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Individuals with obsessive-compulsive disorder are less prone to false memories

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ABSTRACT

Previous research on memory and metamemory processes in obsessive compulsive disorder (OCD) almost exclusively addressed veridical memory. The present study investigated veridical and false memory (recall and recognition of nonpresented information) as well as confidence in OCD. We compared checker OCD, non-checker OCD, and healthy control participants (HC) by using the Deese-Roediger-McDermott (DRM) false memory paradigm. Participants were given word lists, each of which consisted of semantically related words which were strong associates of a non-presented critical target word. They were then given a free recall and a recognition task. Although both OCD groups showed comparable correct recall and recognition performance to that of the HC group, OCD groups were less prone to false memories and reported lower confidence for these false memories than the HC group. Accuracy of global recognition estimates were similar across three groups. This pattern of results may partly be due to OCD groups' reliance on item-based rather than relational processing at encoding.

1. Introduction

1.1. Memory and metamemory in OCD

A substantial amount of research addressed the role of higher-order cognitive processes in the etiology and maintenance of checking symptoms associated with obsessive-compulsive disorder (OCD). These include, among others, attention, executive functions, memory, and planning (for meta-analyses see Abramovitch, Abramowitz, & Mittelman, 2013; Cuttler, & Graf, 2009; Shin, Lee, Kim, & Kwon, 2014; Woods, Vevea, Chambless, & Bayen, 2002).

The present study focused on episodic memory and metamemory in patients diagnosed with OCD. Episodic memory has been a central issue in OCD especially in relation to checking compulsions, because it has been argued that checking behavior might be caused, at least partly, by episodic memory deficits (e.g., Exner, Martin, & Rief, 2009). Several studies testing this relationship found OCD participants with primary checking symptoms to be weaker in terms of episodic memory performance compared to healthy control (HC) participants (e.g., Exner et al., 2009; Sher, Frost, & Otto, 1983; Tükel et al., 2012; Tuna, Tekcan, & Topçuoğlu, 2005; Zitterl et al., 2001). However, some studies suggested that this difference might depend on the type of material (Deckersbach, Otto, Savage, Baer, & Jenike, 2000; Savage et al., 1999) and still others found no difference between groups (Foa, Amir, Gershuny, Molnar, & Kozak, 1997; MacDonald, Anthony, MacLeod, & Richter, 1997; Moritz, Kloss, von Eckstaedt, & Jelinek, 2009). Although the results of individual empirical studies do not present a very clear picture, a number of meta-analyses suggest that verbal memory is poorer in OCD or analogue groups. In their meta-analysis, Woods et al. (2002) found that checkers (sub-clinical checker and OCD-checker groups combined) were poorer than controls in free and cued recall of verbal material. Cuttler et al. (2009) concluded that one of the areas where OCD groups showed deficits in comparison to control participants was verbal memory. Two recent meta-analyses also found poorer verbal memory in OCD groups compared to non-diagnosed control groups (Abramovitch et al., 2013; Shin et al., 2014). Although all of these studies found significant differences in effect sizes, they tended to be smaller for verbal memory than for non-verbal memory (e.g., Abramovitch et al., 2013).

More recently, metamemory processes have been receiving attention with regard to checking behavior in OCD. Metamemory refers to monitoring and control of the content, processes, and outcomes of memory (Metcalfe, 2009; Nelson, & Narens, 1990). Several lines of evidence point to metamemory deficits in OCD

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checkers. It has been shown that OCD checkers are less confident in the accuracy of the retrieved episodic information than control participants (MacDonald et al., 1997; McNally, & Kohlbeck, 1993). They are also less confident and less accurate in prospective metamemory judgments such as feeling of knowing (Tuna et al., 2005). It has been argued that deficits in metamemory (e.g., low confidence) may have a causal role in checking behavior. For instance, Alcolado, and Radomsky (2011) experimentally showed that participants with low memory confidence were more likely to have the urge to check. It has also been suggested that repeated checking might have the effect of decreasing subjective sense of remembering/recollection, thereby increasing checking behavior. For instance, van den Hout, & Kindt (2003a) showed that engaging in repeated checking leads to a decrease in vividness and detail of memories, despite no change in accuracy. Radomsky, Dugas, Alcolado, and Lavoie (2014) found that individuals diagnosed with OCD as well as nonclinical participants reported lower memory confidence and vividness after repeated checking (see also, Radomsky, & Alcolado, 2010; van den Hout, & Kindt, 2003b). It has to be noted that in their comprehensive review, Cuttler et al. (2009) concluded that there was no difference between checker-OCD and non-checker OCD groups in either memory or metamemory performance.

