SAFETY BEHAVIOUR DOES NOT INTERFERE WITH EXPOSURE THERAPY: THE CASE OF SPECIFIC PHOBIA

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ABSTRACT

Safety Behaviour Does Not Interfere with Exposure Therapy: The Case of Specific Phobia

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Safety behaviour consists of actions, thoughts, and/or protective objects that fearful individuals use to reduce their anxiety. It can potentially interfere with the progress of exposure therapy, which entails exposing patients to a feared stimulus or situation, but other hypotheses suggest that it may not be entirely detrimental to treatment effectiveness. This study aims to elucidate the role of safety behaviour in exposure-based treatments for anxiety disorders and uses a paradigm of exposure treatment for snake fear. Participants are randomized to one of two conditions, whereby they use either safety gear, such as gloves and goggles, or do not use any safety gear during 45 minutes of systematic exposure to a live snake. Measures are administered pre-treatment, immediately following treatment, and 10 minutes post-treatment to assess participants' fear-related cognitions, subjective ratings of fear, and their distance of closest approach to the snake. The results demonstrate that exposure treatment for snake fear is effective irrespective of safety behaviour use, as indicated by pre- to post-treatment differences for both groups of participants on all outcome measures. It was found that participants who used safety gear reported cognitive change equivalent to those who did not use safety gear post-treatment, supporting the notion that use of safety behaviour during exposure treatment may promote adaptive cognitive change. Results are discussed in terms of cognitive-behavioural theories of and treatments for anxiety disorders.

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SAFETY BEHAVIOUR DOES NOT INTERFERE WITH EXPOSURE THERAPY: THE CASE OF SPECIFIC PHOBIA

With lifetime prevalence rates of up to 25% (Kessler et al., 1994), anxiety disorders as a group are the most common of all mental disorders. The current treatment of choice is cognitive-behavioural therapy (Otto, Smits, & Reese, 2004), and one of its components, exposure therapy, has made impressive achievements in reducing anxiety across a broad range of disorders, including panic disorder (e.g, Craske & Rodriguez, 1994; Marks, et al., 1993), posttraumatic stress disorder (e.g, Foa et al., 1999), obsessive-compulsive disorder (e.g, Franklin, Abramowitz, Kozak, Levitt, & Foa, 2000), generalized anxiety disorder (e.g, Ladouceur et al., 2000), social anxiety disorder (e.g, Feske & Chambless, 1995), and specific phobia (e.g, Öst, 1989). The extensive success of this treatment method, which involves exposing patients to feared stimuli, has inspired more refined investigations of its mechanisms and effects across individuals and situations. Many contemporary studies are focused largely on the way participants respond in anxiety-provoking situations and the potential of their responses to moderate treatment efficacy (e.g., Foa, Riggs, Massie, & Yarczower, 1995; Wells et al., 1995).

To further our understanding of psychopathology and aid in the development of effective treatments for anxiety disorders, one promising area of inquiry is *safety behaviour*, actions used by anxious individuals to avert or cope with a perceived threat (Salkovskis, Clark, & Gelder, 1996). Such behaviour may consist of overt actions, thoughts (covert safety behaviour), 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 a key factor in the maintenance of

fear and anxiety, and treatment paradigms are thus typically focused on gradually reducing it, among other things.

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 very tightly in order to prevent embarrassment resulting from spilling its contents. Doing so, however, would prevent them from learning about the improbability of spilling their drink even if they do not cling tightly to the glass (Clark & Wells, 1995). Hence, by relying on safety behaviour, anxious individuals may be unable to obtain discomfirmatory evidence related to their unrealistic beliefs. They may conclude that their own actions (i.e., the safety behaviour itself) prevent feared outcomes, leading them to reinterpret harmless, possibly fear-disconfirming situations as threatening. In fact, in this particular example, this form of safety behaviour might actually make the feared outcome more likely, as tightly gripping the glass could cause shaking and unsteadiness.

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. For example, Salkovskis and colleagues (1999) examined the use of safety behaviour in patients with panic disorder with agoraphobia during a 15-minute exposure to an agoraphobic situation. Participants in the experimental group were instructed to stop doing anything that they normally do to prevent expected catastrophic outcomes, whereas those in the control group were permitted to maintain previously identified safety behaviour during treatment. The study demonstrated that the elimination of safety behaviour contributed to a greater reduction in anxiety and catastrophic beliefs.

However, the results were limited, as each group had received a different treatment rationale (a habituation rationale for the control group versus a threat disconfirmation rationale for the decreased safety behaviour group).

Another line of research (Sloan & Telch, 2002) showed that during exposure therapy for claustrophobia, participants who were encouraged to use safety behaviour, such as opening a window and standing near an exit, had significantly more fear at post-treatment and follow-up compared both to participants in a control group and to those in a guided threat and reappraisal group, who were encouraged to focus on their perceived threats and gather disconfirming evidence related to them.

More recently, Kim (2005) compared three types of exposure for social anxiety to evaluate the effects of decreased safety behaviour, such as avoided eye-contact, focus on enunciation, and planned conversations. Forty-five students diagnosed with social phobia were randomly assigned either to exposure with decreased safety behaviour under a cognitive rationale, exposure with decreased safety behaviour under an extinction rationale, or exposure with no change in safety behaviour. Results showed significantly greater reductions in anxiety and beliefs in feared outcomes for participants who decreased their safety behaviour under the cognitive rationale versus those who did so under the extinction rationale or those who maintained their safety behaviour during exposure. The latter group experienced the least amount of pre- to post-intervention change. It is likely that the disconfirmation of negative automatic thoughts is a key element in the effectiveness of reduced safety behaviour during exposure.

Cognitive change may also result from behaviour therapy, as this form of treatment can be used to test the validity of patients' beliefs and to introduce reappraisal

of the feared stimulus 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 in the case of social anxiety disorder, obsessive-compulsive disorder, and panic disorder (for a review, see Deacon & Abramowitz, 2004). Thus, it may not always be necessary to directly disconfirm negative automatic thoughts or dysfunctional beliefs through cognitive interventions in order to modify maladaptive cognitions (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). Adaptive coping strategies are aimed at reducing anxiety, but in contrast to safety behaviour, they do not maintain it as they are not intended to avoid catastrophic outcomes. Despite this theoretical distinction, it is often difficult to differentiate the two in clinical practice, as the 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 concurrently function both as a safety mechanism and a coping strategy, depending on the feared consequences. For instance, a successful 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 further elucidation of the subtle nuances and possible

positive and negative consequences of the role(s) of safety behaviour in anxiety disorders (Thwaites & Freeston, 2005). Indeed, the necessity for fine distinction in this area has been further demonstrated by related work investigating safety behaviour availability and its utilization, revealing that merely the perceived availability of safety aids, and not necessarily their use, exerts a negative effect on fear reduction (Powers, Smits, & Telch, 2004).

