An Experimental Test of Stimulus Estimation Theory:

Danger and Safety with Snake Phobic Stimuli

by

Lisa M. Wright

A thesis submitted to the Faculty of Graduate Studies in Partial Fulfillment of the Requirements for the Degree of Master of Arts in the Department of Psychology, University of Manitoba

0-612-51821-3

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Table of Contents

Abstract

The stimulus estimation model (Taylor and Rachman, 1994) asserts that fear overprediction stems from: (a) overprediction of the danger elements of a phobic stimulus, and (b) underprediction of existing safety resources. Using a 2 X 2 factorial design, with danger (high vs. low) and safety (high vs. low) as between-subjects variables, an experimental test of the model was conducted with 25 snake-fearful participants per condition. The four experimental conditions were matched on initial levels of snake fearfulness, as assessed by the Snake Questionnaire (SNAQ). For the 51 participants who demonstrated overprediction of fear, high danger led to reliably more fear overprediction than low danger; and low safety led to reliably more fear overprediction than high safety. The interaction between danger and safety was not statistically significant. The results offer the first convincing experimental support for the stimulus estimation model of fear overprediction.

Acknowledgments

I would like to sincerely thank my research advisor, Dr. Stephen Holborn, for all his support and hard work as I completed my Master's thesis. Dr. Holborn's enthusiasm and his willingness to give quick feedback were key motivators for me as I worked on my project. I would also like to thank the members of my committee for their numerous helpful suggestions: Dr. Rayleen DeLuca, Department of Psychology; Dr. Laine Torgrud, Department of Clinical Health Psychology; and Dr. Rosemary Mills, Department of Family Studies. I am very grateful to Mrs. Margaret Wright and Ms. Michelle Wright, both of whom volunteered many hours as research assistants in the laboratory. I am also very grateful to Mr. Ed Rzeszutek, who constructed the special terrarium needed for this study. Finally, I would like to thank Mr. Paul Rzeszutek, not only for spending countless hours in the laboratory as a research assistant, but also for offering insightful suggestions as the project developed.

List of Tables

An Experimental Test of Stimulus Estimation Theory: Danger and Safety with Snake Phobic Stimuli

The overprediction of fear bias is the tendency to overestimate how fearful you will be when exposed to a subjectively threatening situation (Taylor & Rachman, 1994). Highly fearful individuals (e.g., patients with panic disorder, people with phobias) are especially prone to fear overprediction (see review by Rachman & Bichard, 1988). Examples include the individual with claustrophobia who overpredicts the likelihood of experiencing a panic attack in an elevator, or the person with a snake phobia who overestimates resultant fear when exposed to a live snake. Fear overprediction can be adaptive, in the short-term, allowing individuals to avoid otherwise unexpected levels of fear in aversive situations (Rachman & Lopatka, 1986a). However, invariably it leads to excessive avoidance behavior, thereby limiting opportunities for exposure practice and subsequent fear reduction (Taylor, 1995).

Initial research by Rachman and Lopatka (1986a, 1986b, 1986c) examined the fear-matching behavior of participants with snake and spider phobias (p.387). Before each of 10 consecutive trials, participants predicted the amount of fear that they expected to experience in the presence of a live, harmless snake or spider. Participants made their ratings by drawing a line on a visual analogue scale (VAS) indicating their predicted level of fear. Once having completed the required exposure task, participants reported the actual peak fear level experienced on the same VAS scale. Prediction and report scores were then examined for correct matches (accurate predictions) and mismatches (overpredictions and underpredictions).

Findings revealed substantial overprediction of fear. Participants overpredicted their fear on approximately half of all exposure trials (46%, 44%, and 49% of participants overpredicted their fear for the three studies, respectively). Furthermore, one-third of the participants, all initially screened for high levels of fear, were excluded because they failed to show even moderate fear levels in the laboratory. Fear overprediction, among other possible explanations (e.g., endorsing a "snake phobia" to gain experimental credit, reporting low fear levels in the laboratory to appear brave in the eyes of the experimenter), may have contributed to this high exclusion rate.

