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Safety Behaviour Does Not Necessarily Interfere with Exposure Therapy

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Abstract

There has been much recent controversy regarding whether or not the use of safety and other neutralizing behaviour interfere with exposure-based therapy. The aim of this study was to examine the role of safety behaviour in the treatment of specific phobia. Sixty-two snake fearful participants were randomized to a 45-minute exposure session with or without the use of safety gear, such as gloves and goggles. During the treatment, participants in the safety behaviour group were able to achieve a significantly closer initial distance of approach to the snake compared to controls. When tested post-treatment without any safety gear, both groups demonstrated comparable treatment gains involving significant reductions in fearful cognitions and subjective anxiety, as well as significant improvements in distance of approach. Results suggest that reliance on safety behaviour during exposure therapy for anxiety disorders may not interfere with treatment outcome.

Keywords: Safety behaviour; exposure treatment; fear reduction; anxiety disorders; specific phobia; cognitive therapy.

Safety Behaviour Does Not Necessarily Interfere with Exposure Therapy

With lifetime prevalence rates of up to 28.8%, anxiety disorders as a group are the most common of all mental disorders (Kessler et al., 2005). The current treatment of choice for most, if not all, anxiety disorders is cognitive-behavioural therapy (Otto, Smits, & Reese, 2004), and one of its components, exposure therapy, has made impressive achievements in reducing anxious symptomatology (Deacon & Abramowitz, 2004). Following the extensive success of this treatment method, which involves exposing patients to feared stimuli, contemporary studies have focused, in part, on examining the relationship between participants' fear responses and treatment outcomes. In particular, the often observed use of safety behaviour by anxious patients has attracted both theoretical consideration and empirical examination in the context of exposure-based interventions; additional investigation is required to further our understanding and aid both in the development and refinement of effective treatments for anxiety disorders.

Safety behaviour embodies an extensive range of idiosyncratic strategies commonly used by anxious individuals to avert or cope with a perceived threat (Salkovskis, Clark, & Gelder, 1996). It may consist of overt actions, thoughts (covert safety behaviour), and/or the use of comforting or protective objects (e.g., carrying a cell phone, paper bag, etc. to cope with possible panic). Current cognitive-behavioural models stress that this type of behaviour is important in the maintenance of fear and anxiety, and treatment paradigms thus typically include emphasis on reducing and/or eliminating it.

Salkovskis (1991) proposed that safety behaviour functions to maintain fear by enabling the avoidance of feared outcomes in anxiety-provoking situations. For instance, patients with social phobia may grip a glass tightly in order to prevent embarrassment that may result from spilling its contents. Doing so, however, may prevent them from learning about the improbability of spilling their drink even if they do not take precaution (Clark & Wells, 1995), and from obtaining evidence that, should the dreaded event actually occur, they may be well able to cope with it. Hence, by relying on safety behaviour, anxious individuals might be unable to obtain disconfirmatory evidence related to their unrealistic beliefs. Indeed, they might conclude that their own actions (i.e., the safety behaviour itself) prevent feared outcomes, leading them to reinterpret harmless, possibly fear-disconfirming experiences as threatening. In the context of exposure treatments, such strategies might thus inhibit the process of adaptive cognitive change.

A number of studies have supported the hypothesis that safety behaviour is important in the maintenance of fear and anxiety, thereby interfering with the benefits of exposure therapy (e.g., Salkovskis et al., 1999; Sloan & Telch, 2002). Findings generally demonstrate that use of safety behaviour during exposure leads to lesser reductions in fear and catastrophic beliefs relative to conditions in which participants are asked to eliminate their safety strategies and/or to focus on cognitive reappraisals. Kim (2005) compared three exposure paradigms for social anxiety to evaluate the effects of decreased safety behaviour. Participants were randomly assigned to exposure with decreased safety behaviour either under a cognitive or an extinction rationale, or to exposure with no change in safety behaviour. Results showed significantly greater reductions in anxiety and beliefs in feared outcomes for participants who decreased safety behaviour under the cognitive rationale versus those who did so under the extinction rationale or those who maintained their coping strategies. The last group experienced the least amount of pre- to post-intervention change. Disconfirmation of negative automatic thoughts is likely a crucial element in the effectiveness of reduced safety behaviour during exposure.

Cognitive change, however, may also result from behaviour therapy alone, as this form of treatment can be used to test the validity of patients' beliefs and to introduce reappraisal of feared stimuli through systematic exposure (Bouchard et al., 1996). Many treatment outcome studies have shown that exposure-based behavioural interventions are sufficient for creating cognitive change, particularly for social anxiety disorder, obsessive-compulsive disorder, and panic disorder (for a review, see Deacon & Abramowitz, 2004). Thus, cognitive interventions are not always necessary to directly disconfirm negative automatic thoughts or dysfunctional beliefs (e.g., Marks et al., 1993; Öst, Westling, & Hellstrbm, 1993).

