The organization of autobiographical memory in patients with schizophrenia

Christine Morise [a,b], Fabrice Berna [a,b,c], Jean-Marie Danion [a,b,c],*

[a] Hôpitaux Universitaires de Strasbourg, Clinique Psychiatrique, Hôpital Civil, 1 Place de l'Hôpital, 67091 Strasbourg Cedex, France
[b] INSERM U666, Physiologie et Psychopathologie Cognitive de la Schizophrénie, Hôpitaux Universitaires de Strasbourg, 1 place de l'Hôpital, BP 426, 67091 Strasbourg Cedex, France
[c] Université de Strasbourg, Faculté de Médecine, 4 rue Kirchleger, 67000 Strasbourg, France

ARTICLE INFO

ABSTRACT

Background: Patients with schizophrenia exhibit a wide range of cognitive deficits, including autobiographical memory impairment. It has been suggested that there is a link between this impairment and a disorganization of autobiographical knowledge. This study aimed to explore both the elementary and conceptual organization of autobiographical memory in schizophrenia.
Methods: We used an event-cueing procedure to obtain and compare ten chains of six inter-related autobiographical memories of eighteen patients with schizophrenia and seventeen control participants. Elementary organization, which relies on memories' basic characteristics, including sensory-perceptive, cognitive, affective and temporal ones, was assessed by calculating the degree of similarity of the memories' characteristics within chains. Cluster-type connectivity, a form of conceptual organization reflecting the ability to organize autobiographical information about sets of causally and thematically related events, was assessed by asking the participants to describe the type of relationship between cued and cueing autobiographical memories.
Results: Whereas in controls elementary organization of memories relied on sensory-perceptive and cognitive characteristics of the memories, in patients it was mostly based on the memories' emotional content. Temporal organization and conceptual organization appeared to be preserved in patients.
Conclusions: Patients fail to use sensory-perceptive and cognitive characteristics of memories to organize autobiographical knowledge. Possibly to compensate for this, they rely more on the memories' emotional characteristics. Our results point towards an imbalance between emotional and non-emotional factors underlying the organization of autobiographical memory in schizophrenia.

© 2011 Published by Elsevier B.V.

1. Introduction

Several studies have shown autobiographical memory impairment in schizophrenia (Feinstein et al., 1998; Riutort et al., 2003). Patients have less specific and less distinctive memories than control participants (Riutort et al., 2003; Danion et al., 2005; Cuervo-Lombard et al., 2007). Although Feinstein et al. (1998) considered that these deficits relate to a disorganization of autobiographical knowledge, the way autobiographical memory is organized in schizophrenia has still not been investigated directly.

One of the most influential cognitive autobiographical memory models is that developed by Conway (2005), which posits a hierarchical organization of autobiographical knowledge, with elementary and more conceptual forms of organization depending on the specificity of autobiographical information. Highly specific memories of single events are nested within larger conceptual structures, corresponding to general events (e.g., my classes at the University of Paris) and temporal structures as "lifetime periods" (e.g., when I was living in France between the ages of 20 and 30), themselves nested within thematic structures (e.g., work and relationships) and self-images (e.g., I am a psychiatrist). A more elementary organization that relies on memories' basic characteristics has also been described (Wright and Nunn, 2000; Conway, 2009). Memories are linked together when they share a similar feature and this shared feature induces similarity between these events. For instance, memories that are temporally close to each other are more likely to be linked in autobiographical memory, a process referred to as "temporal contiguity" (Burt and Kemp, 2003; Kahana et al., 2008). There is no privileged dimension that uniquely organizes autobiographical memory (Barsalou, 1988; Brown and Schopflocher, 1998). It is postulated that events may be related insofar as they share a common dimension that makes these events distinctive among a series of events. These dimensions include emotions and highly specific sensory-perceptive, contextual and cognitive information such as for instance thoughts relating to the events, or the rarity and atypicality of the events. It is worth noting that conceptual and elementary organizations of autobiographical memory complement each other (Conway, 2009) and need to be assessed together.

Wright and Nunn (2000) have developed a method whereby these two aspects of autobiographical memory organization may be investigated. It consists of creating chains of memories by using a personal memory as a cue for another memory. This approach assumes that

* Corresponding author at: Hôpitaux Universitaires de Strasbourg, Clinique Psychiatrique, Hôpital Civil, 1 Place de l'Hôpital, 67091 Strasbourg Cedex, France. Tel.: +33 0 3 88 11 64 45.
E-mail address: jean-marie.danion@chru-strasbourg.fr (J.-M. Danion).

cueing and cued events are most often related to each other within an event cluster, i.e., a larger conceptual memory structure that organizes a set of causally and thematically related events in a meaningful sequence (Brown and Schopflocher, 1998). This form of conceptual organization of autobiographical memory known as cluster-type connectivity can be assessed by asking participants to characterize the type of links between cued and cueing events (Brown and Schopflocher, 1998). Specifically, participants are asked to indicate whether the cued and cueing events are causally related, whether one event is nested in another or whether both events are part of a more general event. The elementary organization of memories is reflected in the degree of similarity of the memories' characteristics within chains (Wright and Nunn, 2000). Using multi-level statistical analysis it is possible to calculate the proportion of the overall variance explained by the chains of events.