At present, there is converging literature to suggest that safety behaviour is detrimental to the long-term reduction of anxiety, although the evidence is far from conclusive. For example, avoidance has long been thought to reinforce anxiety (Mowrer, 1939, 1960), a significant idea that remains prevalent in contemporary cognitive-behavioural theory (e.g., Salkovskis et al., 1999). However, other theorists have found contrary evidence when incorporating avoidance in 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 factor 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 were also instructed to escape if/when their fear reached a pre-set level (70 or above out of 100 on a Subjective Units of Distress Scale); they were to return to the situation and continue exposure once their fear dropped below 25. The results demonstrated that participants in both groups achieved equal and significant improvements on all measures of agoraphobia, which were still evident at a 3-month follow-up. In addition, the use of escape safety behaviour was not followed by increases in fear or in estimates of danger;

instead, it led to a greater sense of control and less fear during treatment. This line of research suggests that allowing escape safety behaviour during exposure treatments for anxiety disorders may not necessarily be detrimental to treatment outcome.

Related theory and research suggest that, contrary to the notion that safety behaviour interferes with threat disconfirmation, it is possible in some circumstances for safety behaviour to have the opposite effect and actually assist in prompting adaptive cognitive change. This idea was put forward by Rachman (1983), who developed a paradigm for exposure treatment that incorporates safety signals, conditions that indicate that a feared outcome will not occur. His perspective was an elaboration of Mowrer's (1960) two-stage theory of fear and avoidance and Gray's (1971) subsequent contribution to it, which suggests that reductions in anxiety are not only regulated by avoidance behaviour but by positive safety signals as well.

Rachman's (1983) safety-signal theory proposes that the pairing of safety cues with feared stimuli could be used as incentive during exposure exercises to increase motivation and facilitate long-term declines in fear and avoidance. For example, a safety signal, such as a friend or a safe place, might be positioned at some distance from the patient in an avoided situation, such that the patient is encouraged to travel towards it, thereby enduring exposure to the feared setting. Doing so would enable the patient to extend his/her range of behaviour and to experience habituation to psychophysiological and subjective components of fear, as well as to acquire new information to disconfirm catastrophic beliefs. This paradigm, however, also raises the possibility that early treatment sessions will lead to a maladaptive increase in patients' reliance on the original safety-signal. Despite this risk, Rachman (1983) argued that, in conjunction with

associated disconfirmation of perceived threats, this type of encouraged exposure would ultimately outweigh any adverse effects associated with a temporary strengthening of the original signal. Indeed, the feared setting itself should eventually become associated with relief and safety.

The safety-signal perspective has been applied to the conceptualization and treatment of both agoraphobia (Rachman, 1983, 1984; Sartory, Master, & Rachman, 1989) and generalized anxiety disorder (Woody & Rachman, 1994). Sartory and colleagues (1989), for example, compared the effectiveness of four sessions of safety-signal therapy versus four sessions of conventional therapist-assisted exposure in 19 agoraphobic patients. Participants receiving the safety-signal treatment were asked to approach a feared target on their own and were met by the therapist at a point at which they had previously turned back to escape the situation; for instance, boarding a bus alone with the therapist waiting inside. Those receiving conventional exposure were accompanied by the therapist throughout treatment sessions. Although the results demonstrated improvements on most outcome measures for both groups, the safety-signal therapy yielded a small but significant advantage over therapist-assisted exposure, with participants in the former group being more likely to enter previously avoided situations and reporting fewer panic symptoms post-treatment. Moreover, on between-session homework measures, those in the therapist-assisted treatment group reported partial relapse, whereas those who were treated with safety-signal therapy experienced further improvement at this time. This study was the first to show that moving *towards* safety, rather than away from it, as prescribed by many current behavioural methods, 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 found that their presence can promote the reduction of initial anxiety. For example, 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 engaged in the procedure without a safe person (Carter, Hollon, Carson, & Shelton, 1995). Importantly, both groups attained comparable post-exposure gains, suggesting that the safety cues were not detrimental. Additionally, it has been shown that when panic patients are provided safety information, they are less likely to experience a heightened fear response during biological challenges (Schmidt & Telch, 1994).

The use of safety behaviour by anxious individuals clearly has important implications for exposure-based treatments. However, as indicated above, 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 elucidate 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. In line with the safety-signal perspective, it is possible that safety aids may be helpful in the exposure treatment of specific phobia, where patients must first increase their proximity to the feared stimulus in order to disconfirm their unfounded beliefs about its danger. In the current study, 54 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 anxiety level, cognitions, and closest distance of approach to the snake were measured before, during, and after the therapy session.

It was predicted that the use of safety behaviour would not be entirely detrimental to the benefits of exposure for specific fears. In particular, we expected that at post-treatment, when both groups were asked to approach the snake without any safety aids, those who used safety gear during treatment would report lower levels of subjective fear than those who did not use safety gear, although they may not be able to get as close to the snake. It was further hypothesized that the safety behaviour group would report more positive changes in snake-relevant cognitions than the control group at post-treatment.

Method

Participants

Participants ($N = 54$) were Concordia University undergraduate students and individuals from the surrounding community who were recruited via posters, newspaper ads, and classroom announcements seeking volunteers for a phobia research study. 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 (see Appendix A). 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 interview (the ADIS-IV, see below) based on criteria from the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American

Psychiatric Association, 1994). Eligible individuals were offered $10 for their participation.

Out of 357 individuals who expressed interest partaking in the study, 116 met the above criteria and were invited to come into the laboratory for a single 1.5 hour test session. Data was collected from 75 individuals who accepted the invitation, and of those, 21 participants were excluded from analyses because they failed to comply with the experimental protocol ($n = 9$), or they expressed little fear during their first approach to the snake, as indicated by their being able to touch the bottom of the terrarium in which the snake was placed (a step near the highest point on the exposure hierarchy; see Appendix B) ($n = 12$). Analyses were conducted with the remaining 54 participants, consisting of 23 females and 5 males in the safety behaviour condition, and 18 females and 8 males in the control condition.

Participants ranged in age from 19 to 58 years ($M = 26.35$, $SD = 8.76$). As assessed with the Anxiety Disorders Interview Schedule for DSM-IV (*ADIS-IV*; see below), the majority of the sample (87%) had a non-clinical fear of snakes, with a mean disorder severity rating of 2.63 ($SD = 1.09$) out of a possible 8. Participants' mean scores on the Beck Anxiety Inventory (BAI; see below) and the Beck Depression Inventory-II (BDI-II; see below) were 10.80 ($SD = 8.58$) and 10.22 ($SD = 8.67$), respectively (see Table 1).

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 door to the room was located on the adjacent wall, 1.81 meters from the terrarium. 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 (see Appendix C for a diagram of the room's layout).

Design

Participants were tested individually. They were randomly assigned to one of two treatment conditions: safety behaviour or control. Outcome measures consisted of self-report questionnaires, behavioural responses, and subjective reports of fear (see *Measures* below). These measures were collected at pre-treatment, at the conclusion of treatment, and after a 10-minute delay (post-treatment). During the exposure, treatment process indices, consisting of distance of approach to the terrarium/snake and subjective reports of fear, were collected at 5-minute intervals.

Measures

Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV). The ADIS-IV (DiNardo, Brown, & Barlow, 1994) is a semi-structured and commonly used standardized clinical interview schedule designed to assess current diagnoses of anxiety disorders consistent with DSM-IV criteria. Participants were administered the specific

phobia component of the schedule in order to assess their diagnostic status for the disorder and the depression section for exclusivity criteria (see above). This measure has demonstrated excellent reliability for a current principle diagnosis of specific phobia (Brown, Di Nardo, Lehman, & Campbell, 2001; Di Nardo, Moras, Barlow, Rapee, & Brown, 1993).