In addition to research on the role of safety behaviour in anxiety, recent discussion has centered on the distinction between safety behaviour and adaptive coping strategies (Thwaites & Freeston, 2005), the latter which are also aimed at reducing anxiety but are *not* intended to avoid catastrophic outcomes. Despite this theoretical distinction, it is often difficult to differentiate the two in clinical practice, as differences between them can only be determined after evaluating a patient's intention for their use, their perceived function in a specific context, and the resultant cognitive impact. It is also possible for the same behaviour to function both as a safety mechanism and a coping strategy, depending on the feared consequences. For instance, a component of some treatments for panic disorder, breathing control, may be perceived by some patients as a form of immediate relief from their symptoms, leading them to fear dire consequences should they fail at correcting their breathing (Craske & Barlow, 2001). This often vague clinical distinction between safety behaviour and coping strategies speaks strongly to the need for greater understanding of possible positive and negative consequences of safety behaviour in anxiety disorders. Indeed, the necessity for clarification in this area is further emphasized by research demonstrating that merely the perceived availability of safety aids, and not necessarily their use, has a negative effect on fear reduction (Powers, Smits, & Telch, 2004).

At present, there is some evidence to suggest that safety behaviour is detrimental to the long-term reduction of anxiety, although it is far from conclusive. For example, although avoidance has long been thought to reinforce anxiety (Mowrer, 1939, 1960), others have found contrary evidence when incorporating avoidance into exposure-based treatments. Rachman, Craske, Tallman, and Solymon (1986), in a replication of a previous study with similar results (de Silva & Rachman, 1984), compared two 8-session exposure treatments for agoraphobia that varied as a function of escape behaviour. One group of participants was exposed progressively to fear-evoking situations in a standard manner, whereas participants in the escape-exposure group were exposed progressively but also instructed to escape if/when their fear reached a pre-set level; they returned to the exposure once their fear dropped below a specified point. Both groups achieved equal and significant improvements on all measures of agoraphobia, which were still evident at a 3-month follow-up. Escape safety behaviour was not followed by increases in fear or in estimates of danger; instead, it led to greater perceived control and less fear during treatment.

Related theory and research also suggest that it is possible in some circumstances for safety behaviour to promote adaptive cognitive change. Rachman's (1983) safety-signal theory posits that pairing safety cues (e.g., a safe person or place) with feared stimuli during exposure exercises might increase motivation and facilitate long-term declines in fear and avoidance. Sartory and colleagues (1989), for example, compared the effectiveness of safety-signal therapy versus conventional therapist-assisted exposure for agoraphobia. Safety-signal therapy yielded a small but significant advantage over therapist-assisted exposure, with participants in the former group reporting fewer panic symptoms and being more likely to enter previously avoided situations. Whereas, the therapist-assisted group experienced partial relapse between sessions, those in the safety-signal group reported between-session gains. This study was the first to show that moving *toward* safety, rather than away from it, can reduce avoidance behaviour and may even be more effective at doing so than conventional exposure paradigms.

In further support of the fear-reducing impact of safety cues during exposure, it has been shown that, panic patients who underwent a CO_2-inhalation procedure in the presence of a safe person reported less subjective anxiety, physiological arousal, and fewer catastrophic cognitions than those who did so without a safe person (Carter, Hollon, Carson, & Shelton, 1995). Importantly, both groups attained comparable post-exposure gains. Misattribution of safety was not apparent in this paradigm, and cognitive change was not hindered by reliance on safety behaviour. It has also been shown that panic patients who are provided with safety information are less likely to experience a heightened fear response during biological challenges (Schmidt & Telch, 1994). By contrast to the major tenants of the widely cited emotional processing theory of fear (Foa & Kozak, 1986), this research suggests that reductions in fear activation during exposure do not detract from therapeutic gains. This is of considerable importance given the marked dropout and refusal rates reported with this treatment method, which are likely attributable, in part, to the high threat and fear anticipation associated with exposure.

Finally, although rarely cited in the current safety behaviour literature, earlier work by Bandura, Jeffery, and Wright (1974) proposed that improvements in exposure therapy may be facilitated with the use of ‘response induction aids’. In a study of exposure therapy with snake phobics, the authors offered minimal, moderate, or high use of such aids (e.g., gloves) when participants were unable to perform an exposure exercise after it was modeled to them. Once the desired behaviour was achieved, the protective supports were withdrawn. Participants who relied on moderate or high levels of induction procedures benefited from substantially greater fear reduction than those who were minimally aided. Outcome measures included change in approach behaviour and in fear of snakes, thus the extent to which participants' catastrophic beliefs were modified is unknown, although the authors suggested that the eventual fading of induction aids ensured that they did not misattribute their success to external sources.

The use of safety behaviour by anxious individuals clearly has important implications for exposure-based treatments. However, theory and research to date have produced arguments that call for both its inclusion in and complete elimination from treatment protocols, emphasizing the need for more research to clarify the nature of its function during exposure interventions for specific disorders. In the present study, we aimed to further the investigation of the role of safety behaviour in the treatment of anxiety disorders using a paradigm of exposure therapy for snake fears. Safety aids might be helpful in exposure treatment of specific phobia, where patients must increase their proximity to the feared stimulus in order to disconfirm their unfounded beliefs about its danger. In the current study, 62 snake-fearful participants were randomly assigned to one of two treatment conditions, where they either used safety gear or did not use any safety gear during 45 minutes of exposure therapy to a live snake. Their subjective anxiety, cognitions, and closest distance of approach to the snake were measured before, during, and after exposure.

It was predicted that the use of safety behaviour would not be detrimental to the benefits of exposure for specific fears. In particular, we hypothesized that participants in the safety behaviour condition would experience greater initial gains than control participants in their distance of approach to the snake, which might lead them to experience more positive change in snake-relevant cognitions. Post-treatment, when both groups approach the snake without any safety aids, participants who used them during treatment were expected to report lower levels of subjective fear than those who did not use them, although they were not expected to approach the snake as closely by virtue of being less accustomed to the situation without safety gear.

