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Metacognition and episodic memory in obsessive-compulsive disorder

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ABSTRACT

Memory deficits in patients with obsessive-compulsive disorder (OCD) have been frequently reported but are not sufficiently accounted for by cognitive models of OCD. The aim of the study was to identify cognitive mechanisms that might be able to explain memory deficits in OCD. We hypothesized that a self-conscious meta-cognitive style might be responsible for reduced memory performance in OCD.

Episodic verbal memory performance was assessed in 23 participants with OCD (DSM-IV criteria) and 22 matched controls. Cognitive self-consciousness was assessed with a self-report measure derived from the Meta-Cognitions Questionnaire (MCQ). Compared to controls, OCD participants showed reduced immediate and delayed recall of complex verbal material and increased self-reported levels of cognitive self-consciousness. Multiple regression analyses indicated that group differences in story recall were significantly mediated by self-reported trait cognitive self-consciousness. Results point to the deteriorating effects of a thought-focused cognitive style on effortful encoding processes in OCD.

1. Introduction

Deficits in the area of learning and memory are among the most frequently reported neuropsychological findings in people with obsessive-compulsive disorder (OCD) (see Kuelz, Hohagen, & Voderholzer, 2004; Muller & Roberts, 2005, for review). What remains unclear from previous investigations is how deficits in learning and memory relate to the psychopathological symptoms of OCD. Do memory problems contribute to or even cause obsessive-compulsive psychopathology or are they a consequence of OCD symptoms instead? Neurobiological models of OCD have attributed learning and memory deficits in OCD to deficient organizational strategies thought to arise from dysfunctions in frontostriatal pathways (Deckersbach, Otto, Savage, Baer, & Jenike, 2000; Savage et al., 1999; Savage et al., 2000).

Cognitive models of OCD emphasize the negative appraisal of intrusive thoughts, which subsequently leads to neutralizing behavior (Rachman, 1997, 1998; Salkovskis, 1985, 1989). These cognitive theories of OCD focus on dysfunctional thought *contents*. They only rarely attempt to incorporate information *processing* deficits. An early memory deficit theory of OCD sought to explain pathological doubt and checking rituals by low memory accuracy (Sher, Frost, Kushner, Crews, & Alexander, 1989; Sher, Frost, & Otto, 1983). This model conceptualized obsessive-compulsive pathology as a consequence of preexisting memory problems but the theory has failed to find consistent empirical support (Moritz, Jacobsen, Willenborg, Jelinek, & Fricke, 2006; Tallis, Pratt, & Jamani, 1999).

During the last decade original appraisal-belief-models have been extended to incorporate abnormal meta-cognitive processing in OCD (Purdon & Clark, 1999; Wells, 2000; Wells & Matthews, 1996). The Obsessive Compulsive Cognition Working Group (OCCWG) has emphasized the overimportance of thoughts and control of thoughts as dimensions of dysfunctional (meta-)cognition in people with OCD (Compulsive Cognitions Working Group, 2001, 2003). Meta-cognition refers to cognitive processes and structures that monitor and control a person's own cognition. Two specific constructs of meta-cognitive processing have been linked in particular to memory performance in OCD. Both meta-cognitive models conceptualize memory problems as arising from OCD pathology rather than conditioning it: First, people with OCD, especially of the checking subtype, have been repeatedly shown to have low confidence in their own memory performance (Hermans, Martens, De Cort, Pieters, & Eelen, 2003; Macdonald, Antony, Macleod, & Richter, 1997; Rachman, 2002; Tolin et al., 2001) which is further reduced by constant checking (van den Hout & Kindt, 2003, 2004). Second, people with OCD show a heightened tendency to focus attention on their own mental processes regardless of thought contents. This meta-cognitive characteristic, termed cognitive self-consciousness (CSC), has been shown to be especially linked to obsessive-compulsive pathology (Cartwright-Hatton & Wells, 1997; Cohen & Calamari, 2004; Janeck, Calamari, Rieman, & Heffelfinger, 2003). Cognitive

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self-consciousness might be seen as a predisposition that renders participants more vulnerable to development of obsessions and compulsions because it makes intrusive negative thoughts more salient and increases the probability of dysfunctional thought appraisal, especially of assigning too much importance to passing thoughts. Increased cognitive self-consciousness, as it draws on the limited resources of controlled attention, might also disturb performance on effortful cognitive tasks (e.g. episodic memory or problem-solving).