1.2. False memory in OCD

As noted by Klumpp, Amir, and Garfinkel (2009) almost all research on episodic memory-OCD relationship have investigated veridical memory performance. Indeed, this has also been true for metamemory. We agree with Klumpp et al. (2009) that memory errors or false memories may also be very informative regarding both memory and metamemory processes in OCD. In the only study addressing false memory in OCD, Klumpp et al. (2009) looked at memory errors by using a procedure similar to the Deese-Roediger-McDermott paradigm (DRM; Deese, 1959; Roediger, & McDermott, 1995) in college students with high vs. low washing scores. In a typical study using the DRM paradigm, participants study several word lists each of which consists of related words (e.g., *rest*, *bed*, *blanket*, *snooze* etc.) that are semantic associates of a non-presented word in the list, known as the critical lure (in this example, *sleep*). At the end of each list participants are given memory tests, with the main variable being the memory for non-presented critical item. Results of several studies show that participants tend to falsely recognize the critical lure as having been studied (e.g., Gallo, & Roediger, 2003; Roediger et al., 1995). Moreover, these false memories are associated with a strong sense of remembering and vividness (e.g., Roediger et al., 1995) and are largely immune to forewarning (e.g., Gallo, Roberts, & Seamon, 1997). Several studies employed the DRM procedure in order to elucidate the cognitive mechanisms in clinical populations, including depression (Yeh, & Hua, 2009) and bipolar disorder (Schilling, Wingenfeld, Spitzer, Nagel, & Moritz, 2013).

In their study, Klumpp et al. (2009) modified the classical DRM procedure. Participants studied positive, neutral, and threat-relevant scenarios and then were given a recognition test, in which they were presented with words studied as part of the scenarios as well as nonstudied words. In the test, they were asked to indicate studied words as “old” and nonstudied words as “new”. For words given an “old” judgment, participants also made a Remember/Know judgment to assess the subjective experience of remembering (Gardiner, & Richardson-Klavehn, 2000; Tulving, 1985; van den Hout et al., 2003a). Remember judgments refer to positive recognition (“old”) decisions based on some perceptual/contextual information about having studied the stimuli. Know judgments refer to positive recognition judgments based on knowledge, without any associated perceptual or contextual detail (Gardiner et al., 2000; Tulving, 1985). It is argued that Know judgments are likely to be based on the familiarity with the studied material in the absence of specific details. Klumpp et al. (2009) found no group difference in the overall correct recognition. However, the OC group showed higher false recognition than control participants, but only for threat-relevant words that were associated with Know rather than Remember type of judgments, indicating more reliance on familiarity. The authors suggested that these familiarity based judgments may add to uncertainty experienced by individuals with OCD.

The DRM procedure, which has been a canonical technique to demonstrate false memory, is very appropriate for studying memory as well as metamemory. First, it measures correct and false memory for the same set of stimuli. Second, although it is possible to investigate false memory (especially intrusion errors) with typical free recall tasks, false memory rates in these studies are very low, making it very difficult to study possible effects of different independent variables. The DRM technique, on the other hand, leads to robust and consistent false memory effects. Third, in this technique participants may report a strong sense of recollection for the material they tend to falsely remember, allowing researchers to dissociate accuracy and confidence. Given the central role confidence is argued to play in checking behavior (e.g., van den Hout et al., 2003a), these characteristics make the DRM paradigm a useful tool to address the confidence associated with experienced vs non-experienced events.

1.3. The present study

In the present study, we investigated memory and metamemory for veridical and false memory performance using the DRM paradigm. More specifically, because OCD (especially checking behavior associated with it) is arguably linked to episodic memory deficits (Abramovitch et al., 2013; Cuttler et al., 2009; Shin et al., 2014; Woods et al., 2002), all published work on memory processes in OCD addressed forgetting of studied information (omission errors). The present study is the first to look at false memory (remembering information that has not been studied) in individuals diagnosed with OCD, thereby providing novel data regarding the boundaries of memory and metamemory performance in OCD. Moreover, inclusion of participants diagnosed with OCD with and without primary checking symptoms provides a chance to address the role of checking symptomatology on memory (Cuttler et al., 2009).

Research also shows that episodic memory deficits in OCD may result from weak strategic organization in patients (Buhlmann et al., 2006; Cabrera, McNally, & Savage, 2001; Deckersbach et al., 2000; Melloni, Urbistondo, Sedeno, Gelormini, Kichic, & Ibanez, 2012). As such, DRM paradigm becomes especially useful since false memory in DRM is based on implicit semantic activation of strongly associated information existing in memory (e.g., Gallo, 2010). Thus, it provides an opportunity to test both accurate and false memory performance without the need for strategic organization at encoding.

As noted in the introduction, a number of meta-analyses showed that verbal memory tasks show small effect sizes in OCD-HC comparisons. Given that providing semantically organized lists minimizes negative effects of strategic organization deficits in OCD groups, we expected that accurate episodic memory performance would be less affected by the quality of participant-initiated strategies, leading to a small deficit in the OCD groups in correct recall and recognition compared to the HC group. Research with neuropsychological tests consisting of semantically associated items such as California Verbal Learning Test (CVLT) also support this prediction (e.g., de Geus, Denys, Sitskoorn, & Westenberg, 2007). In terms of false memory, the activation of the critical lure is