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# The use of safety-seeking behavior in exposure-based treatments for fear and anxiety: Benefit or burden? A meta-analytic review

Ann Meulders<sup>a,b,\*</sup>, Tom Van Daele<sup>a,c</sup>, Stéphanie Volders<sup>a</sup>, Johan W.S. Vlaeyen<sup>a,b,d</sup>

<sup>a</sup> Research Group on Health Psychology, University of Leuven, Leuven, Belgium

<sup>b</sup> Center for Excellence Generalization Research in Health and Psychopathology, University of Leuven, Leuven, Belgium

<sup>c</sup> Applied Psychology, Thomas More University College, Antwerp, Belgium

<sup>d</sup> Department of Clinical Psychological Science, Maastricht University, The Netherlands

## HIGHLIGHTS

- We examined the effect of safety-seeking behavior on exposure-based fear reduction.
- The results of the first meta-analysis on the topic are inconclusive.
- The results provide limited evidence in favor of dropping safety-seeking behavior.
- Due to potential risk of bias in included studies, interpretation warrants caution.
- We suggest that more experimental research based on modern learning theory is needed.

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## ABSTRACT

There is a longstanding debate whether allowing safety-seeking behaviors (SSBs) during cognitive-behavioral treatment hampers or facilitates the reduction of fear. In this meta-analysis, we evaluate the impact of SSBs on exposure-based fear reduction interventions.

After filtering 409 journal articles, 23 studies were included for systematic review of which 20 studies were coded for meta-analysis. For each study, the Standardized Mean Difference (SMD or Hedges' *g*) of self-reported fear was calculated at post-intervention. Two comparisons were distinguished: I) exposure without safety-seeking behavior (SSB-) versus baseline behavior (BL), and II) exposure with safety-seeking behavior (SSB+) versus BL.

The results showed that average effect sizes were in favor of SSB-, (I:  $SMD = 0.31$ , 95% CI  $[-0.04, 0.66]$ ), and in favor of BL, (II:  $SMD = -0.13$ , 95% CI  $[-0.37, 0.11]$ ). Neither of the effect sizes were statistically significant (I:  $Z = 1.75$ ,  $p = .08$ ; II:  $Z = 1.07$ ,  $p = .28$ ). The current meta-analysis could not provide compelling evidence supporting either the removal or addition of SSB during exposure. More systematic and statistically empowered replications, using comparable research methods, in (non-)clinical settings are needed. Novel insights from fear conditioning research may also shed light on the role of SSB in fear reduction.

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\* Corresponding author at: Department of Psychology, University of Leuven, Tiensestraat 102, Box 3726, 3000 Leuven, Belgium.

E-mail address: [ann.meulders@ppw.kuleuven.be](mailto:ann.meulders@ppw.kuleuven.be) (A. Meulders).

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Anxiety disorders constitute one of the most common forms of psychopathology, surpassing the prevalence of mood and substance abuse disorders, with a 12-month prevalence of 18.1% in the USA (Kessler, Chiu, Demler & Walters, 2005) and a global 12-month and lifetime prevalence of 11.6% and 7.3% respectively (Baxter, Scott, Vos, & Whiteford, 2013), costing 74.4 billion per capita in Europe in 2010, and affecting over 69 million Europeans (Gustavsson et al., 2011). Moreover, fear and anxiety are known to contribute significantly to the origins and maintenance of health-related pathology, such as chronic musculoskeletal pain (Vlaeyen & Linton, 2000, 2012), tinnitus (Cima et al., 2012), chronic obstructive pulmonary disease (Janssens et al., 2011), and cardiovascular disorders (Back, Cider, Herlitz, Lundberg, & Jansson, 2013).

