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EXAMINING THE EFFECTS OF SAFETY BEHAVIOURS ON FEAR REDUCTION DURING EXPOSURE

by

Heather Hood
Bachelor of Arts, University of Guelph, 2007

A thesis

presented to Ryerson University

in partial fulfillment of the

requirements for the degree of

Masters of Arts

in the program of

Psychology

Toronto, Ontario, Canada, 2009

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Abstract

Examining the Effects of Safety Behaviours on Fear Reduction During Exposure

Masters of Arts, 2009

Heather Hood

Psychology

Ryerson University

The use of safety behaviours has been considered one of the primary maintaining mechanisms of anxiety disorders; however, evidence suggests that they are not always detrimental to treatment success. This study examined the effects of safety behaviours on behavioural, cognitive, and subjective indicators of fear during exposure for fear of spiders. A two-stage design examined fear reduction and approach distance during an exposure task for participants ($N = 43$) assigned to either a safety behaviour use (SBU) or no safety behaviour use (NSB) condition. No differences were observed between the groups in subjective or cognitive measures at prettest, posttest, and one-week follow-up; however, unlike the NSB group, the SBU group did not maintain their gains in approach distance at follow-up, though this was no longer true after self-efficacy was covaried. These results call for a reconsideration of the practice of completely eliminating safety behaviours during exposure-based treatments for specific fears.

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EXAMINING THE EFFECTS OF SAFETY BEHAVIOURS ON FEAR REDUCTION DURING EXPOSURE

Anxiety disorders are among the most common psychological disorders and are, by definition, distressing and disabling (American Psychological Association, 2000). Epidemiological studies conducted in the United States estimate that up to 28.8% of the population suffers from an anxiety disorder in their lifetime (Kessler, Berglund, Demler, Jin, & Walters, 2005), and up to 18% in a 12-month period (Kessler, Chiu, Demler, & Walters, 2005). Almost 1.2 million Canadians struggle with clinically significant anxiety at any given time (Statistics Canada, 2002). Fortunately, anxiety disorders are among the most treatable psychological conditions, and the majority of people who seek treatment benefit significantly from cognitive behavioural therapy (CBT; Hofmann & Smits, 2008; Norton & Price, 2007). CBT, incorporating systematic exposure to the feared situation or stimulus, is considered an efficacious treatment for many anxiety disorders (Chambless & Ollendick, 2001), yet some people fail to respond to treatment. Some studies have found that up to 25% to 40% of clients with social phobia (Heimberg et al., 1990), 25% with panic disorder (Gould, Otto, & Pollack, 1995), and 46% with posttraumatic stress disorder (Bradley, Greene, Russ, Dutra, & Westen, 2005) fail to achieve clinically significant improvement after CBT, and that client drop out is not uncommon. It is essential, therefore, to identify predictors of treatment success and, importantly, barriers to success.

Theories about the mechanisms of exposure therapy suggest potential variables mediating treatment response. While new research is pointing to neurobiological explanations for fear reduction during exposure (see McNally, 2007), emotional processing theory (EPT; Foa & Kozak, 1986; Foa, Huppert, & Cahill, 2006) remains an influential theory of the mechanisms underlying exposure therapy. According to EPT, information about the feared object or situation

is stored as a network of related concepts in memory, which includes information about the appropriate responses to the feared stimulus, and about the meaning of the relationship between the stimulus and response. The fear structure becomes activated by threat-relevant cues, which elicits both physiological (e.g., racing heart, sweaty palms) and behavioural responses intended to prevent danger (typically escape from or avoidance of the situation). Although fear structures exist for normal, adaptive responses to realistic danger (such as protecting oneself from an attacker), pathological fear structures thought to underlie anxiety disorders are characterized by inaccurate interpretations of the nature and intensity of the threat and the associated meaning, as well as excessive responses. Emotional processing refers to modification of the underlying pathological fear structure through the learning of new, more realistic associations about the stimulus, responses, and meanings. In order for emotional processing to occur, Foa and Kozak (1986) argue that the underlying fear structure must be activated (in the form of physiological arousal or subjective self-reports) while the individual is exposed to unambiguous "corrective" information that is incompatible with existing elements of the fear structure. This new association then becomes encoded as either a parallel non-pathological fear structure or as modifications to the original memory network.

Take, for example, an individual with a fear of dogs. The fear structure may contain elements in memory typical of an encounter with a dog, such as a park, the sound of dog tags or a bark, the sight of a dog, or the thought of a bite. This person is more likely than someone without such a fear to notice a dog and to believe that the probability of being bitten is high. When a dog is encountered while walking down a street, the element becomes activated in memory and spreads to other nodes in the fear structure, leading to physiological arousal and perhaps behavioural responses. One such behavioural response is to avoid a confrontation by crossing the street. In doing so, the individual does not have the opportunity to encounter

corrective information that dogs are relatively harmless. If, however, the individual chooses to approach the animal on several occasions without being bitten, the person learns that the animal is not dangerous and a new fear structure develops. With successive encounters, the new associations in memory are strengthened and the pathological elements are weakened, until the dominant response is one of approach rather than avoidance.

The critical element of EPT is that symptom reduction is the result of cognitive change. Specifically, emotional processing aims to modify the associations between the elements of the fear structure, as well as correcting inflated estimates of the probability and consequences of harm. Exposure therapy, in which individuals are exposed to a feared stimulus in the absence of feared outcomes, provides a powerful opportunity to challenge erroneous beliefs. For example, when physiological or subjective arousal decreases within a treatment session, the individual learns that the anxiety response is not incapacitating or indefinite, which may be at odds with his or her beliefs. This is often the case with individuals who engage in interoceptive exposure for panic disorder. Panic disorder is characterized by catastrophic misinterpretations of bodily sensations (Clark, 1986). For example, a patient with panic disorder may believe that a slight increase in heart rate will escalate out of control until, ultimately, he or she has a heart attack. For people with such fears, interoceptive exposures might involve activities that increase heart rate, thereby activating the fear structure, and then allowing one's fear to decrease within session, providing corrective information about the realistic nature of threat. The patient is then able to encode the new information that fluctuations in heart rate may seem uncomfortable but they are not dangerous. In addition, if the feared outcome fails to materialize after repeated exposure to the feared situation across several treatment sessions, the individual is able to make a more realistic appraisal of the long-term consequences and encode new information about the relative safety of the feared stimulus. Importantly, it is between session fear reduction, rather

than within session change, that appears to be the key to successful treatment (Foa, Huppert, & Cahill, 2006). Several studies indicate that within session fear reduction is not a necessary condition for successful treatment outcomes (Jaycox, Foa, & Morral, 1998; Kozak, Foa, & Steketee, 1988). Further, single prolonged exposure sessions are vulnerable to factors that are thought to interfere with emotional processing, either by insufficient activation of the fear structure, possibly as a result of distraction, or by failing to provide unambiguous disconfirmatory evidence, often due to the use of safety behaviours.

The use of safety behaviours has traditionally been considered one of the primary maintaining mechanisms of anxiety disorders (Rachman, Radomsky, & Shafran, 2008). Safety behaviours are defined as overt or covert actions carried out within a fearful situation to prevent a feared outcome from occurring (Salkovskis, 1991). These often take the form of escape and avoidance of feared situations, but may also manifest as more subtle anxiety management strategies, such as cognitive distraction and thought suppression. For example, people with social phobia may mentally rehearse a conversation and engage in excessive self-monitoring to avoid freezing up or babbling when making conversation (Wells et al., 1995). Individuals with obsessive-compulsive disorder often attempt to suppress anxiety provoking thoughts or perform behaviours intended to neutralize the perceived threat (e.g., washing hands to counteract contamination) (Salkovskis, 1985). And people with a fear of spiders may scan a room before entering to avoid encountering a spider (Antony, Craske, & Barlow, 2006). Distraction has been conceptualized as a particular class of safety behaviour (Salkovskis, 1991) that may also interfere with belief change during exposure. Foa and Kozak (1986) suggest that cognitive distraction, such as imagining being somewhere else or focusing on thoughts other than the feared stimulus, simultaneously directs attention away from corrective information and limits activation of the fear structure, thus impeding emotional processing. Alternatively, it may be that distraction

limits the cognitive resources available for processing disconfirming evidence (Telch et al., 2004).

Although these behaviours may alleviate the acute anxiety experienced when confronted with a feared stimulus, many researchers believe that they ultimately interfere with successful treatment. In line with EPT, safety behaviours are thought to interfere with corrective learning because the nonoccurrence of the feared outcome can be misattributed to the use of the safety behaviours, rather than disconfirming inaccurate threat-related beliefs (Salkovskis, 1991). If the client takes preventative measures to avert the feared outcome, then he or she does not encounter unambiguous evidence about the relative safety of elements in the fear structure (e.g., actual nature of the perceived threat, appropriate responses, and associated meanings) and, theoretically, emotional processing is compromised.

Although the use of safety behaviours is now being implicated in the exacerbation and maintenance of several psychological conditions, including sleep disorders (Harvey, 2002), depression (Moulds, Kandris, Williams, & Lang, 2008), and psychosis (Freeman, Garety, Kuipers, Fowler, Bebbington, & Dunn, 2007), nowhere has it received more empirical investigation than in the area of anxiety disorders. Several studies have found support for cognitive models of fear reduction through exposure, in which safety behaviours are presumed to maintain anxiety by preventing disconfirmation of inaccurate beliefs. In one of the first tests of this hypothesis, Wells et al. (1995) had socially anxious participants engage in two brief exposures with either a neutral treatment rationale, in which participants were simply encouraged to remain in the feared situation until their anxiety decreased naturally, or with instructions to refrain from using safety behaviours. When participants were discouraged from using safety behaviours, they reported significantly greater reductions in anxiety and fearful beliefs, compared to exposure with a neutral treatment rationale. Although the significance of this study

is limited by a small sample size, short exposure duration, and a within-subjects design susceptible to carryover effects, several other studies appear to confirm these findings. For example, Morgan and Raffle (1999) examined differences in reported anxiety after intensive group CBT for social phobia with and without instructions to drop safety behaviours. After three weeks, both groups experienced significant improvement in social anxiety symptoms; however, those instructed not to use safety behaviours made greater gains. Although those instructed to eliminate safety behaviours reported using significantly fewer safety strategies than those in the treatment as usual group (means and standard deviations were not reported), it should be noted that 67% of those instructed to drop safety behaviours continued their use throughout the 3 week treatment program, compared to 77% of those in the treatment as usual group. Nonetheless, the additional instructions to drop safety behaviours appeared to improve treatment outcome.

Similar results have been found in studies of exposure treatment for panic disorder. Salkovskis, Clark, Hackmann, Wells, and Gelder (1999) randomly assigned participants from a treatment seeking sample of panic disorder patients to one of two treatment conditions: a) exposure with a cognitive rationale for eliminating safety behaviours during the task, or b) exposure with a habituation[1] rationale without reference to safety behaviours. Participants completed a 15 minute individualized exposure to an agoraphobic situation then returned two days later for a follow-up behavioural task. Participants who were encouraged to drop their safety behaviours reported significantly lower fear during the follow-up behavioural task, and greater reductions in fearful beliefs.

Given the evidence that eliminating safety behaviours appeared to improve treatment

[1] The authors refer to the rationale for the control condition as "habituation," in which participants are instructed to remain in the exposure situation until fear decreases naturally over time. The term habituation is often used synonymously with fear reduction throughout the exposure literature; however, it is not an accurate description of the mechanisms of fear reduction during exposure. While habituation refers to a biological process which results in temporary fear reduction, the term extinction more accurately describes the process of new learning that occurs during exposure-based treatments.

outcomes, Kim (2005) conducted a study to explore the mechanisms by which this effect occurs. Kim noted that previous studies confounded the effects of safety behaviour use with the experimental instructions, such that those instructed to eliminate safety behaviours were provided with a cognitive rationale for doing so, whereas those in control conditions were provided with a habituation model. To determine if eliminating safety behaviours alone was sufficient for symptom reduction, or if the therapeutic effects of dropping safety behaviours are the result of seeking disconfirmatory evidence, participants were assigned to one of three conditions: a) exposure with decreased safety behaviours under a cognitive rationale, b) exposure with decreased safety behaviours under an extinction rationale, or c) exposure with no change in safety behaviours. After a brief presentation task, participants provided with a cognitive rationale for eliminating safety behaviours reported greater reductions in anxiety and fearful beliefs than those instructed to drop safety behaviours under an extinction rationale, or those in the control condition. Consistent with cognitive models, eliminating safety behaviours is most effective when emphasizing the disconfirmatory evidence.

Similarly, Sloan and Telch (2002) compared the effects of safety behaviour utilization, guided threat reappraisal (focus on threat-relevant disconfirming evidence), and exposure alone in a sample of 46 severely claustrophobic participants. Initial levels of fear were comparable across conditions, regardless of the presence of safety signals. At posttreatment and 2-week follow-up, all groups showed significant decreases in behavioural indicators of fear; however, the magnitude of difference between the groups was quite substantial, with 100% of the guided threat reappraisal group able to complete the BAT, 77% of the exposure alone control group, and only 44% of the safety behaviour group able to do so. In fact, the additional instructions to not only minimize distraction but also to seek out disconfirming evidence have been shown elsewhere to substantially enhance fear reduction during exposure (Kamphuis & Telch, 2000).

Evidence indicates that even the perceived availability of safety behaviours can interfere with extinction learning. Powers, Smits, and Telch (2004) found that 94% of participants in a standard in vivo exposure condition for claustrophobia achieved clinically significant improvement in end-state functioning, but only 45% of participants who had safety behaviours available, and 44% of those who actually used safety behaviours experienced similar improvements. This pattern of results was similar across behavioural and cognitive measures of fear and was stable at a two-week follow-up.

