



# A Theoretical review of cognitive biases and deficits in obsessive–compulsive disorder



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## ABSTRACT

During the past 30 years, experimental psychopathologists have conducted many studies aiming to elucidate the cognitive abnormalities that may figure in the etiology and maintenance of OCD. In this paper, we review research on both dysfunctional beliefs and cognitive deficits in OCD, as findings from both traditional self-report and information-processing approaches provide distinct sources of information concerning cognitive abnormalities. First, we discuss dysfunctional beliefs and metacognitive beliefs implicated in the disorder. Research has identified a number of maladaptive appraisals (e.g., heightened responsibility) and metacognitive beliefs (e.g., need to control one's thoughts) that are associated with the disorder, yet these are not invariably present in all cases of OCD. Next, we review the literature on memory and attentional deficits and biases in OCD. This line of research shows inconsistent evidence for deficits in memorial and attentional processes, but does indicate that people with the disorder have memory and attention biases that may be related to metacognitive beliefs about their ability to remember and attend to stimuli. Finally, we discuss recent work that suggests that people with OCD have reduced access to internal states, thus causing them to engage in rituals to resolve persistent uncertainty. Implications and future directions are discussed.

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## 1. Introduction

Individuals who suffer from obsessive–compulsive disorder (OCD) are afflicted by time-consuming repetitive and intrusive thoughts, images, and impulses (obsessions) and repetitive actions (compulsions) that cause significant distress and impairment (American Psychiatric Association, 2013). Though OCD is broadly characterized by obsessions and compulsions, it is a very heterogeneous disorder that manifests in a variety of ways. Researchers have outlined four major symptom dimensions, or subtypes, of OCD, including (1) contamination obsessions and cleaning compulsions, (2) responsibility for harm obsessions and checking compulsions, (3) symmetry/incompleteness obsessions and ordering/arranging/repeating compulsions, and (4) aggressive/sexual/religious obsessions (e.g., “unacceptable thoughts”) and mental/checking compulsions (Abramowitz et al., 2010). Research indicates that different subtypes are associated with different treatment outcomes (Mataix-Cols, Rauch, Manzo, Jenike, & Baer, 1999) and thus may be relevant to understanding the mechanisms mediating the disorder.

Salkovskis (1985) developed a cognitive-behavioral model of OCD by elucidating how people can develop the disorder by catastrophically misinterpreting the significance of normal, distressing intrusive thoughts, thereby explaining how obsessions originate. His work indicates that most people without OCD occasionally experience intrusive thoughts that do not differ in content from those experienced by people with OCD. Rather, people who develop the disorder seem to misinterpret the significance and consequences of these thoughts, which leads them to engage in compulsions, thereby perpetuating this cycle of obsessions and compulsions. Notably, Salkovskis emphasizes the importance of inflated responsibility in this model. He asserts that people with OCD interpret normal intrusive thoughts as indicative of harm or danger and feel responsible for preventing harm to themselves or others (Salkovskis, 1985; Shafran, 2005). Thus, this feeling of increased responsibility motivates people to take measures to prevent such harm. According to this model, a man without OCD who has an intrusive thought of pushing a person in front of an oncoming train would be likely to dismiss the thought as meaningless. However, a man with OCD would interpret the same thought as an indication that he is dangerous and a true threat to others' safety. In an attempt to prevent harm to others, he would then engage in compulsions (e.g., keeping his hands occupied, praying repeatedly, counting to a lucky number, etc.) that would temporarily decrease

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his anxiety. According to Salkovskis's model, this decrease in anxiety not only reinforces his compulsive behavior, but also prevents him from learning that the thought is meaningless and that his anxiety would naturally decrease even without performing compulsions (Salkovskis, 1985; Taylor, 2002). Indeed, the attempts to suppress the obsessive thought may itself increase its frequency of occurrence, further reinforcing the man's belief in his dangerousness.

In his cognitive model of OCD, Rachman (1997) later expanded upon Salkovskis's work to include cognitive biases other than inflated responsibility. He theorized that what distinguishes people with OCD from those without the disorder is that the former group makes "catastrophic misinterpretation[s]" (p. 4) of their thoughts, interpreting them as meaningful, significant, and threatening. Rachman (1997) includes inflated responsibility as one of the cognitive misappraisals, but also includes others, which we discuss later in greater detail. Since the introduction of this cognitive model of OCD, experimental psychopathologists have conducted many studies aiming to elucidate the cognitive abnormalities that may figure in the etiology and maintenance of OCD. In this article, we review research on both dysfunctional beliefs and cognitive deficits in OCD, as findings from both traditional self-report and information-processing approaches provide distinct sources of information concerning cognitive abnormalities (McNally, 2001). Specifically, we review work on abnormalities in beliefs, attention, and memory before discussing a recent line of work on doubt and accessing internal states. There is abundant research on the biological aspects of OCD, especially neuropsychological studies on content-independent deficits unrelated to processing of emotional information (For a review, see Abramovitch, Abramowitz, & Mittelman, 2013). However, cognitive neuroscience research concerning how the brain mediates information-processing biases and dysfunctional beliefs has only just begun. We discuss this work when relevant with suggestions for future directions.