Despite growing evidence that fear overprediction plays an important role in generating phobic avoidance (see review by Rachman & Bichard, 1988), specific factors contributing to the overprediction of fear bias remained poorly understood. In an attempt to identify such contributing factors, Taylor and Rachman (1994) proposed the stimulus estimation model. Specifically, they hypothesized that fear overprediction stems from: (a) overprediction of the danger elements of a feared stimulus, and (b) underprediction of existing safety resources (e.g., proximity of escape routes). In a test of their model, 224 snake-fearful university students were asked to approach a container housing a live garter snake. Prior to actual exposure, participants completed a questionnaire asking them about predicted fear levels at two specified distances from the snake. They also rated the predicted dangerousness of the snake (snake length, activity level, and a global rating of dangerousness), and predicted level of safety (control over whether the snake touched the participant, and a global rating of safety). Participants then completed the approach task, while reporting on actual levels of fear, danger, and safety at each approach point.

Structural equation modeling supported the stimulus estimation model of fear overprediction. Analysis of prediction-report difference scores at the closest approach point confirmed the tendency, in these participants, to overpredict fear while overpredicting danger and underpredicting safety. Furthermore, a maximum-likelihood factor analysis identified underprediction of global safety features as the most influential factor in fear overprediction (followed by the overprediction of global danger features). This finding was especially noteworthy, as it was the first empirical evidence suggesting that fearful individuals underpredict safety. Results also suggested that biases in estimating global features (e.g., danger, safety) rather than in estimating specific features (length, activity level) contribute most strongly to fear overprediction (p.179).

The main purpose of my research was to conduct an experimental test of the stimulus estimation model. Further tests of the model proposed by Taylor and Rachman (1994) are warranted, since two subsequent studies (Telch, Valentiner, & Bolte, 1994; Arntz, Hildebrand, & van den Hout, 1994) reportedly have found evidence that contradicts stimulus estimation theory. However, Taylor (1995) is critical of the methodology employed by these researchers. Specifically, he points out that neither study obtained <u>both predictions and reports</u> of danger and safety from the participants. Since overprediction of danger and underprediction of safety were never actually demonstrated, but only inferred, he argues that neither study was a valid test of the model. As well, Taylor suggests using an experimental design that <u>directly manipulates</u> overprediction of danger and underprediction of safety (p.700), rather than relying on the correlational methods used in previous studies (see Arntz, Hildebrand, & van den Hout, 1994; Taylor and Rachman, 1994). He cautions, however, that it is critical to ensure that the experimental conditions are having the desired effects. In other words, researchers must verify that the "high danger" manipulation is, in fact, producing greater overprediction of danger than the "low danger" manipulation (and that the "low safety" manipulation is, indeed, producing greater underprediction of safety than the "high safety" condition).

My research employed a 2 X 2 factorial design, with danger (high vs. low) and safety (high vs. low) as between-subjects variables, and fear overprediction as the dependent variable. Participants fearing snakes (n = 100) were assigned to one of four experimentally manipulated conditions: (a) high danger/high safety, (b) high danger/low safety, (c) low danger/high safety, or (d) low danger/low safety. Each participant completed a pre-trial session where they made predictions of fear, danger, and safety, followed by the actual exposure trial. In the pre-trial session, participants visualized approaching a live garter snake inside a glass terrarium at two specified approach points, making predictions of fear, danger, and safety. Participants then entered the laboratory and made actual ratings of fear, danger and safety at two approach points while focusing on a live garter snake inside the terrarium. Prediction-report difference scores for fear, danger, and safety were examined for overpredictions and underpredictions.

In accordance with stimulus estimation theory (Taylor & Rachman, 1994), participants who overpredict danger while underpredicting safety should overpredict fear. It was expected that the high danger/low safety condition, in particular, would result in both the overprediction of danger and underprediction of safety, resulting in the highest magnitude of fear overprediction. It was further hypothesized that the closest approach point (AP2) would result in the highest magnitude of fear overprediction, making AP2 the logical approach point for testing stimulus estimation theory (Taylor & Rachman, 1994).