Not only are safety behaviours proposed to interfere with successful treatment, they may also make the feared outcome more likely to occur. McManus, Sacadura, and Clark (2008) assigned high and low socially anxious individuals to engage in two 5-minute conversations with a partner, once while using safety behaviours typical of those with social anxiety and once with instructions to refrain from using safety behaviours or focusing on one's performance. When engaging in safety behaviours and self-focus, participants reported greater anxiety during the conversations, perceived themselves to be more anxious, and perform more poorly compared to social interactions without the use of safety behaviours. Perhaps more importantly, the conversation partner rated the participant's performance more poorly, and described the participant as more anxious and less likeable than those who did not use anxiety management strategies. Despite one's best efforts to minimize the possibility of the feared outcome, using such strategies may inadvertently contribute to the perceived problem. As this study noted, safety behaviours are intended to reduce one's anxiety while in the feared situation but, paradoxically, participants actually felt more anxious when using safety behaviours during the conversations. Similarly, Deacon and Maack (2008) found that the use of safety behaviours increased fears of contamination, even among people without pre-existing contamination fear. After instructing participants with a high or low fear of contamination to engage in daily contamination-related

safety behaviours (e.g., avoid touching public door handles, disinfecting hands after routine tasks, taking several showers a day) for one week, all participants reported increased probability estimates of harm, fears of contamination, and behavioural avoidance during subsequent BATs. Although these changes could be attributed to an increased awareness of sources of contamination, it suggests that the use of safety behaviours may contribute not only to the exacerbation of pre-existing fears, but also may be a factor in the development of such symptoms.

The results of these studies illustrate the potentially counter-therapeutic effect of safety behaviour use during exposure treatment. Extending this research to clinical practice, it is often considered essential that therapists instruct clients to drop their safety behaviours during exposure. However, further review of the literature suggests that the use of safety behaviours does not always prevent treatment success and, under some conditions, may even facilitate exposure therapy.

The above studies reported substantial pretreatment to posttreatment improvements for those receiving exposure for their fears, confirming the efficacy of exposure-based treatment. It is notable that in most cases the safety behaviour utilization and availability groups also showed significant improvements in subjective and behavioural indicators of fear (Kamphuis & Telch, 2000; Morgan & Raffle, 1999; Powers, Smits, & Telch, 2004; Sloan & Telch, 2002; Wells et al., 1995), albeit not as large as the exposure alone groups. Although the magnitude of change may not have been as great, substantial improvements did occur when safety behaviours were not discouraged. Given the intermittent or short duration of exposure in many of these studies (5 to 15 minutes), it is possible that the safety behaviour groups would continue to see improvements with longer exposure times. As noted throughout, the main argument against the use of safety behaviours during treatment is that they prevent the disconfirmation of dysfunctional beliefs.

However, many of the aforementioned studies observed changes in fear-related beliefs even among those that used safety behaviours during exposure. Taken together, this suggests that information processing does occur in the presence of safety signals but perhaps at a slower rate than when they are eliminated.

In an experimental test of conventional beliefs about safety behaviours, Milosevic and Radomsky (2008) had participants with a nonclinical fear of snakes approach the animal with or without the use of safety equipment (e.g., gloves, apron, goggles). At the end of a 45-minute exposure session, participants did not differ in approach distance; however, the safety behaviour group approached the snake at a faster rate than the control group. In addition, both groups experienced comparable improvements in subjective fear and, importantly, negative cognitions about snakes. This suggests that the use of safety behaviours does not preclude new learning about a feared stimulus which, according to emotional processing theory (Foa & Kozak, 1986), is the likely mechanism of change during exposure. Unfortunately, this study did not include a follow-up session and thus does not provide evidence of the durability of treatment gains. As noted earlier, within-session fear reduction is not a sufficient predictor of treatment outcome, but rather between-session fear reduction is necessary for overall improvement (Craske et al., 2008). Despite this limitation, this study does suggest that a more flexible approach to exposure therapy in practice may be warranted.

This has led some to argue for the "judicious" use of safety behaviour (Rachman, Radomsky, & Shafran, 2008), particularly at the beginning of treatment, to increase the tolerability of exposure therapy and reduce client dropout. Over time, as new learning occurs about the relative safety of the feared stimulus, safety behaviours can gradually be dropped and exposure can continue in its traditional form. The value of using safety behaviours then may lie in reducing the participants' subjective anxiety enough to enter into the phobic situation and

attend to disconfirmatory information. This hypothesis was the basis of Rachman's (1983) safety signal theory of exposure. Briefly, safety signal therapy was derived from conditioning models in which it was thought that pairing exposure to the feared situation with a positive reinforcer, such as a trusted companion or a safe place, would motivate the individual to engage in regular exposures. By placing safety signals in situations that are typically avoided, clients would be encouraged to walk toward "safety" rather than toward danger as in traditional exposure models, thereby modifying avoidance behaviour. With repeated exposures, reduction of psychophysiological and subjective fear responses occurs and the safety signals can be gradually withdrawn.

Support for the safety signal theory comes mainly from the area of panic disorder and agoraphobia. To test the hypothesis, de Silva and Rachman (1984) recruited agoraphobic patients for eight weekly in vivo exposure sessions. Participants were instructed to either remain in the situation until their anxiety declined at least 50% from peak level during the session, as in traditional exposure therapy, or to leave the situation when their anxiety increased to 75% of one's maximum anticipated anxiety. After eight sessions, both groups showed comparable improvements in approach distance and reported fear. Further, agoraphobic avoidance was not strengthened in the escape group, as would be predicted by cognitive theories proposing that escape fails to correct inaccurate threat-related beliefs, thereby maintaining the disorder. Unfortunately, the study suffered from several methodological limitations, such as uncontrolled duration of exposure between the groups and failure to measure cognitions, making interpretation of the results difficult; however, a replication of the study with greater experimental control and a 3-month follow-up assessment produced similar results (Rachman, Craske, Tallman, & Solyom, 1986). Other studies have even shown a slight advantage in terms of decreases in avoidance and panic symptoms for those using safety supports during treatment

for agoraphobia (Sartory, Master, & Rachman, 1989). These studies suggest that escaping the situation when anxiety becomes excessive, considered to be the most harmful safety behaviour, does not interfere with long-term treatment success.

Rachman and colleagues proposed that escape behaviour may have had positive effects on treatment outcome through an increase in self-efficacy and perceived control over one's symptoms (Rachman, Craske, Tallman, & Solyom, 1986). Other researchers have long noted the potentially therapeutic role of perceived control on exposure treatment. Self-efficacy theory (Bandura, 1977) proposes that the use of safety behaviours may facilitate exposure by promoting one's sense of personal mastery and control. Self-efficacy, defined as "the conviction that one can successfully execute the behavior required to produce the outcomes" (Bandura, 1977, p. 193), is thought to be a necessary condition for fear reduction through exposure. According to this theory, safety behaviours are implemented when one does not feel confident to cope effectively with the feared situation. Incorporating safety behaviours into exposures allows the individual to successfully complete behavioural experiments, providing opportunities for corrective learning about the relative safety of the feared situation and increased confidence to manage the feared situation even outside of the treatment context. Over time, as dysfunctional beliefs are modified and mastery experiences accumulate, the client often feels confident to eliminate his or her defensive behaviours. Bandura's theory is not incompatible with emotional processing theory; however, the mechanisms by which fear reduction is thought to occur are reversed. Whereas emotional processing theory contends that cognitive change follows behaviour change, self-efficacy theory suggests that cognitive change, in the form of increased confidence to perform threatening activities, precedes behaviour change.

Self-efficacy has been found to be an important element in successful treatment outcomes for exposure, particularly with regard to behaviour change. In one of the first tests of the theory,

Bandura, Jeffery, and Wright (1974) randomly assigned snake fearful participants to perform a prolonged gradual exposure task (mean duration = 81 minutes) with low, moderate, or high degree of response aids. Those who were permitted moderate use of safety aids, such as therapist modeling and help to perform tasks in the hierarchy, reported the greatest increases in self-efficacy and generalization of gains relative to the low and high safety groups, and similar improvements in behavioural performance and self-reported fear as those in the high safety behaviour group. Further, studies have found that exposure emphasizing mastery experiences and increased self-efficacy through the use of safety aids facilitates reduction in maladaptive beliefs, subjective fear, and behavioural avoidance (Biran & Wilson, 1981; Williams, Dooseman, & Kleifield, 1984).

Although evidence regarding the effects of distraction during exposures is mixed, some research has found that distraction can facilitate treatment gains, potentially through its effect on self-efficacy (Johnstone & Page, 2004; Zoellner, Echiverri, & Craske, 2000). For example, Johnstone and Page (2004) found that individuals who engaged in cognitive distraction, compared to focused attention, during exposure for fear of spiders showed greater gains in self-efficacy, and that self-efficacy was predictive of behavioural approach. Importantly, these improvements in self-efficacy occurred not only for treatment-related tasks but also for general spider-related behaviours in situations that may be encountered outside of the experimental context. Although research has yet to determine if increased self-efficacy is a predictor or product of anxiety reduction, it appears to be an important element of the treatment process. Understanding the role that safety behaviours may play in enhancing self-efficacy, particularly self-efficacy for related activities outside of the experimental situation, has important implications for the generalizability of treatment gains.

No definitive statements can be made about the use of safety behaviours in practice until

research has reconciled these contradictory findings. The purpose of this study was to examine the effects of safety behaviour use on behavioural, cognitive, and subjective indicators of fear during exposure therapy for fear of spiders. A two-stage design examined both the rate of fear reduction and rate of approach during an exposure task for two groups of participants: those instructed to use self-selected safety behaviours, and those instructed not to use safety strategies.

Behaviourally, *the pace* at which the groups were able to approach the feared stimulus, and the *final distance of approach* to the spider, were examined. Research to date focusing on pre- to posttreatment between group differences is equivocal, with some studies indicating that safety behaviour use interferes with behaviour change (Mohlman & Zinbarg, 2000; Salkovskis, Hackmann, Wells & Gelder, 1999), some studies indicating that it does not (Rachman, Craske, Tallman, & Solyom, 1986; Milosevic & Radomsky, 2008), and others suggesting that safety behaviour use may facilitate approach behaviour (Bandura, Jeffery, & Wright, 1974). Few studies have considered the effects of safety behaviours on the rate of approach; however, preliminary data suggest that safety behaviours may increase the pace at which the feared stimulus is approached (Milosevic & Radomsky, 2008). Consistent with this research, it was predicted that participants using safety behaviours would approach the spider more quickly, but not necessarily more closely, than those not using safety behaviours.

Subjective fear reduction was also compared between the groups. Like the data regarding approach distance, research findings on the effects of safety behaviour use on subjective reports of fear are unclear. Some studies have found that posttreatment subjective fear is similar in safety behaviour use and no safety behaviour use conditions (Milosevic & Radomsky, 2008; Morgan & Raffle, 1999), whereas many studies have found significant differences between the groups (Sloan & Telch, 2002; Wells et al., 1995). In keeping with current theory and practice, it was predicted that those using safety behaviours would report greater subjective fear at a one-week

follow-up BAT than those instructed to refrain from using safety behaviours. In the first stage of the experimental procedure, having participants approach the spider as closely as they are able and remain in that position provided an opportunity to monitor fear reduction without confounding reported fear with changing approach distance. The standard procedure in exposure therapy and research involves moving progressively closer to the feared stimulus throughout the session. However, in doing so, one's fear typically increases with each movement closer to the feared object. Thus, it is not possible to get a true measure of subjective fear reduction over time using the standard exposure procedure. Therefore, behavioural indicators, such as approach distance and rate of approach, become measures of fear reduction rather than one's self-reported fear. The two stage procedure used in this study allowed for an independent examination of rate of change for both subjective and behavioural indicators of fear. Although this study is the first known investigation to use this procedure, it was reasonable to predict that the rate of fear reduction would be similar for participants in each group, despite potentially different initial fear levels.

Finally, spider-related cognitions were compared between the groups at pretest, posttest, and one-week follow up. Examining changes in fear-relevant cognitions provided a direct test of the main arguments against the use of safety behaviours during exposure. If safety behaviours interfere with extinction learning, there should be differential changes in beliefs about spiders between the groups. However, if corrective learning does occur even in the presence of safety signals, there should be no difference in fear-relevant beliefs between groups. Similar to the findings of Milosevic and Radomsky (2008), changes in fearful beliefs about spiders from pretest to posttest were expected to be similar across groups. Unfortunately, their study did not include a follow-up assessment; therefore, no data are available to indicate whether this effect persisted past the experimental session. Although few studies have examined the durability of cognitive

change, some research suggests that changes in fearful cognitions are more likely to occur and endure when participants do not use safety behaviours (Sloan & Telch, 2002). Therefore, it was predicted that fear-relevant beliefs would be significantly different between the groups at the follow-up BAT, with the group not using safety behaviours likely to experience more enduring gains.

This study improves upon previous research in a number of ways. Few studies directly compare the effects of safety behaviour use to their discontinuation during exposure. Most studies include an experimental condition in which safety strategies are either encouraged or discouraged, and a neutral instruction comparison group provided with an extinction rationale and no information about safety behaviours. However, it is difficult to control for the actual quantity and type of safety behaviours used in the neutral conditions. Further, using both a cognitive rationale in the experimental group and an extinction rationale in the comparison groups confounds the effects of safety behaviour use to the type of instructions provided. In the present study, the explicit instructions to either use or refrain from using safety behaviours with a consistent cognitive rationale allows for a direct comparison of the two conditions.

When a safety behaviour utilization group is included, participants are typically asked to use "safety" items that are selected by the experimenter (Kim, 2005; Powers, Smits, & Telch, 2004; Sloan & Telch, 2002). That safety behaviours are largely idiosyncratic in nature creates a difficult challenge for experimenters attempting to balance ecological validity and experimental control. In an effort to strike this balance and improve the generalizability of the results, this study allowed participants to select from a wide array of safety behaviours that they believed would be most helpful during the task (e.g., availability of escape, protective clothing, cognitive distraction). Participants were also encouraged to incorporate any anxiety management strategies that are typical of their response to a spider in their day to day life. In this way, the safety

behaviour manipulation more accurately reflected the theoretical purpose of such behaviours; that is, selection of a strategy that is functionally related to the individual's idiosyncratic fears.

