



Review

Obsessions and compulsions in the lab: A meta-analysis of procedures to induce symptoms of obsessive-compulsive disorder



Laura M.S. De Putter\*, Lotte Van Yper, & Ernst H.W. Koster

Ghent University, Belgium

HIGHLIGHTS

- A meta-analysis on the efficacy of induction procedures is presented
- There was no significant difference between subclinical and clinical subjects
- Inductions evoke more symptoms in (sub)clinical OCD than healthy participants
- Effect size within (sub)clinical OCD is large and has significant moderators
- Effect size within healthy subjects is medium and varies over induction categories

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ABSTRACT

Efficacious induction procedures of symptoms of obsessive-compulsive disorder (OCD) are necessary in order to test central tenets of theories on OCD. However, the efficacy of the current range of induction procedures remains unclear. Therefore, this meta-analysis set out to examine the efficacy of induction procedures in participants with and without OCD symptoms. Moreover, we explored whether the efficacy varied across different moderators (i.e., induction categories, symptom dimensions of OCD, modalities of presentation, and level of individual tailoring). In total we included 4900 participants across 90 studies. The analyses showed that there was no difference in studies using subclinical and clinical participants, confirming the utility of analogue samples. Induction procedures evoked more symptoms in (sub)clinical OCD than in healthy participants, which was most evident in the contamination symptom dimension of OCD. Analysis within (sub)clinical OCD showed a large effect size of induction procedures, especially for the threat and responsibility category and when stimuli were tailored to individuals. Analysis within healthy participants showed a medium effect size of induction procedures. The magnitude of the effect in healthy individuals was stronger for mental contamination, thought-action fusion and threat inductions.

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Contents

1.	Introduction . . . . .	138
1.1.	Categories of provocation procedures . . . . .	138
1.2.	The present meta-analysis . . . . .	139
2.	Method . . . . .	139
2.1.	Literature search . . . . .	139
2.2.	Inclusion criteria . . . . .	140
2.3.	Study selection . . . . .	140
2.4.	Coding procedure . . . . .	140
2.5.	Data analysis . . . . .	140

\* Corresponding author at: Ghent University, Faculty of Psychology and Educational Sciences, Department of Experimental Clinical and Health Psychology, Psychopathology and Affective Neuroscience Lab, Henri Dunantlaan 2, BE-9000 Ghent, Belgium.  
 E-mail address: [laura.deputter@ugent.be](mailto:laura.deputter@ugent.be) (L.M.S. De Putter).

3.	Results	142
3.1.	Analyses between diagnostic groups	142
3.1.1.	General effect	142
3.1.2.	Categories	142
3.1.3.	Idiosyncratic	142
3.1.4.	Symptom dimension of OCD	142
3.1.5.	Modality of presentation	142
3.2.	Analyses within diagnostic groups	142
3.2.1.	Induction effects within (sub)clinical OCD	142
3.2.2.	Induction effects within healthy participants	143
3.3.	Publication bias	143
3.3.1.	Analyses between diagnostic groups	143
3.3.2.	Analysis within diagnostic groups	143
3.4.	Sensitivity analysis	143
4.	Discussion	144
4.1.	Main findings	144
4.2.	Practical recommendations for inducing OCD symptoms in the lab	144
4.3.	Quality and quantity of the available research	145
4.4.	Limitations of the current conclusions	145
5.	Conclusion	145
	Role of funding sources	146
	Contributors	146
	Conflict of interest	146
	Acknowledgments	146
	Appendices A and B. Supplementary data	146
	References	146

## 1. Introduction

Obsessive-compulsive disorder (OCD) is an impairing and persistent disorder characterized by obsessions and/or compulsions (American Psychiatric Association, 2013). Its lifetime prevalence is 2–3.5%, making it the fourth most common mental disorder with high economic and societal costs (Angst et al., 2004; Rasmussen & Eisen, 1992; Ruscio, Stein, Chiu, & Kessler, 2010). Obsessions consist of images or thoughts that are experienced as intrusive and often evoke anxiety and distress (American Psychiatric Association, 2013). Compulsions are defined as repetitive actions that occur either internally (e.g., repetitive counting) or externally (e.g., excessive hand washing). In order to reduce anxiety, patients with OCD use a variety of compulsions. However compulsions can also be performed independently from obsessions (American Psychiatric Association, 2013). Although there are many efficacious psychological and pharmacological treatments for OCD, many patients suffer from symptoms even after undergoing treatment (Fisher & Wells, 2005).

In order to advance treatments, improved understanding of OCD is required. A key prerequisite for developing and testing theories of OCD is the ability to induce symptoms of OCD in laboratory settings. This is paramount in order to study OCD symptom elicitation, regulation, and their psychological as well as neurological correlates in a controlled environment (Abramovitch & Cooperman, 2015). For instance, there has been a long standing state-trait debate in neuropsychological dysfunctions in OCD, in which it is unclear whether a neuropsychological deficit precedes the development of OCD or whether OCD symptoms cause neuropsychological deficits (Abramovitch & Cooperman, 2015). Such debates can only be resolved by research using carefully considered symptom provocation paradigms. Although a wide variety of symptom provocation procedures have been used across studies, there is no systematic review examining and comparing the efficacy of these different procedures in inducing OCD symptoms. Therefore, there is currently no systematic evaluation of how successful these induction procedures are relative to each other in inducing symptoms in different populations. This is problematic since there is substantial heterogeneity in induction procedures that are used and their efficacy. For research purposes, it would be interesting to have a clear overview on which procedures currently exist and how they compare to other

procedures in terms of efficacy in order to allow optimal induction of symptoms in the lab. Furthermore, the issue of efficacious provocation procedures is not merely relevant for studies on OCD patients. Abramowitz et al. (2014) highlighted the importance of analogue studies using samples of subclinical participants or even healthy samples to advance our knowledge of clinical OCD. Moreover, some OCD symptom inductions have been designed to provoke OCD symptoms even in healthy participants (e.g., Mataix-Cols, Lawrence, Wooderson, Speckens, & Phillips, 2009). Therefore the current meta-analysis sought to determine which procedures are most efficacious in inducing OCD-related symptoms in samples with and without OCD symptoms. Below, we start by identifying different categories of inductions that are being used, which will serve as a key moderator. Finally, we will describe the approach of the current meta-analysis.

### 1.1. Categories of provocation procedures

Based on the current literature we identified seven categories of provocation procedures. The first category is presenting *threat-related material*. This method has been used by the first studies investigating OCD during the experience of symptoms (e.g., Breiter et al., 1996; McGuire et al., 1994; Rauch et al., 1994; Zohar et al., 1989). In this category OCD symptoms are elicited by exposing individuals to stimuli that are directly related to concerns typical for OCD. Stimuli can be tailored to individuals to match their OCD-related concerns (e.g., OCD patients can take pictures of their triggers; Schienle, Schäfer, Stark, Walter, & Vaitl, 2005). However, standardized procedures are also commonly used, for instance a standardized picture set for every symptom dimension of OCD was designed by Mataix-Cols et al. (2009).

The second category is *disgust induction*. Disgust is characterized by a typical, universal physiological response, facial expression, and withdrawal/avoidance pattern (Rozin & Fallon, 1987). The triggers of disgust are largely universal and easily identifiable. They often include representations related to animals, bodily products and/or decay (Rachman, 1994). One could argue that disgust is related to the threat category for contamination fear. Contamination fear is frequently present in OCD (e.g., Olatunji, Cisler, McKay, & Phillips, 2010). For instance, feces are both disgusting and hold the potential to jeopardize one's health by contamination. However, in contrast to contamination fears, in

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