Method

Participants

One hundred snake-fearful participants (77 females, 23 males) were recruited from Introductory Psychology classes at the University of Manitoba, and they received experimental credit for their participation. The presence of snake fearfulness was assessed via mass testing of 600 Introductory Psychology students, using a shortened version of the Fear Survey Schedule-III specially constructed for my research (Wolpe & Lang, 1964; see Appendix A). This version of the FSS-III consists of 10 items assessing different types of fears, including fear of snakes. All items were rated using a 5-point Likert-type scale, with 1 = Not at all disturbed, and 5 = Very much disturbed. Participants who indicated at least a moderate level of snake fear (score of 3 or higher) during mass screening were subsequently contacted by phone using a standard protocol (see Appendix B). Additional selection criteria included: (a) informed consent upon arrival at the laboratory (see Appendix C), and (b) English as a first language, since the effectiveness of the danger manipulation rested on reading comprehension.

Materials

Participants were asked to approach a live, 21" Florida garter snake enclosed in a glass terrarium (see Appendix J). The terrarium had a plexiglass partition that divided the container into equal halves. The partition was designed to keep the snake close to the end with the hinged lid during the exposure trial. The terrarium was lined with green carpeting, and was anchored securely to a metal table (0.72 m high) using four separate elbow clamps. This was to ensure that if a participant pulled a hand away quickly, the terrarium would not be knocked to the floor. The terrarium was kept in a locked research room during the day, and was carried to and from the laboratory by either the principal experimenter (myself) or one of two graduate research assistants from the University of Manitoba (from the Department of Psychology and the Department of Family Studies, respectively). During evenings and weekends, the snake was housed in a second terrarium at my home.

Prior to making predictions of fear, danger, and safety in the pre-trial session, participants were given a questionnaire package that included the following: (a) a copy of the SNAQ questionnaire (snake questionnaire), (b) a danger script (either high or low), and (c) a 4-item quiz testing for mastery of relevant information in the script. The SNAQ questionnaire is a 30-item true/false questionnaire that assesses degree of snake fearfulness (Klorman, 1974; see Appendix D). The SNAQ scores were used as a manipulation check on the matching procedure, to verify that the mean level of phobic response was comparable across the four experimental conditions. After completing the items in the initial questionnaire package, participants were then given a second questionnaire package that included instructions for completing pre-trial predictions and the actual exposure trial (see Appendix E). The questionnaire asked participants to visualize themselves approaching a live garter snake housed in a glass terrarium, and then to make predictions of fear, danger, and safety at two approach points. Participants were then asked to make actual ratings of fear, danger, and safety in the presence of the snake.

Design

A 2 X 2 factorial design was employed, with danger (high vs. low) and safety (high vs. low) as between-subjects variables, and fear overprediction (fear prediction - fear report) scores as the dependent variable. Participants were assigned to one of four conditions: (a) high danger/high safety, (b) high danger/low safety, (c) low danger/high safety, and (d) low danger/low safety.

Table 1 shows the means and standard deviations for SNAQ scores in each of the four experimental conditions, as well as the overall mean and standard deviation for SNAQ scores. The overall mean SNAQ score (M = 17.91) indicated a moderate level of snake fearfulness for the total sample (see Klorman, 1974). A one-way ANOVA revealed that mean SNAQ did not differ as a function of experimental condition, F (3,96) = 0.40, p = .989, confirming that the four experimental conditions were matched on initial levels of snake fearfulness.