Beck Anxiety Inventory (BAI) and Beck Depression Inventory-II (BDI-II). The BAI (Beck, Epstein, Brown, & Steer, 1988) and BDI-II (Beck, Steer, & Brown, 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 ($\alpha = .92$) 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 (see Appendix D). It was administered to assess the degree of pre- and post-treatment fear of snakes. The FSQ has demonstrated high internal consistency ($\alpha = .92$) (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 are 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 (see Appendix B). Greater numbers on the hierarchy indicated a closer proximity to the snake.

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) to assess cognitions about loss of control and physical concerns during exposure to a snake (see Appendix E). The ACQ has adequate internal consistency ($\alpha = .80$) 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 ($\alpha = .88$), with acceptable test-retest reliability ($r = .67$) and convergent and discriminant validity

(see Appendix F; Chambless et al., 1984). The ACQ-S and BSQ were administered at three time points to assess cognitive change.

Procedure

After providing informed consent, participants were assessed by the experimenter, a trained graduate student, with the specific phobia section of the ADIS-IV. They then completed the BAI and BDI-II, and as part of the pre-treatment measures, they completed the FSQ. Next, a research assistant who was blind to condition assignment took 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, participants were asked to provide a SUDS rating. Participants then returned to the initial assessment room and completed the ACQ-S and the BSQ (for a flowchart of the experimental protocol, see Appendix G).

Based on random assignment to either the safety behaviour or the control treatment condition, participants were next prepared for the exposure session. Those in the safety condition were shown 12 safety items (see Appendix H) 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 an upcoming exposure session. This choice was provided to allow for idiosyncratic differences in what makes one feel safe or comforted, thus contributing to the ecological validity of the experiment. Participants were next given instructions for the treatment. The control group was not shown or offered the use of safety gear and received treatment instructions immediately after the pre-treatment assessment.

Treatment for both groups consisted of a single 45-minute session of gradual in-vivo systematic desensitization (as outlined in Craske, Antony, & Barlow, 1997; see Appendix C for exposure hierarchy), which proceeded at the participants' own pace. They were encouraged to focus on the snake and to keep talking to a minimum. SUDS ratings and the distance from the snake were recorded at 5-minute intervals during the exposure. Immediately after treatment, with those in the experimental group still wearing safety gear, participants were asked to perform another BAT and provide a SUDS rating at the closest distance, as well as to complete the ACQ- S and BSQ while in the treatment room.

Following treatment, participants returned to the other 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 (see Appendix I), 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 at pre-treatment. The final administration of the ACQ-S and BSQ was then conducted in the assessment room, followed by an informal interview assessing the use of any covert safety behaviour (thoughts) during exposure. The latter information was obtained by asking the participants if there was anything they did to make themselves feel safer during the exposure session (see Appendix J). Participants were then debriefed and compensated for their time.

Results

Participant Characteristics

Participants in the safety behaviour and control groups did not differ in age, $F(1, 52) = 2.27, p > .05$. They also did not differ with regard to the severity of their snake fear, as measured by the ADIS-IV, $F(1, 52) = 2.03, p > .05$, nor did they differ with regard to the mean total scores on the BAI, $F(1, 52) = 1.83, p > .05$ or the BDI-II, $F(1, 52) = 1.87$, $p > .05$ (see Table 1 for descriptive statistics).

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 the FSQ, ACQ-S, BSQ, BAT distance, and SUDS ratings. There were no significant differences on the FSQ, BAT distance, and SUDS ratings (all F's$(1, 52) < 1.14, p$'s $> .05$). However, significant pre-treatment group differences were found on the ACQ-S ($F(1, 52) = 4.50, p < .05$), with participants in the safety behaviour group reporting fewer concerns regarding physiological reactions and loss of control ($M = 15.71$, $SD = 9.50$) than participants in the control group ($M = 23.27$, $SD = 16.08$) after the initial exposure to the snake. A marginal effect was found for the BSQ ($F(1, 52) = 2.97, p = .09$), with those in the safety behaviour group reporting less distress over bodily sensations after the pre-test exposure ($M = 34.89$, $SD = 11.61$) than participants in the control group ($M = 41.54$, $SD = 16.50$) (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 post-treatment across both groups, including the FSQ, $F(1, 52) = 84.30, p < .0001$, partial Eta squared = .62; ACQ-S, $F(1, 51) = 32.21, p < .0001$, partial Eta squared = .39; BSQ, $F(1, 51) = 49.41, p < .0001$, partial Eta squared = .49; BAT distance, $F(1, 51) = 77.21, p < .0001$, partial Eta squared = .60; and SUDS ratings, $F(1, 52) = 30.34, p < .0001$, partial Eta squared = .37 (see Figures 1–4).

Between-Participants Effects

Due to important pre-treatment differences on the ACQ-S and BSQ, 2 x 2 (condition x time) repeated measures ANCOVA's were conducted on these measures, co-varying the pre-treatment values to evaluate differences at the remaining two time points (at-treatment and post-treatment). There was a marginal condition x time interaction on the ACQ-S ($F(1, 50) = 2.92, p = .09$, partial Eta squared = .06), whereby participants in the safety behaviour group reported fewer agoraphobic cognitions ($M = 14.71$, $SD = 12.76$) than controls ($M = 20.48$, $SD = 11.44$) immediately after treatment,[1] with this difference diminishing post-treatment (safety behaviour group: $M = 8.68$, $SD = 9.65$; control group: $M = 9.36$, $SD = 8.53$). There were no significant group effects or interactions for the BSQ ($F(1, 50)$'s < 1.67, p's $> .05$).

[1] The assumption of equal slopes was not met. The test for equality of slopes of the regression lines was significant for the ACQ-S immediately following treatment, $F(1, 49) = 5.05$, $p < .05$, thus these results should be interpreted with caution.

For the remaining measures, 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 BAT distance and SUDS ratings. No significant between-participants effects or interactions were found for the three measures (all F's$(1, 52) < 2.84, p$'s $> .05$).

Time-Course Analysis During Treatment

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 ($F(8, 416) = 50.64, p < .0001$, partial Eta squared = .49), whereby participants' distance of closest approach to the snake decreased significantly with time in the exposure session (see Figure 5). Moreover, a marginal main effect of condition was observed ($F(1, 52) = 2.74$, $p = .10$, partial Eta squared = .05), whereby participants using safety behaviour were consistently able to approach the snake more closely than control participants, from the beginning to the end of the exposure session. A significant main effect of time also emerged on the SUDS measure ($F(8, 400) = 9.16, p < .0001$, partial Eta squared = .16), with significantly lower reported distress ratings as exposure therapy progressed (see Figure 6); no significant between-participants differences were found for SUDS ratings, $F(1, 50) = .02, p > .05$.

Safety Gear Items and Treatment Outcome

Because we allowed participants in the experimental group to choose any number of safety aids, an analysis was conducted to determine whether idiosyncratic differences in the choice of safety gear were associated with treatment outcome. The number of

selected safety aids was correlated with the absolute values of pre-to post-treatment difference scores for the FSQ, ACQ-S, BSQ, BAT distance, and SUDS ratings. There were no significant Pearson correlations between the number of items used during treatment and any of the outcome measures.