Method

Participants

Participants were undergraduate students from a Canadian University and members from the surrounding community. They were recruited via announcements in classrooms and with posters and newspaper ads. The presence of snake fearfulness was assessed with a questionnaire requesting fear ratings for eight items/situations, including snakes, on a 7-point Likert scale. Those who endorsed either of the two highest fear ratings for snakes ("very much fear" or "terror") were invited to partake in the study provided they did not report symptoms of depression during a subsequent screening interview based on criteria from the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*; American Psychiatric Association, 1994).

Out of 382 individuals who expressed interest in partaking in the study, 116 met the above criteria and were invited to attend a single 1.5 hour test session. Participants were paid for their time. Data were collected from 86 individuals who accepted the invitation and of those, 21 were excluded from analyses because they failed to comply with the experimental protocol (n = 10, see below) or because they expressed little fear during their first approach to the snake (n = 14), defined as being able to touch the bottom of the terrarium in which the snake was placed during the initial behavioural approach test (BAT). Analyses were conducted with the remaining 62 participants.

Participants ranged in age from 19 to 58 years (M = 26.08, SD = 8.36). The majority (77.42%) were women. Demographic data on the participants' ethnic background was not collected; however, the sample reflected the population of a university in a large, ethnically diverse Canadian city. Participants' mean scores on the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) were 9.95 (*SD* = 8.53), and their mean scores on the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) were 10.48 (*SD* = 8.34).

Materials

The fear stimulus was a common ribbon snake (*Thamnophis sauritus*) measuring 26 cm in length and 1.5 cm in diameter. It was housed in a transparent glass terrarium measuring 75 x 30 x 40 cm with a removable wire mesh lid. The terrarium was placed on a cabinet 110 cm in height, and during testing it was empty except for the snake, such that participants had an unobstructed view of the animal at all times.

The terrarium was placed in a corner of a 3.13 x 2.30 meter room. The farthest distance from the terrarium measured 2.74 meters (9 feet), and participants were asked to use that as their starting point once inside the room. An X marked on the floor identified this point, and 0.30-meter (1 foot) increments were further marked along the diagonal toward the terrarium. The therapy room had no windows, and potentially distracting objects (e.g., paintings) were removed from view in the vicinity of the terrarium.

Design

Participants were randomly assigned to one of two treatment conditions: safety behaviour or control. Outcome measures were collected pre-treatment, at the conclusion of treatment, and after a 10-minute delay post-treatment. During the exposure session, treatment process indices, consisting of distance of approach to the terrarium/snake and subjective reports of fear, were recorded at 5-minute intervals.

Measures

Beck Anxiety Inventory (BAI) and Beck Depression Inventory-II (BDI-II). The BAI (Beck et al., 1988) and BDI-II (Beck et al., 1996) are standardized and well used self-report measures, each consisting of 21 items. They were administered to assess state anxiety and symptoms of depression in the sample. The BAI has excellent internal consistency (α = .92) and has demonstrated convergent and divergent validity in a sample of outpatients (Beck et al., 1988). The BDI-II also has excellent internal consistency, yielding coefficient alphas of .92 in a sample of outpatients and .93 in college students (Beck et al., 1996). In addition, it has demonstrated convergent and divergent validity (Beck et al., 1996; Steer & Clark, 1997).

Fear of Snakes Questionnaire. The Fear of Snakes Questionnaire was adapted from the Fear of Spiders Questionnaire (FSQ; Szymanski & O'Donohue, 1995). The FSQ is an 18-item self-report measure that is sensitive to differences between phobics and non-phobics, as well as to decrements in phobic responding during treatment. Items on the FSQ include snake-specific beliefs, such as "If I saw a snake now, I would think it will harm me" and "If I saw a snake now, I would think it will try to jump on me". In the current study, the adapted version of the FSQ was administered to assess the degree of pre- and post-treatment fear of snakes. Although there are no existing psychometric evaluations of this measure, a reliability analysis in the current study demonstrated satisfactory internal consistency (α = .86). The original FSQ has demonstrated high internal consistency (α = .92; Szymanski & O'Donohue, 1995), as well as high test-retest reliability (r = .91) and adequate convergent validity (Muris & Merckelbach, 1996).

Behavioural Approach Test (BAT). The BAT is a commonly used behavioural index of fear in anxiety disorders research. In this study, it consisted of participants' approaching the snake as close as they were able, yielding a distance measure coded along a 33-point hierarchy, ranging from standing outside the therapy room with the door closed to holding the snake. Generally, the lower end of the hierarchy involved approaching the terrarium while its lid remained on, whereas intermediate steps involved the same types of approach but with the lid off. Steps at the highest end of the hierarchy required participants to gradually submerge their hand in the tank and to ultimately touch and hold the snake. Greater numbers on the hierarchy indicated a closer proximity to the snake. Participants proceeded to a higher step on the hierarchy once they reported a subjective units of distress score of 30 or below (see SUDS, below).

Subjective Units of Distress Scale (SUDS). The SUDS (Wolpe, 1958) is a widely used measure of subjective fear in behaviour therapy. It enables participants to quickly rate their current reactivity when asked how fearful they feel on scale of 0 to 100, with 0 being neutral and 100 being the worst distress they can imagine. This measure has been shown to correlate with physiological measures of stress (e.g., Thyer, Papsdorf, Davis, & Vallecorsa, 1984).

