



## Changing disgust through imagery rescripting and cognitive reappraisal in contamination-based obsessive-compulsive disorder

Jakob Fink<sup>a,\*</sup>, Elisa Pflugradt<sup>a</sup>, Christian Stierle<sup>b</sup>, Cornelia Exner<sup>a</sup>

<sup>a</sup> University of Leipzig, Clinical Psychology and Psychotherapy, Neumarkt 9-19, 04081 Leipzig, Germany

<sup>b</sup> Schön Klinik Bad Bramstedt, Birkenweg 10, 24576 Bad Bramstedt, Germany

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### ABSTRACT

Contamination-related obsessive-compulsive disorder (C-OCD) is characterized by strongly experienced disgust and fear, in response to potentially contaminating stimuli. Both emotions differ in their susceptibility for change by habituation and extinction, which are important processes for the success of exposure therapy. Even though the response rates for exposure therapy for C-OCD are very good, it seems promising to test additional therapeutic techniques which target disgust more directly. Therefore, imagery rescripting and cognitive reappraisal were evaluated for their potential to change levels of disgust (within-subject), in the two-session laboratory study with 30 participants, with diagnosed C-OCD, and 30 matched, healthy controls (between-subject), presented. The results show that both emotion-regulation strategies reduced disgust better than a non-intervention control task (counting fishes), across all the participants. Therefore, both strategies seem to be applicable and effective for reducing disgust, in the short term, in participants with diagnosed C-OCD. The implications of these findings for the experimental approach and for the clinical treatment of C-OCD, are discussed.

### 1. Introduction

Obsessive-compulsive disorder (OCD) is a clinically heterogeneous condition, in which patients present differing symptom profiles (Mataix-Cols, Rosario-Campos, & Leckman, 2005). Many patients experience not only fear, but also strong disgust, in response to trigger stimuli, especially those suffering from the contamination subtype of OCD (C-OCD, Rachman, 2004). Disgust, in general, is associated with aversion, rejection and the perception of being contaminated (Cisler, Reardon, Williams, & Lohr, 2007). The gold standard for OCD therapy is cognitive behavioral therapy, with exposure and response prevention (ERP, Rosa-Alcazar, Sanchez-Meca, Gomez-Conesa, & Marin-Martinez, 2008). Despite its empirically proven success, a clinically significant proportion of OCD patients still fail to respond sufficiently to ERP, or experience a relapse of symptoms (Abramowitz, Franklin, Schwartz, & Furr, 2003).

Treating disgust reactions in contamination-related OCD, has proven to be even more difficult than reducing fear (Adams, Willems, & Bridges, 2011; McKay, 2006; Olatunji, Wolitzky-Taylor, Willems, Lohr, & Armstrong, 2009; Tolin, Maltby, Diefenbach, Hannan, & Worhunsky, 2004). One explanation for insufficient response rates, in patients suffering from the contamination-related subtype of OCD, might be the multiple emotional basis of C-OCD, usually presented as a mixture of

fear and disgust. Two phenomena are discussed in respect of exposure therapy: habituation reflecting changes in performance (Foa & Kozak, 1986) and extinction learning, reflecting changes in the learning processes (Craske et al., 2008). There is growing evidence that disgust and fear differ in their susceptibility to habituation and extinction processes. Several studies showed that the participants reported a decline in the disgust and fear experienced, when they were exposed to the stimuli several times, but the decay slopes for fear images were significantly steeper than for disgust stimuli (Adams et al., 2011; Coughle, Wolitzky-Taylor, Lee, & Telch, 2007; Olatunji et al., 2009; Smits, Telch, & Randall, 2002). In two other studies, a neutral stimulus (CS) was combined with either a disgusting (CS+) or a neutral image (CS-). During the extinction phase, the fear ratings did not differ between CS+ and CS-, while the disgust ratings were lower for CS-, compared to CS+ (Mason & Richardson, 2010; Olatunji, Forsyth, & Cheria, 2007). These findings show that disgust results in slower habituation and stronger resistance to extinction, in experimental settings, compared to fear, which might be one explanation for the smaller response rates for ERP in patients with C-OCD. While fear seems to be reduced strongly by repeated exposure, additional therapeutic techniques to ERP might be required to reduce the pathological experience of disgust. The aim of the present study is to investigate additional disgust-targeting therapeutic techniques to ERP, in the context of C-OCD. We therefore

\* Corresponding author.