A one-week follow-up session was also included to determine whether changes in behaviour, cognitions, and subjective fear persist over time. As mentioned previously, few of the studies that have found support for the use of safety behaviours have included a follow-up session to provide evidence that gains are maintained. Should safety behaviours facilitate (or, at the very least, not impede) pre- to posttest fear reduction, a short follow-up period may indicate whether this is a temporary result or if it is a more enduring effect.

Finally, a measure of self-efficacy was included to provide information about this important variable in the treatment process. Examining the nature of the relationship between safety behaviours and treatment outcomes, using more ecologically valid methods, including a measure of self-efficacy, and including a short follow-up period, were all intended to enhance our understanding of the effects of safety behaviours on the efficacy of exposure therapy.

Method

Participants

Undergraduate students enrolled in an introductory psychology course at Ryerson University and individuals from the surrounding community were recruited through a three-stage screening process. Advertisements were placed throughout the community, online, and in a local newspaper directing potential participants to complete the *Fear of Spiders Questionnaire* (FSQ; Szymanski & O'Donohue, 1995) online. Those who scored above the previously established mean for spider phobics ($M = 89.1$, $SD = 19.6$; Muris & Merckelbach, 1996) were contacted by telephone for further screening. Participants were asked about any previous contact with a tarantula and asked to estimate how closely they could approach a tarantula in a closed container. Those who indicated that they would be unable to touch an aquarium containing the spider were invited into the lab for a behavioural assessment. During the initial behavioural approach test (BAT; see below), individuals who were able to touch the outside of the container (step 11) were excluded from the study. All others continued with the first session. The strict exclusion criteria ensured that participants demonstrated a significant fear of spiders prior to beginning the 35-minute exposure task to allow variability among participants and to avoid a ceiling effect. Individuals recruited through the undergraduate participant pool received one percentage point toward their final grade in an introductory psychology class for attending the first session and an additional percentage point for completing the follow-up session one week later. Community participants received 10 dollars compensation for attending each session.

Of the 319 people who completed the FSQ screening questionnaire online, 106 were subsequently contacted by telephone for additional screening, and 55 met the minimum criteria to be invited into the lab for the behavioural assessment. Six individuals who completed the in-session screening were ineligible to participate because they demonstrated insufficient levels of

fear, five participants were discontinued at various points throughout the procedure due to health concerns or significant emotional distress, one participant lacked the English language proficiency necessary to adequately comprehend the instructions of the task, and one participant completed Session 1 but was unable to return for the second session due to scheduling conflicts. The remaining 43 participants completed both sessions scheduled one week apart.

Characteristics of the sample are presented in Table 1. The groups did not differ significantly with respect to age, $t(40) = .07, p > .05$, or sex ($p = .61$, *Fisher's exact test*). Tests could not be conducted to compare the distributions of ethnicity and educational attainment between the groups due to insufficient sample size; however, the patterns appear similar for both the NSB and SBU groups. Overall, 35% of the sample met DSM-IV-TR (American Psychiatric Association, 2000) criteria for Specific Phobia (Animal Type, Spiders), assessed via the *Structured Clinical Interview for the DSM-IV* (SCID-IV; First, Spitzer, Gibbon, & Williams, 1996), with no significant difference between the groups, $\chi^2(1) = 1.15, p = .28$, and 28% of the total sample had at least one Specific Phobia other than spiders.

Design

Participants were randomly assigned to either a safety behaviour use (SBU) or no safety behaviour use (NSB) group. Self-report measures of spider-related fear, cognitions, and self-efficacy were administered before and after a two-stage exposure task, and at one week follow-up. In the initial approach task (Stage 1), the participant was encouraged to approach the spider as closely as possible and remain in that position for 5 minutes, and subjective fear and heart rate were recorded at 1-minute intervals. This was immediately followed by a gradual exposure stage (Stage 2), in which the participant was asked to move progressively closer to the spider over a 30 minute period, and measurements of approach distance, self-reported fear or anxiety, and heart rate were taken at 5-minute intervals. This two-stage design allowed for independent

Table 1

Demographic Characteristics of Participants in the NSB Group and SBU Group

	Group	
Variable	NSB ($n = 21$)	SBU ($n = 22$)
Age (years)		
M (*SD*)	24.24 (6.76)	24.10 (6.50)
Sex		
# Females	19	21
# Males	2	1
Ethnicity		
# Black	3	0
# Asian	8	9
# Middle Eastern	0	1
# White	8	11
# Multi-ethnic	2	1
Education		
# High school	3	3
# College or University	14	16
# Graduate Level	4	3
Specific Phobia – Spiders[a]	9	6
Additional Phobias[a]	6	6

Note. NSB = no safety behaviour use condition; SBU = safety behavior use condition.

[a]Number of participants in each group who met DSM-IV-TR criteria for Specific Phobia

examination of both subjective (Stage 1) and behavioural (Stage 2) indicators of fear. A follow-up BAT was conducted one week later to test the stability of pretest to posttest changes in approach distance and subjective fear.

Materials

Phobic Stimulus. The fear stimulus for both sessions was a live Chilean Rose Hair Tarantula (*Grammostola rosea*). The tarantula was placed in a transparent plastic container (53 cm x 38 cm x 15 cm) without a lid, which allowed the spider enough space to move freely, and ensured that the spider was clearly visible to the participants at all times. The container was placed in the middle of a 90 centimetre (3 feet) high round table at one end of a room. A 3 metre (10 feet) measuring tape marked the floor of the room, from the starting point of the exposure tasks to the front edge of the table containing the tarantula, marked at 30 cm (1 foot) increments. The room was free of any other items, decorations, or noises that might have distracted participants during the sessions.

Physiological measures. The participant's heart rate was measured continuously throughout the 35 minute exposure task using a Polar RS400 heart rate monitor. The monitor consists of a chest strap with transmitter that sends heart rate signals to a wristwatch receiver worn by the participant. The receiver has a lap marker to allow calculation of average heart rate for each 1-minute interval during Stage 1 and each 5-minute interval during Stage 2, and for the duration of the follow-up BAT. Heart rate data were downloaded to a dedicated database and stored by participant number for further analysis.

Measures

Subjective Units of Distress Scale (SUDS; Wolpe & Lazarus, 1966). The SUDS is a commonly used scale that allows an individual to quickly and verbally rate his or her subjective fear on a 100-point scale, where 100 represents the worst fear or distress that one can imagine,

and 0 represents no fear at all. The scale has been found to correlate with indices of autonomic nervous system arousal associated with fear (Thyer, Papsdorf, Davis, & Vallecorsa, 1984), and with measures of state anxiety (Kaplan, Smith, & Coons, 1995).

Fear of Spiders Questionnaire (FSQ; Szymanski & O'Donohue, 1995). The FSQ is an 18-item scale designed to measure severity of spider phobia. The items assess avoidance and help seeking behaviour (i.e., "If I came across a spider now, I would get help from someone else to remove it."), and fear of harm from spiders (i.e., "Currently, I sometimes think about getting bit by a spider."). Agreement with each item is rated on an 8-point Likert scale ranging from 0 (totally disagree) to 7 (totally agree), and an individual's score is obtained by summing the responses. Discriminant validity is good, as the scale is able to distinguish between phobic (M = 89.1, SD = 19.6) and non-phobic (M = 3.0, SD = 7.8) individuals, and between pretreatment to posttreatment scores (Muris & Merckelbach, 1996). Further, the FSQ has demonstrated excellent internal consistency (α = .97), and three-week test-retest reliability (r = .91; Muris & Merckelbach, 1996). The FSQ was used in this study to screen participants for a minimum level of fear prior to the study, and as an indicator of change in fear throughout the procedure. In the current study, internal consistency was good and comparable to previously published standards (α = .90).

Spider Phobia Beliefs Questionnaire (SBQ; Arntz, Lavy, van den Berg, & van Rijsoort, 1993). The SBQ is a 78-item self-report questionnaire that measures the strength of negative spider-related beliefs and beliefs about one's reaction when confronted with a spider. The spider-related beliefs subscale contains 42 items measuring thoughts about the spider, such as "When there is a spider in my vicinity, I believe that the spider is vicious." The self-related beliefs subscale consists of 36 items related to one's reaction to encountering a spider, such as "If the spider does not go away and crawls on me, I will lose control over myself." Each item is rated on

a 100-point scale, indicating the degree to which the participant believes the statement to be true (0 = I do not believe it at all; 100 = I absolutely believe it), and the total score is obtained by computing the mean of the responses on the individual items. The SBQ can discriminate those with spider phobias from nonphobic control participants, and can identify pretreatment to posttreatment changes (for a comparison of groups by individual subscale, see Arntz, Levy, van den Berg, & van Rijsoort, 1993). Internal consistency is excellent for both the spider-related beliefs subscale (α = .94) and the self-related beliefs subscale (α = .94), and the two-month test-retest reliability is generally good (Arntz et al., 1993). In the current study, internal consistency for both the spider-related beliefs subscale (α = .95) and the self-related beliefs subscale (α = .94) were similar to previously reported values.

Spider Self-Efficacy Scale (SSES; Johnstone & Page, 2008). The SSES is a 26-item scale that measures the strength of one's self-efficacy about performing spider-related behaviours in an approach task and in day-to-day life. The measure contains three subscales: one subscale related to tasks that may be completed during a BAT in an experimental situation (e.g., "Stand 5 ft from a spider in a closed container"); one subscale containing items that would likely be experienced during an exposure task in a hypothetical experiment or treatment context (e.g., "Let spider walk on bare hand"); and a general self-efficacy subscale for situations that may be encountered in everyday life (e.g., "Remove a spider from a room on your own"). Each item is rated on an 11-point scale, where 0 represents no confidence or high uncertainty in one's ability to perform the behaviour, and 10 represents total confidence or complete certainty in one's ability to perform the behaviour. The fullscale and subscale scores are derived by calculating the mean of the responses, where higher scores indicate greater self-efficacy for performing behaviours related to spiders. Although a psychometric evaluation of the scale has not been published, Johnstone and Page (2008) reported a mean fullscale SSES score of 2.36 (*SD* = .24) for a sample of spider

phobic participants, and subscale scores of 3.98 (*SD* = 1.74), 2.32 (*SD* = 1.28), and .49 (*SD* = .68) for the experimental, hypothetical, and general subscales respectively. The scale has also demonstrated good to fair internal consistency for both the fullscale and subscale forms in the validation study (alphas = .91 to .70) as well as in the current study (alphas = .93 to .76), good discriminant validity, as it is able to discriminate between those with low and high spider fears and behavioural avoidance, and good construct validity, as there were significant increases in fullscale and subscale scores from pretreatment to posttreatment for those with spider phobias.

Depression Anxiety Stress Scales, 21-item version (DASS-21; Lovibond & Lovibond, 1995). The DASS comprises three scales that assess features uniquely associated with depression, anxiety, and psychological distress. While many commonly used measures of anxiety and depression capture overlapping symptoms, the DASS assesses features unique to each factor. The depression subscale (DASS21-D) targets symptoms of anhedonia and dysphoric mood characteristic of depression, without addressing changes in sleep, energy, and appetite commonly assessed with other measures of depression. The anxiety subscale (DASS21-A) specifically measures symptoms of physiological arousal and fear associated with anxiety disorders, and the stress subscale (DASS21-S) primarily focuses on symptoms of distress, irritability and tension. The 21-item short form has demonstrated excellent psychometric properties comparable to the original 42-item measure (Antony, Bieling, Cox, Enns, & Swinson, 1998). The DASS-21 was used in this study to determine if there were any pre-existing group differences in emotional symptomatology that may have potentially confounded behavioural approach or anxious responding to the feared stimulus.

Behavioural Approach Test (BAT). Behavioural Approach Tests are commonly used as a behavioural indicator of the intensity of one's fear of threat-relevant stimuli. In this study, participants were read standardized instructions asking them to perform a series of steps of

increasing difficulty in which they gradually approached a live tarantula until they were unable to proceed further (see Appendix A). Participants were given 15 seconds to complete each step and must have maintained the position for three seconds in order for the step to be considered complete. The behavioural score was obtained by recording the closest distance of approach on a 17-point hierarchy that ranged from 1 (standing 10 feet away from the spider) to 17 (holding the spider in the palm of hand).

Treatment Credibility/Expectancy. After being provided with the rationale for exposure and instructions for the main exposure task, participants were asked to rate, on a scale of -10 to +10, the extent to which they believed that participation in the study would be effective in reducing their fear of spiders. A score of -10 indicated that the participant believed his or her fear would get much worse, +10 corresponded to a belief that one's fear would get much better, and 0 represented no expected change in fear as a result of participation. This was included to ensure that the rationale and instructions for the task were perceived as equally credible and thus, any treatment effects could not be accounted for by expectancy for change. This is particularly important given the evidence that expectancy and credibility of the treatment rationale can significantly influence behaviour change during exposure (Chambless, Tran & Glass, 1997; Kazdin & Wilcoxin, 1976).

Procedure

Individuals who met inclusion criteria based on the FSQ and telephone screen were invited into the lab for the behavioural assessment and to complete the first session, if appropriate. Following informed consent (see Appendix B), participants were asked to wear a heart rate monitor to record their heart rate, as a measure of physiological arousal, during the task. Heart rate was then recorded over a 2-minute period in which the participant was left alone in the room to rest quietly, in order to establish a baseline with which to compare subsequent

measurements. Participants were then administered the Specific Phobia section of the *Structured Clinical Interview for the DSM-IV* (SCID-IV; First, Spitzer, Gibbon, & Williams, 1996) to determine if their fear met full diagnostic criteria for Specific Phobia (Animal Type, Spiders), and completed the initial BAT to assess baseline fear and determine suitability for the study. Participants who were able to touch the outside of the container (step 11) spider were excluded from the study. Eligible participants next completed a series of computer-administered questionnaires, including a demographic information form, FSQ, SBQ, DASS, and SSES. Participants were then randomly assigned to one of two treatment conditions: (a) Safety behaviour use (SBU), or (b) no safety behaviour use (NSB).

