



# Rumination and autobiographical memory impairment in patients with schizophrenia



J.J. Ricarte<sup>a,b,\*</sup>, J.V. Hernández<sup>a,b,c</sup>, J.M. Latorre<sup>a,b</sup>, J.M. Danion<sup>d,e,f</sup>, F. Berna<sup>d,e,f</sup>

<sup>a</sup> Department of Psychology, University of Castilla La Mancha, Spain

<sup>b</sup> Research Institute of Neurological Disabilities, School of Medicine, Albacete, Spain

<sup>c</sup> Mental Health Service of Castilla La Mancha, Cuenca, Spain

<sup>d</sup> Unité INSERM 1114, Physiopathologie et Psychopathologie Cognitive de la Schizophrénie, Hôpitaux Universitaires de Strasbourg, Strasbourg Cedex, France

<sup>e</sup> Université de Strasbourg, 4 rue Kirchleger, Strasbourg, France

<sup>f</sup> FMTS: Fédération de Médecine Translationnelle de Strasbourg, France

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## ABSTRACT

Although patients with schizophrenia exhibit autobiographical memory impairment, which is considered to be a limiting factor in their daily life, the mechanisms underlying such impairment have been rarely studied. In the current study, we investigate whether rumination and, in particular, brooding, which is a form of maladaptive repetitive thinking, may be linked to the difficulty that patients with schizophrenia experience when attempting to access specific autobiographical memories. Our results indicate that patients reported less specific autobiographical memories compared to control participants. Patients also displayed a higher level of brooding and had more depressive symptoms. According to the CaR-FA-X model (Williams et al., 2007), depression and brooding were associated with memory specificity in control participants. In contrast, neither depression nor brooding was correlated with memory specificity in patients. These results suggest that depression and rumination may not be directly related to patients' difficulty to recall specific memories and that other factors, such as metacognitive deficits, must first be considered when seeking interventions aimed to improve autobiographical memory in patients with schizophrenia.

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## 1. Introduction

Memory impairment is considered to be one of the most important cognitive dysfunctions in patients with schizophrenia (Aleman et al., 1999). Autobiographical memory recall sustained by episodic memory is impaired in schizophrenia (for review, Danion et al., 2007). Patients with schizophrenia have consistently demonstrated difficulties retrieving specific autobiographical memories of past events that occurred at a particular time and place and lasted less than a day (Feinstein et al., 1998; Danion et al., 2005; Dimaggio et al., 2012; Potheegadoo et al., 2012). Most importantly, this lack of memory specificity represents one aspect of broader alterations of autobiographical memories in schizophrenia that are associated with reduced self-consciousness (Danion et al., 2005; Potheegadoo et al., 2012), deficits in self-identity (Raffard et al., 2010; Berna et al., 2011a; Bennouna-Greene et al., 2012) and mentalizing (Dimaggio et al., 2012), disorganization of autobiographical knowledge (Morise et al., 2011) and distortions of temporal perception and visual perspective (Potheegadoo et al., 2012, 2013).

However, until now, the mechanisms involved in these deficits have not been fully understood.

Based on the hierarchical search model of personal event retrieval (Conway and Pleydell-Pearce, 2000), Williams et al. (2007) selected three main cognitive components underlying overgeneral recall in psychopathological conditions for the CaR-FA-X model: capture and rumination, functional avoidance, and impaired executive control. Executive functions are essential during the effortful process of generative retrieval, which allows the individual to access and hold in the working memory the very specific memory details relating to a particular past event. In schizophrenia, due to the dysfunction of the prefrontal cortex, attentional and executive capacities are markedly reduced (Barch and Ceaser, 2012). The recent study by Potheegadoo et al. (2014) provided convincing evidence for a direct contribution of executive dysfunction in the reduced ability for patients to retrieve specific memories. In the study, a specific cueing intervention (Levine et al., 2002) was used to help patients retrieve various categories of details relating to past personal events. The results showed that patients' reduced capacity to retrieve specific memories during an initial effortful retrieval phase can be alleviated when adequate strategies to retrieve memory details are given to the patients by means of the specific cueing intervention.

The functional avoidance mechanism is a means of affect regulation achieved by avoiding the retrieval of specific memories. The retrieval of

\* Corresponding author at: Psychology Department, Faculty of Medicine, University of Castilla La Mancha, Avda. Almansa 14, 02006 Albacete, Spain. Tel.: +34 967 599 200x2917; fax: +34 967 599 204.

E-mail address: [Jorgejavier.Ricarte@uclm.es](mailto:Jorgejavier.Ricarte@uclm.es) (J.J. Ricarte).

non-specific memories is regarded as a strategy to reduce distress after an adverse event. It is known that patients with schizophrenia have experienced more traumatic experiences in their lives than non-psychiatric people (Bebbington et al., 2004) and that memories relating to psychotic episodes or hospitalizations are frequently experienced as traumatic (Harrison and Fowler, 2004; Berna et al., 2011b). However, Harrison and Fowler (2004) found that functional avoidance was linked to negative symptoms but did not account for patients' reduced memory specificity. Moreover, other studies provided indirect evidence against the role of functional avoidance in patients with schizophrenia. First, the specificity of self-defining memories does not differ significantly between patients and controls, despite the fact that these memories relate to highly emotional and sometimes traumatic past events (Raffard et al., 2010; Berna et al., 2011a,b). Second, the patient's ability to retrieve specific memories can be improved by specific training or a remediation of autobiographical memory (Ricarte et al., 2012, 2014; Lalova et al., 2013; Potheegadoo et al., 2014). In particular, the aforementioned study of Potheegadoo et al. (2014) showed that both the number and the richness of emotional details were normalized following the specific cueing intervention. However, according to the CaR-FA-X model, functional avoidance should prevent patients from accessing emotional details, and similarly, it should prevent them from accessing specific highly emotional events that are, in fact, self-defining memories.