Table 1. Mean SNAQ Scores By Condition

Condition	M	SD
High Danger/Low Safety	17.64	5.12
Low Danger/ Low Safety	18.04	4.58
High Danger/High Safety	18.08	5.28
Low Danger/High Safety	17.88	4.86
Overall Mean	17.91	4.89

The closest approach point in Taylor & Rachman (1994) involved touching a red mark inside a container, located 10 cm up from the bottom. However, the Human Ethical Review Committee in the Department of Psychology at the University of Manitoba stipulated that if participants were going to be touching the inside of the terrarium, they must be warned about the potential risk of contracting Salmonella poisoning from the snake's environment. Since the present study manipulated danger (high vs. low), warning the participants about the risk of contracting Salmonella poisoning may have resulted in all participants perceiving the snake as dangerous. Therefore, the closest approach point (AP2) in the present study involved opening the hinged lid of the terrarium with one hand, while at the same time touching a red mark located on the shorter outside wall of the terrarium (10 cm from the bottom) directly beneath the hinged lid (see Appendix J).

Danger was manipulated via an information handout that either emphasized (high danger) or minimized (low danger) the threat-relevant characteristics of snakes (see Appendix D). In other words, participants either read a script about snakes that emphasized danger (e.g., snakes are active and highly mobile, some are poisonous), or one that focused on non-dangerous characteristics (e.g., life-span information, feeding patterns). Information in these scripts was obtained from two sources (see Mertens, 1987; Trutnau, 1981). To ensure that the material in the scripts was mastered, all participants were administered a four-item multiple-choice quiz testing for retention of critical information in the scripts (see Appendix D).

Safety was manipulated by varying (a) the participant's proximity to the exit during the exposure session, and (b) the amount of assistance offered by the experimenter during the exposure session (i.e., verbal instructions, hand gestures, visibility of experimenter during approach tasks). Before the pre-trial predictions were made, each participant read a procedural script (either high safety or low safety) that described the setup of the laboratory, location of exits, positioning of the experimenter, etc. (see Appendix F). When they entered the lab for the exposure trial, the experimenter essentially repeated the information that participants had already read in the procedural scripts (see Appendix F).

In the high safety condition, participants were near an exit (3 m away) when they approached the snake (e.g., to allow for quick escape from the laboratory). As well, the experimenter was available for assistance/support throughout all exposure tasks (e.g., experimenter sat 5 m behind the participant during the exposure tasks). In the low safety condition, the front (nearest) exit was barricaded. The experimenter walked to the front of the room with the participant through a maze of desks that "barricaded" the participant from the back exit. The experimenter cued each participant (both verbally and by pointing at the front exit) to look at the front exit before commencing the actual exposure trial. The experimenter instructed participants that the front exit was sealed (the exit was barricaded by a long table and was marked by a NO EXIT sign), and that they were to walk back through the maze of desks and exit at the back of the room (approx. 15 m away) at the end of the trial. No verbal reassurance was offered by the experimenter, who remained at the back of the room throughout the duration of the trial (see Appendix F for the list of acceptable verbal instructions/hand gestures for each safety condition).

Treatment Integrity

Treatment integrity refers to both a) procedural reliability, or consistent application of experimental procedures across conditions (Billingsley, White, & Munson, 1980), and b) participant compliance to instructions and procedures (Gutkin & Holborn, 1994). Treatment integrity was maintained in the following ways. First, participants read written scripts to achieve the danger manipulation, and then completed a short quiz to ensure mastery of the material. Second, all necessary instructions for completing the experiment were explicitly detailed in two questionnaire packages. Third, the experimenter followed a verbal procedural script (including appropriate hand gestures) while guiding participants through the approach tasks (see Appendix F). Fourth, <u>both predictions and reports</u> of danger and safety were obtained from participants at each approach point, allowing for verification of the effectiveness of the danger and safety manipulations (e.g., the "high danger" manipulation is, in fact, producing greater overprediction of danger than the "low danger" manipulation; see Taylor, 1995). Finally, one of the two research assistants filled out an observer checklist in each session, ensuring that any procedural deviations (by the experimenter) were recorded (see Appendix G) and corrected in future sessions. A procedural reliability coefficient, indicating reliable execution of the experimental procedure, was obtained by dividing the number of experimenter behaviors emitted in correspondence with the planned procedure (as illustrated on the checklist) by the total number of possible behaviors which could have been emitted by the experimenter in accordance with the planned procedure (Billingsley, White, & Munson, 1980, p. 234). The procedural reliability coefficient was 0.99, indicating reliable execution of the planned experimental procedure. Occasional procedural deviations were (a) failing to place the Exit/No Exit signs above the front door, (b) failing to barricade the sealed front door in the low safety condition, (c) omission of hand gestures (e.g., saying that the front exit is sealed but not pointing to it), and (d) failing to correct the short quiz testing for mastery of relevant material in the danger script (note, however, that all participants obtained a score of at least 3 out of 4 on the quiz).