In the SBU group, participants were given basic information about safety behaviours and provided a list of behaviours and items often used by people with spider phobias. They were then asked to select the items that they believed would be most helpful to reduce anxiety and enable them to complete the exposure task, and rate how useful they believed each strategy to be (see Appendix C). The list of nine items was generated through consultation with several clinicians with expertise in the nature and treatment of spider phobias, and included: (a) looking away from the spider, (b) closing your eyes, (c) staring or focusing on the spider, (d) wearing protective clothing (long-sleeved shirt, rubber gloves, work/gardening gloves, or hat with a face screen), (e) repeating a word or phrase in your head to distract yourself from the spider, and (f) rearranging your position in the room to be close to the exit. Participants also had the option to specify any other strategies not on the list that could be incorporated into the experimental procedure (e.g., having the experimenter perform each task regularly throughout the exposure, receiving frequent reassurance from the experimenter, deep breathing). Instructions for the procedure, presented verbally, described the rationale for exposure and emphasized the potentially beneficial effects of safety behaviour use during exposure (see Appendix D). The participant was then given the

opportunity to seek clarification or additional information regarding the instructions, and was asked to provide a rating of credibility of the instructions and rationale. Any safety-related items (e.g., gloves, hat, shirt) identified earlier were provided, and, if requested, the room was rearranged prior to beginning the task.

Participants in the NSB group were provided with the same information and list of safety behaviours as in the SBU condition and asked to select and rate the items from the list that they believed would be useful during the task. Having participants reference the same list ensured that the experimental procedure was equivalent between groups with the exception of the safety behaviour instructions, and allowed the experimenter to identify any covert safety behaviours that the participant may unintentionally use when confronted with the spider. The rationale for exposure was also the same as in the SBU condition; however, the instructions explicitly stated that the use of safety behaviours interferes with fear reduction during exposure and instructed the participant to refrain from engaging in these behaviours during the procedure (see Appendix E). After receiving the instructions, any questions were addressed and the participant provided a credibility rating for the given rationale and instructions.

In the first stage of the exposure, all participants were asked to approach the spider as closely as possible and remain in that position for 5 minutes. The closest distance of approach was recorded along the same 17-point hierarchy as in the BAT. A SUDS rating and heart rate measurement were taken at the beginning of Stage 1 and at the end of each 1-minute interval.

In the second stage of the exposure, immediately following Stage 1, participants were instructed to move progressively closer to the spider at their own pace over a 30-minute period and recordings were made at 5-minute intervals. The experimenter demonstrated an approximation of each step in the hierarchy, without touching the spider at any time, and a standardized prompt was given at the end of each interval to encourage the participant to

continue to move closer to the spider, if possible. Participants were reminded to either use or not use safety behaviours, depending on their assigned condition, at the beginning of Stage 2 and at the end of the 15-minute interval. At the end of each interval, the experimenter recorded: (a) closest distance of approach to the spider, (b), approach distance at end of the interval, (c) SUDS rating, (d) mean heart rate, (e) any movement of the spider, and (f) any possible safety behaviours observed. Stage 2 continued for 30 minutes or until the participant was able to hold the tarantula in the palm of his or her hand and report a SUDS rating of 0.

After completing the exposure task, the spider was removed from the room and the participant was asked if he or she engaged in any safety behaviours, or did anything to help manage their fear, at any time during the task. For each item identified, the participant was asked to explain the purpose of the behaviour and if the strategy was perceived to be helpful. If possible safety behaviours were observed but not spontaneously reported by the participant, the experimenter requested clarification from the participant about the behaviour and its perceived utility. Next, participants again completed the FSQ, SBQ, and SSES. Finally, participants were provided compensation where appropriate.

At the 1-week follow-up session, participants first performed the BAT, with approach distance, SUDS, and heart recorded at the end of the task, and then completed the FSQ, SBQ, and SSES. Finally, participants were fully debriefed about the purpose of the study (see Appendix F), provided compensation, and offered psychoeducational materials regarding anxiety management and possible treatment referrals if they were experiencing any remaining distress.

Results

Preliminary Analyses

Prior to beginning the main analyses, the data were screened for missing values, and descriptive statistics and tests for normality were conducted to identify violations of assumptions for subsequent statistical tests. Data were entered twice to ensure accuracy. Sixteen questionnaire items were missing from the 387 items in the dataset (4.13%) and no more than 3.8% from any one questionnaire. Missing values were replaced with the group mean for the missing item. Several self-report measures at baseline were not normally distributed; however, analysis of variance (ANOVA) is robust to violations of normality for two-tailed tests when the sample size per group is large (> 15) and the variances are homogenous (Boneau, 1960; Sawilowski & Blair, 1992). Therefore, the results of the reported ANOVAs for self-report measures should be interpreted with some caution but not considered invalid.

A significance level of .05 was selected for all statistical analyses, and the actual probability value obtained was reported. Partial eta-squared, a measure of the proportion of variance in the dependent variable attributable to the effects of the independent variable, was calculated as the estimate of effect size for all ANOVAs. Cohen's *d* was calculated as the estimate of effect size for *t*-tests, and the magnitude of the effect can be interpreted according to Cohen's (1998) guidelines (small effect = 0.20, medium effect = 0.50, large effect = 0.80).

Preexisting group differences. To detect any preexisting group differences, independent groups *t*-tests were conducted on approach distance during the initial BAT, and pretest scores on the FSQ, SBQ, SSES and its subscales, and DASS-21 (means and standard deviations are presented in Table 2). The groups did not differ at the .05 level in initial approach distance, $t(41) = .99$, $p = .33$, $d = 0.30$, or on any of the DASS-21 subscales [DASS21-D: $t(41) = 1.40$, $p = .09$, $d = 0.43$; DASS21-A: $t(41) = 1.50$, $p = .14$, $d = 0.46$; DASS21-S: $t(41) = 1.73$, $p = .09$, $d = 0.53$].

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There were also no significant differences between the groups on pretest scores on the SBQ self-related beliefs subscale, $t(41) = 1.26$, $p = .22$, $d = 0.38$, SSES experimental subscale, $t(41) = .93$, $p = .36$, $d = 0.29$, SSES general subscale, $t(41) = .20$, $p = .84$, $d = -0.06$, and fullscale SSES, $t(41) = 1.05$, $p = .30$, $d = 0.32$. Resting heart rate, measured prior to encountering the spider, was also similar between the NSB group ($M = 85.69$, $SD = 12.10$) and the SBU group ($M = 80.58$, $SD = 11.43$), $t(36) = 1.34$, $p = .19$, $d = 0.43$.

However, the NSB group had higher pretest scores on the FSQ, $t(41) = 2.32$, $p = .03$, $d = 0.71$, spider-related beliefs subscale of the SBQ, $t(41) = 2.82$, $p = .01$, $d = 0.86$, and the hypothetical subscale of the SSES, $t(41) = 2.58$, $p = .01$, $d = 0.78$. None of these variables, however, were significantly correlated with SUDS at any interval during Stage 1 for the NSB group (FSQ: *r*s range from -.03 to .40; SBQ subscale: *r*s from -.05 to .18; SSES subscale: *r*s from -.01 to .26), or the SBU group (FSQ: *r*s range from .19 to .29; SBQ subscale: *r*s from -.002 to .28; SSES subscale: *r*s from -.05 to .11). The FSQ and SBQ spider-related beliefs subscale were also not correlated with approach distance at any interval of Stage 2 for the NSB group (FSQ: *r*s range from -.25 to -.40; SBQ subscale: *r*s from -.01 to .22) or the SBU group (FSQ: *r*s range from -.01 to .22; SBQ subscale: *r*s from -.07 to .14). All *p*s were non-significant at the .05 level; therefore, pretest scores on the FSQ and SBQ subscales were not included as covariates when conducting the main analyses. However, baseline scores on the hypothetical subscale of the SSES were significantly correlated with approach distance during Stage 2 for both the NSB group (5 minutes: $r = .75$, $p < .001$; 10 minutes: $r = .71$, $p < .001$; 15 minutes: $r = .63$, $p = .002$; 20 minutes: $r = .59$, $p = .005$; 25 minutes: $r = .48$, $p = .03$; 30 minutes: $r = .38$, $p = .09$), and the SBU group (5 minutes: $r = .51$, $p = .02$; 10 minutes: $r = .65$, $p = .001$; 15 minutes: $r = .70$, $p < .001$; 20 minutes: $r = .58$, $p = .005$; 25 minutes: $r = .48$, $p = .02$; 30 minutes: $r = .33$, $p = .13$), which could be expected given the relationship between self-efficacy and behaviour. As such,

Table 2

Means and Standard Deviations for Self-Report Questionnaires at Pretest, Posttest, and Follow-up for the NSB (n = 21) and SBU (n = 22) Groups

	Pretest				Posttest				Follow-up			
	NSB		SBU		NSB		SBU		NSB		SBU	
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
FSQ	101.38	12.56	89.36	20.38	76.67	20.71	65.91	27.59	58.57	28.89	56.77	31.64
SSES												
Fullscale	2.81	1.43	2.33	1.53	5.48	2.31	4.71	2.16	5.59	2.09	5.38	2.30
Experimental	3.87	2.03	3.26	2.22	7.15	2.42	6.23	2.39	7.32	2.39	6.80	2.38
Hypothetical	1.10	1.15	.38	.61	3.21	2.91	2.36	3.03	3.26	2.45	2.75	3.39
General	2.98	1.27	3.09	2.10	5.18	2.13	4.79	2.15	5.24	2.04	6.05	2.03
SBQ												
Spider beliefs	69.34	15.32	55.45	16.92	46.21	19.93	36.62	20.25	37.73	21.65	32.36	21.18
Self beliefs	48.30	16.13	41.54	18.98	32.88	21.53	26.17	18.42	28.91	28.91	24.14	20.69
DASS-21												
Depression	11.15	8.14	7.82	7.43								

Anxiety	13.05	7.06	9.64	7.80
Stress	17.62	7.86	13.36	8.24

Note. NSB = no safety behaviour use group; SBU = safety behaviour use group; FSQ = Fear of Spiders Questionnaire; SSES = Spider Self-Efficacy Scale; SBQ = Spider Phobia Beliefs Questionnaire; DASS-21 = Depression Anxiety Stress Scales, 21-item Version

analyses related to behavioural approach were calculated both with and without SSES hypothetical subscale scores included as a covariate.

Credibility of rationale and instructions. The distribution of credibility scores was normal for the NSB group but not the SBU group. However, one outlier was identified in the SBU group which, when removed, corrected the shape of the distribution. Subsequent analyses were conducted with and without the outlier included in the distribution; there were no differences in the results of the tests so the case was retained for all further analyses.

An independent samples *t*-test was performed to compare the credibility scores of those in the NSB group to those in the SBU group to determine if the rationale and instructions for the task were perceived as equally credible. The credibility scores of participants in the NSB group ($M = 4.14$, $SD = 2.95$) were not significantly different from those in the SBU group ($M = 3.00$, $SD = 3.6$), $t(41) = 1.14$, $p = .26$, $d = 0.35$. A score in this range reflects a moderate expectation of improvement in one's fear of spiders as a result of participation in the study, but not a complete alleviation of one's symptoms.

Credibility scores were further explored to examine if a relationship existed between treatment credibility and the primary outcome measures. The correlation between credibility scores and SUDS at the end of Stage 1 was not significant for either the NSB group ($r = .25$, $p = .27$) or the SBU group ($r = -.28$, $p = .20$). Similarly, credibility was not significantly correlated with closest distance of approach to the spider during Stage 2 for either the NSB ($r = .11$, $p = .63$) or SBU ($r = -.21$, $p = .36$) group. Therefore, it is unlikely that the perceived credibility of the rationale and instructions could account for differences in the outcome variables between groups and was not included as a covariate in subsequent analyses.

Spider movement. The amount of movement by the spider during both stages of the task

was examined to ensure that the feared stimulus appeared similar to both groups. In Stage 1, where the activity of the spider was spontaneous and not the result of being touched by the participant, the tarantula was observed by the experimenter to have moved during 52.4% of sessions for the NSB group and 68.2% of SBU sessions. This difference was not significant, $\chi^2(1, N = 43) = 1.12, p = .29$. During Stage 2, the spider was observed to move both spontaneously and after being touched by the participant in 90.5% of cases in the NSB group and 90.9% of cases in the SBU group, a difference that was also not significant, $\chi^2(1, N = 43) = .002$, $p = .96$. These results indicate that the activity level of the spider was equivalent between groups and cannot explain any group differences in the outcome variables.

Manipulation check. To examine compliance with the safety behaviour manipulation, an independent-samples *t*-test was conducted to compare the reported number of safety behaviours used during the exposure task between groups. Participants in the SBU group ($M = 4.45$, $SD = 1.63$) used a significantly greater number of different safety behaviours during the exposure than those in the NSB group ($M = .95$, $SD = .86$), $t(41) = -8.76$, $p < .001$, $d = 2.69$, confirming that participants were generally compliant with the instructions.

