



## Autobiographical memory and differentiation of schematic models in substance-dependent patients

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### ABSTRACT

**Background and objectives:** This study aims at investigating reduced autobiographical memory specificity in substance-dependent patients. We examined whether this phenomenon is related to undifferentiated schematic models of self and to depression and anxiety levels. We also investigated the maintenance of these impairments after early clinical remission.

**Methods:** Seventy-three dependent patients (including 30 active users, 23 methadone-maintained patients, 20 early abstinent patients) and 31 control participants were given Williams' and Scott's Autobiographical Memory Test (AMT) to evaluate the level of memory specificity. Depression and anxiety levels were assessed with the Hospital Anxiety and Depression Scale (HADS), and the ability of differentiation in affect-related schematic models of self with the Level of Emotional Awareness Scale (LEAS).

**Results:** Dependent patients recall less specific memories than control individuals to the AMT. For all the participants, only the ability to differentiate emotional states predicts the level of specificity, whereas reduced specificity is not linked to depression and anxiety levels. The results also show that reduced specificity is still observable in methadone-maintained patients and in abstinent patients.

**Limitations:** Despite the absence of difference in the level of memory specificity in the three groups of dependent patients, we cannot state that reduced memory specificity is stable over time because non-active consumers may not remain in remission for a long period.

**Conclusions:** Only a lack of emotional differentiation seems to impede the access to specific memories in dependent patients and in general population. The reduced memory specificity observed in dependent patients seems to last after recent clinical improvement.

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### 1. Introduction

Many neuropsychological studies have shown cognitive impairments in chronic opiate consumers (Davis, Liddiard, & McMillan, 2002; Gruber, Silveri, & Yurgelun-Todd, 2007; Verdejo-Garcia, Lopez-Torrecillas, Orozco, & Perez-Garcia, 2004), in particular, deficits in attention, psychomotor speed (Gruber et al., 2007), visuospatial skills (Gruber et al., 2007; Prosser, Cohen, Steinfeld, Eisenberg, & Galynker, 2006) and memory impairments (Gruber et al., 2007; Li, Hao, & Hu, 2007; Prosser et al., 2006). Most studies examining substance consumers' memory skills have aimed to evaluate memory on the basis of neuropsychological measures (Darke, Sims, McDonald, & Wickes, 2000; Gruber et al., 2007; Li et al., 2007; Prosser et al., 2006) and show verbal memory (Darke et al., 2000) and visual memory deficits (Darke et al., 2000;

Prosser et al., 2006). However, only a small number of studies have used other measures to quantify those deficits in opiate consumers.

Specifically, the study of autobiographical memory, which corresponds to the memory of individuals' personal history, has rarely been explored with regard to opiate consumers. Nevertheless, a research study by Eiber, Puel, and Schmitt (1999) reveals a paucity of autobiographical memories in heroin-dependent individuals. In addition, individuals with addictive disorders often experience some difficulty in generating specific memories of events in response to a list of word cues with the Autobiographical Memory Test (AMT) (Williams & Scott, 1988).

Some studies have described reduced autobiographical memory specificity in patients with eating disorders (Dalgleish et al., 2003; Laberg & Andersson, 2004; Nandrino, Doba, Lesne, Christophe, & Pezard, 2006) and in alcohol-dependent patients (D'Argembeau, Van Der Linden, Verbanck, & Noël, 2006), and one study has explored the overgeneralization of memory in substance-dependent patients (Gandolphe & Nandrino, 2010). It has been

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proposed that such a reduced specificity of autobiographical memories represents the cognitive strategy of blocking or disrupting access to the details of distressing autobiographical events (Dalglish, Rolfe, Golden, Dunn, & Barnard, 2008).

The literature concerning the dominant influences of the reduced specificity of autobiographical memories has focused on affect regulation, wherein specific personal information is avoided more by those experiencing greater distress and compromised executive control, and increased distress is associated with an inability to set aside inappropriate general responses on the AMT (Dalglish et al., 2008; Williams et al., 2007). The processes underlying a deficit in specific memory retrieval are not mutually exclusive and can operate independently or concurrently.

In addition, as suggested by Ramponi, Barnard, and Nimmo-Smith (2004), an abstract and analytical mode of processing coupled with impoverished and unelaborated self-related representations (or schematic model of self) would enhance the adoption of a general mode of autobiographical memory retrieval. These authors found that an undifferentiated schematic model of self is linked with reduced specificity of autobiographical memory. They explain that a low level of differentiation would impede encoding and/or retrieving specific memories.