E-mail addresses: [jakob.fink@uni-leipzig.de](mailto:jakob.fink@uni-leipzig.de) (J. Fink), [elisapflugradt@hotmail.de](mailto:elisapflugradt@hotmail.de) (E. Pflugradt), [CStierle@Schoen-Kliniken.de](mailto:CStierle@Schoen-Kliniken.de) (C. Stierle), [exnerc@uni-leipzig.de](mailto:exnerc@uni-leipzig.de) (C. Exner).

applied two emotion-regulation techniques, with different underlying mechanisms, to evaluate their capacity to change the levels of disgust experienced, both in a C-OCD population and in a healthy control population.

Imagery rescripting (ImR) is an emotion-regulation strategy, which is supposed to change the affective meaning of aversive memories and intrusive images (Wild, Hackmann, & Clark, 2008). Holmes, Arntz, and Smucker (2007) suggest two types of ImR: first, modifying the content of a negative image into a positive image, or second, generating a new positive image, to rescript negative schematic beliefs. Mental imagery is thought to be the mechanism behind ImR (Holmes & Mathews, 2005). Beck (1976), had already linked affective distress to visual cognitions, which was further supported by the work of Holmes and Mathews (2010, 2005). The authors showed that inducing a visual-imagery processing style resulted in stronger emotional reactivity, compared to inducing a verbal-semantic style. There is evidence that people differ in their tendency and ability to use the visual-imagery style (Holmes, Mathews, Mackintosh, & Dalgleish, 2008; Jola & Mast, 2005; Kosslyn, Brunn, Cave, & Wallach, 1984; Lee & Kwon, 2013). It can be suggested that changing strong emotional experiences through imagery interventions might be challenging for people who are weaker in visual-imagery processing, whereas people prone to visual-imagery processing might profit more from ImR. However, to the best of our knowledge, there is no research to date confirming this hypothesis.

In a recent meta-analysis, Morina, Lancee, and Arntz (2017) found large treatment effects from ImR, particularly for PTSD and social anxiety. There is also evidence that a significant number of people with OCD experience intrusive images (de Silva and Marks, 1999; Lipton, Brewin, Linke, & Halperin, 2010; Rachman, 1997; Speckens, Hackmann, Ehlers, & Cuthbert, 2007). Visual intrusions in C-OCD are often associated with disgust (Lipton et al., 2010). There is research which postulates that disgust is difficult to change using cognitive interventions, because the rational understanding that a stimulus is no longer associated with something disgusting, is unrelated to the feelings of disgust toward the stimulus (Mason & Richardson, 2010; Rozin, Millman, & Nemeroff, 1986). Given these findings, the application of ImR to target disgust in the context of C-OCD, appears promising. So far, there is only indirect evidence, from research in PTSD, that ImR might help to reduce disgust (Grunert, Weis, Smucker, & Christianson, 2007; Hagedaars & Arntz, 2012; Jung & Steil, 2013; Raabe, Ehring, Marquenie, Olf, & Kindt, 2015) and only one study, which applied ImR in the context of OCD (Veale, Page, Woodward, & Salkovskis, 2015). In this case study, ImR was applied to twelve participants with diagnosed OCD, of which seven participants reached a clinically significant improvement in a 3-month follow-up. Therefore, the authors concluded that ImR might be a promising therapeutic technique for OCD.