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, such as thinking pleasant, distracting thoughts and conducting mental calculations of the distance to the door. There were no significant between-group differences with regard to the number of covert strategies used during treatment, $t(52) = 6.97, p > .05$. Across both groups, participants used a mean of 1.10 ($SD = 0.92$) 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 a behavioural 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 at 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 was partially supported. A trend for differences in snake-relevant agoraphobic cognitions was found immediately following treatment, with participants who had used safety gear reporting fewer negative cognitions than those who had not. This difference was no longer evident 10 minutes later at post-treatment, suggesting that participants who used safety gear may have experienced a greater sense of control during treatment versus controls. Importantly, during a subsequent exposure to the feared stimulus without safety gear, the experimental group reported cognitive change equivalent to the controls, supporting the notion that use of safety behaviour may promote adaptive cognitive change.

A time-course analysis of reported subjective fear and behavioural responding during the 45 minutes of exposure treatment revealed that individuals 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. Because SUDS ratings are highly subjective and characterized by greater variance than the BAT, the BAT may be a more accurate index of fear, suggesting that the use of safety behaviour helped to decrease initial anxiety during exposure to the snake, which is consistent with Rachman's (1983) safety-signal perspective. Since the groups reported similar levels of fear across all indices at post-treatment, it may be concluded that the 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 would be necessary to determine if this holds in the long-term.

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 50 % for phobia (Prochanska, 1991). 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 and to complete it. In the current study, several participants in the safety behaviour condition exemplified this notion with comments such as, "I would never do this without gloves" or "I would have quit if I didn't have this on". However, 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 this study, 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). Such a low rate of dropout is likely a factor of sampling from a non-clinical population (ADIS severity = 2.63). The striking pre-treatment variability on the cognitive measures is also likely the

result, in part, of using a non-clinical sample, in addition to using fear of snakes as a treatment target. With respect to the latter, we found that many participants had very little, if any, previous exposure to a snake, which 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 participant if 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 participants, for whom the potential benefit of safety behaviour use during exposure might have been more salient. Indeed, in our sample, several individuals declined the use of safety gear, citing 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.

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, ours was not necessarily an established means for collecting this data. The inquiry was placed at the end of the experiment, relying greatly on participants' ability to recall

details of their behaviour during the treatment session. Thus, it is possible that the comparable number of reported covert behaviours in the two groups was a function of general memory ability, which would likely be similar regardless of condition. 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 an alternative treatment with expected lower gains. Furthermore, it is possible that the current absence of group differences is the result of a failed experimental manipulation (i.e., participants in the experimental group did not feel more safe). This, however, is unlikely as there was a consistent trend for group differences on an objective behavioural measure during the implementation of the experimental manipulation.

Conclusion

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 hinders fear reduction. Indeed, with continued investigation in this area, there appears to be significant potential for the incorporation of safety behaviour into such treatments with the aim of increasing compliance and subsequently providing more opportunity for cognitive and behavioural change. This will likely be particularly useful to participants who would otherwise have dropped out of or refused standard effective treatments.

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Table 1

ADIS-IV Severity Ratings for Snake Phobia, and Scores on the BAI and BDI-II

Measure	*M*	*SD*	Min.	Max.	Max. possible
ADIS-IV					
SB[a]	2.43	0.96	1.00	6.00	8.00
Control[b]	2.85	1.19	1.00	6.00	8.00
Total[c]	2.63	1.09	1.00	6.00	8.00
BAI					
SB[a]	9.29	7.67	1.00	29.00	63.00
Control[b]	12.42	9.33	0.00	34.00	63.00
Total[c]	10.80	8.58	0.00	34.00	63.00
BDI-II					
SB[a]	8.68	9.16	0.00	24.00	63.00
Control[b]	11.88	7.96	0.00	22.00	63.00
Total[c]	10.22	8.67	0.00	24.00	63.00

Note. SB = safety behaviour condition.
[a] $n = 28$. [b] $n = 26$. [c] $N = 54$.

Table 2

Means and Standard Deviations for Pre-, At-, and Post-Treatment Outcome Measures

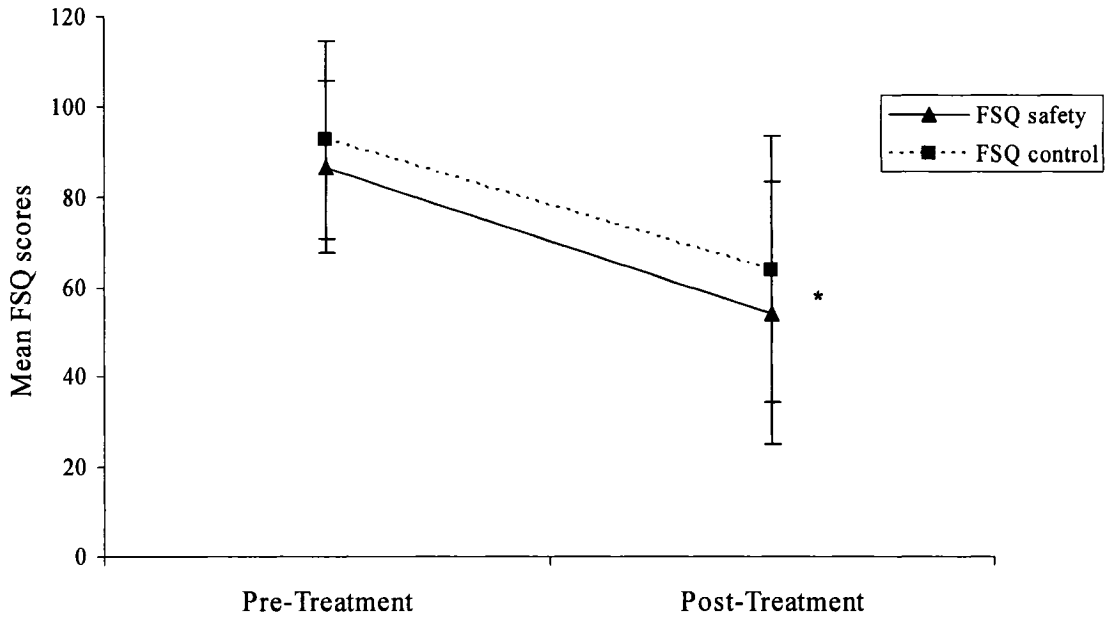
	Safety Behaviour ($n = 28$)			Control ($n = 26$)		
	Pre-Treatment	At-Treatment	Post-Treatment	Pre-Treatment	At-Treatment	Post-Treatment
Measure	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
FSQ	86.63*	---	54.13*	92.6*	---	63.77*
	(19.14)		(29.14)	(22.14)		(29.46)
BAT	13.07*	26.0	23.82*	12.38*	23.54	23.3*
	(7.83)	(9.64)	(9.11)	(9.55)	(9.68)	(9.91)
SUDS	57.32*	38.75	41.64*	62.65*	42.38	35.42*
	(23.71)	(25.72)	(27.51)	(24.01)	(26.51)	(26.09)
ACQ-S	15.7*†	14.71‡	8.68*	22.28$_a$*†	20.48$_a$‡	9.36$_a$*
	(9.49)	(12.77)	(9.65)	(15.58)	(11.44)	(8.53)
BSQ	34.89*‡	33.25	27.39*	41.16$_a$*‡	37.04$_a$	27.4$_a$*
	(11.60)	(13.29)	(10.40)	(16.72)	(14.43)	(11.99)

Note. At-treatment measures were completed immediately after exposure treatment; post-treatment measures were completed 10 minutes after exposure treatment.