Effectiveness of the Intervention

Behavioural. At the end of Stage 2, 9.5% of participants in the NSB group and 27.3% of the SBU group were able to hold the spider in the palm of their hand, a difference that was not statistically significant ($p = .24$, *Fisher's exact test*). At the follow-up session, the difference remained non-significant ($p = 1.00$, *Fisher's exact test*), with the number of participants in the NSB group who held the spider increasing to 14.3% compared to 18.2% of those in the SBU group. McNemar tests were conducted to determine if the proportion of participants in each group who were able to touch the spider changed significantly from Session 1 to the follow-up

session. Although there was a decrease from Session 1 to Session 2 in the proportion of SBU participants who were able to hold the spider, this reduction was not significant ($p = .63$, *McNemar test*). Conversely, there was a slight increase in the proportion of participants in the NSB group who were able to hold the spider from posttest to follow-up; however, this difference was also not statistically significant ($p = 1.00$, *McNemar test*).

A 2 (group) x 3 (time) mixed design analysis of variance (ANOVA) was conducted to determine if changes in approach distance at the beginning and end of the exposure session and at follow-up differed between groups. There was no main effect of group assignment on the distance of approach to the spider, $F(1, 41) = .05$, $p = .82$, partial $\eta^2 = .001$. There was a significant main effect of time on approach distance, $F(2, 82) = 241.08$, $p < .001$, partial $\eta^2 = .86$. Bonferroni adjusted pairwise comparisons revealed that approach distance at the end of Stage 2 ($M = 13.74$, $SE = .38$) and at the follow-up session ($M = 13.05$, $SE = .49$) were significantly closer than at baseline ($M = 7.01$, $SE = .35$, $ps < .001$), but approach distance was not significantly different at the end of Stage 2 compared to the follow-up session ($p = .06$). These results should be qualified, however, by a significant interaction between the safety behaviour groups and time, $F(2, 82) = 3.14$, $p = .048$, partial $\eta^2 = .07$, indicating that the distance of approach to the spider was different between the safety behaviour groups over time (see Figure 1). Specifically, pairwise comparisons revealed that the NSB group approached the spider more closely at the end of Stage 2 ($M = 13.33$, $SD = .54$) and at follow-up ($M = 13.33$, $SD = .70$) than at baseline ($M = 7.38$, $SD = .50$, $ps < .001$). There was no significant difference in approach distance at the end of Stage 2 compared to follow-up ($p = 1.00$). Like the NSB group, the SBU group approached the spider more closely at the end of Stage 2 ($M = 14.14$, $SE = .53$) and at follow-up ($M = 12.77$, $SD = .68$) compared to baseline ($M = 6.64$, $SE = .49$, $ps < .001$); however,

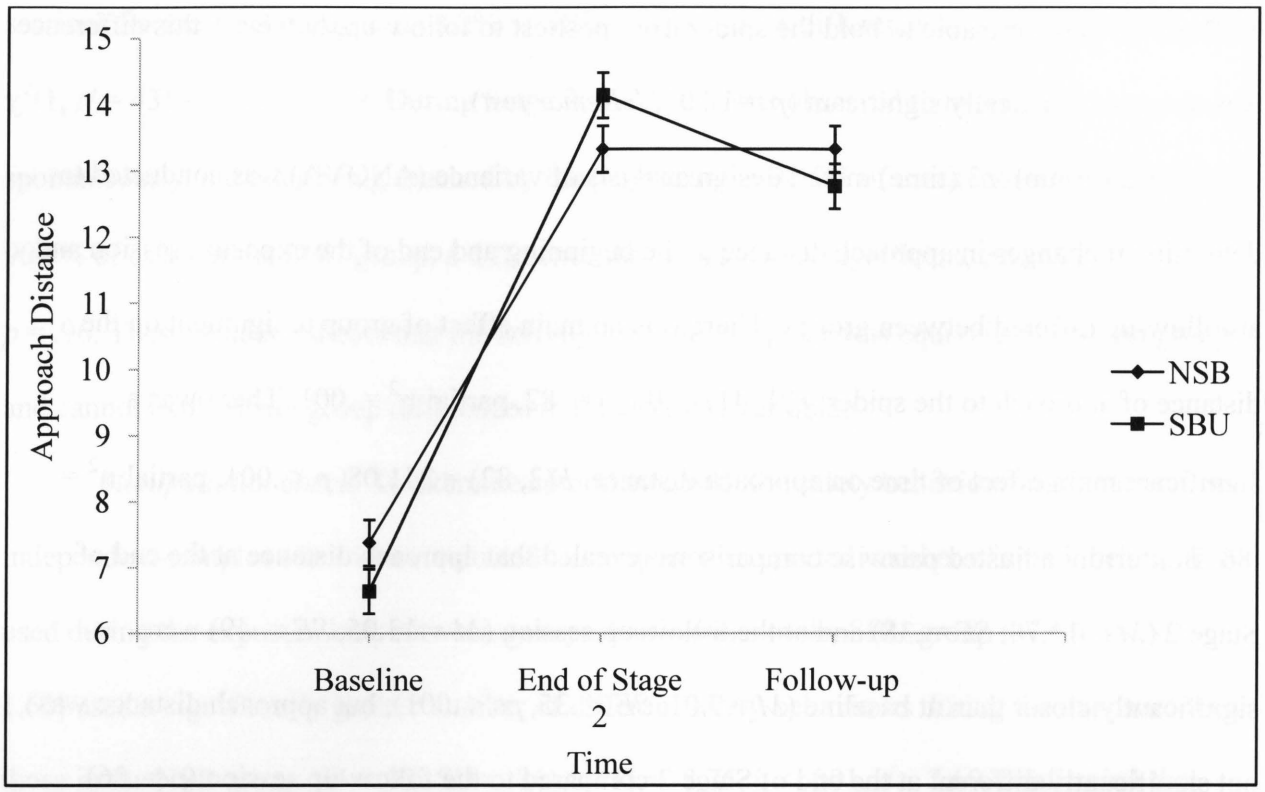

Figure 1. Approach distance of the NSB (n = 21) and SBU (n = 22) groups at the beginning of Stage 1, end of Stage 2, and at the follow-up session. Approach distance is coded on a 17-point hierarchy, from standing 10 feet away from the spider to holding the spider in the palm of hand. Larger numbers indicate closer proximity to the spider.

they showed a decrease in approach distance at follow-up (M = 12.77, SE = .68) relative to the end of Stage 2 (p = .004). This indicates that the NSB group maintained their gains in approach distance from the end of Session 1 to the follow-up session, whereas the SBU group did not, suggesting that exposure without the use of safety behaviours results in more durable changes in behavioural indicators of fear.

When scores on the SSES hypothetical subscale were included as a covariate to account for preexisting group differences, the main effect of group remained non-significant, $F(1, 40)$ = .99, p = .33, partial η^2 = .02, and the main effect of time remained significant, $F(2, 80)$ = 149.53, $p < .001$, partial η^2 = .79. However, the interaction between the safety behaviour groups and time became non-significant, $F(2, 80)$ = 1.76, p = .18, partial η^2 = .04, suggesting that the use of safety behaviours did not have different effects on approach distance over time. The discrepancy between interaction effects when the covariate is included, together with the small effect size of the significant interaction, indicates that the safety behaviour manipulation did not have a strong effect on approach distance in this procedure.

Subjective. A 2 (group) x 3 (time) mixed design ANOVA was conducted to examine the change in SUDS ratings at the beginning of Stage 1, end of Stage 2, and the follow-up BAT. No main effect of time emerged, $F(2, 82)$ = 1.81, p = .17, partial η^2 = .04, indicating that self-reported fear did not decline significantly at the three time points. There was also no main effect of group, $F(1, 41)$ = 1.49, p = .23, partial η^2 = .04, suggesting that the subjective fear ratings were consistent between groups. Finally, no significant interaction was found between groups and reported fear, $F(2, 82)$ = .83, p = .44, partial η^2 = .02.

Self-report psychometric measures. To analyze overall change in self-report psychometric measures at pretest, posttest, and follow-up, separate 2 (group) x 3 (time) mixed

design ANOVAs were conducted on FSQ, SBQ subscales, and SSES fullscale and subscale scores. For all of the measures, there was a significant main effect of time (*p*s < .001), but no main effect of group and no significant interaction (*p*s > .05). Follow-up pairwise comparisons using a Bonferroni correction were conducted for all significant main effects.

On the FSQ, there was no main effect of group, $F(1, 41) = 1.70$, $p = .20$, partial $\eta^2 = .04$, and no significant interaction, $F(2, 82) = 1.25$, $p = .29$, partial $\eta^2 = .03$. There was a significant main effect of time, $F(2, 82) = 58.59$, $p < .001$, partial $\eta^2 = .59$, such that scores on the FSQ were significantly lower at posttest ($M = 71.29$, $SE = 3.73$) and follow-up ($M = 57.67$, $SE = 4.62$) compared to baseline ($M = 95.37$, $SE = 2.60$, *p*s < .001). FSQ scores at follow-up were significantly lower than at the end of Stage 2 ($p < .001$). This indicates that fear of spiders decreased significantly after the exposure, and continued to decline over the follow-up period.

For the fullscale SSES, there was no main effect of group, $F(1, 41) = .86$, $p = .36$, partial $\eta^2 = .02$, and no significant interaction, $F(2, 82) = .55$, $p = .54$, partial $\eta^2 = .01$. There was a significant main effect of time, $F(2, 82) = 69.95$, $p < .001$, partial $\eta^2 = .63$, such that scores were significantly lower at baseline ($M = 2.57$, $SE = .23$) compared to posttest ($M = 5.10$, $SE = .34$, $p < .001$) and follow-up ($M = 5.49$, $SE = .34$, $p < .001$), but were similar at posttest relative to the follow-up session ($p = .15$). Self-efficacy increased after the exposure and remained stable at the follow-up session, indicating that confidence in one's ability to perform spider-related tasks improved substantially after participating in the study.

For the SSES general subscale, there was no main effect of group, $F(1, 41) = .12$, $p = .74$, partial $\eta^2 = .003$, and no significant interaction, $F(2, 82) = 2.34$, $p = .10$, partial $\eta^2 = .05$. There was a significant main effect of time, $F(2, 82) = 47.19$, $p < .001$, partial $\eta^2 = .54$, such that scores were significantly lower at baseline ($M = 3.04$, $SE = .27$) compared to posttest ($M = 4.99$, $SE =$

.33, $p < .001$) and follow-up ($M = 5.64$, $SE = .31$, $p < .001$). SSES general subscale scores increased significantly from posttest to follow-up ($p = .02$), providing evidence for between session improvements in self-efficacy. This suggests that increases in self-efficacy generalized to spider-related tasks that may be encountered outside of the experimental context.

On the experimental subscale of the SSES, there was no main effect of group, $F(1, 41) = 1.26$, $p = .27$, partial $\eta^2 = .03$, and no significant interaction, $F(2, 82) = .22$, $p = .74$, partial $\eta^2 = .005$. There was a significant main effect of time, $F(2, 82) = 76.05$, $p < .001$, partial $\eta^2 = .65$, such that scores were significantly lower at baseline ($M = 3.56$, $SE = .33$) compared to posttest ($M = 6.69$, $SE = .37$, $p < .001$) and follow-up ($M = 7.06$, $SE = .36$, $p < .001$), but were similar at posttest relative to the follow-up session ($p = .26$).

On the SSES hypothetical subscale, there was no main effect of group, $F(1, 41) = 1.25$, $p = .27$, partial $\eta^2 = .03$, and no significant interaction, $F(2, 82) = .10$, $p = .88$, partial $\eta^2 = .002$. There was a significant main effect of time, $F(2, 82) = 21.86$, $p < .001$, partial $\eta^2 = .35$, such that scores were significantly lower at baseline ($M = .74$, $SE = .14$) compared to posttest ($M = 2.79$, $SE = .45$, $p < .001$) and follow-up ($M = 3.01$, $SE = .45$, $p < .001$), but were similar at posttest relative to the follow-up session ($p = 1.00$).

On the spider-related beliefs subscale of the SBQ, there was no main effect of group, $F(1, 41) = 3.60$, $p = .07$, partial $\eta^2 = .08$, and no significant interaction, $F(2, 82) = 1.32$, $p = .27$, partial $\eta^2 = .03$. There was a significant main effect of time, $F(2, 82) = 59.62$, $p < .001$, partial $\eta^2 = .59$, such that scores were significantly lower at posttest ($M = 41.42$, $SE = 3.07$) and follow-up ($M = 35.05$, $SE = 3.27$) relative to baseline ($M = 62.4$, $SE = 2.47$, $ps < .001$) . Scores were also significantly lower at follow-up than at posttest ($p = .004$), indicating that participants experienced a significant reduction in negative beliefs about spiders after the exposure, and these

changes continued to decrease throughout the follow-up session.

Finally, for the self-related beliefs subscale of the SBQ, there was no main effect of group, $F(1, 41) = 1.35$, $p = .25$, partial $\eta^2 = .03$, and no significant interaction, $F(2, 82) = .11$, $p = .84$, partial $\eta^2 = .003$. Again, there was a significant main effect of time, $F(2, 82) = 33.90$, $p < .001$, partial $\eta^2 = .45$, such that scores were significantly lower at posttest ($M = 29.53$, $SE = 3.05$) and follow-up ($M = 26.53$, $SE = 3.13$) than at baseline ($M = 44.92$, $SE = 2.69$, $ps < .001$) , but scores were similar at posttest relative to the follow-up session ($p = .25$). This reflects a decrease in negative beliefs about one's expected reaction to a spider after the exposure, an effect which was maintained at the 1-week follow-up session.

