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## Disconfirming contamination-related threat beliefs by exposure plus safety behavior



Sophie L. van Uijen<sup>\*</sup>, Marcel A. van den Hout, Anne T. Klein Schiphorst, Emma S. Knol, Iris M. Engelhard

Department of Clinical Psychology, Utrecht University, The Netherlands

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### ABSTRACT

**Background and objectives:** Safety behavior (SB) is detrimental to the beneficial effects of exposure, because it prevents patients from obtaining evidence that disconfirms their excessive threat beliefs. However, previous studies showed that cleaning SB during exposure to a contaminant does not prevent a reduction in feelings of contamination, fear of contamination, danger, and disgust (CFDD). We aimed to directly examine the effect of SB during exposure to a contaminant on threat beliefs associated with CFDD.

**Method:** Healthy participants were randomly assigned to one of three groups: repeated exposure to a contaminant whilst abstaining from SB (exposure plus response prevention; E + RP); with the use of disinfectant wipes after each instance of exposure (exposure plus SB; E + SB); or no exposure or safety behavior (control condition). Participants identified their threat belief associated with the contaminant and rated CFDD and the degree to which they believed their threat belief at the pre- and post-test.

**Results:** The E + RP and E + SB condition resulted in a larger decrease of CFDD and threat belief ratings than the control condition, whereas these reductions did not differ between the E + RP and E + SB condition.

**Limitations:** Results were obtained from a nonclinical sample, and with a single session of exposure.

**Conclusion:** Cleaning SB did not impede the beneficial effects of exposure.

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### 1. Introduction

In patients with anxiety disorders safety behavior (SB) maintains threat beliefs, and thereby anxiety, because it prevents them from obtaining evidence that disconfirms their excessive threat beliefs (e.g., Salkovskis, 1991). Patients are therefore encouraged to inhibit their SB during exposure (i.e., exposure response prevention or ERP), in order not to misattribute the non-occurrence of a catastrophe to the SB. Rachman, Radomsky, and Shafran (2008), however, called for a reconsideration of the categorical rejection of SB during treatment. They argued that there is no evidence that all SBs necessarily prevent disconfirmatory experiences, and that the incorporation of SB in exposure could facilitate treatment and may reduce drop-out and refusal. Recent research suggests that adding SB to exposure can indeed enhance treatment acceptability (Levy &

Radomsky, 2014; Levy, Senn, & Radomsky, 2014; Milosevic & Radomsky, 2013a), although other studies did not find differences in acceptability between exposure with SB (E + SB) and without SB (E + RP; see, for example, Deacon, Sy, Lickel, & Nelson, 2010; Milosevic & Radomsky, 2013b). Additionally, although several studies have shown unfavorable effects E + SB compared to E + RP (e.g., McManus, Sacadura, & Clark, 2008; Salkovskis, Clark, Hackmann, Wells, & Gelder, 1999), other studies suggest that SB is not always detrimental to the beneficial effects of exposure. E + SB and E + RP resulted in comparable reductions in fear of snakes (Milosevic & Radomsky, 2008), fear of spiders (Hood, Antony, Koerner, & Monson, 2010; Milosevic & Radomsky, 2013b), claustrophobic fear (Deacon et al., 2010; Sy, Dixon, Lickel, Nelson, & Deacon, 2011), and feelings of contamination (Rachman, Shafran, Radomsky, & Zysk, 2011; Van den Hout, Engelhard, Toffolo, & van Uijen, 2011; Van den Hout, Reininghaus, van der Stap, & Engelhard, 2012). Overall, findings concerning SB effects on exposure outcomes are mixed. In a recent literature review, Blakey and Abramowitz (2016) concluded that while SB is not

<sup>\*</sup> Corresponding author. PO Box 80140, 3508 TC Utrecht, The Netherlands.  
E-mail address: [s.l.vanuijen@uu.nl](mailto:s.l.vanuijen@uu.nl) (S.L. van Uijen).

always detrimental to the beneficial effects of exposure, it does tend to interfere with therapeutic effects. However, a meta-analysis did not find evidence in favor of either the incorporation or removal of SB during exposure (Meulders, Van Daele, Volders, & Vlaeyen, 2016).

How can the beneficial effects of E + SB be explained? From a cognitive perspective, it seems unlikely that participants' fears would decrease if their threat beliefs remained unchanged. Closer inspection of the operationalization of SB in these studies suggests that the behavior may not have prevented disconfirmation of threat beliefs. For example, in the studies by Milosevic and Radomsky (2008, 2013b), participants in the E + SB condition could wear protective gear, such as gloves and goggles, during exposure to a harmless snake (2008) or spider (2013b). This would not have prevented the corrective learning experience of, for example, not getting attacked by the snake. Additionally, Milosevic and Radomsky (2013b) directly assessed threat beliefs which indeed decreased not only in the E + RP condition, but also during E + SB. It thus appears that if SB does not preclude learning about the non-occurrence of the feared catastrophe, it does not impede the effects of exposure.