Procedure

Upon arrival, participants first were asked to read the information handout detailing the experimental procedure. After reading the handout, each participant signed the consent form (see Appendix C). Participants then received a second handout that included, in the following order: (a) a copy of the SNAQ questionnaire, (b) an information script that either minimized (low danger) or maximized (high danger) the threat relevant characteristics of garter snakes, and (c) a short quiz testing for retention of the critical information in the danger scripts (see Appendix D). Once all these items were completed, I corrected the quiz and went over any incorrect answers with the participant. Participants were then given a questionnaire package that included instructions for completing the pre-trial predictions, and were escorted to a small desk just outside the back door of the laboratory. Participants sat in this desk while reading the procedural script (see Appendix F) and completing their prediction ratings. At this time, the laboratory was set up for the appropriate safety condition (open vs. barricaded front exit) with the snake placed in the terrarium at the front of the room.

Before making their prediction for the first approach point, participants read the following instructions: "Visualize yourself walking up to the snake at the front of the lab. You will be stopping 1 foot from the terrarium and focusing on the snake for approximately 5 seconds" (see Appendix E). After visualizing completing this task, participants then answered the following three questions on a VAS scale ranging from 0 (not at all afraid) to 100 (extremely afraid; see Appendix E):

(1) How dangerous do you believe the snake is?

(2) How safe do you think you will feel when you see the snake?

(3) How fearful do you think you will be when you see the snake?

Before making predictions for the second approach point, participants read the following instructions: "Now, imagine yourself lifting the hinged portion of the lid of the terrarium. You will hold the lid open for up to 3 seconds with one hand, while at the same time touching the red tape on the outside wall of the terrarium with your other hand" (see Appendix E). After visualizing completing this task, participants were asked to answer three questions:

(1) How dangerous do you believe the snake is?

(2) How safe do you think you will feel, opening the lid when the snake is inside?

(3) How fearful do you think you will be, opening the lid when the snake is inside?

After answering these questions, the participant called out to the experimenter that they had completed the first portion of the questionnaire. The research assistant then brought the participant into the laboratory through the back door.

For the actual exposure trial, participants completed the tasks they had visualized completing in the pre-trial session. Participants first walked up to the terrarium, stopping directly in front of the terrarium (0.33 m away). After focusing on the snake for a few seconds, they answered the following three question (using the same VAS scale; see Appendix E):

(1) How dangerous do you believe the snake is?

(2) How safe do you feel right now?

(3) How much fear are you experiencing right now?

Participants then were asked to lift the hinged lid of the terrarium with one hand, and to hold it open for approximately 3 s while touching the red mark located on the outside wall of the terrarium. After closing the lid, they were asked to answer three questions:

(1) How dangerous did you believe the snake was?

(2) How safe did you feel, opening the lid with the snake inside?

(3) How much fear did you feel, opening the lid with the snake inside?

Once all ratings were completed, the participant left the laboratory with the research assistant, keeping their questionnaire package with them. The participant then re-entered the laboratory through the back door for debriefing, handing in their questionnaire to the experimenter at this time.

