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Underlying mechanisms of verbal memory deficits in obsessive-compulsive disorder and major depression – The role of cognitive self-consciousness

Julia Kikul [a,*], Timna Sarai Van Allen [b], Cornelia Exner [b]

[a] Schoen Klinik Bad Arolsen, Hofgarten 10, D-34454 Bad Arolsen, FRG, Germany
[b] Department of Clinical Psychology and Psychotherapy, University of Marburg, Gutenbergstr. 18, D-35032 Marburg, Germany

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ABSTRACT

Background and Objectives: Previous studies have demonstrated that some individuals suffering from obsessive-compulsive disorder (OCD) are impaired in verbal memory performance. This study was designed to investigate the role of cognitive self-consciousness (CSC) as a putative underlying mechanism of these cognitive deficits.
Methods: Verbal memory performance of 36 participants with OCD, 36 individuals with major depression disorder (MDD) and 36 healthy controls was assessed with the California Verbal Learning Test under three different experimental conditions: (1) single-task condition, (2) while simultaneously focusing on their thoughts (CSC condition), (3) while simultaneously focusing on external stimuli (dual-task condition).
Results: Memory performance in the CSC condition and in the dual-task condition was reduced compared to single-task condition but no interaction effect was found.
Limitations: It remains unclear whether CSC and other concepts with an inward self-referential focus of attention (e.g. rumination) differ in the way they influence cognitive performance.
Conclusions: These results confirm the deteriorating influence of heightened CSC on verbal memory encoding but suggest that the effect is not specific to OCD.
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1. Introduction

Memory deficits have been frequently found in obsessive-compulsive disorder (OCD) (for reviews see Kuelz, Hohagen, & Voderholzer, 2004; Muller & Roberts, 2005). It has been consistently demonstrated that non-verbal memory is impaired in OCD (e.g., Boone, Anath, Philpott, Kaur, & Djenderidjian, 1991; Christensen, Kim, Dysken, & Hoover, 1992; Savage et al., 2000), while results concerning verbal memory performance are more heterogeneous. It seems to be particularly reduced in tasks with high demands on organizational capacity (e.g., Deckersbach, Otto, Savage, Baer, & Jenike, 2000; Savage et al., 2000; Segalàs et al., 2008). Recent research has dealt with the origins of these cognitive deficits. Here, cognitive self-consciousness (CSC) has been given increased attention. CSC is defined as the tendency to be aware of and to monitor one's thoughts and cognitive processes and has frequently been found to be associated with obsessive-compulsive symptoms (e.g., Goldman et al., 2008; Janeck, Calamari, Riemann, & Heffelfinger, 2003; Wells & Papageorgiou, 1998). It has been found to be more elevated in people with OCD in comparison to healthy ones (e.g., García-Montes, Pérez-Álvarez, Soto Balbuena, Perona Garcelán, & Cangas, 2006; Hermans, Martens, De Cort, Pieters, & Eelen, 2003; Janeck et al., 2003) and to distinguish persons with OCD from individuals with GAD or other emotional disorders (e.g., Cartwright-Hatton & Wells, 1997; Janeck et al., 2003). High levels of CSC have been considered a possible link between OCD and its cognitive deficits (e.g., Exner et al., 2009; Janeck et al., 2003). Heightened CSC requires cognitive resources and might thus disturb encoding processes in memory tasks, so that memory performance should be poorer in individuals with high CSC. In a recent study by Kikul, Vetter, Lincoln, and Exner (2011), this negative influence of heightened CSC on visual memory performance in OCD could be demonstrated: Compared to visual memory performance under standard condition where full attention capacity was available, memory performance was reduced when situational CSC was experimentally raised. The authors concluded that increased CSC was comparable to dual-task demands on divided attention.

Memory deficits have also been found in other psychological disorders, such as posttraumatic stress disorder (e.g., Jenkins,

* Corresponding author. Tel.: +49 5691 6238 3022; fax: +49 5691 6238 1043.
E-mail address: jkikul@schoen-kliniken.de (J. Kikul).