[a]$n = 25$

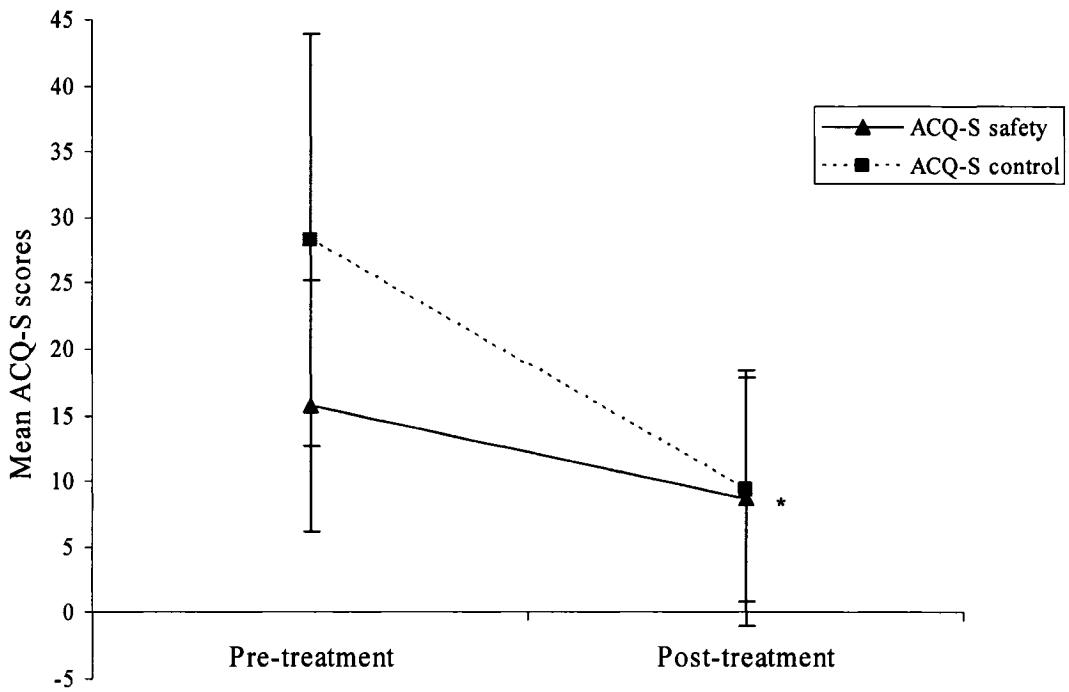
*Within-participant difference, $p < .0001$. †Between-participant difference, $p < .05$. ‡Between-participant trend, $p = .09$.

Figure 1. Mean scores on the Fear of Snakes Questionnaire (FSQ) at pre- and post-treatment for safety behaviour and control groups.



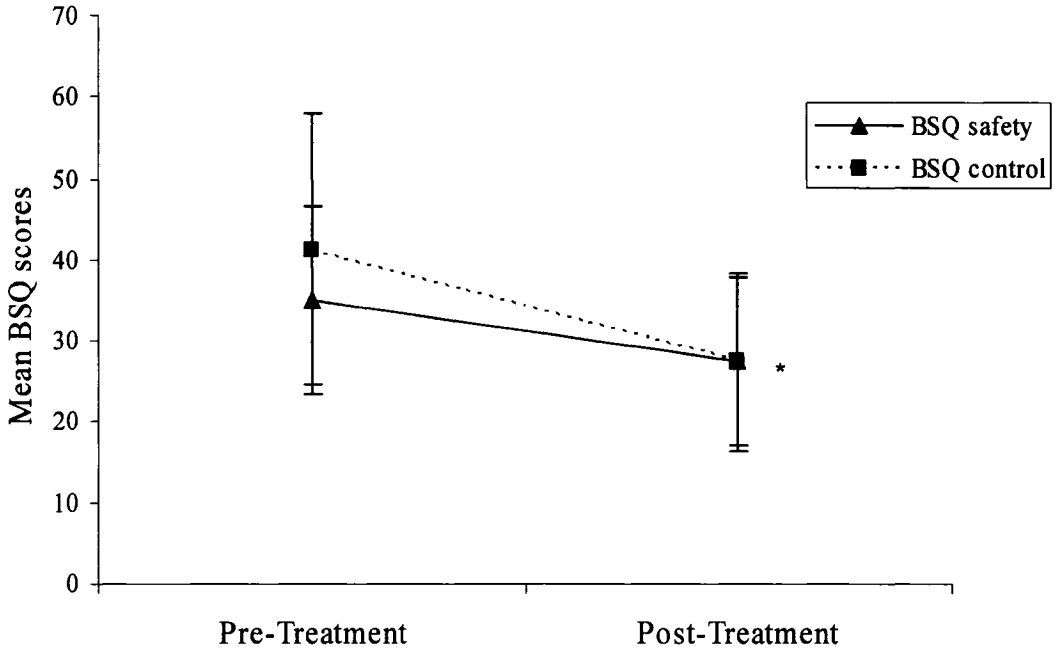
* Within-participants main effect F (1, 52) = 84.30, p < .0001, partial Eta squared = .62

Figure 2. Mean scores on the Agoraphobic Cognitions Questionnaire for Snake Phobia (ACQ-S) at pre- and post-treatment for safety behaviour and control groups.



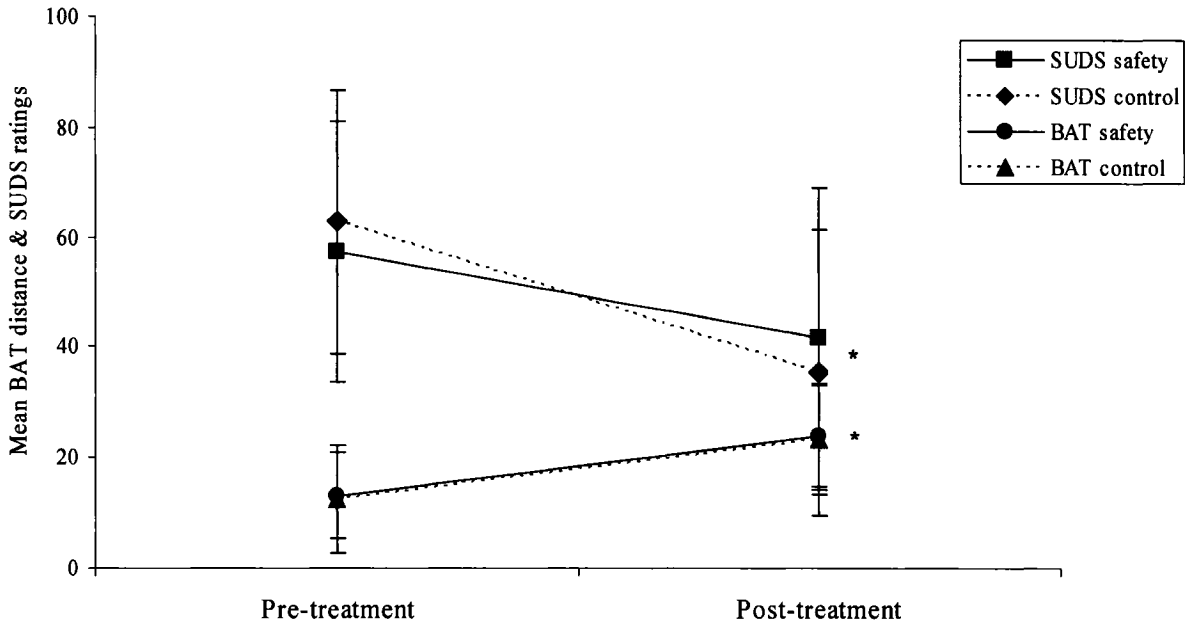
* Within-participants main effect $F(1, 51) = 32.21, p < .0001$, partial Eta squared = .39