In this study we aimed to investigate autobiographical memory organization in schizophrenia, in a way that made it possible to explore both elementary and conceptual organizations. Previous literature on autobiographical memory in schizophrenia has provided evidence of an impairment of different components of autobiographical memories. We therefore hypothesized that these deficits could result in abnormal organization of different memory components: Patients' memories were poorer in specific details, including sensory-perceptive, contextual and semantic, and less distinctive when compared with controls (Riutort et al., 2003; Danion et al., 2005), leading us to hypothesize altered elementary organization based on highly specific sensory-perceptive and cognitive features in patients. Neumann et al. (2007) found some alterations of the emotional component of autobiographical memories in patients. However, whether emotions associated with memory are more generally altered in schizophrenia remains unclear (for review, see Herbener, 2008). This conflicting evidence prevented us from arriving at any firm hypothesis regarding organization of the emotional component. We also hypothesized altered organization of the memories' temporal dimension in patients, but this hypothesis was treated with caution given that the event-cueing procedure differed from previous procedures used to assess the temporal dimension. Finally, we hypothesized that conceptual organization would be weakened, insofar as it requires executive functions such as meaning making which are impaired in schizophrenia (Raffard et al., 2009).

2. Method

2.1. Participants

Eighteen outpatients took part in the study (4 women). All of the patients were clinically stabilized, i.e. they had not been hospitalized and their usual treatment had not been modified for a period of one month preceding the test. All of them met the DSM-IV-TR (APA, 2000) criteria for schizophrenia (paranoid, N = 10; residual, N = 6; undifferentiated N = 2) as determined by consensus of the current treating psychiatrist and two senior psychiatrists in the research team. Patients were recruited from the Psychiatry Department of the University Hospital in Strasbourg. Patients with a history of traumatic brain injury, epilepsy, alcohol and substance abuse, or other neurological conditions were excluded from the study. All the patients were on long-term neuroleptic medication (atypical, N = 10; typical, N = 8). One was being treated with antidepressant, eight were also on antiparkinsonian medication. Patients taking benzodiazepine or mood stabilizers were excluded. The comparison group comprised 17 healthy participants (6 women) with no history of psychiatric or neurologic disorders or substance abuse. Control participants were recruited via newspaper advertisements. Patients and controls did not differ in terms of age or level of education, but patients had significantly lower IQ, as assessed using a short form of the Wechsler Adult Intelligence Scale Revised (WAIS-R: Crawford et al., 1996). Data are presented in Table 1.

The study was approved by the local ethics committee and all of the participants gave their informed written consent.

Table 1
Clinical evaluations and characteristics of chains and memories.

	Patients (N = 18)		Controls (N = 17)		Statistics	
	M	SD	M	SD	t	p
Age	39.1	(10.4)	37.1	(6.3)	0.63	0.49
Level of Education	10.5	(2.2)	10.9	(1.6)	−0.53	0.60
IQ (WAIS-R)	85.9	(12.8)	97.5	(13.2)	−2.61	0.01
Clinical evaluations						
Duration of the illness	14.7	(9.1)			–	–
Age at onset of the illness	14.4	(6.5)			–	–
PANSS positive	16.4	(6.5)			–	–
PANSS negative	19.8	(7.2)			–	–
PANSS general	36.3	(12.9)			–	–
Characteristics of chains and memories						
Mean length of chains	5.0	(0.9)	4.7	(1.1)	0.91	.37
Emotional intensity	13.4	(1.6)	13.9	(1.5)	−0.78	.38
Distinctiveness	17.4	(1.4)	17.9	(1.7)	−0.72	.42
Date (Remoteness of memory)	9.8	(6.8)	10.2	(7.8)	−0.26	.87

Note. WAIS-R = Wechsler Adult Intelligence Scale—Revised; PANSS = Positive And Negative Syndrome Scale.

2.2. Cueing event procedure of autobiographical memories

A variant of Wright and Nunn's (2000) procedure was used with a set of 5 of the authors' cue words (restaurant, car, shoe, birthday, and supermarket) and another 5 (birth, friend, meeting, holidays, and school) taken from another autobiographical memory test (TEMPau: Piolino et al., 2003). Participants were asked to recall a specific autobiographical memory in response to a cue word. They then gave a title to each memory, to serve as the cue for a subsequent specific memory. They were instructed to give the first memory that came to mind upon reading the cue title. To obtain chains of 6 events the same procedure was repeated and applied in the case of each cue word. Participants were asked to recall memories of unique events lasting no more than a few hours. After narrating each memory, they had to indicate their age at the time of the event and attribute a cognitive-affective rating (see below, Section Cognitive-affective ratings). After relating the second to sixth memory of each cluster, they had to answer different questions exploring the relationship between the cueing event and the cued event. First, they had to indicate whether or not both of these events involved the same people, and/or the same activities and/or the same place. Secondly, they had to indicate the link between the cueing and the cued events by choosing between 5 possibilities: 1) both events were part of a single, broader event, 2) one event caused the other, 3) one event was part of the other, 4) the two events were related in some other way, and 5) the two events were not related to each other. According to Brown and Schopflocher (1998), two events were considered to be clustered when their relationship fell within one of the first three categories. Consequently, three categories were used for statistical analysis for the link variable: cluster-type, other and absent.

The protocol consisted of two sessions with a day between each session. A session comprised 5 cue words and lasted approximately two hours. In total 1685 memories were obtained.

2.3. Cognitive-affective ratings

2.3.1. Emotional characteristics of the memories

Five items on 5-point scales (Conway et al., 1996) were used to measure participants' emotions: Emotion, Anxiety, Surprise, Agreeableness and Disagreeableness. A global score of emotional intensity was calculated by adding up the emotional scores.

2.3.2. Distinctiveness of the memories

Five items on 5-point scales (Conway et al., 1996) were used to assess noticeable characteristics of the event that distinguished it from other events: frequency, distinctiveness, change in ongoing activity and