Exposure therapy has a strong pedigree as one of the most potent cognitive-behavioral treatments to reduce disabling fear and anxiety (for a review, see Barlow, Raffa, and Cohen (2002)). The underlying idea is that fear is triggered by the erroneous interpretation of a cue as a warning signal for an impending catastrophe. This perceived threat turns the cue into a “false alarm” triggering unnecessary fear, e.g., panic patients may misinterpret interoceptive cues such as labored breathing, dizziness, and a “racing” heart, as warning signals for an upcoming panic attack (Salkovskis, 1996; Salkovskis, Clark, & Gelder, 1996). Exposure therapy can correct such misinterpretations and reduce fear by challenging these erroneous beliefs by testing an alternative hypothesis, e.g., that aversive interoceptive signals do not culminate into a full-blown panic attack or body injury (for an example of a protocol, see Barlow (2002, 2008); Vlaeyen, Morley, Linton, Boersma, and De Jong (2012)). To provide such disconfirming evidence, patients are repeatedly confronted with the perceived threat cues without the expected catastrophe taking place. As a result, patients will learn that these stimuli are safe, which in turn reduces their capacity to elicit fear (Hermans, Craske, Mineka, & Lovibond, 2006).

Intriguingly, many anxiety patients appear to use subtle behavioral tricks or aids (e.g., Tang, Salkovskis, Poplavskaya, Wright, Hanna and Hester, 2007) during such exposure exercises, assuming that these can prevent or minimize a feared catastrophe. For example, people with panic disorder may sit down when feeling dizzy to prevent a full-blown panic attack. These so-called “safety-seeking behaviors” (Salkovskis, 1996; Wells et al., 1995) can be *adaptive* when they effectively reduce threat. In that case, these behaviors foster survival and contribute to the individual’s well-being. However, in relatively safe situations (i.e., in response to “false alarm” cues) they may become *maladaptive*. For example, although providing temporary relief, safety-seeking behavior (SSB) during an exposure-based fear reduction procedure is thought to preserve excessive threat beliefs and to cause fear to return later on (Lovibond, Mitchell, Minard, Brady, & Menzies, 2009; Volders, Meulders, De Peuter, Vervliet, & Vlaeyen, 2012). Presumably

this is because patients misattribute the absence of the catastrophe to their own behavior, which subsequently precludes the correction of misinterpretations and thus reinforces and preserves fear (Salkovskis, 1991, 1996; Salkovskis et al., 1996; Wells et al., 1995). Others have encouraged the judicious use of safety-seeking behavior, especially in the early stages of treatment because it makes treatment less aversive and reduces refusal and drop-out (Parrish, Radomsky, & Dugas, 2008; Rachman, 2012; Rachman, Radomsky, & Shafran, 2008; Rachman, Shafran, Radomsky, & Zysk, 2011; Sy, Dixon, Lickel, Nelson, & Deacon, 2011; van den Hout, Engelhard, Toffolo, & van Uijen, 2011).

Recently, two reviews provided preliminary evidence for the idea that correcting erroneous beliefs is indeed key to exposure therapy (McMillan & Lee, 2010), and that SSB might jeopardize such corrective learning (Helbig-Lang & Petermann, 2010). Because both reviews relied on systematic and narrative methods, no firm conclusions can be drawn with regards to the status of SSBs in exposure-based treatments. Considering the discernible presence of SSB in anxiety-related pathology and the ubiquitous use of exposure therapy, a better understanding of whether such behaviors indeed compromise treatment may help further improve the efficacy of exposure treatments. To determine whether the use of SSBs is a benefit or a burden, and to quantify the impact of SSB on exposure-based fear reduction, we performed a meta-analytic review.

## 1. Method

### 1.1. Search strategy and inclusion criteria

We performed a meta-analysis in accordance with the Cochrane Collaboration guidelines (Higgins & Green, 2008). We searched three major databases (PubMed, Web of Science, and Wiley Interscience Journals; for a detailed table of the keywords, see Appendix A) and manually searched the reference sections of relevant articles (see Fig. 1 for a flowchart of the search and selection strategy). Articles were included if they 1) were published in the last 20 years (January 1995–January 2015), 2) were written in English, 3) included an exposure-based intervention, 4) did not induce fear in healthy participants via experimental procedures such as fear conditioning, 5) included a manipulation of safety (-seeking) behavior, and 6) used an experimental design including a control condition. Authors were contacted if required details were missing in the published article.

### 1.2. Rationale for inclusion in meta-analysis

To obtain a meta-analysis that allows for sensible interpretation, we established a common denominator by formulating one extra inclusion criterion: studies needed to include self-reported fear measures

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