Participants were not given a full verbal description of the study, in order to prevent future participants from obtaining information about the purpose of the study. However, they were told that the study's goal was to examine how perceptions of danger and safety can affect a person's tendency to overpredict fear in the presence of a phobic stimulus (in this case, a snake). Participants were thanked for their participation, as well as praised for their courage in confronting a feared object (see Appendix H). Participants also were asked to voice any questions or concerns about the study at this time. All participants received a handout that (a) provided contact numbers, should they have any questions or concerns about the experiment, or if they desired additional information about phobias and their treatment, and (b) informed participants where (and when) a full description of the study, and its results, would be posted (see Appendix I).

Results

Results are presented in three stages as follows. First, a repeated measures t-test compared the mean fear difference scores (for the total sample) at AP1 and AP2. This was to confirm that, as in Taylor and Rachman (1994), the closest approach point (AP2) produced the greater magnitude of fear overprediction, and was therefore the best approach point for testing stimulus estimation theory. Second, independent-groups t-tests compared (a) the mean danger difference scores (predicted danger - reported danger) for each danger condition (high danger vs. low danger), and (b) the mean safety difference scores (predicted safety - reported safety) for each safety condition (high safety vs. low safety). This treatment integrity check on the danger and safety manipulations was critical (see Taylor, 1995), in order to verify that (a) the high danger condition did, in fact, produce greater overprediction of danger than the low danger condition, and (b) the low safety condition did, in fact, produce greater underprediction of safety than the high safety condition. Finally, a 2 X 2 analysis of variance, or ANOVA (high danger vs. low danger X high safety vs. low safety), was conducted on fear difference scores (fear prediction - fear report) at AP2, in order to assess the magnitude of fear overprediction across experimental conditions.

Effectiveness of Approach Point Manipulation

Participants reliably overpredicted fear at AP2 (M = 11.35) relative to AP1 (M = 6.66), t (99) = 2.04, $p < .05$ ($\varphi^2 = .28$), confirming that the closest approach point did, in fact, produce the greatest magnitude of fear overprediction. Since Taylor and Rachman (1994) used only the closest approach point in their analyses, stating that AP2 "... is more appropriate than AP1 (fear prediction 1 - fear report 1) for testing the hypothesis that stimulus estimation bias contributes to overprediction of fear " (p.177), only ratings for AP2 were included in subsequent analyses.

Effectiveness of Danger and Safety Manipulations

In accordance with the stimulus estimation hypothesis, the high danger/low safety condition should produce the highest magnitude of danger overprediction and safety underprediction, thus resulting in the highest magnitude of fear overprediction. However, it must be verified that the experimentally manipulated conditions are having the desired effects (see Taylor, 1995). In other words, the "high danger" manipulation must, in fact, produce greater overprediction of danger than the "low danger" condition (and the "low safety" manipulation must, indeed, produce greater underprediction of safety than the "high safety" condition).

Positive danger difference scores (danger prediction 2 - danger report 2) demonstrate an overprediction of danger. Participants in the high danger (M = 14.50, SD = 24.67) condition reliably overpredicted danger relative to participants in the low danger (M = 4.00, SD = 24.93) condition, t (98) = 2.117, $p < .04$. Positive safety difference scores (safety prediction 2 - safety report 2) demonstrate an underprediction of safety.

Participants in the low safety (M = 14.38, SD = 27.69) condition reliably underpredicted safety relative to those in the high safety (M = 4.06, SD = 24.49) condition, $t\ (98) = 1.974$, $p \leq .05$.

Magnitude of Fear Overprediction

Mean fear difference scores (including standard deviations) for AP2, by experimental condition, are shown in Table 2. Participants in the high danger (M = 15.62) condition overestimated fear relative to those in the low danger (M = 7.08) condition. Participants in the low safety (M = 13.02) condition overestimated fear relative to the high safety (M = 9.68) condition. The effects of the danger manipulation were increased somewhat in the low safety condition relative to the high safety condition. A 2 X 2 between-subjects ANOVA (high danger vs. low danger X high safety vs. low safety) revealed a nonsignificant main effect for danger, $F\ (1, 96) = 3.01$, $p = .09$; a nonsignificant main effect for safety, $F\ (1, 96) = 0.46$, $p = .50$; and a nonsignificant interaction between danger and safety, $F\ (1, 96) = 0.09$, $p = .76$.