Agoraphobic Cognitions Questionnaire for Snake Phobia (ACQ-S) and Body Sensations Questionnaire (BSQ). The ACQ-S is a 17-item self-report measure adapted from the Agoraphobic Cognitions Questionnaire (ACQ; Chambless, Caputo, Bright, & Gallagher, 1984) by Radomsky, Teachman, Baker, and Rachman (1996). The ACQ-S consists of 12 items from the original questionnaire, which assess cognitions about loss of control and physical concerns during a threatening situation, and 5 additional items, which assess cognitions specific to snakes. These items include statements such as "The snake is going to bite me", "The snake will get on me", and "The snake is dangerous". In the current study, the ACQ-S demonstrated excellent internal consistency (α = .91). In previous work, the original ACQ was found to have adequate internal consistency (α = .80) and test-retest reliability (r = .86), as well as convergent and discriminant validity (Chambless et al., 1984). The BSQ is a 17-item self-report scale assessing fears associated with common sensations of autonomic arousal and has been shown to be internally consistent (α = .88), with acceptable test-retest reliability (r = .67) and convergent and discriminant validity (Chambless et al., 1984).

Procedure

After providing informed consent, participants completed the BAI and BDI-II, and as part of the pre-treatment measures, they completed the FSQ. A research assistant who was blind to condition assignment then led the participants to a separate room where the snake was located in a closed glass terrarium. There, they completed the first BAT, and at their closest distance to the snake, they were asked to provide a SUDS rating. Participants then returned to the initial assessment room and completed the ACQ-S and the BSQ.

Participants in the safety behaviour condition were shown 12 safety items described as “protective gear commonly used by people who handle snakes” and were asked to select any, all, or none of them to use during the session. Examples of safety gear options included gloves, a protective apron, a beekeeper hat, and goggles. Choice was provided to allow for idiosyncratic differences in desired safety behaviour (likely associated with idiosyncratic snake fears), thus contributing to the ecological validity of the study. The control group was not shown or offered the use of safety gear.

Treatment for both groups consisted of a single 45-minute session of gradual *in vivo* exposure to a snake (as outlined in Craske, Antony, & Barlow, 1997), which proceeded at participants’ own pace. Participants were encouraged to focus on the snake and to minimize chatting. They were prompted to provide a SUDS rating every 5 minutes during treatment, and their position on the hierarchy (i.e., distance of approach) was also recorded at these times. At the conclusion of treatment, with those in the experimental group still wearing safety gear, all participants were asked to perform another BAT (starting from the first step on the hierarchy), to provide a SUDS rating at the closest distance, and then to complete the ACQ- S and BSQ while in the treatment room.

Following treatment, participants returned to the assessment room. Those in the safety behaviour condition were asked to remove their gear and were told that they would not use it again. All participants then engaged in a 10-minute word puzzle filler task, after which they completed the FSQ and returned to the treatment room for a post-treatment BAT, including a SUDS rating at the closest distance. The BAT distance and SUDS rating were obtained by the same blinded research assistant who recorded the measures pre-treatment. The final administration of the ACQ-S and BSQ was then conducted in the assessment room, followed by an informal debriefing interview assessing the use of covert safety behaviour (e.g., mental distraction, calculations of distance to exit). Participants were queried if they did anything to make themselves feel safer during the exposure session that could not be readily observed by the experimenter.

Results

Participant Characteristics

Participants in the safety behaviour and control groups differed neither in age, $F(1,60) = 2.45$, *n.s.,* nor with regard to scores on the BDI-II, $F(1, 60) = 2.60$, *n.s.*, nor the BAI, $F(1, 60) = 2.73$, *n.s.* (see Table 1 for means and standard deviations). The gender distribution did not differ significantly between groups, $\chi^2(1, N = 62) = 0.37$, *n.s.*

Pre-Treatment Comparability of Groups

To confirm that the two experimental groups were comparable before the safety behaviour manipulation was introduced, one-way ANOVA’s were conducted on FSQ, ACQ-S, BSQ, BAT distance, and SUDS ratings. There were no significant differences on the FSQ, $F(1, 60) = 1.51$, *n.s.*, BSQ, $F(1, 60) = 3.52$, *n.s.*, BAT distance, $F(1, 60) = 0.28$, *n.s.*, or SUDS ratings, $F(1, 60) = 1.35$, *n.s.* However, significant pre-treatment group differences were found on the

ACQ-S, $F(1, 60) = 4.96$, $p < .05$, with participants in the safety behaviour group reporting fewer concerns regarding physiological reactions and loss of control ($M = 15.52$, $SD = 9.58$) than participants in the control group ($M = 22.68$, $SD = 15.12$) after the baseline exposure to the snake. See Table 2 for means and standard deviations of outcome measures at each of the three time points.

Treatment Effectiveness

To assess the effectiveness of the exposure treatment, a 2 x 2 (condition x time) repeated measures ANOVA was conducted for each of the outcome measures pre- and post-treatment. Significantly reduced levels of fear were observed on all of the fear indices at 10 minutes post-treatment across both groups, including the FSQ, $F(1, 60) = 90.39$, $p < .001$, partial $\eta^2 = .60$; ACQ-S, $F(1, 59) = 36.80$, $p < .001$, partial $\eta^2 = .38$; BSQ, $F(1, 59) = 56.90$, $p < .001$, partial $\eta^2 = .49$; BAT distance, $F(1, 60) = 100.33$, $p < .001$, partial $\eta^2 = .63$; and SUDS ratings, $F(1, 60) = 40.27$, $p < .001$, partial $\eta^2 = .40$.