Notable exceptions to this explanation seem to be studies on feelings of contamination (Rachman et al., 2011; Van den Hout et al., 2011; 2012). During two sessions, separated by a two-week interval, healthy participants repeatedly touched a contaminated stimulus, either while abstaining from any form of SB (E + RP) or with the use of disinfectant wipes after each instance of exposure (E + SB). At the post-test after each session, none of the participants could clean themselves. E + SB and E + RP produced comparable, large, and stable reductions in feelings of contamination, fear of contamination, danger and disgust (CFDD). However, cleaning oneself with a wipe after exposure to a contaminant should logically prevent disconfirmatory learning experiences about the feared consequences of contamination. Participants should misattribute the non-occurrence of contamination and subsequent infection or illness to the use of SB: "Nothing bad happened, because I cleaned myself".

Several explanations for the positive effect of using wipes after exposure to a contaminant have been provided. First, Van den Hout et al. (2012) hypothesized that SB did not prevent a reduction of contamination fear through the commitment to future exposures: the knowledge that one would re-contaminate oneself again after wiping may have made the SB irrelevant. An E + SB and an E + RP condition with high commitment to exposure were compared to an E + SB condition with low commitment to exposure. Participants signed a declaration stating that they would do their utmost best to finish the series of twenty exposure trials, because the data would otherwise be unusable (high commitment), or stating that they could quit at any moment, because finishing the experiment was not necessary for the usability of the data (low commitment). Contrary to the hypothesis, the effects of E + SB with a strong commitment to exposure were comparable to the effects of E + SB with a small commitment to exposure and to E + RP (Van den Hout et al., 2012). Second, Levy and Radomsky (2016) argued that the beneficial effects of E + SB are due to the novelty of the SB: SB that has never been used before has not been associated with prevention or avoidance of feared outcomes, and may therefore not cause a misattribution of safety to the behavior. In their study, patients with obsessive-compulsive disorder (OCD) and contamination fear received one exposure session to a contaminant without the use of SB (E + RP), with SB they routinely used, or with SB they had never used before. The three conditions showed comparable reductions in contamination fear on a behavioral approach test and on subjective anxiety ratings. Notably, exposure with never-used SB resulted in a greater reduction of self-reported contamination fear

than exposure with routinely-used SB and E + RP. Third, Goetz and Lee (2015) showed that it is important to distinguish whether SB is aimed at preventing future distressing emotional responses or increases in anxiety, or performed to decrease the emotional experience in a feared situation (i.e., restorative), as is the case with cleaning yourself after touching a contaminating object. In their study, healthy participants repeatedly touched a contaminant without the use of SB (E + RP), with the use of preventive SB (e.g., holding a tissue while touching), or with the use of restorative SB (e.g., using hand sanitizer after touching). Exposure with restorative SB resulted in greater reductions in fear and behavioral avoidance than exposure with preventive SB and E + RP, and E + RP outperformed exposure with preventive SB. Goetz and Lee (2015) reasoned that using restorative SB after exposure can decrease fear of contamination, because it enables patients to learn about their ability to tolerate distress during exposure and to cope with feelings of contamination. However, they defined SB based on its function in relation to emotional distress (cf. Helbig-Lang & Petermann, 2010), which may not be synonymous with SB aimed at preventing feared outcomes. Restorative SB can still be expected to prevent the disconfirmation of threat beliefs about future catastrophes.

Whether cleaning SB prevents the disconfirmation of threat beliefs associated with touching a contaminant is an empirical question that can be assessed directly. We therefore aimed to extend the findings by Rachman et al. (2011) and Van den Hout et al. (2011) by incorporating a direct examination of the effect of SB on threat beliefs associated with feelings of contamination, fear of contamination, danger and disgust (CFDD). We expected that the results for feelings of CFDD would be replicated, that is, that the E + RP and E + SB condition would show a pre-to post-test decrease in CFDD ratings, compared to a no-exposure control condition (cf. Van den Hout et al., 2011). Furthermore, in line with cognitive theory, we hypothesized that participants in the E + RP condition would show a larger pre-to post-test decrease in the degree to which they believed a threat belief related to the contaminant than participants in the E + SB condition and participants in a no-exposure control condition. Additionally, we explored the time course of effects on CFDD in the E + RP and E + SB condition, and effects of the interventions on perceived control (cf. Van den Hout et al., 2011; 2012).

## 2. Method

### 2.1. Participants

Participants were recruited using posters, flyers and online advertisement on the university website. A total of 297 students were screened for contamination fear with the Padua Inventory - Contamination Obsessions and Washing Compulsions subscale (PI-COWC; Burns, Keortge, Formea, & Sternberger, 1996; see 2.3.1). Individuals who scored 3 or higher ( $n = 225$ , above the lowest-quartile range, to decrease the likelihood that participants had to be excluded after the pre-test, see 2.2.1) and indicated willingness to participate ( $n = 180$ ) were invited to participate, of whom 103 agreed to make an appointment. Exclusion criteria were past or current OCD diagnosis ( $n = 1$ ); contamination scores for all six contaminants (see 2.4) at the pre-test below 60 ( $n = 11$ , cf. Van den Hout et al., 2011); and a score below 60 for the threat belief at the pre-test ( $n = 25$ ; see 2.2.1), because this indicated that participants considered their threat belief largely unbelievable. This resulted in a final sample of 66 participants (13 men;  $M_{\text{age}} = 21.68$ ,  $SD = 2.95$ ;  $M_{\text{PI-COWC}} = 8.89$ ,  $SD = 5.54$ ), who were randomly assigned to the E + RP ( $n = 22$ ; 4 men), E + SB ( $n = 22$ ; 5 men), or control ( $n = 22$ ; 4 men) condition. Participants gave written informed consent and

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