Stage 1 Analyses

Subjective. The SUDS ratings at baseline and 1 minute intervals for the NSB and SBU groups were analyzed with a 2 (group) x 6 (time) mixed ANOVA. There was no significant effect of group, $F(1, 41) = 2.61$, $p = .11$, partial $\eta^2 = .06$, indicating that the degree of fear reduction during Stage 1 was similar between the groups. The interaction between the safety behaviour groups and time was also non-significant, $F(5, 205) = .36$, $p = .74$, partial $\eta^2 = .01$, indicating that neither the NSB or SBU group showed steeper declines in self-reported fear relative to the other at any time during the 5-minute stationary exposure. There was, however, a significant main effect of time on SUDS ratings, $F(5, 205) = 23.54$, $p < .001$, partial $\eta^2 = .37$, such that both groups reported significant reductions in fear throughout the 5-minute exposure. Pairwise comparisons using a Bonferroni correction revealed that there were no differences in SUDS ratings at baseline ($M = 56.42$, $SE = 3.12$), 1 minute ($M = 55.28$, $SE = 3.13$), and 2 minutes ($M = 51.95$, $SE = 3.05$). Fear ratings at baseline, minute 1, and minute 2 were significantly higher than SUDS at minute 3 ($M = 45.96$, $SE = 3.32$, $ps < .03$), 4 ($M = 42.15$, $SE =$

3.74, $ps < .001$), and 5 ($M = 39.07$, $SE = 3.57$, $ps < .001$). Finally, SUDS after 5 minutes was significantly lower than after 4 minutes ($p = .01$) and 3 minutes ($p = .001$).

An analysis of baseline fear alone was conducted to examine whether those who used safety behaviours reported less anxiety at the beginning of the task relative to those in the NSB group. A *t*-test comparing the baseline fear of participants in the NSB and SBU groups was marginally significant, $t(41) = 1.99$, $p = .053$, $d = 0.61$, such that participants in the SBU group ($M = 50.23$, $SD = 20.32$) reported lower SUDS ratings at baseline than those in the NSB group ($M = 62.62$, $SD = 20.53$). To determine whether this difference remained after the 5 minute stationary exposure, a *t*-test of fear levels at the end of Stage 1 was conducted. The SUDS ratings of participants in the SBU group ($M = 34.09$, $SE = 24.48$) were not significantly different than the NSB group ($M = 44.05$, $SE = 22.17$), $t(41) = 1.40$, $p = .17$, $d = 0.43$, at the end of Stage 1.

Heart Rate. For a subset of people in the study, heart rate data were recorded and analyzed with a 2 (group) x 5 (time) mixed design ANCOVA to compare the mean heart rate of the groups at 1 minute intervals throughout Stage 1, controlling for resting heart rate. There was no significant main effect of group, $F(1, 34) = 1.73$, $p = .20$, partial $\eta^2 = .05$, indicating that the heart rate of both the NSB ($M = 86.03$, $SE = 2.55$) and SBU ($M = 84.62$, $SE = 2.25$) groups was comparable throughout Stage 1. There was also no significant main effect of time, $F(4, 136) = .69$, $p = .60$, partial $\eta^2 = .02$, indicating that heart rate did not decrease significantly over time. Finally, there was no significant interaction between the groups and time, $F(4, 136) = 2.01$, $p = .10$, partial $\eta^2 = .06$. This indicates that the use of safety behaviours did not have different effects on heart rate throughout Stage 1.

A *t*-test was conducted to determine if the initial heart rate of the SBU group was different than the NSB group at the first encounter with the spider after being provided with

safety items. The mean heart rate of the NSB group (M = 86.89, SD = 10.93) was not significantly different than that of the SBU group (M = 85.81, SD = 12.40), $t(38) = .29$, $p = .77$, $d = 0.09$. This suggests that the provision of safety behaviours did not result in lower heart rate upon first confronting the spider.

Stage 2 Analyses

Behavioural. A 2 (group) x 7 (time) mixed design ANOVA compared the approach distance of the groups at baseline and 5-minute intervals during Stage 2 to determine if participants were able to approach the spider more closely when using safety behaviours. There was no significant main effect of group on approach distance, $F(1, 41) = .06$, $p = .81$, partial $\eta^2 = .001$, indicating that the overall distance of approach to the spider was equivalent between the groups. There was a main effect of time on approach distance, $F(6, 246) = 117.54$, $p < .001$, partial $\eta^2 = .74$, such that the groups were able to move substantially closer to the spider throughout the exposure. However, these results should be interpreted with caution given the significant interaction between the safety behaviour groups and approach distance, $F(6, 246) = 3.23$, $p = .03$, partial $\eta^2 = .07$ (see Figure 2). This indicates that, at certain time intervals, the groups differed in their distance of approach.

To examine the interaction, simple main effects were evaluated using Bonferroni-adjusted pairwise comparisons. Means and standard deviations are presented in Table 3. For the NSB group, closest distance of approach at baseline and after the 5-minute interval was significantly farther from the spider than at every other time interval ($ps < .05$). However, approach distance plateaued and, with the exception of a significant difference in approach distance at 10 minutes compared to 30 minutes ($p = .006$), there were no significant differences after any other interval ($ps > .05$). In contrast, the SBU group had more steady increases in

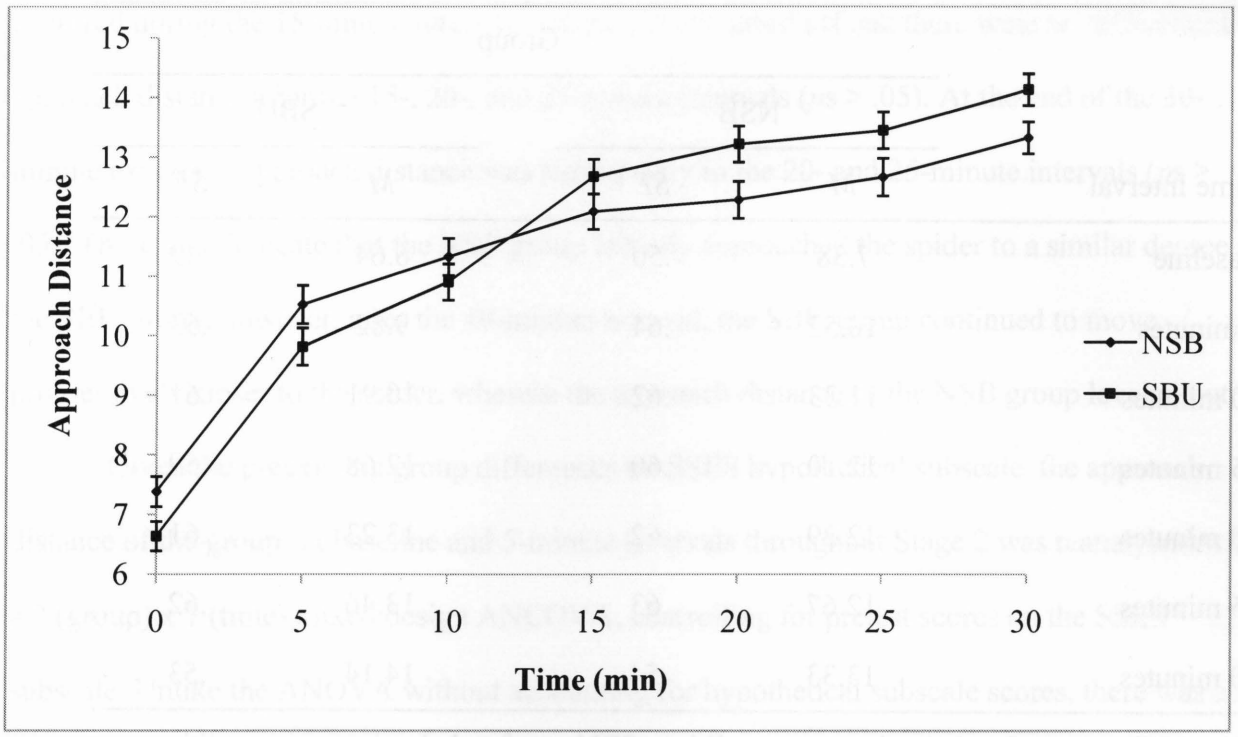

Figure 2. Approach distance of the NSB ($n = 21$) and SBU ($n = 22$) groups at the beginning, and at 5 minute intervals throughout Stage 2. Approach distance is coded on a 17-point hierarchy, from standing 10 feet away from the spider to holding the spider in the palm of hand. Larger numbers indicate closer proximity to the spider.

Table 3

Mean Distance of Approach for the NSB (n = 21) and SBU (n = 22) Groups at 5-minute Intervals Throughout Stage 2

	Group			
	NSB		SBU	
Time Interval	*M*	*SE*	*M*	*SE*
Baseline	7.38	.50	6.64	.49
5 minutes	10.52	.64	9.82	.63
10 minutes	11.33	.62	10.91	.61
15 minutes	12.10	.60	12.68	.59
20 minutes	12.29	.62	13.23	.61
25 minutes	12.67	.63	13.46	.62
30 minutes	13.33	.54	14.14	.53

Note. NSB = no safety behaviour use condition; SBU = safety behaviour use condition. Approach distance is coded on a 17-point hierarchy, from standing 10 feet away from the spider to holding the spider in the palm of hand. Larger numbers indicate closer proximity to the spider. Means in the same column that do not share the same subscript differ at $p < .05$ level in the Bonferroni-adjusted pairwise comparison.

approach distance throughout the exposure. Specifically, for the SBU group, closest distance of approach at baseline, 5 minutes, and 10 minutes was significantly farther from the spider than at every other time interval (*p*s < .001). The most substantial increases in approach distance occurred during the 15-minute interval, but approach leveled off and there were no differences in approach distance after the 15-, 20-, and 25-minute intervals (*p*s > .05). At the end of the 30-minute exposure, approach distance was similar only to the 20- and 25-minute intervals (*p*s > .05). These data indicate that the NSB group initially approached the spider to a similar degree as the SBU group; however, after the 10-minute interval, the SBU group continued to move progressively closer to the spider, whereas the approach distance of the NSB group leveled out.

Given the preexisting group differences on SSES hypothetical subscale, the approach distance of the groups at baseline and 5-minute intervals throughout Stage 2 was reanalyzed with a 2 (group) x 7 (time) mixed design ANCOVA, controlling for pretest scores on the SSES subscale. Unlike the ANOVA without accounting for hypothetical subscale scores, there was a main effect of group, $F(1, 40) = 4.56$, $p = .04$, partial $\eta^2 = .10$, such that, overall, participants in the SBU group ($M = 12.12$, $SE = .43$) approached the spider more closely than those in the NSB group ($M = 10.76$, $SE = .44$). The main effect of time remained significant, $F(6, 240) = 77.18$, $p < .001$, partial $\eta^2 = .66$, where both groups made significant gains in approach distance throughout the second stage of the task. Consistent with the ANOVA, the ANCOVA revealed a marginally significant interaction, $F(6, 240) = 11.46$, $p = .06$, partial $\eta^2 = .06$, indicating that, at certain time intervals, the groups differed in their closest distance of approach. Although the closest distance of approach was similar between groups, those who used safety behaviours appeared to approach the spider more quickly than those discouraged from using safety behaviours.

Subjective. A 2 (group) x 7 (time) mixed design ANOVA compared the degree of fear reduction at baseline and at 5-minute intervals throughout the exposure task with and without the use of safety behaviours. There was no main effect of group, $F(1, 41) = .97$, $p = .33$, partial $\eta^2 = .02$, and no significant interaction, $F(6, 246) = .86$, $p = .49$, partial $\eta^2 = .02$, indicating that the degree of fear reduction over time was similar between groups. Again, there was a main effect of time, $F(6, 246) = 12.45$, $p < .001$, partial $\eta^2 = .23$, such that SUDS ratings were lower at the beginning of Stage 2 ($M = 39.07$, $SE = 3.57$) compared to ratings after 5 minutes ($M = 58.24$, $SE = 3.64$, $p < .001$), 10 minutes ($M = 60.26$, $SE = 3.32$, $p < .001$), 15 minutes ($M = 57.94$, $SE = 3.56$, $p < .001$), 20 minutes ($M = 57.57$, $SE = 3.85$, $p < .001$), and 25 minutes ($M = 55.27$, $SE = 4.01$, $p = .005$), but not at 30 minutes ($M = 48.99$, $SE = 3.80$, $p = .19$). SUDS ratings after 10 minutes were significantly higher than at the end of Stage 2 ($p = .04$), as were SUDS at 15 minutes relative to 30 minutes ($p = .03$). These relationships indicate that self-reported anxiety increased significantly once participants began to move toward the spider in Stage 2 but declined to levels comparable to the end of Stage 1.

Heart Rate. A 2 (group) x 6 (time) ANCOVA, with resting heart rate as a covariate, compared the heart rate of the groups at 5 minute intervals throughout Stage 2. There was no significant main effect of group, $F(1, 34) = 3.22$, $p = .08$, partial $\eta^2 = .09$, indicating that the heart rate of the NSB ($M = 87.60$, $SE = 2.69$) and SBU ($M = 87.78$, $SE = 2.32$) groups were comparable during Stage 2. There was also no significant main effect of time, $F(5, 170) = .17$, $p = .93$, partial $\eta^2 = .01$, which indicates that heart rate did not change significantly throughout the exposure. Finally, there was no significant interaction found between the safety behaviour groups and time, $F(5, 170) = 1.71$, $p = .16$, partial $\eta^2 = .05$. This suggests that the use of safety behaviours during exposure did not decrease heart rate to a greater extent during any interval in

Stage 2 relative to the NSB group.

Safety Behaviour Use

Participants in the SBU group used an mean of 4.45 (*SD* = .86, range = 2-7) safety behaviours during Session 1, the most common of which were wearing heavy gloves (*n* = 18), positioning one's body in such a way to minimize potential danger when close to the spider (*n* = 10), seeking reassurance (*n* = 10), and using mental distraction or thought suppression (*n* = 10). At follow-up, the mean number of safety behaviours used by the SBU group decreased to .50 (*SD* = .91, range = 0-3), and 72.7% of participants reported using no safety behaviours at all during the follow-up BAT. This suggests that, despite using safety behaviours during Session 1, participants were largely able to discontinue their use on a subsequent encounter with the spider. Thirty-eight percent of participants in the NSB group instructed not to use safety behaviours were compliant at Session 1 (*M* = .95, *SD* = .19, range = 0-2), and this number increased to 81% at follow-up (*M* = .33, *SD* = .17, range = 0-3). Of those in the NSB group who reported using safety behaviours, the most common was reassurance seeking (*n* = 9) followed by mental distraction or thought suppression (*n* = 5). There was no significant relationship between the number of safety behaviours used and approach distance at the end of the 35 minute exposure, *r* = .10, *p* = .53, or at the follow-up BAT, *r* = -.17, *p* = .29.