Between-Participants Effects

Due to pre-treatment differences on the ACQ-S, a 2 x 2 (condition x time) repeated measures ANCOVA was conducted on this measure, co-varying the pre-treatment values to evaluate differences at the remaining two time points (at end of treatment and 10 minutes post-treatment). There were no significant between-participant effects, $F(1, 59) = .08$, *n.s.*, partial $\eta^2 = .00$, or interaction effects, $F(1,59) = 1.92$, *n.s.*, partial $\eta^2 = .03$. A 2 x 2 (condition x time) repeated measures ANOVA was conducted for the FSQ and 2 x 3 (condition x time) repeated measures ANOVA's were conducted for the BSQ, BAT distance, and SUDS ratings. There were no significant group differences, FSQ, $F(1, 60) = 3.16$, *n.s.*, partial $\eta^2 = .05$; BSQ, $F(1, 59) = .28$, *n.s.*, partial $\eta^2 = .01$; BAT distance, $F(1, 60) = .19$, *n.s.*, partial $\eta^2 = .00$; SUDS ratings, $F(1,$

60) = .01, *n.s.*, partial η^2 = .00) or interactions, FSQ, $F(1, 60)$ = 1.11, partial η^2 = .02; BSQ, $F(1, 59)$ = .2.07, partial η^2 = .03; BAT distance, $F(1, 60)$ = .05, partial η^2 = .00; SUDS ratings, $F(1, 60)$ = 3.03, partial η^2 = .05, for any of the measures.

Time-Course Analysis of Treatment Session

The time-course of distance of approach and SUDS ratings during treatment were analyzed with 2 x 9 (condition x time) repeated measures ANOVA's. The analyses revealed a significant main effect of time for the BAT distance measure, $F(8, 480) = 61.43$, $p < .001$, partial η^2 = .51, whereby participants' distance of closest approach to the snake increased significantly over time in the exposure session (see Figure 1). A main effect of condition did not, however, reach the significance threshold for this measure, $F(1, 60) = 3.59$, $p = .06$, partial η^2 = .06, with results demonstrating only a marginal effect, whereby participants using safety behaviour approached the snake more closely than control participants throughout the session.

More important than analyses of the main effect of BAT is the test of our hypothesis that use of safety behaviour during exposure would result in behavioural (BAT) benefits that are most prominent during the early stages of treatment. In order to test this prediction, means for the BAT measure during three intervals (5 to 15 minutes, 20 to 30 minutes, and 35 to 45 minutes) were analyzed with three separate ANOVA's. Consistent with the safety-signal perspective, the distance of approach was significantly different between groups during the first interval, $F(1, 60) = 4.20$, $p < .05$, Cohen's $d = 0.52$, with participants in the safety behaviour group ($M = 17.82$, $SD = 9.83$) demonstrating a greater increase than controls ($M = 12.96$, $SD = 8.82$) in their approach to the snake, as coded on the exposure hierarchy. A marginal difference was found for the second interval, $F(1, 60) = 3.19$, $p = .08$, Cohen's $d = 0.45$, with participants in the safety behaviour group ($M = 23.61$, $SD = 9.53$) again moving closer to the snake than control participants (M =

19.32, *SD* = 9.38). There was no group difference in the distance of approach during the final 15 minutes of the exposure session, $F(1, 60) = 2.09$, *n.s.*

A significant main effect of time was observed on the SUDS measure, $F(8, 464) = 10.98$, $p < .001$, partial $\eta^2 = .16$, with significantly lower reported distress ratings as the exposure treatment progressed (see Figure 1). No significant between-participant differences were found for SUDS ratings, $F(1, 58) = .01$, *n.s.*

Safety Gear Items and Treatment Outcome

The mean number of safety gear items selected by participants in the experimental group was 2.87 (*SD* = 1.26). The most frequently selected items were long gloves (*n* = 27), a protective jacket (*n* = 16), lower leg covers (*n* = 8), and protective trousers (*n* = 8). Twenty-four different combinations of items were selected. Because we allowed participants to choose any number of safety aids, an analysis was conducted to determine if idiosyncratic differences in the choice of gear were associated with treatment outcome. There were no significant Pearson correlations between the number of items used during treatment and any outcome measures (all *r*'s < .19). However, pre-treatment scores on the ACQ-S were significantly correlated with the number of selected items, $r(31) = .36$, $p < .05$. The remainder of the pre-treatment indices (FSQ, BAT, SUDS, BSQ) were not significantly associated with the number of items, *r*'s < .21, *n.s.*

Use of Covert Safety Behaviour

An independent-samples *t*-test was conducted to assess group differences on the reported number of covert safety behaviours used during exposure treatment. There were no significant between-group differences on this measure, $t(60) = 1.52$, *n.s.* Across both groups, participants used a mean of 0.98 (*SD* = 0.91) covert safety behaviours.

Discussion

This study demonstrated treatment gains in exposure therapy for specific phobia with and without the use of safety aids, supporting the hypothesis that safety behaviour may not necessarily be detrimental to treatment effectiveness. Both groups experienced significant pre- to post-treatment improvements on fearful thoughts about snakes, cognitions regarding control and autonomic arousal, subjective fear responding and distance of closest approach to the snake.