Figure 3. Mean scores on the Body Sensations Questionnaire (BSQ) at pre- and post-treatment for safety behaviour and control groups.



* Within-participants main effect F (1,51) = 49.41, p < .0001, partial Eta squared = .49

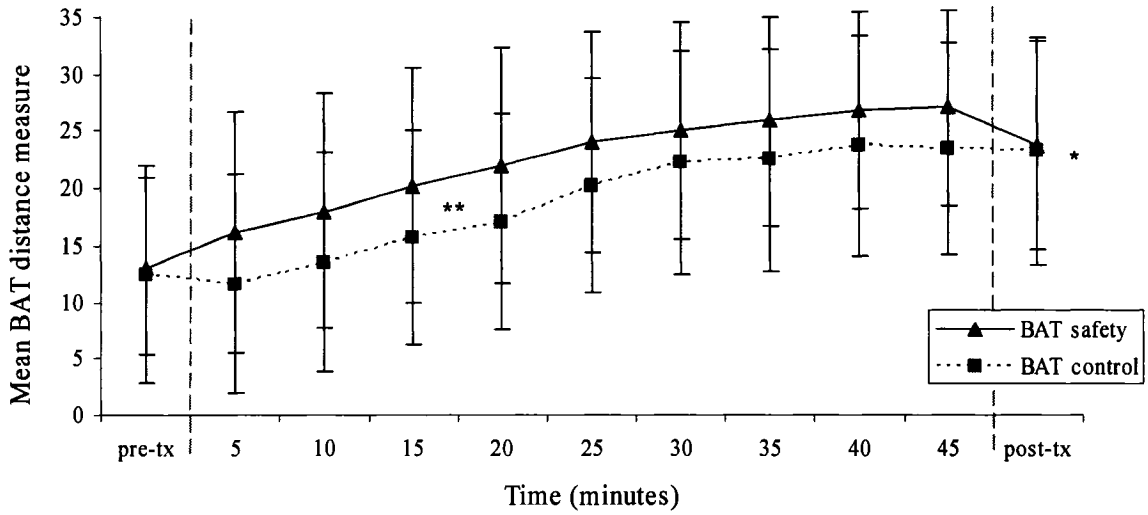
Figure 4. Mean BAT distances and SUDS ratings at pre- and post-treatment for safety behaviour and control groups.



Note. BAT range = 0–33 (higher numbers = closer proximity to snake); SUDS range = 0–100 (higher numbers = greater subjective distress).

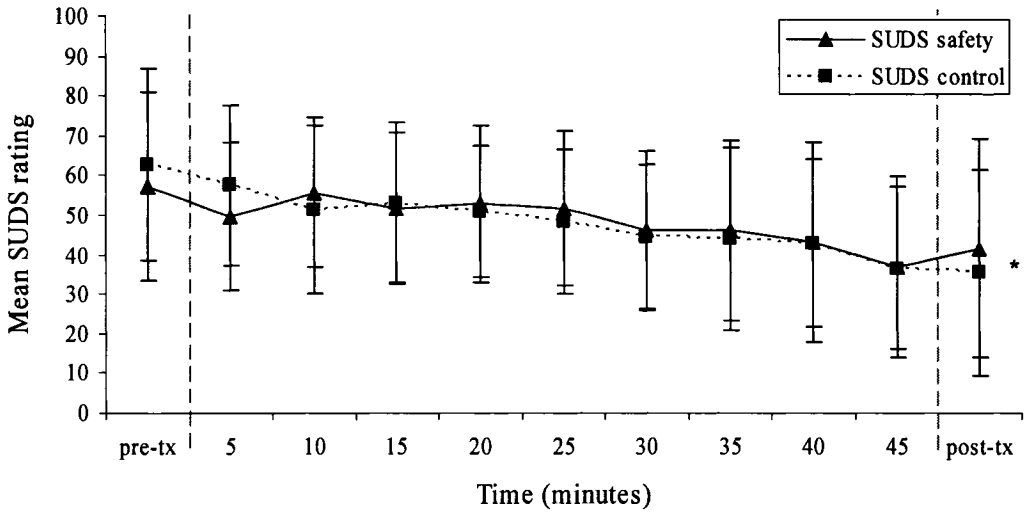
* BAT within-participants main effect $F(1,52) = 77.21, p < .0001$, partial Eta squared = .60
* SUDS within-participants main effect $F(1, 52) = 30.34, p < .0001$, partial Eta squared = .37

Figure 5. Time-course analysis of mean BAT distance measures during treatment for the safety behaviour and control groups.



* Within-participants main effect $F(8, 416) = 50.64$, $p < .0001$, partial Eta squared = .49
** Between-participants main effect $F(1, 52) = 2.74$, $p = .10$, partial Eta squared = .05

Figure 6. Time-course analysis of mean SUDS ratings during treatment for the safety behaviour and control groups.



* Within-participants main effect $F(8, 400) = 9.16$, $p < .0001$, partial Eta squared = .16

Appendix A

Fear and Anxiety Lab Questionnaire

Below are several different stimuli that can cause fear in people. Please circle the number that best represents how fearful you are of each stimulus.

	None	Very little fear	A little fear	Some fear	Much fear	Very much fear	Terror
1. Sharp objects	0	1	2	3	4	5	6
2. Blood	0	1	2	3	4	5	6
3. Spiders	0	1	2	3	4	5	6
4. Deep water	0	1	2	3	4	5	6
5. Enclosed spaces	0	1	2	3	4	5	6
6. Snakes	0	1	2	3	4	5	6
7. Heights	0	1	2	3	4	5	6
8. Dentists	0	1	2	3	4	5	6