Table 2. Mean Fear Difference Scores By Condition at AP2

	Experimental Condition			
	High Danger Low Safety	Low Danger Low Safety	High Danger High Safety	Low Danger High Safety
M	18.04	8.00	13.20	6.16
SD	31.38	24.67	24.80	15.28

Note: The values represent mean fear overprediction scores (fear predictions-fear reports). For each experimental condition, $n = 25$.

The stimulus estimation hypothesis states that it is participants who overpredict fear that should at the same time overpredict danger while underpredicting safety. In the present sample, 51 of the 100 participants overpredicted their fear at AP2, while the remaining 49 participants either underpredicted fear (n = 24) or accurately predicted fear (n = 25). Since the stimulus estimation model specifies that only participants who overpredict fear should engage in the stimulus estimation bias, a more sensitive test of the theory would be achieved by using data only from participants who overpredicted fear at AP2. Overprediction of fear was defined as a fear difference score (fear prediction 2 - fear report 2) greater than, or equal to, five.

Mean SNAQ Scores By Condition: Modified Sample

Table 3 shows the means and standard deviations for SNAQ scores in each of the four experimental conditions for the modified sample. The overall mean SNAQ score (M = 16.88) indicated a moderate level of snake fearfulness for the modified sample (see Klorman, 1974). A one-way ANOVA revealed that mean SNAQ did not differ as a function of experimental condition, F (3, 47) = 0.59, p = .622, confirming that the four experimental conditions were matched on initial levels of snake fearfulness.

Table 3. Mean SNAQ Scores By Condition for the Modified Sample

Condition	n	M	SD
High Danger/Low Safety	13	15.54	5.09
Low Danger/Low Safety	12	17.67	3.34
High Danger/High Safety	14	17.71	5.30
Low Danger/High Safety	12	16.58	5.21
Overall Mean	51	16.88	4.77

Effectiveness of Danger and Safety Manipulations: Modified Sample

As before, the effectiveness of the danger and safety manipulations were first verified in the modified sample (n = 51). Twenty-seven participants were in the high danger condition, and twenty-four participants were in the low danger condition. Participants in the high danger (M = 21.40, SD = 28.36) condition overpredicted danger relative to those in the low danger (M = 11.46, SD = 24.91) condition. However, with the reduced sample size and large variability in scores, this mean difference was not statistically reliable, t (49) = 1.32, p = .19. Twenty-five participants were in the low safety condition, and twenty-six participants were in the high safety condition. Participants in the low safety (M = 30.68, SD = 22.55) condition reliably underpredicted safety relative to those in the high safety (M = 13.12, SD = 28.48) condition, t (49) = 2.435, $p \leq .02$.

Magnitude of Fear Overprediction: Modified Sample

Mean difference scores (including standard deviations) for the modified sample, by experimental condition, are shown in Table 4. Participants in the high danger (M = 35.48) condition overestimated fear relative to those in the low danger (M = 22.67) condition. Participants in the low safety (M = 34.54) condition overestimated fear relative to those in the high safety (M = 23.84) condition. The effects of the danger manipulation were increased somewhat in the low safety condition relative to the high safety condition. A 2 X 2 between-subjects ANOVA (high danger vs. low danger X high safety vs. low safety) revealed a statistically significant main effect for danger, F (1, 47) = 5.81, $p \leq .02$, ($\varphi^2 = .11$), and a statistically significant main effect for safety, F (1, 47) = 3.91, $p \leq .05$,

($\varphi^2 = .08$). However, the interaction between danger and safety was not statistically reliable, $F(1, 47) = 0.12$, $p = 0.73$.