We had predicted that participants who used safety gear during exposure might not approach the snake as closely as those in the control group post-treatment and would report lower levels of subjective fear. This hypothesis was not supported. In fact, group differences 10 minutes post-treatment were not evident on any of the outcome measures. We had also hypothesized that participants in the safety behaviour group would experience greater positive change in cognition, which also was not supported as the groups had comparable outcomes on both the ACQ-S and BSQ. This finding is nevertheless important, as it supports the notion that significant cognitive change is possible even with the use of safety behaviour.

A time-course analysis of reported subjective fear and behavioural responding during the 45-minute exposure session revealed that participants in both groups experienced comparable levels of subjective fear, as indicated by the SUDS ratings, whereas there was a notable trend for participants in the safety behaviour group to approach the snake more closely than the control group throughout the treatment, with this difference being significant during the first third of the treatment session. That is, the hypothesis that use of safety behaviour would lead to declines in initial fear was supported, with participants in the safety behaviour condition exhibiting a greater ascent along the exposure hierarchy during the first 15 minutes of treatment, which is consistent with Rachman's (1983) safety-signal perspective. Since the groups reported similar levels of fear across all indices post-treatment, it may be concluded that decrements in short-term anxiety from use of the safety behaviour did not detract from post-treatment gains, although further research involving a longer follow-up period is necessary to determine if this holds in the long-term.

It is noteworthy that scores on the ACQ-S and BSQ, the cognitive measures, appeared to drop dramatically between the end of treatment and the post-treatment assessment administered 10 minutes later. Possible factors that may have contributed to this drop in maladaptive cognitions include the consolidation of disconfirmatory events observed in treatment and during the final BAT, the emotional processing of fear (as outlined in Rachman, 1980), and a decrease in physiological arousal. These findings, however, were not related to the hypotheses of the current study and await future empirical attention.

An alternative explanation for the absence of post-treatment differences in this study is that the selection of protective items offered to participants did not correspond to their threat beliefs. If safety items do not correspond to maladaptive beliefs, their use would offer no advantage or disadvantage during treatment. However, our analyses of participants' selection of the safety items suggests that this was likely not the case. Participants were allowed choice in their selection of safety gear precisely to account for differences in their beliefs about safety, and it was found that across 31 individuals, 24 possible combinations of safety items were selected. Presumably, the variability in the selection of safety gear was associated with participants' specific beliefs as to how this gear might be beneficial in the presence of a threat. Indeed, we found that negative beliefs assessed by the ACQ-S were significantly predictive of the number of items selected for use during treatment. Our post-treatment findings thus suggest that safety behaviour did not impair adaptive cognitive change during the exposure session.

An additional potential explanation for the current findings is that both groups benefited because both groups experienced similar amounts of subjective anxiety. That is, equivalent levels of subjective anxiety during the session enabled participants in both conditions to receive equivalent functional exposure, irrespective of safety behaviour use. The crux of this argument is the notion that one needs to become anxious in order to benefit from fear reduction during exposure, which is consistent with the emotional processing theory by Foa and Kozak (1986). However, this component of their theory has never been adequately tested (Tryon, 2005). There is evidence from several literatures to suggest that long-term treatment gains are possible without dramatic increases in anxiety during treatment (e.g., Hofmann et al., 2006; Johnstone & Page, 2004; Tang & deRubeis, 1999).

The mechanisms underlying the effects of safety behaviour are largely unexplored, although there is some evidence from studies examining the effects of attention to phobic stimuli to suggest that increases in perceived control and self-efficacy, as predicted by safety-signal theory, are indeed contributors to positive treatment outcome when distraction, conceivably a form of safety behaviour, is used during exposure (Johnstone & Page, 2004). In their work on the effects of response induction aids during exposure therapy, Bandura and colleagues (1974) also suggested that fearful individuals' sense of personal mastery is increased when safety supports (i.e., safety behaviours) are temporarily introduced, as they enable participants to perform successfully in a threatening environment and, once the supports are faded, to ultimately do so unassisted.

These findings have important implications for the way in which cognitive-behavioural therapy is conducted. Clinicians are frequently devoted to eliminating safety behaviour during exposure-based treatments for anxiety disorders, whereas these results suggest that this may not always be necessary; indeed, it implies potential for dramatic improvements in treatment compliance. High dropout rates for exposure therapy for anxiety disorders have been well documented, ranging from 28 % for panic disorder (Barlow, Gorman, Shear, & Woods, 2000) to as high as 45 % for certain types of phobias (reviewed by Choy, Fyer, & Lipsitz, 2007). Recently, Foa and colleagues (2005) reported a 29 % dropout rate for exposure and ritual prevention treatment of obsessive-compulsive disorder, as well as a 10 % refusal rate for receiving this type of intervention. Given the magnitude of these rates, improving patients' motivation to receive and complete exposure-based treatments is crucial to improving treatment effectiveness. Allowing them the use of safety behaviour to reduce anxiety during exposure and to increase their sense of control may enable them to comply more readily with the treatment protocol, particularly in the early stages of treatment. To further clarify the potential benefits of safety behaviour use in this regard, future studies must examine its relation to dropout and refusal rates.