According to Barnard and Teasdale's (1991) Interacting Cognitive Subsystems (ICS), semantic representations are processed by two interrelated subsystems: the "propositional" subsystem, which processes specific representations, and the "implicational" subsystem, which sets up schematic models and processes more general self-representations. These schematic models are strongly linked to our experience of affect and generate representations triggered by the propositional system. When these schematic models are unelaborated, the propositional content that will be encoded in memory and recalled is undifferentiated, which leads to general memories.

Having schematic models of self, others and the world differentiated involves the ability to consider oneself, others and the world under various cognitive aspects. According to a cognitive-developmental approach, Lane and Schwartz (1987) consider that the ability to identify and discriminate emotional states would develop in conjunction with the process of symbolization, as the language helps to the structuration and establishment of concepts. These authors have developed the Level of Emotional Awareness Scale (LEAS) (Lane, Quinland, Schwartz, Walker, & Zeitlin, 1990) which measures the ability to discriminate emotional states by analyzing the descriptions made by the participant of his/her emotional experiences and the ones allowed to others in various emotional situations. A complex verbal content reflects a greater ability to differentiate emotional states. Consequently, this scale gives an indirect measure of the ability to differentiate the schematic models of self, others and the world (Ramponi et al., 2004).

The link between a lack of differentiation of schematic models and reduced specificity of autobiographical memory has been specifically studied in depressive patients (Ramponi et al., 2004). In those patients, the emotional information processing is characterized by a focalization on negative abstract representations of the self. These representations are strongly activated during autobiographical retrieval, and impede the progression of the search in the autobiographical memory database during the top down retrieval process. Instead of reaching a suitable memory (i.e., specific memory), depressive individuals recall available material, which corresponds mostly to abstract and undifferentiated self representations and results in the prevalence of general memories.

Nevertheless, even if Ramponi et al. (2004) have shown that a low level of differentiation of emotional schematic models of self and others predicts a low level of specific memory recall in depressive patients, they nonetheless suggest that the level of

specific memories is independent from the level of depressive symptoms. It is possible that this mechanism can be observed in other populations of patients with undifferentiated schematic models of the self, independently from mood disorders. A deficit in the ability to differentiate self and other emotional states has been described in multiple substance-dependent patients, which suggests an impoverishment of emotional schematic models (Carton et al., 2010).

The first objective of this study was to verify the existence of reduced autobiographical memory specificity in multiple substance-dependent opiate-using individuals. We assessed autobiographical memory in opiate-dependent patients and in non-dependent individuals with the Autobiographical Memory Test of Williams and Scott (1988), and we hypothesized that dependent patients recall fewer specific memories than control individuals.

Given these results concerning the undifferentiated schematic models of self and others in multiple dependent patients, the second objective of this study was to investigate if this emotional information processing accounts for reduced memory specificity in opiate-dependent patients. We expected that dependent patients depict a deficit in the ability to differentiate emotional states for self and others and that a low level of emotional differentiation predicts a low level of specific memories recalled.

In addition to this objective, we proposed to verify the effect of depressive symptoms on the decrease of autobiographical memory specificity. As we suggested above, we hypothesized that reduced memory specificity in dependent patients is linked to a particular cognitive processing, as is the case in depressive patients, characterized by undifferentiated schematic models, which cannot be solely explained by the presence of mood disorders.

The last objective was to determine if an autobiographical memory deficit is also observable in substance-dependent patients after clinical improvement, in particular, after withdrawal or when they are engaged in a methadone substitution treatment. Indeed, although many studies agree on the existence of cognitive deficits in opiate consumers, the evolution of these dysfunctions after clinical improvement remains unclear. In our group of dependent patients, we compared the level of specific memories recalled with the autobiographical memory test of actively dependent patients, patients after recent abstinence and methadone maintained-patients.

## 2. Method

### 2.1. Participants

The study consisted of 110 voluntary participants ranging from 17 to 52 years of age (see Table 1). Of these participants, 73 were patients diagnosed with actual or past multiple-substance dependence, including opiate dependence, according to the DSM-IV criteria and were recruited in the addictology department of the Dr. Schaffner Hospital Center of Lens in the north of France. This sample included 50 active consumers hospitalized for detoxification (30 active consumption patients were included upon admission and 20 patients in early partial remission were included during the last week of their stay) and 23 outpatients under a methadone maintenance treatment for at least two months. The methadone-maintained individuals did not abuse any drug or alcohol. All participants' primary current or past substance dependence was an opioid dependence. Before participating, all patients were submitted to a medical assessment performed by an addictologist and saw a physician the first day of their hospitalization to evaluate their somatic state and establish treatment. When the participants met inclusion criteria, they were asked to participate and sign an informed consent form. The participants did not have a recent

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