## 2. Dysfunctional beliefs

Since Salkovskis (1985) and Rachman (1997) first proposed that catastrophic misinterpretations, such as inflated responsibility, might contribute to the onset and the maintenance of the OCD, many studies have examined different thoughts that might be associated with the disorder. Building on early cognitive models, the Obsessive Compulsive Cognitions Working Group (OCCWG) was formed to identify and create an assessment of dysfunctional beliefs that are specific to OCD. In a series of papers, they outlined three domains of dysfunctional beliefs that contribute to the development and maintenance of the disorder, including (1) overestimation of threat and inflated responsibility, (2) importance of and need to control thoughts, and (3) perfectionism and intolerance of uncertainty (OCCWG, 1997, 2001, 2003, 2005). Numerous studies have demonstrated the importance of these dysfunctional beliefs in OCD, and research within these domains continues. A description of each of these domains appears below, followed by a general discussion of how dysfunctional beliefs are related to OCD.

### 2.1. Inflated responsibility & overestimation of threat

Conceptualized as the belief that one is responsible for preventing harm or other negative outcomes, inflated responsibility has been identified as a significant cognitive distortion in OCD. As noted above, Salkovskis (1985) emphasized the importance of inflated responsibility in his cognitive model of OCD, and since then, many studies have shown its association to OCD symptoms in clinical and non-clinical samples (Salkovskis et al., 2000). Indeed, research suggests that manipulating beliefs about personal

responsibility affects both thoughts and behavior. For example, Lopatka and Rachman (1995) placed people with OCD in low and high responsibility conditions. The low responsibility situation prompted significant decreases in discomfort, panic, and urges to engage in checking behavior; an opposite trend was observed when the same individuals were placed in a high responsibility condition. Similarly, Ladouceur et al. (1995) asked a non-clinical sample to perform tasks in both low and high responsibility conditions. The authors found that individuals in the high responsibility condition not only experienced an increase in anxiety, but also engaged in more checking behaviors. In a subsequent study, Ladouceur, Leger, Rheume, and Dube (1996) treated four OCD patients whose primary symptoms included checking. Interestingly, the treatment consisted of cognitive therapy that specifically targeted beliefs about inflated responsibility, but not other dysfunctional thoughts. After 32 sessions of treatment, all four patients showed significant improvements in symptoms and three of them maintained these gains at 6 and 12-month follow-up. Taken together, these studies support the link between heightened responsibility and obsessive-compulsive symptoms, and suggest that directly targeting this cognitive factor may have clinical benefits.

In an attempt to understand the etiology of cognitive misappraisals, Salkovskis, Shafran, Rachman, and Freeston (1999) posited that there exist a number of pathways that might lead to the development of heightened responsibility. Pathways outlined by the researchers included recurring experiences, such as growing up with rigid rules of conduct, being shielded from responsibility, and being raised with a sense of responsibility for avoiding harm, as well as isolated experiences, including incidents in which one actually does cause harm or erroneously believes that he or she did. Coles and Schofield (2008) developed a self-report measure (i.e., the Pathways to Inflated Responsibility Beliefs Scale (PIRBS)), based on these proposed pathways, and a recent study using this scale indicated that parental overprotection and experiences in which a person caused or influenced harm were associated with stronger OCD-related beliefs and symptoms in a clinical sample (Coles, Schofield, & Nota, 2014). Findings from additional studies, using measures other than the PIRBS, likewise suggested that overprotective parenting (Smari, Martinsson, & Einarsson, 2010) and feelings of increased responsibility for family members' protection and happiness (Careau, O'Connor, Turgeon, & Freeston, 2012) were associated with OCD-related beliefs. Although the aforementioned studies have found relationships between certain developmental pathways and cognitive biases, ultimately, the results only offered modest support for Salkovskis et al.'s model, as other pathways were not significantly and uniquely associated with OCD symptoms (Coles et al., 2014). Coles et al. (2014) concluded from their study that early developmental experiences are likely insufficient to explain cognitive factors in OCD and that future research should aim to expand the current etiological model.

Researchers have likewise identified overestimation of threat as a significant cognitive distortion in individuals with OCD. This construct includes dysfunctional beliefs about the likelihood of danger occurring in general and about personal vulnerability to aversive events (Moritz & Pohl, 2009; OCCWG, 1997). A series of studies suggest that individuals with the disorder do not actually overestimate the likelihood of aversive OCD (e.g., a contamination item asks about the number of new HIV infections documented in Germany in a given year) and non-OCD events in general, but rather lack an "unrealistic optimism" (Moritz & Pohl, 2009, p. 5) bias, the belief that one is less vulnerable to harm and more likely to experience positive events than are others. Indeed, findings from three studies showed that OCD subjects overestimate the likelihood of harm befalling them and experience less relief than do those without the disorder when presented with actual statistics about the low frequency of harmful events (Moritz & Jelinek, 2009; Moritz & Pohl,

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