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Langlais, Delis, & Cohen, 1998; Johnsen, Kanagaratnam, & Asbjørnsen, 2008; Vasterling, Brailey, Constans, & Sutker, 1998), panic disorder (e.g., Asmundson, Stein, Larsen, & Walker, 1995; Lucas, Telch, & Bigler, 1991) and depression (e.g., Elgamal, Denburg, Marriott, & MacQueen, 2010; Fossati, Coyette, Ergis, & Allilaire, 2002; Otto et al., 1994). As in OCD, research regarding depression has dealt with the relationship of the observed cognitive deficits and psychopathological symptoms. In this regard, the concept of rumination has frequently received great attention. Rumination is defined as a pattern of "behaviours and thoughts that focus one's attention on one's depressive symptoms and on the implications of those symptoms" (Nolen-Hoeksema, 1991, p. 568). Several studies demonstrated the deteriorating influence of induced or trait rumination on cognitive task performance (e.g. Davis & Nolen-Hoeksema, 2000; Lyubomirski, Kasri, & Zehm, 2003; Watkins & Brown, 2002).

While there are many different conceptualizations of rumination and many questions remain about the relationship of rumination and similar constructs (for a detailed discussion see Smith & Alloy, 2009), it has been considered as a subcomponent of the wider concept of private self-awareness by some researchers (e.g., Trapnell & Campbell, 1999). This conceptualization is similar to our conceptualization of CSC as we consider CSC to be a subcomponent of private self-consciousness (see Kikul et al., 2011). Although there are also some important differences between rumination in depression and high CSC in OCD (e.g., they differ with regard to their thought contents), both concepts share the inward self-referential focus of attention. Thus, both depression and OCD might be conditions characterized by a self-directed modus of attention, which apart from increasing negative affect also interferes with memory encoding and problem solving.

The present study aims to investigate the underlying mechanisms of cognitive deficits in OCD. It seeks to expand the findings of our previous study (Kikul et al., 2011) by additionally studying verbal memory performance and including individuals with major depression as a clinical control group. We hypothesized that verbal memory performance in OCD would be reduced when situational CSC was experimentally heightened in comparison to memory performance when full attention capacity was available. We expected that both individuals with OCD and MDD would be more vulnerable to that effect than healthy controls as both clinical conditions are characterized by a trait tendency for heightened self-focus of attention. However, the effect was expected to be more pronounced in participants with OCD owning to their difficulties in disengaging from internal mental processes. We also included a common dual-task paradigm in our investigation in order to disentangle the effects of dividing attention towards internal as opposed to external events.

2. Methods

2.1. Participants

The OCD group consisted of 36 participants with a current primary diagnosis of OCD according to the DSM-IV (American Psychiatric Association, 1994a). Nineteen of the participants with OCD (52.8%) had comorbid psychiatric disorders, while seventeen (47.2%) only suffered from OCD. Current comorbid Axis I diagnoses included: major depression ($n = 10$), dysthymia ($n = 5$), social phobia ($n = 4$), hypochondriasis ($n = 3$), specific phobia ($n = 2$), panic disorder with agoraphobia ($n = 2$) and general anxiety disorder ($n = 1$). Remitted Axis I diagnoses were as follows: alcohol abuse ($n = 2$) and MDD ($n = 1$). Twenty-two of the OCD participants (61.1%) were on psychotropic medication.