Rumination is generally described as a cognitive process that includes repetitive, prolonged, and recurrent thoughts about oneself, one's concerns and one's experiences (Watkins, 2008). Repetitive thinking based on reflection about previous experiences is necessary for daily decision making and problem solving, and thus, it plays an adaptive function. Indeed, analytical rumination might be conceptualized as some form of problem solving (Segal et al., 2002). However, when the repetitive thought is focused on the causes of the current symptoms (e.g., "Why do I feel like this?" or "What have I done to deserve this?") or when the individual engages in brooding behavior, negative consequences on emotion regulation are consistently observed (see for review, Watkins, 2008). The reviews of the studies that examine depressed and post-traumatic stress disorder patients based on the CaR-FA-X model support a robust association between rumination and difficulty accessing specific memories (Sumner, 2012). For instance, induced rumination maintained non-specific memories relative to a distraction strategy in patients with depression (Watkins et al., 2000; Watkins and Teasdale, 2001). More specifically, brooding interacts with non-specific memories mainly in depressed samples by intensifying dysphoric mood and negative thinking (Lyubomirsky and Nolen-Hoeksema, 1995; Watkins and Baracaia, 2002; Watkins, 2004). As there is accumulating evidence to also suggest a transdiagnostic role of brooding on clinical symptomatology (Harvey et al., 2004; Watkins, 2009; Nolen-Hoeksema and Watkins, 2011), this form of maladaptive rumination was solely correlated with non-specific memories in nonclinical samples (Debeer et al., 2009; see for review, Smets et al. 2013).

The few studies that have investigated rumination in patients with schizophrenia have described the contribution of rumination on psychopathology. For instance, rumination was associated with emotional withdrawal and stereotyped thinking in patients (Halari et al., 2009). Furthermore, it was associated with the distress produced by auditory hallucinations (Badcock et al., 2011) and with hallucination-proneness as it induced intrusive thoughts (Jones and Fernyhough, 2009). However, the role of rumination with respect to the difficulty patients experience when accessing specific memories has not been investigated yet. Accordingly, we conducted a study to examine the relationship between rumination and autobiographical memory impairment in patients with schizophrenia by taking into account other factors involved in the CaR-FA-X model, such as working memory and depression. We assumed that if rumination, particularly maladaptive rumination, accounts for a significant variance of memory specificity, this could be considered a relevant factor to target in the remediation of autobiographical memory.

On the contrary, other factors should be considered for interventions aimed at improving autobiographical memory.

## 2. Material and methods

### 2.1. Participants (Table 1)

Thirty-one patients with schizophrenia were selected from the mental health unit of the metropolitan area of Cuenca (Spain). All patients met the DSM-IV-TR (APA, 2004) criteria for schizophrenia (paranoid,  $n = 26$ ; residual,  $n = 2$ ; undifferentiated,  $n = 3$ ), as determined by consensus of their current psychiatrist and psychologist (with expertise in psychiatric research), and all were clinically stable. Brain damage, epilepsy episodes, recent changes in medication, and prior history of alcohol, drug abuse or neurological disabilities were defined as exclusion criteria. All sampled patients were receiving long-term antipsychotic treatment (first generation,  $n = 2$ ; second generation,  $n = 28$ ; and both,  $n = 1$ ).

The comparison group consisted of 31 participants (24 men). Participants were recruited from the general population by means of public announcements. They were selected based on their socio-demographic characteristics. Thus, patients did not differ significantly in terms of age, gender and years of education with respect to the control group. None of the individuals in the control group had a psychiatric illness or was on medication.

### 2.2. Procedure

The protocol followed in this study was approved by the ethical committee of clinical research at the Health Service of Castilla-La Mancha (Spain). Written consent was obtained after the participants and/or their legal tutors (in the context of their regular follow-ups at the mental health unit) received a complete description of the study.

Clinical psychologists who periodically reviewed the behaviors of their patients assessed the variables of this study in one session in the office where patients were normally treated. Prior to the task, patients' positive and negative symptoms of schizophrenia were assessed using the PANSS (Kay et al., 1987).

### 2.3. Measures (Table 2)

#### 2.3.1. Clinical evaluations

**2.3.1.1. Depression.** The Beck Depression Inventory (BDI-II; Beck et al., 1996) is a widely self-report questionnaire comprising 21 items rated each on a 4-point scale. It has shown good consistency to assess the severity of depression symptoms (Beck and Steer, 2006). Participants are instructed to appraise their feelings over the last two weeks regarding each of the 21 items.

**Table 1**  
Socio-demographic characteristics of participants.

Variable	Patients ( $n = 31$ )	Controls ( $n = 31$ )	Statistical test	$p$
Age ( $M, SD$ )	38.5 (10.6)	38.7 (11.4)	$F(1,60) = 0.00$	.750
Gender				
Male	25	24		
Female	6	7	$\chi^2(1) = 0.75$	1.00
Education				
Primary	20	21		
Secondary	8	8		
University	3	2	$\chi^2(2) = 0.22$	.891
Onset of illness (years) ( $M, SD$ )	20.96 (3.93)			
Duration of illness (years) ( $M, SD$ )	18.42 (9.06)			

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