Depression Scale	3.7 (3.1)	–	
Hamilton Anxiety Rating Scale	13.2 (6.7)	–	
Age of illness onset	26.0 (7.4)	–	
Disease duration (years)	21.8 (11.6)	–	

^a The scale used was: 1=no study; 2=uncompleted primary studies; 3=completed primary studies; 4=high school uncompleted; 5=high school completed; 6=undergraduate studies; 7=bachelor or master degree; 8=doctorate.

^b The equivalent National Adult Reading Test (NART) scores are 16.2=89 and 21.1=98 (Gomar et al., 2011).

Download English Version:

<https://daneshyari.com/en/article/6815742>

Download Persian Version:

<https://daneshyari.com/article/6815742>

[Daneshyari.com](https://daneshyari.com)