The MDD group consisted of 36 participants with a current episode of major depression disorder (MDD) according to the DSM-IV. 15 Participants had new-onset MDD; the remaining 21 participants were suffering from recurrent MDD. Twenty-eight of the participants with MDD (77.8%) had comorbid psychiatric disorders, while eight (22.2%) had pure MDD. Current comorbid Axis I disorders were: social phobia ($n = 3$), specific phobia ($n = 3$), dysthymia ($n = 2$), pain disorder ($n = 1$), panic disorder ($n = 1$) and agoraphobia with panic disorder ($n = 1$). Remitted Axis I diagnoses were as follows: alcohol abuse ($n = 1$), post-traumatic stress disorder ($n = 1$) and social phobia ($n = 1$). Twenty-six of the MDD participants (72.2%) were on psychotropic medication. All participants with OCD or MDD were recruited from the inpatient treatment facility for psychological disorders in Bad Arolsen, Germany.

The healthy control group comprised 36 participants with no current or lifetime Axis I disorder as determined by the SCID interview. Only participants without a history of neurological disturbances were included. None were taking psychotropic medication. All control participants were recruited through posted flyers and advertisements in the greater Marburg area, Germany.

The OCD group and the healthy control group had already taken part in a former study (Kikul et al., 2011). But participants with depression also repeated the visual memory test used in the former study, so that test experience/ test sophistication was comparable in all three groups.

Clinical status was assessed using the German version (Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1997) of the structured clinical interview for DSM-IV (SCID; American Psychiatric Association, 1994b). Exclusion criteria in the two clinical groups were current or a history of psychotic disorders (e.g., schizophrenia), bipolar disorders, any drug or alcohol dependence or neurological disturbances (e.g., craniocerebral injury, neurodegenerative diseases).

The three groups did not differ with respect to years of education, $F(2, 107) = 2.234$, $p = 0.112$, $\eta_p^2 = 0.041$, or gender, $\chi^2(2) = 1.258$, $p = 0.533$, *Cramer's* $V = 0.11$, but with respect to age, $F(2, 107) = 19.383$, $p < 0.001$, $\eta_p^2 = 0.27$. Means and standard deviations are presented in Table 1. Bonferroni-corrected post-hoc tests indicated that the MDD group was older than the OCD group ($p < 0.001$) and than the healthy control group ($p < 0.001$), while the OCD group and the healthy control group did not differ with respect to age ($p = 1$). The OCD group had a longer duration of disorder than the MDD group, $t(70) = 3.635$, $p = 0.001$, $r = 1.27$.

Table 1
Demographic and clinical characteristics by group.

	OCD ($n = 36$)	MDD ($n = 36$)	Control ($n = 36$)
Gender ratio (female/male)	21/15	25/11	21/15
Age (years)	33.3 (12.1)$_b$	47.05 (10.85)$_{ac}$	32.8 (1.7)$_b$
Years of education	15.8 (3.1)	14.91 (3.25)	16.7 (4.2)
Y-BOCS total (raw scores)	21.0 (7.1)	–	–
Y-BOCS, subscale "obsession" (raw scores)	10.2 (4.5)	–	–
Y-BOCS, subscale "compulsion" (raw scores)	10.8 (4.3)	–	–
Duration of disorder (years)	13.3 (12.8)	4.8 (5.6)	–
PI-WSUR (raw scores)	89.5 (24.5)$_{bc}$	55.64 (12.28)$_a$	48.4 (7.6)$_a$
MCQ, subscale "cognitive self-consciousness – expanded" (raw scores)	34.2 (5.6)$_{bc}$	30.19 (6.97)$_{ac}$	25.4 (6.8)$_{ab}$
BDI-II (raw scores)	19.9 (10.6)$_{bc}$	27.76 (7.98)$_{ac}$	4.1 (3.9)$_{ab}$

Note. Means and standard deviations (in parentheses) unless indicated otherwise. Subscripts indicate pairwise differences (all $p < .05$) with $_a$ = significantly different from OCD group, $_b$ = significantly different from MDD group and $_c$ = significantly different from control group. Y-BOCS = Yale-Brown Obsessive Compulsive Scale, PI-WSUR = Padua Inventory – Washington State University Revision; MCQ = Meta-Cognitions Questionnaire; BDI-II = Beck Depression Inventory-II.

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