Appendix B

Exposure Hierarchy

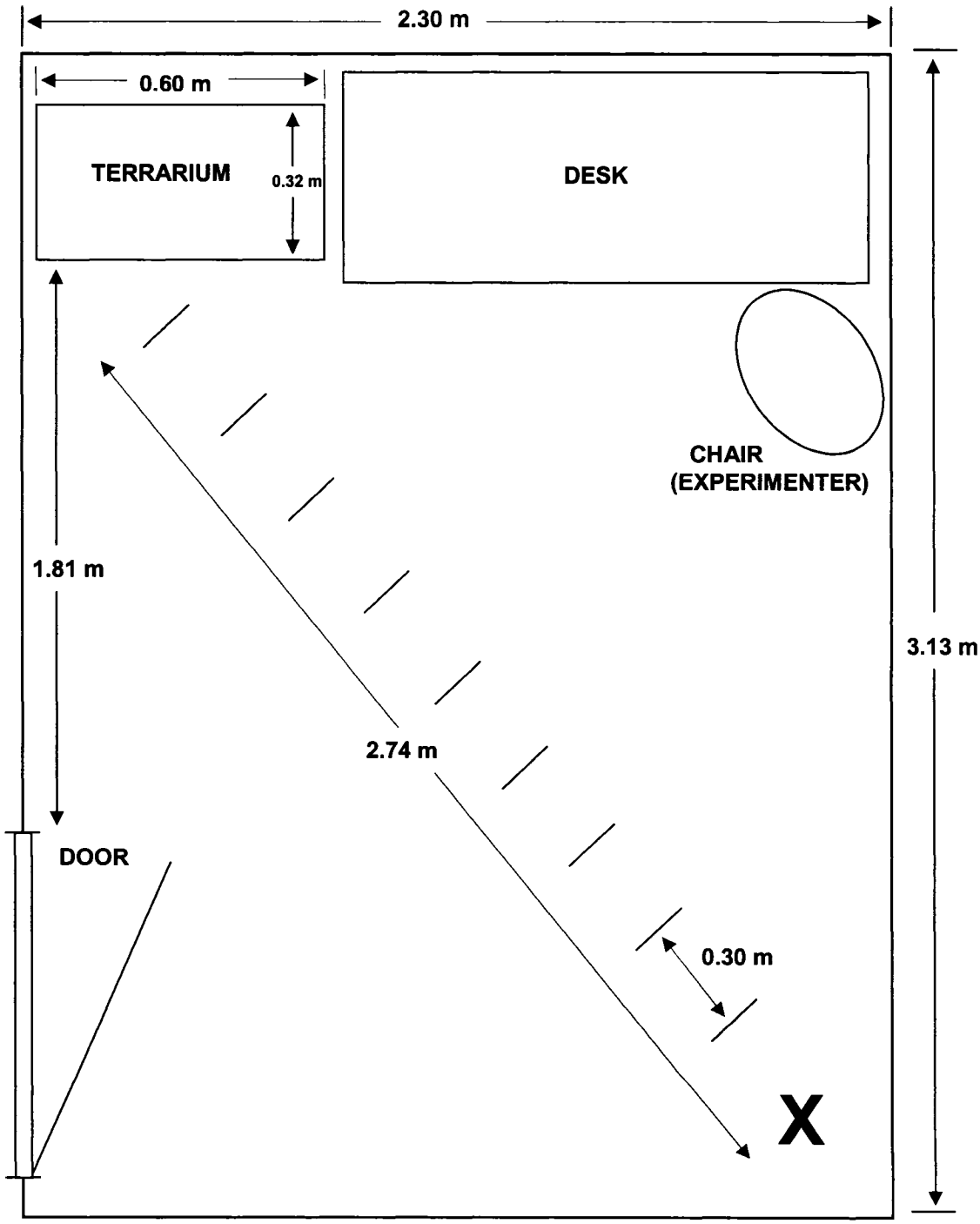
1. Standing just outside the room that the snake is in, with the door closed.
2. Standing at the doorway of the room that the snake is in, with the door open.
3. Standing inside the room that the snake is in at red X (9 feet).
4. 8 feet away from the tank.
5. 7 feet away from the tank.
6. 6 feet away from the tank.
7. 5 feet away from the tank.
8. 4 feet away from the tank.
9. 3 feet away from the tank.
10. 2 feet away from the tank.
11. 1 foot away from the tank.
12. Standing beside the tank.
13. Touching the outside of the tank.
14. Peering closely into tank, at eye level.

➔ Lid off

15. Standing just outside the room that the snake is in, with the door closed.
16. Standing at the doorway of the room that the snake is in, with the door open.
17. Standing inside the room that the snake is in at red X (9 feet).
18. 8 feet away from the tank.
19. 7 feet away from the tank.
20. 6 feet away from the tank.
21. 5 feet away from the tank.
22. 4 feet away from the tank.
23. 3 feet away from the tank.
24. 2 feet away from the tank.
25. 1 foot away from the tank.
26. Standing beside the tank.
27. Touching the outside of the tank.
28. Peering closely into tank, at eye level.
29. Touching inside the tank, near the top.
30. Touching bottom of tank (but not touching the snake).
31. Touching the snake with one finger.
32. Touching snake while experimenter holds it.
33. Holding the snake.

Appendix C

THERAPY ROOM LAYOUT



Appendix D

Fear of Snakes Questionnaire (FSQ)

For each item, pleaser record a number to indicate how much you agree with the statement. Ratings can include any number between 0 (totally disagree) and 7 (totally agree).

Totally Disagree — Totally Agree
0 ---------- 1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6 ---------- 7

____ 1. If I came across a snake now, I would get help from someone else to remove it.

____ 2. Currently, I am sometimes on the look-out for snakes.

____ 3. If I saw a snake now, I would think it will harm me.

____ 4. I now think a lot about snakes.

____ 5. I would be somewhat afraid to enter a room now, where I have seen a snake before.

____ 6. I now would do anything to try to avoid a snake.

____ 7. Currently, I sometimes think about getting bit by a snake.

____ 8. If I encountered a snake now, I wouldn't be able to deal effectively with it.

____ 9. If I encountered a snake now, it would take a long time to get it out of my mind.

____ 10. If I came across a snake now, I would leave the room.

____ 11. If I saw a snake now, I would think it will try to jump on me.

____ 12. If I saw a snake now, I would ask someone else to kill it.

____ 13. If I encountered a snake now, I would have images of it trying to get me.

____ 14. If I saw a snake now, I would be afraid of it.

____ 15. If I saw a snake now, I would feel very panicky.

____ 16. Snakes are one of my worst fears.

____ 17. I would feel very nervous if I saw a snake now.

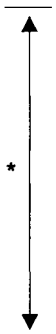
____ 18. If I saw a snake now, I would probably break out in a sweat and my heart would beat faster.

Appendix E

ACQ-S

Several types of thoughts are described below. Please indicate how strongly each thought occurred to you during your exposure to the snake.