To test the effectiveness of ImR, we also included an evidence-based emotion-regulation condition applying cognitive reappraisal. Cognitive reappraisal is one of the best evaluated emotion-regulation strategies (Ochsner & Gross, 2007). Gross and Thompson (2007), defined reappraisal as changing “a situation’s meaning in a way that alters its emotional impact” (p. 20). Verbal processing is one of the mechanisms underlying cognitive reappraisal, (Holmes & Mathews, 2005). There is evidence that people differ in their tendency and ability to use reappraisal strategies (Abler & Kessler, 2009), and that reappraisal can be helpful in reducing disgust (Goldin, McRae, Ramel, & Gross, 2008; Olatunji, Berg, & Zhao, 2017; Pitskel, Bolling, Kaiser, Pelphrey, & Crowley, 2014). de Wit et al. (2015), investigated reappraisal strategies in an OCD sample: the authors found that the OCD group, as well as the healthy control group, showed similar reductions in distress after reappraisal. Therefore, the authors postulated that OCD patients were able to use reappraisal to down-regulate negative effects. Although the pictures inducing OCD distress also included contamination-related pictures, there were no separate results presented concerning disgust-related distress reduction.

Taking these findings together, the aim of the present study was to

(1) investigate ImR as an emotion-regulation strategy for challenging disgust, (2) in the context of C-OCD and (3) in comparison to an evidence-based active emotion-regulation strategy and a passive control condition.

There are only a few laboratory studies which have investigated ImR (Hagedaars & Arntz, 2012; Jacob et al., 2011; Nilsson, Lundh, & Viborg, 2012), but to our knowledge, there are none that have investigated the influence of ImR in changing levels of disgust, in the context of C-OCD. We therefore developed six-minute, auditory instructions for ImR and reappraisal. During the ImR task, participants were told how to change a disgust-inducing picture into a neutral or positive picture. During the reappraisal task, participants were told how to find reasons why the disgust stimulus on the picture was not dangerous, as well as questions regarding meta-beliefs about disgust. To control for laboratory exposure and within session habituation, we included a non-intervention, control condition in which participants had to perform a counting task. The same disgust-eliciting picture was presented and rated, before and after the intervention or the control task. Each participant performed all three experimental conditions twice, in randomized order (within-subject). Additionally, the participants had to write down how they had applied the emotion-regulation strategies. These written reports were analyzed using content analysis (manipulation check). To ensure personal involvement and relevance, in response to the disgust pictures, only pictures were presented which matched the disgust categories which had, a-priori, received the highest, individual disgust ratings. A healthy control population was included, to test whether C-OCD patients profited differently from using the regulation strategies, compared to healthy controls. If so, this could provide valuable insights into the underlying mechanisms of regulation deficits in OCD.

However, although there is evidence that mental imagery initially elicits stronger emotions, compared to verbal processing (Holmes and Mathews, 2010, 2005), there is no study at this time, which directly compares visual processing (in the context of ImR) and verbal processing (in the context of reappraisal), for the management of pathological disgust. We therefore predicted that both active emotion-regulation conditions (ImR and reappraisal) would reduce disgust across all participants, to a significantly greater extent, than the non-intervention control condition (hypothesis 1a). Given the higher initial disgust levels in people with C-OCD, we assumed that both strategies would reduce disgust in the C-OCD group to a greater extent than in the healthy control group (hypothesis 1b). The success of ImR and reappraisal, should also depend on the habitual use of the emotion regulation styles, whereby participants with higher habitual spontaneous use of imagery should profit more from ImR, and participants with a higher habitual use of reappraisal should profit more from cognitive reappraisal (hypothesis 2).

## 2. Method

### 2.1. Participants

Sixty-four voluntary participants participated in this study. All the participants were native German speakers. The healthy control group participants were screened by telephone before being invited to the first appointment, to guarantee that they matched the inclusion criteria. Participants had to be aged between 18 and 65 years old, without a history of, or current, diagnosed neurological disorders, traumatic brain injury, tic disorder, psychotic or bipolar disorder, and with no substance abuse or dependence. All the healthy control participants were paid 8.50 €/hour for participation in the experiment.

#### 2.1.1. Participants with the washing subtype of obsessive-compulsive disorder

Thirty-four participants, who met the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association,

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