Empirical support for the role of cognitive self-consciousness in deficient memory performance of OCD participants comes from recent research findings: Compared to normal controls (Marker, Calamari, Woodard, & Riemann, 2006) and to subjects with non-OCD anxiety disorders (Goldman et al., 2008) OCD participants were found to show impaired performance on an implicit serial reaction time test, but enhanced recognition of the embedded stimulus pattern. Thus, heightened levels of cognitive self-consciousness might be seen as conscious processing gating problems. This increases likelihood of normally unattended and undetected information (e.g. an embedded structure in the serial reaction time task or negative intrusive thoughts) to enter consciousness and interfere with ongoing cognitive tasks. In an own previous investigation we found *Rumination* (a subscale of the Padua Inventory) to be the aspect of OC pathology with the strongest association to episodic memory deficits in participants with OCD (Exner, Martin, & Rief, in press). The psychopathological dimension of *Rumination* appears to be closely related to the concepts of self-focused attention (situational) and self-consciousness (dispositional self-attention) as it represents a cognitive style that is characterized by an increased attentional focus on internal mental processes and a sense of reduced control over own mental activities. We suggested that increased attention to one's own thoughts and monitoring of own mental processes might distract persons with OCD from memory tasks at hand and thus hamper them in the use of effortful encoding strategies.

The aim of the present study was to look beyond group differences on standard memory measures between people with OCD and healthy controls in order to understand the mechanisms associated with reduced memory performance in OCD. Building on our previous observations the purpose of the present investigation was to study the proposed influence of a self-conscious meta-cognitive style on episodic memory processing directly and in a new OCD sample. We specifically hypothesized that increased levels of cognitive self-consciousness would have a mediating effect on episodic memory performance of participants with OCD.

2. Methods

2.1. Participants

2.1.1. Participants with obsessive-compulsive disorder (OCD)

The sample comprised 23 outpatients with the current diagnosis of obsessive-compulsive disorder (see Table 1). Participants were recruited for the study from our outpatient clinic (4 participants) and from 2 psychosomatic hospitals (19 participants). All participants fully met the criteria for current OCD of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*) (American Psychiatric Association, 1994) on the basis of structured interviews (see Section 2.2). Subjects with a history of head injury, neurological diseases or substance dependence were excluded. Eleven OCD participants were on psychotropic medication: The majority (6 participants) was taking selective serotonin reuptake inhibitors (SSRIs), the others were taking other antidepressant agents (serotonin noradrenalin reuptake inhibitors, serotonin agonist and reuptake inhibitors, lithium carbonate).

2.1.2. Healthy controls

OCD participants were compared with 22 healthy control subjects recruited for the study by an advertisement in a local newspaper and leaflets distributed in town. Only participants without a history of psychiatric or neurological disorder were studied. None was taking psychotropic drugs. Control participants matched OCD participants in terms of age, sex, years of education and intelligence (3 subtests of the *Wechsler Adults Intelligence Scale, WAIS-III*). The clinical and demographic characteristics of participants are summarized in Table 1. After complete description of the

Table 1
Demographic and clinical characteristics of participants.

Variable [a]	OCD participants ($n = 23$)	Controls ($n = 22$)	Statistic	P[d]
Age, *y*	33.3 ± 8.5	33.2 ± 8.7	$t(43) = 0.03$	0.976
Education [b], *y*	17.1 ± 3.0	17.1 ± 3.0	$t(43) = -0.07$	0.944
Gender, no. (%) female	11 (47.8)	10 (45.5)	$\chi^2 = 0.05$	0.824
WAIS-III, scaled scores				
Information	12.0 ± 2.2	13.1 ± 2.7	$t(43) = -1.557$	0.127
Similarities	12.5 ± 1.8	12.4 ± 2.2	$t(43) = 0.268$	0.790
Block design	11.0 ± 2.8	12.1 ± 2.6	$t(43) = -1.240$	0.222
Y-BOCS, total raw score	22.2 ± 6.6	–		
Obsessions	11.6 ± 4.7	–		
Compulsions	11.1 ± 3.4	–		
PI-R, total raw score	64.6 ± 23.5	16.3 ± 8.6	$t(28.0) = 9.222$[c]	**<0.001**
Impulses	4.6 ± 6.3	1.0 ± 1.1	$t(23.5) = 2.703$[c]	**0.013**
Washing	12.9 ± 10.7	2.3 ± 2.6	$t(24.8) = 4.599$[c]	**<0.001**
Checking	15.2 ± 7.5	3.7 ± 3.0	$t(29.1) = 6.821$[c]	**<0.001**
Rumination	25.7 ± 7.0	8.0 ± 4.3	$t(36.8) = 10.221$[c]	**<0.001**
Precision	6.2 ± 4.8	1.3 ± 1.6	$t(27.3) = 4.577$[c]	**<0.001**
CSC-E	37.0 ± 8.1	29.5 ± 5.8	$t(43) = 3.559$	**0.001**
BDI, total raw score	15.9 ± 9.5	3.2 ± 2.6	$t(25.4) = 6.15$[c]	**<0.001**

WAIS-III: Wechsler Adult Intelligence Scale, German Version; *Y-BOCS*: Yale-Brown Obsessive Compulsive Scale; PI-R: Padua Inventory, revised; *CSC-E*: Cognitive Self-Consciousness Scale-Expanded, *BDI*: Beck's Depression Inventory.

[a] Table values are given as mean ± S.D. unless indicated otherwise.

[b] Number of years spent in full-time education.

[c] Homogeneity correction in case of heterogeneous variances.

[d] Bold values refers $P < 0.05$.