Discussion

This study adds to the growing literature regarding the use of safety behaviours during exposure-based treatments for anxiety disorders. While some research indicates that the use of safety behaviours interferes with behavioural, subjective, and cognitive changes, the evidence is far from conclusive. To examine this relationship, the rate of fear reduction during a 5 minute stationary exposure task, and the rate of approach toward a spider over a 30 minute traditional exposure task, was compared for those using safety behaviours and those instructed not to do so. Overall, few differences were observed at pretest, posttest, and follow-up in approach distance, self-reported anxiety during the exposure, and cognitions between those who used safety behaviours during the exposure and those who did not. At regular intervals throughout the task, both groups showed significant reductions in self-reported anxiety and increases in approach distance; however, those using safety behaviours during the exposure experienced a faster rate of approach.

Behavioural Approach

Participants who were encouraged to use safety behaviours appeared to approach the feared stimulus more quickly than those who did not use safety behaviours, as evidenced by the significant interaction between the groups and approach distance throughout the second stage of the experimental task. However, by the end of the 30 minute exposure, the approach distance of the groups was equivalent, and no differences emerged at the one-week follow-up session. These results confirm the hypothesis that safety behaviours may influence the rate, but not necessarily the magnitude, of approach. The hypothesis that differences in approach distance would emerge at the follow-up session, favouring the durability of behavioural change for those who refrained from using safety behaviours, was also supported. However, this effect disappeared when

accounting for preexisting differences in self-efficacy. Together with the small effect sizes observed, this is likely an indication that safety behaviours did not greatly contribute to changes in approach distance over and above the effects of exposure alone. Meta-analyses have confirmed the effectiveness of exposure alone in the treatment of anxiety disorders, often reporting very large effect sizes (Deacon & Abramowitz, 2004). The effects of safety behaviours must be substantial in order to be detected independent of the effects of exposure. This suggests that our study lacked sufficient power to detect a genuine effect of safety behaviours, if indeed one exists.

Subjective Distress

As predicted, after adopting the safety strategies, the SBU group reported lower fear than the NSB group upon first encountering the spider and, although the rate of fear reduction was similar between the groups, the SBU group continued to report lower fear than the NSB group throughout the 5 minute stationary exposure. Although it is unclear whether baseline differences in SUDS ratings reflect preexisting between group differences in fear of spiders or whether the addition of safety behaviours significantly reduced subjective distress, it is possible that the use of safety behaviours increased the tolerability of exposure without interfering with long term symptom reduction. If this is indeed the case then safety strategies may be safely incorporated into treatment to increase the acceptability of exposure and decrease client drop out because of high anxiety. Unfortunately, we are unable to draw this conclusion based on the available data; however, this remains a critical question to be addressed in future research. It should be noted that fear levels were comparable between the groups at the end of the initial 5 minute exposure and remained so throughout the duration of the subsequent 30 minute exposure, and at follow-up. This suggests that, although differences in reported fear were present at baseline, this difference

quickly dissipated and subjective distress steadily declined throughout the exposure for all participants. Contrary to predictions, subjective fear did not remain high during the second stage as participants moved progressively closer to the feared stimulus. Rather, fear increased as the participant began to approach the spider, but gradually declined to a degree similar to that at the end of Stage 1. Not surprisingly, subjective fear fluctuated as proximity to the perceived threat changed but, overall, prolonged exposure was characterized by gradual reduction in distress over time.

Cognitive Factors

There was no indication that the groups experienced differential changes in fear or beliefs about spiders, or in one's ability to manage an encounter with a spider, as measured by the self-report psychometric measures. Both groups experienced substantial and stable reductions over time in the strength of negative beliefs about the spider and the perceived threat, as well as beliefs about one's inability to cope when encountering a spider. In some domains, gains were not only maintained but there was continued improvement over the 1 week follow-up period. Scores on the FSQ declined significantly from the beginning to end of Session 1 and at follow-up for both groups, indicating that within and between session fear reduction occurred regardless of safety behaviour use. Further, the fact that belief and self-efficacy scores remained stable one week later provides evidence for the consolidation of new learning that occurred within the session. This is particularly important as most other studies showing support for the use of safety behaviours during treatment have consisted of only a single session, providing no evidence of enduring cognitive change. The finding that cognitive changes were maintained after a short follow-up period indicates that the use of safety behaviours during treatment did not preclude meaningful changes in beliefs and associated functioning. This challenges the premise in

emotional processing theory that using safety behaviours prevents corrective learning and, consequently, symptom reduction. As noted earlier, Salkovskis (1991) argued that, when safety behaviours are used during exposure, evidence for the relative safety of the feared stimulus or situation remains unclear because the client can misattribute the nonoccurrence of the feared outcome to the use of safety behaviours. However, it appears that inaccurate beliefs are in fact modified despite the presumably ambiguous evidence.

Self-efficacy also increased significantly for both groups from pretest to posttest, reflecting increased confidence to perform spider-related tasks regardless of the presence of safety strategies. This is inconsistent with previous findings that people who use safety behaviours report greater increases in self-efficacy and, as a result, improved performance on behavioural tasks, relative to those who are not permitted such coping strategies (Johnson & Page, 2004, Oliver & Page, 2008). Self-efficacy was also significantly correlated with approach distance at each measurement point, a relationship that has been well established in the literature; however, there was no indication that the use of safety behaviours promoted such changes. This discrepancy may be explained by the nature of the experimental manipulation across studies. Studies showing a positive relationship between self-efficacy and behavioural changes during exposure, favouring those that used safety strategies throughout the task compared to those that did not, have primarily examined the effects of distraction. Typically, these studies employ conversation as the distractor task, which demands relatively few cognitive resources and allows attention to be allocated to processing threat-disconfirming information. The present study explored the effects of safety behaviours more generally, with distraction being just one of the available safety strategies. It may be that distraction is more likely to enhance self-efficacy compared to other safety behaviours, particularly when the cognitive demand of the distractor

task is low. Although the present study is unable to draw any conclusions about the independent effects of each recorded safety behaviour on self-efficacy, future studies should determine if some safety strategies are more likely to promote increased confidence to engage in exposure-related tasks.

Importantly, elevated scores on the general self-efficacy subscale of the SSES were also observed both within and between sessions, indicating that confidence to perform spider-related tasks generalized to situations outside of the experimental context. The experimental task and the fear stimulus were unquestionably different than what participants would experience in their day to day lives. A tarantula was chosen as the fear stimulus largely for practical purposes (e.g., easy to maintain, long life expectancy), as well as to be consistent with previous research. However, a tarantula is largely unrepresentative of many people's typical fear of common house spiders. Despite the apparent differences, increased general self-efficacy across sessions indicates that the fear reduction experienced in session extended to more realistic spider-related tasks.

Contrary to much of the existing research and what would be predicted by the emotional processing theory, there did not appear to be any differences between the groups on any of the cognitive measures. One possible explanation for this could be that safety behaviours are more detrimental during treatment for some anxiety disorders than others. The evidence suggesting that safety behaviours may be facilitative has been found primarily for specific phobias (e.g., Johnstone & Page, 2004; Milosevic & Radomsky, 2008; Williams, Dooseman, & Kleifield, 1984). On the other hand, studies regarding the use of safety behaviours during treatment for social phobia and panic disorder largely indicate that they interfere with symptom change (e.g., Kim, 2005; McManus, Sacadura, & Clark, 2008; Salkovskis, Clark, Hackmann, Wells, & Gelder, 1999). If, as cognitive models propose, safety behaviours interfere with cognitive

change, then it is a reasonable assumption that they would have their greatest impact during treatment for disorders that are more cognitively mediated. Some have alluded to the relatively uncomplicated nature of specific phobias compared to other anxiety disorders (Foa & Kozak, 1986, Salkovskis, 1991). As Salkovskis (1991) noted, "specific phobias have the least cognitive component" (p. 14) among the anxiety disorders. Similarly, Foa and Kozak (1986) suggested that the fear structure of people with specific phobias is less complex and more coherent, and therefore more easily targeted by in vivo exposure, than those with other phobias. This has been supported by psychophysiological data showing that individuals with specific phobias have a faster and stronger physiological response to threat relative to individuals with other anxiety disorders, perhaps because specific phobia is characterized by a less complex network of fear associations in memory (Cuthbert et al., 2003). Further, a substantial amount of evidence indicates that specific phobias are most effectively and efficiently treated with exposure alone, and that augmenting exposure with cognitive therapy does not improve treatment outcomes (Wolitzky-Taylor, Horowitz, Powers, & Telch, 2008). Thus, if the fear structures underlying specific phobias are thought to be reasonably uncomplicated and do not require targeted cognitive interventions to address elaborate beliefs, then factors thought to interfere with cognitive change may be less detrimental during treatment. For example, in the current study, many participants expressed specific fears that the spider might jump and cling to their body. Regardless of whether gloves are worn or a barrier is maintained between the spider and one's body, the spider failed to behave as anticipated, providing direct evidence against the specific prediction. On the other hand, fears in social phobia are often more diffuse and complex. If, for example, the belief is that others will think the client is stupid, disconfirmation of one's fears is highly dependent on others' responses, and often those reactions are unpredictable and

ambiguous. Further, these fears could be activated in various social situations everyday that are all subject to potentially biased interpretations. Any safety behaviour on the part of the client that makes objective interpretation more difficult may have the consequence of maintaining the fears. Although cognitive change may be the critical element in symptom reduction across anxiety disorders, such reappraisals may be more straightforward for specific phobias and, therefore, less vulnerable to the effects of safety behaviours.

Another possible explanation for the absence of group differences may be related to the experimental manipulation in the current study. There were no significant differences between the groups on any of the cognitive and subjective outcome measures and, although there were differences in approach distance observed throughout Stage 2, the effect sizes for even statistically significant analyses were quite small. This could indicate that there is genuinely no difference in treatment outcomes when safety behaviours are incorporated during exposure, or it may suggest that the safety behaviour manipulation was not sufficiently powerful to detect an effect. The latter explanation is a reasonable possibility given that many participants in the NSB group did in fact use safety behaviours during the exposure task. The most common safety behaviour used by this group was reassurance seeking, typically taking the form of asking informational questions about the spider in order to reduce anxiety during the task. While those in the SBU group used this strategy in addition to other cognitive (e.g., mental distraction) and behavioural (e.g., wearing protective clothing) strategies, it may be that the type, rather than the quantity, of safety behaviours has the greatest impact on fear reduction. If reassurance seeking more strongly interferes with fear reduction than other safety behaviours, then the strength of the experimental manipulation is compromised because both groups employed this strategy. Future studies should attempt to isolate the effects of a variety of safety behaviours on exposure

outcomes to determine if some safety strategies are more detrimental to treatment success than others. If this is indeed the case, then practical recommendations can be made to eliminate those behaviours that interfere with treatment outcomes while incorporating, perhaps temporarily, some safety strategies as a means of increasing tolerability and treatment compliance.

With regard to the safety behaviour manipulation, the frequency and topography of behaviours were recorded; however, at times the function of the behaviour was unclear. After completing the task, participants reported any strategies that they used to prevent something bad from happening, to help them complete the tasks, or to manage their anxiety. However, without a more thorough dialogue regarding the precise purpose of the safety behaviour, we are unable to conclude that the observed and reported behaviours were indeed functioning as safety behaviours. As such, this approach may have confounded adaptive coping strategies with safety behaviours (Thwaites & Freeston, 2005). Safety seeking behaviours themselves are not maladaptive; however, when the behaviour is intended to prevent a perceived catastrophe, it may have the effect of interfering with cognitive change. Adaptive coping strategies, on the other hand, may reduce anxiety and enhance self-efficacy, perhaps promoting corrective learning. Some strategies can simultaneously be considered both effective coping behaviours and safety behaviours, making interpretation of their effects difficult. Following the initial exposure session, a more precise measurement of the nature and purpose of the safety strategies used could have allowed us to interpret their contribution to the strength of the experimental manipulation.

Despite the potential difficulties associated with discriminating maladaptive safety behaviours from coping behaviours, permitting participants to choose their own strategies from an extensive and varied list provides support for the validity of the experimental manipulation. Most studies instruct participants to employ safety behaviours that are typical of the particular

disorder under investigation (Kim, 2005; McManus, Sacadura, & Clark, 2008; Powers, Smits, & Telch, 2004). The studies that do allow the participant to choose often provide a finite selection of items, generally protective clothing (Milosevic & Radomsky, 2008). This study was unique in that it allowed participants to choose strategies consistent with their particular concerns in the situation, increasing the chances that the strategy was indeed functioning as a safety behaviour. In addition, the available safety strategies included the most common classes of safety behaviours, including the availability of escape if one's fear became excessive, varying attentional focus (either staring or looking away from the spider), overt behaviours (e.g., wearing protective clothing), and covert behaviours (e.g., mental distraction). Participants were also encouraged to incorporate any idiosyncratic behaviours representative of their response in real life encounters with a spider that may have been feasible within the experimental context, such as maintaining a barrier between oneself and the spider. In this way, the experimental manipulation was a reasonable representation of safety behaviours that may be utilized in the participants' day to day lives, increasing the ecological validity of the study.