In the current study, several participants in the safety behaviour condition made comments to suggest that the safety behaviour made treatment more tolerable, such as "I would never do this without gloves" or "I would have quit if I didn't have this on". However, we did not observe group differences in subjective anxiety during the course of the treatment, which is inconsistent with previous studies demonstrating the benefits of safety behaviour use during exposure (e.g., Carter et al., 1995; Rachman et al., 1986). Additionally, only one participant dropped out before beginning exposure due to apprehension about the procedure and another terminated her participation during the treatment because she felt too anxious (she was in the control group). The lack of group differences in reported anxiety during treatment and the low rate of dropout is likely a factor of sampling from a non-clinical population. We found that many participants had very little, if any, previous exposure to a snake, which may have resulted in marked variability in their responses during the initial exposure despite their reported fear on the screening questionnaire. It is possible that setting a higher threshold for exclusion during the initial behavioural approach (e.g., exclude the participant if they are able to stand beside terrarium) would have reduced the baseline scatter, as would have the use of a larger, more threatening snake. Group differences in this study may have been greater with more fearful (or clinical) participants, for whom the potential benefit of safety behaviour use during exposure might have been more salient. Indeed, in our sample, several (excluded) individuals declined the use of safety gear, citing that they would not need it for such a small snake, suggesting—in addition to the low dropout rate—that treatment compliance was not a significant challenge for our participants.

Given their relatively low level of clinical severity and the general scarcity of snakes in their daily environment, the participants in this study likely did not rely on safety behaviour in daily life to the same extent one might expect from a clinical population, whether with snake phobia or another anxiety disorder. As discussed above, this may have impacted participants' reported fear during treatment, but it may also have made it more easy to accept the selected gear as a viable safety strategy during treatment. Patients who present with an existing repertoire of frequent safety behaviour may find it more difficult to adopt new strategies presented by the therapist and/or to relinquish favoured but potentially maladaptive behaviours. Future work is necessary on the development of the most appropriate methods for both phasing in clinically useful safety strategies and fading out those that have the potential to interfere with treatment. As emphasized by Thwaites and Freeston (2005), a functional analysis of any given strategy is essential to assess its impact on the presenting problem and its potential role in therapy.

To further clarify the complex role of safety behaviour use in the treatment of anxiety disorders, future investigations must overcome additional limitations of the present study. We did not systematically control for the use of covert safety behaviour; hence, there is a possibility that participants who were not provided with safety aids used more covert strategies to make themselves feel safer than those who had the benefit of physical protection. This would be consistent with our findings that both groups benefited equally from the exposure session. Although our informal survey of participants' reliance on neutralizing thoughts during treatment indicated that the groups did not differ in this regard. Future studies would benefit from the incorporation of a standardized measure of covert safety behaviour that can be implemented during the exposure session (see Behar, Vescio, & Borkovec, 2005, for a procedure on verbalizing mentation).

To firmly establish the effectiveness of treatment for both groups, follow-up studies would further benefit from incorporating into the present design an additional group that receives a control treatment with expected lower gains. Finally, a larger sample size will enable more powerful analyses of pre- to post-treatment change. Our ability to accept the null hypothesis (i.e., no group differences post-treatment) with confidence is limited by the high likelihood of a Type II error in this study. Our findings must thus be interpreted with caution and, as mentioned, replicated in larger samples. It is of note that this limitation does not negate the possibility that if post-treatment differences were readily observable, they might favour the use of safety behaviour during exposure. Indeed, future research faces the challenge of identifying the therapy conditions that make this possible.

Taken together, the findings of this study call into question the notion that the use of safety behaviour during exposure-based treatments for anxiety disorders categorically prevents fear reduction and/or cognitive change. With continued investigation in this area, there appears to be significant potential for the incorporation of safety behaviour into such treatments with the aims of reducing the number of treatment refusers, increasing compliance and subsequently providing more opportunity for cognitive, emotional, and behavioural change. This will likely be particularly useful to participants/patients who would otherwise have dropped out of or refused standard effective treatments.

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Table 1

Participant Characteristics by Group

	Condition	
	SB	Control
Variable	(*n* = 31)	(*n* = 31)
Female		
n (%)	25 (80.65)	23 (74.19)
Age		
M (*SD*)	24.45 (5.30)	27.74 (10.43)
BDI-II		
M (*SD*)	8.32 (8.90)	11.84 (8.25)
BAI		
M (*SD*)	8.77 (7.48)	12.26 (9.06)

Note. SB = Safety Behaviour.