	0 Not at all	1 Slightly	2 Moderately	3 Definitely	4 Extremely
1. I am going to throw up.	0	1	2	3	4
2. I am going to pass out.	0	1	2	3	4
3. I will have a heart attack.	0	1	2	3	4
4. I will choke to death.	0	1	2	3	4
5. I am going to act foolish.	0	1	2	3	4
6. I am going blind.	0	1	2	3	4
7. I will not be able to control myself.	0	1	2	3	4
8. I will hurt someone.	0	1	2	3	4
9. I am going to go crazy.	0	1	2	3	4
10. I am going to scream.	0	1	2	3	4
11. I am going to babble or talk funny.	0	1	2	3	4
12. I will be paralyzed by fear.	0	1	2	3	4
13. The snake is going to bite me.	0	1	2	3	4
14. The snake will escape from the tank.	0	1	2	3	4
* 15. The snake will get on me.	0	1	2	3	4
16. The snake will attack me.	0	1	2	3	4
17. The snake is dangerous.	0	1	2	3	4



* New items for snake cognitions

Appendix F

BSQ

Below is a list of specific body sensations that may occur when you are nervous or in a feared situation. Please mark down how afraid you are of these feelings. Use the following five point scale:

1	2	3	4	5
not at all	somewhat	moderately	very	extremely

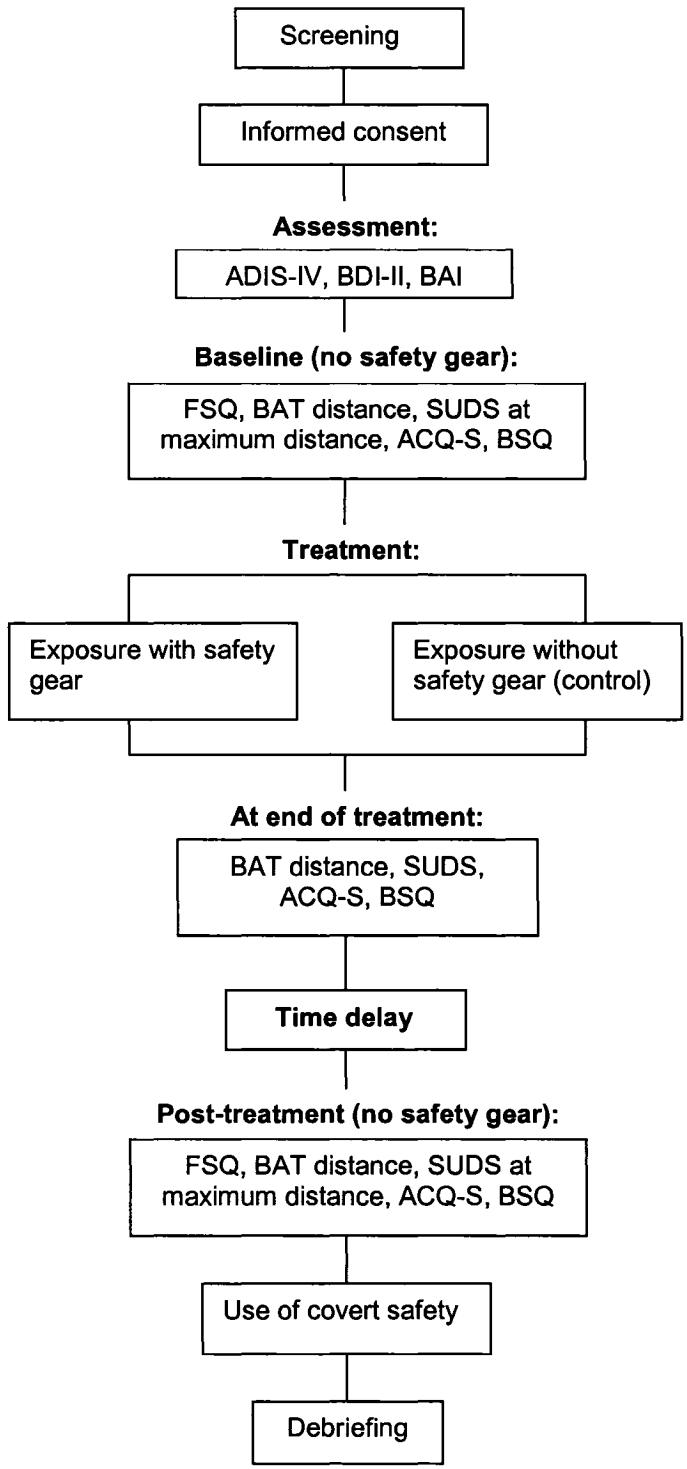
..... frightened by this situation.

Please rate all items.

1. heart palpitations	1	2	3	4	5
2. pressure or a heavy feeling in chest	1	2	3	4	5
3. numbness in arms or legs	1	2	3	4	5
4. tingling in the fingertips	1	2	3	4	5
5. numbness in another part of your body	1	2	3	4	5
6. feeling short of breath	1	2	3	4	5
7. dizziness	1	2	3	4	5
8. blurred or distorted vision	1	2	3	4	5
9. nausea	1	2	3	4	5
10. having "butterflies" in your stomach	1	2	3	4	5
11. feeling a knot in your stomach	1	2	3	4	5
12. having a lump in your throat	1	2	3	4	5
13. wobbly or rubber legs	1	2	3	4	5
14. sweating	1	2	3	4	5
15. a dry throat	1	2	3	4	5
16. feeling disoriented and confused	1	2	3	4	5
17. feeling disconnected from your body: only partly present	1	2	3	4	5
18. other (please describe) _____	1	2	3	4	5
19. other (please describe) _____	1	2	3	4	5
20. other (please describe) _____	1	2	3	4	5

Appendix G

Experiment Protocol Flow Chart



Appendix H

Safety Gear Survey

Please indicate, with a checkmark, which items on the table you would select to use as safety gear during your exposure to the snake. You may select as many or as few as necessary.

1. _____ Protective head cover #1

2. _____ Protective head cover #2

3. _____ Safety goggles

4. _____ Safety trousers

5. _____ Safety jacket

6. _____ Mesh safety jacket

7. _____ Gloves #1

8. _____ Gloves #2

9. _____ Knee protectors

10. _____ Lower leg protectors

11. _____ Shoe covers

12. _____ Protective apron

Appendix I

Word Fragment Inventory Revised (WFI-R)

Complete the following word fragments by filling in the first and last letters, eg. **b**rea**k**, ho**m**e, **p**ro**p**. There may be more than one possible response for some words; please respond with the one that comes to mind first.

1. __ealt__
2. __is__
3. __riti__
4. __atera__
5. __ove__
6. __oda__
7. __rou__
8. __icku__
9. __arl__
10. __ain__
11. __epai__
12. __rim__
13. __oma__
15. __ampe__
16. __hef__
17. __nemi__
18. __ivel__
19. __ive__
20. __enti__
21. __as__
22. __lini__
23. __omin__
24. __ ac __
25. __lum__
26. __ende__
27. __cut__
29. __eade__
30. __ylo__
31. __uil__
32. __rea__
33. __rou__
34. __isce__
35. __onat__
36. __heor__
37. __lum__
38. __ode__
39. __tat__
40. __ain__
41. __ossi__

14. __regan__
28. __one__
42. __ta__
43. __hirs__
55. __esis__
67. __har__
44. __ insen__
56. __eac__
68. __npu__
45. __ic__
57. __aw__
69. __ast__
46. __unne__
58. __riz__
70. __epi__
47. __eac__
59. __ol__
71. __ebe__
48. __ave__
60. __agge__
72. __eru__
49. __row__
61. __has__
73. __ates__
50. __ura__
62. __ub__
74. __al__
51. __one__
63. __nar__
75. __etr__
52. __ve__
64. __en__
76. __onten__
53. __oa__
65. __edan__
77. __ein__
54. __do__
66. __lan__
78. __amer__

Appendix J

Assessment of Covert Safety Behaviour

"This completes today's experiment. I have one final question for you before I give you the debriefing sheet. During your exposure treatment to the snake, did you engage in any subtle behaviours that made you feel more safe? Some examples of these include distracting yourself with specific thoughts or planning an escape. There are no right or wrong answers."