It has been noted previously that the presence of an experimenter or therapist can also be a safety signal during exposure (de Silva & Rachman, 1984; Lovibond, Davis, & O'Flaherty, 2000). To mitigate this possibility, participants should have been provided with educational information about the spider prior to the task to minimize the amount of interaction with the experimenter. As in previous studies, participants may have also benefitted from a demonstration of each step in the exposure hierarchy prior to beginning the extended behavioural task. This would likely impose stricter experimental control as participants would have less need to seek direction during the task and, consequently, reduce the possibility that the experimenter acted as a safety signal. Further, this would likely reduce the need of participants to seek reassurance and

request descriptive information about the spider. However, it is unlikely that between group differences on the outcome measures were affected by the presence of the experimenter, given that the extent of interaction with participants in the NSB group was limited, and the presence of the experimenter was a constant in both groups. In fact, the presence of the experimenter may have been desirable, as it more closely approximates a treatment environment where the therapist has considerable communication with the client, again providing support for the validity of our results.

Another strength of the study worth noting is that the strict inclusion criteria ensured that the sample of participants also closely approximated a clinical population. Although only 35% of the sample reported symptoms that met DSM-IV-TR (American Psychiatric Association, 2000) criteria for Specific Phobia of spiders, the majority of people reported fears in the clinical range but did not endorse criterion E; that is, many people indicated that their fear of spiders was not causing significant distress or impairment in daily living. However, community participants were specifically selected based on behavioural and self-report measures indicating that they were representative of clients seen in clinical practice, a population for which we know exposure to be effective. This has important clinical implications as the conclusions from this study can be realistically applied in a clinical setting.

Conclusions

The results of the current study are inconsistent with the specific premise in cognitive theories of anxiety disorders that the use of safety behaviours prevents unambiguous disconfirmation of one's maladaptive cognitions, thereby maintaining the disorder. Not only did both groups report significant reductions in fear of spiders, spider- and self-related beliefs, and increases in self-efficacy, they reported a corresponding decrease in subjective distress during

the exposure and at follow-up. These changes were reflected in substantial behavioural changes, in that both groups were similarly able to approach the spider and, in many cases, hold the spider. Importantly, such improvements appeared to generalize outside the experimental context, despite the incongruence between the experimental stimuli and one more likely to be encountered in day to day life. While this study supports the overwhelming evidence that exposure is an efficacious treatment for anxiety disorders, it challenges the often rigidly-held notion that safety behaviours are uniformly detrimental and should be eliminated during treatment. In fact, these results suggest that such anxiety management strategies may increase the rate at which treatment can proceed. Although these results are at odds with much of the published literature, it remains unclear what could account for these discrepancies. Hence, this study points to the need for further examination of the relationship between safety behaviour use and possible client or process variables that may affect the progress and outcome of treatment. In light of the mounting evidence that safety behaviours are not necessarily detrimental to treatment outcomes, a clear understanding of their role in exposure-based treatments is necessary before guidelines regarding their use are integrated into continually evolving treatment protocols.

Appendix A

Behavioural Approach Test

Instructions: First, I want to see how close you can get to the spider. We don't expect everyone to be able to touch the spider; I just want to see how far you can get. When you are ready to begin, I will bring the spider into the room and ask you to complete a series of steps in which you gradually get closer to the spider and, if possible, touch the spider. You will have 15 seconds to complete each step and then I'll ask you to move on to the next step. You can stop at any time, but the further you can go the better. Let me know when you can't go any further."

Steps in the BAT

1-10. Start at the back of the room and walk toward the aquarium (1-10)

11. Touch the outside walls of the container

12. Touch the inside walls of the container

13. Touch the bottom of the aquarium

14. Touch the tarantula with a pen

15. Touch the tarantula with your finger

16. Let the tarantula crawl on your hand

17. Hold the tarantula in the palm of your hand

Appendix B

Consent Agreement

TITLE OF THE STUDY:

Examining the effect of safety behaviours on the rate of fear reduction during exposure

You are being asked to participate in a research study. Before you give your consent to be a volunteer, it is important that you read the following information and ask as many questions as necessary to be sure you understand what you will be asked to do.

INVESTIGATORS:

This study is being conducted by Heather Hood, B.A., under the supervision of Dr. Martin M. Antony, Ph.D., from the Department of Psychology at Ryerson University.

PURPOSE OF THE STUDY

The purpose of this study is to examine how quickly fear reduces during exposure for people with a fear of spiders. Sixty participants with a fear of spiders will be recruited through the undergraduate participant pool at Ryerson University and through advertisements in the community.

DESCRIPTION OF THE STUDY

If you volunteer to participate in the study, you will be required to make two separate visits to the Psychology Research and Training Centre at Ryerson University. The first visit will take approximately 90 minutes. Upon reading and signing this consent form, you will be asked to do the following things:

- Approach a live spider in an aquarium as closely as you are able
- In another room, complete a short interview and several questionnaires that measure your fear of spiders and your beliefs about spiders
- Wear a heart rate monitor with chest strap to measure physiological arousal (i.e., heart rate) during the remaining tasks
- Approach the spider again, as closely as you are able, and remain there for 10 minutes
- At the end of 10 minutes, move toward the spider at your own pace for the next 30 minutes
- Complete the same questionnaires again

The second visit will take place one-week later. At that time, you will be asked to approach the spider again, as closely as you are able. Then you will be asked to complete the same questionnaires measuring your fear of spiders and beliefs about spiders. The second visit will take about 30 minutes.

RISKS OR DISCOMFORTS

You may experience a substantial amount of anxiety and discomfort during the procedure because you are being asked to approach the spider. However, you are free to withdraw from participation at any time if this becomes too distressing. There is also a remote risk that the spider may bite; however, tarantulas are typically non-aggressive and bites are rare (about 0.1% of tarantulas are known to bite). Tarantula bites are generally not harmful; they produce only mild stinging and minimal inflammation at the site of the bite.

BENEFITS OF THE STUDY

You may experience a reduction in your fear of spiders through participation in this study. Research has shown that controlled exposure to spiders is an effective way to reduce one's fear. However, there is no guarantee that your fears will improve from participating in this study. In addition, results from this study may be beneficial to further our understanding of the nature of phobias and their treatment.

CONFIDENTIALITY

Every effort will be made to ensure confidentiality of any identifying information that will be obtained in connection with this study. Your name and id number will not be kept together with your response data. Questionnaires will be kept in a locked filing cabinet inside a locked room, and electronic data files will be password protected. Confidentiality will be maintained to the extent allowed by law, and data will be destroyed no later than seven years after publication of the study. No one other than the investigators will have access to the data.

INCENTIVES TO PARTICIPATE

Participants recruited from the participant pool will be given one percent for research participation toward your mark in your introductory psychology course for attending the first visit, and one credit for returning one-week later for the second visit. All other participants will receive 10 dollars for each visit to the Psychology Research and Training Centre. If you choose to withdraw from the study at any point during the procedure, you will receive full compensation for that visit, but will not be eligible to complete or receive payment for the follow-up session.

VOLUNTARY NATURE OF PARTICIPATION

Participation in this study is voluntary. Your choice of whether to participate will not influence your future relations with Ryerson University. If you decide to participate, you are free to withdraw your consent and to stop your participation at any time without penalty or loss of benefits to which you are allowed.

At any particular point in the study, you may refuse to answer any particular question, refuse to complete a specific aspect of the study, or stop participation altogether.

QUESTIONS ABOUT THE STUDY

If you have any questions about the research now, please ask. If you have questions later about the research, you may contact.

Principal Investigator: Heather Hood
Telephone Number: 416-979-5000 ext. 2184

Or: Faculty Supervisor: Dr. Martin M. Antony
Telephone Number: 416-979-5000 ext. 2631

If you have questions regarding your rights as a human subject and participant in this study, you may contact the Ryerson University Research Ethics Board for information.

Research Ethics Board
c/o Office of the Vice President, Research and Innovation
Ryerson University
350 Victoria Street
Toronto, ON M5B 2K3
416-979-5042

AGREEMENT:

Your signature below indicates that you have read the information in this agreement and have had a chance to ask any questions you have about the study. Your signature also indicates that you agree to be in the study and have been told that you can change your mind and withdraw your consent to participate at any time. You have been given a copy of this agreement.

You have been told that by signing this consent agreement you are not giving up any of your legal rights.

_____
Name of Participant (please print)

_____ _____
Signature of Participant Date

_____ _____
Signature of Investigator Date

Appendix C

List of Spider-Related Safety Behaviours

Instructions: Spider-related safety behaviours are things that people do when confronted with a spider in an effort to reduce their anxiety. Below is a list of common safety behaviours that people who are afraid of spiders sometimes use. For this study, you will be asked to approach a live tarantula gradually over a 35 minute period and, if possible, hold the tarantula in the palm of your hand. Please select as many items from the list below that you think would help you perform this task. Next, on a scale of 0 to 10 (0 = not at all useful, 10 = very useful), rate the selected behaviours on how useful you think it will be to help you manage your fear.

Rating (0-10)	**Safety Behaviour**
_____	1. Look away from the spider
_____	2. Close your eyes
_____	3. Staring or focusing on the spider
	4. Wearing protective clothing:
_____	a. Long-sleeved shirt
_____	b. Rubber gloves
_____	c. Gardening gloves/work gloves
_____	d. Hat with a face screen
_____	5. Repeating a word or phrase in your head to distract yourself from the spider
_____	6. Rearranging the room so that you are close to the exit
_____	7. Other (specify):_____

Appendix D

Instructions for SBU Condition

Even though you have encountered spiders in the past, you may not have remained in the situation for a long period of time. Treatment for spider phobias typically involves exposure – that is, exposing yourself to the feared situation even if you feel quite afraid. Research has shown that exposure is one of the best ways to decrease your fear. It will likely be very unpleasant at first, but you will discover that your fear actually decreases the longer you stay in the situation. This helps you to directly learn that the things you fear are not going to happen. So, it is important to face the spider instead of avoiding it. By repeatedly allowing yourself to be in the feared situation, you will learn that the spider is really not threatening at all, which will help to get rid of your fear.

Earlier, I asked you to identify the safety behaviours from the list that you thought would be helpful as you approach the tarantula during the exposure task. You said that you thought (safety behaviour) would be helpful. Safety behaviours, like this/these, are thought to make it easier to overcome your fear of spiders. When you are faced with a spider, you may find that (safety behaviour) helps to decrease your anxiety so that you are able to get closer to the spider and remain in the situation for a longer period of time. This is because you believe that (safety behaviour) keeps you safe and you feel more confident to approach the spider. Over time, you will learn that what you fear may not be true. So for this task, I'm going to ask you to use as many of the safety behaviour that you identified - that is, (safety behaviour) – to help you manage your anxiety.

Appendix E

Instructions for NSB Condition

Even though you have encountered spiders in the past, you may not have remained in the situation for a long period of time. Treatment for spider phobias typically involves exposure – that is, exposing yourself to the feared situation even if you feel quite afraid. Research has shown that exposure is one of the best ways to decrease your fear. It will likely be very unpleasant at first, but you will discover that your fear actually decreases the longer you stay in the situation. This helps you to directly learn that the things you fear are not going to happen. So, it is important to face the spider instead of avoiding it. By repeatedly allowing yourself to be in the feared situation, you will learn that the spider is really not threatening at all, which will help to get rid of your fear.

Earlier, I asked you to identify the safety behaviours from the list that you thought would be helpful as you approached the tarantula during the exposure task. You said that you thought (safety behaviour) would be helpful. However, safety behaviours, like this/these, are known to interfere with overcoming your fear of spiders. You may find that (safety behaviour) helps to decrease your anxiety in the short term, but most research has shown that they actually work to maintain your anxiety over the long term. This is because you believe that (safety behaviour) keeps you safe and you never learn that what you fear may not be true. So for this task, I'm going to ask you to refrain from using any safety behaviours at all, especially (safety behaviour).

Appendix F

Debriefing Form

Thank you for your participation in our study. The purpose of this study is to examine how quickly fear declines when confronted with a feared object, and how this may be affected by the use of safety behaviours. Safety behaviours are anxiety management strategies that help to alleviate anxiety when in a fearful situation. These often take the form of escape and avoidance, but may also be more subtle strategies, such as distraction or focusing. For example, people with a fear of spiders may scan a room before entering to avoid encountering a spider, or wear a hat or hood to prevent a spider from crawling in one's hair. Although these behaviours may be helpful at the time, many researchers believe that they ultimately contribute to the long-term maintenance of anxiety and fear. This is because you never encounter information that might disconfirm your inaccurate beliefs, a process that is considered essential for overcoming problems with anxiety. This study was designed to examine the effects of safety behaviours during exposure to a live spider among those with an extreme fear of spiders.

In order to test this, we invited people who demonstrated an extreme fear of spiders to participate in the study, and asked them to complete two consecutive exposure tasks. In the first stage, you were asked to approach the spider as closely as possible and remain in the situation for 10 minutes to see how quickly your heart rate and fear declined. In the second stage, you were asked to move progressively closer to the spider to see how quickly you could approach it. You were also asked to complete a series of questionnaires that assessed your beliefs about spiders before and after the exposure task to see if your beliefs had changed throughout the session. The follow-up session was conducted to see if any changes in fear ratings persist over time.

Thank you for your time and participation. I hope that you found this study interesting and learned something new about your fear of spiders. If you are experiencing any concerns about your fear of spiders, please contact Ryerson Counseling Services (416) 979-5195, Lower Ground Level, Jorgenson Hall (JOR-07C). Also, if you would like to learn more about spider phobias and ways to manage your fear, you may be interested in the following books:

Antony, M. M., Craske, M., & Barlow, D. H. (2006). Mastering your fears and phobias (client workbook). New York: Oxford University Press.

Antony, M. M., & McCabe, R. E. (2007). Overcoming animal and insect phobias: How to conquer fear of dogs, snakes, rodents, bees, spiders, and more. Oakland, CA: New Harbinger.

This study has been approved by the Research Ethics Board of Ryerson University (REB # 2008-238) and is supervised by Dr. Martin M. Antony of the Psychology Department. Should you have any additional questions or concerns, please contact Heather Hood, the principal investigator, at (416) 979-5000, extension 2184, or hhood@psych.ryerson.ca.

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