Table 2

Outcome Measures at Three Assessment Points

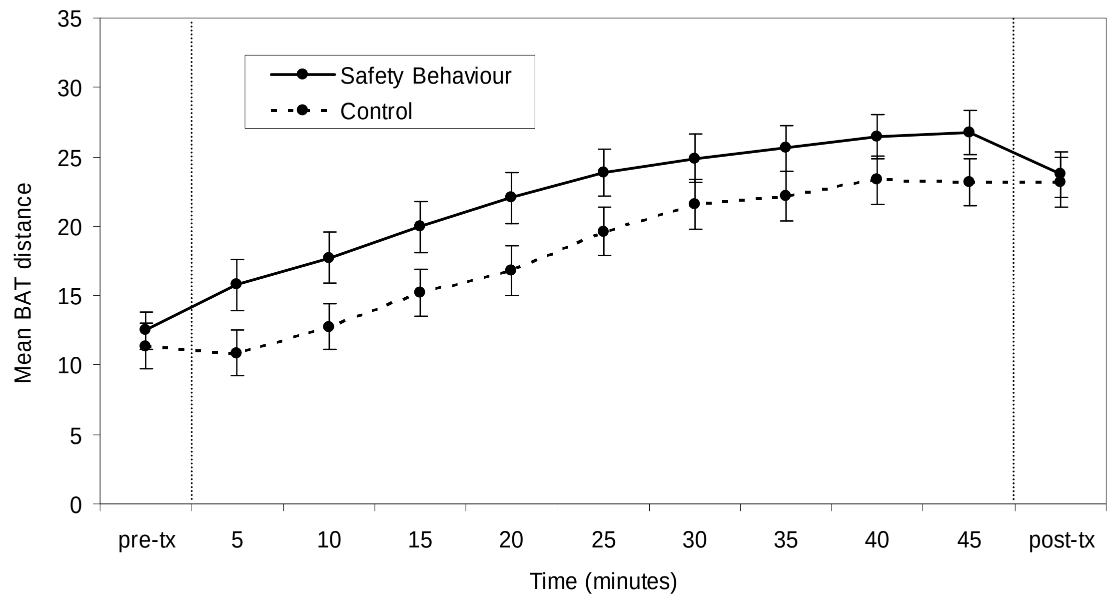
	Pre-Treatment		End-of-Treatment		Post-Treatment	
	SB (n = 31)	Control (n = 31)	SB (n = 31)	Control (n = 31)	SB (n = 31)	Control (n = 31)
Measure	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
FSQ	85.77_{a}	92.26_{a}	---	---	52.98_{b}	66.00_{b}
	(18.69)	(22.68)			(27.93)	(28.61)
BAT	12.48_{a}	11.35_{a}	25.77_{b}	23.29_{b}	23.74_{b}	23.13_{b}
	(7.68)	(9.12)	(9.73)	(9.69)	(9.13)	(9.95)
SUDS	58.61_{a}	65.61_{a}	39.35_{b}	41.35_{b}	42.45_{b}	36.48_{b}
	(23.48)	(23.90)	(24.51)	(25.20)	(26.73)	(24.41)
ACQ-S	15.52_{a*}	22.68_{b*}	15.81_{a}	$20.77_{(a)b}^{\dagger}$	8.71_{c}	$9.50_{c}^{\dagger}$
	(9.58)	(15.12)	(12.64)	(11.46)	(9.18)	(8.26)
BSQ	34.84_{a}	41.35_{a}	33.13_{a}	$37.07_{a}^{\dagger}$	27.00_{b}	$27.00_{b}^{\dagger}$
	11.94	15.19	12.62	13.48	10.05	10.33

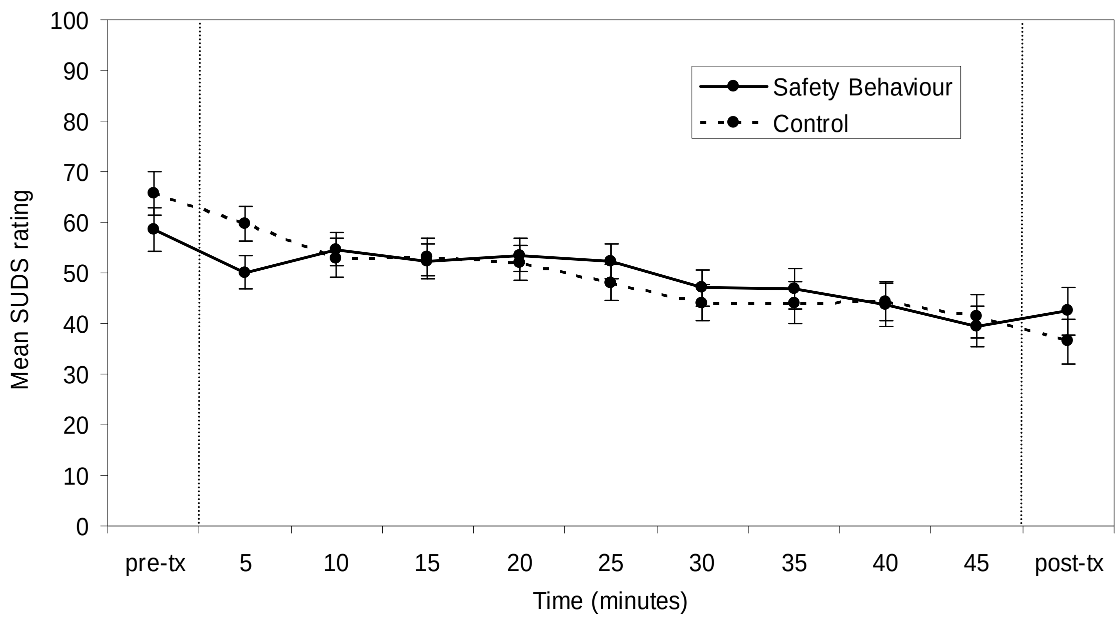
Note. Means with unshared subscripts in each row differ, $p < .001$. SB = Safety Behaviour; FSQ = Fear of Snakes Questionnaire; BAT = Behavioural Approach Test; SUDS = Subjective Units of Distress Scale; ACQ-S = Agoraphobic Cognitions Questionnaire for Snake Phobia; BSQ = Body Sensations Questionnaire.

$*p < .05$. $^{\dagger}n = 30$.

Figure Caption

Figure 1. Time-course analysis of mean BAT distance measures and SUDS ratings during treatment for the safety behaviour and control groups.


Safety Behaviour
Control
Mean BAT distance
35
30
25
20
15
10
5
0
pre-tx
5
10
15
20
25
30
35
40
45
post-tx
Time (minutes)


Safety Behaviour
Control
Mean SUDS rating
100
90
80
70
60
50
40
30
20
10
0
pre-tx
5
10
15
20
25
30
35
40
45
post-tx
Time (minutes)