Table 4. Mean Fear Difference Scores By Condition for the Modified Sample

	Experimental Condition			
	High Danger Low Safety	Low Danger Low Safety	High Danger High Safety	Low Danger High Safety
n	13	12	14	12
M	42.00	27.08	29.42	18.25
SD	23.48	18.88	20.80	11.01

Note: The values represent mean fear overprediction scores (fear predictions-fear reports). For the modified sample, n = 51.

Discussion

My research appears to be the first to test the stimulus estimation model of fear overprediction via experimental manipulation of danger and safety. Taylor (1995) stressed that, in order to test the stimulus estimation model experimentally, it <u>must</u> first be confirmed that danger and safety were effectively manipulated. In other words, it is essential to demonstrate that the high danger condition did, in fact, produce greater overprediction of danger relative to the low danger condition, and that the low safety condition did, in fact, produce greater underprediction of safety relative to the high safety condition. Analysis of the mean danger difference scores (predicted danger - reported danger) and mean safety difference scores (predicted safety - reported safety) confirmed, both in the total sample and in the modified sample, that the danger and safety manipulation were effective in creating a greater magnitude of danger overprediction in the high danger condition, and a greater magnitude of safety underprediction in the low safety condition. Although the difference in mean danger overprediction for the modified, smaller sample was not statistically significant, the difference of 9.95 ($\underline{M}$ = 14.50 for high danger, $\underline{M}$ = 4.00 for low danger) was substantial and in the desired direction, suggesting that the high danger condition produced a greater magnitude of danger overprediction than the low danger condition.

Once the effectiveness of the danger and safety manipulations was established, interpretation of the subsequent analyses examining the effects of danger and safety on fear overprediction became possible. All analyses were conducted for ratings at AP2, given that this approach point produced a significantly greater magnitude of fear than at

AP1 (Taylor & Rachman, 1994). Results for the total sample indicated that the magnitude of fear overprediction did not differ significantly as a function of experimental condition. Participants in the high danger condition did overestimate fear relative to those in the low danger condition, and participants in the low safety condition did underestimate fear relative to the high safety condition. However, the difference was not statistically reliable. The effects of manipulating danger were slightly greater in the low safety condition than in the high safety condition, although the interaction between danger and safety was relatively small and statistically nonsignificant.

In the total sample, 51 participants overpredicted their fear at AP2, while 24 participants underpredicted their fear and 25 participants accurately predicted their fear. Since the stimulus estimation model states that only participants who engage in the overprediction of fear bias should at the same time overpredict danger and underpredict safety, the logical test of the model lies with the data of the 51 participants who actually demonstrated fear overprediction. Results obtained from this modified sample offered convincing support for the stimulus estimation model of fear overprediction. Participants in the high danger condition reliably overestimated fear relative to those in the low danger condition, and participants in the low safety condition reliably overestimated fear relative to those in the high safety condition. Although the effects of manipulating danger were greater in the low safety condition relative to the high safety condition, this interaction did not reach statistical significance.

The results from my research offer the first experimental support for the stimulus estimation theory of fear overprediction. Additional experimental studies now must test the generality of the model with a variety of fears. The variability in fear difference scores (error variance) was reduced considerably when the sample was modified to include only the 51 participants who overpredicted fear. Thus, future research using a larger sample of only fear overpredictors may uncover stronger main effects, and even a statistically significant interaction between danger and safety. As well, researchers should continue to examine the potential mechanisms underlying the overprediction of danger and underprediction of safety (Taylor and Rachman, 1994, p.179). For example, Taylor and Rachman have suggested that overprediction of fear may stem from selective recall of highly fearful experiences. Thus, studies that manipulate memory retrieval (e.g., experimental studies that prime fear-relevant vs. fear-irrelevant memories), in addition to manipulating danger and safety, may increase our understanding of how perceptions of danger and safety affect fear overpredictions (p.179).

It is interesting to note that, while the majority of participants who overpredicted fear engaged in the stimulus estimation bias, approximately 30% of the participants who overpredicted fear (16 out of 51 participants) did not overpredict danger while underpredicting safety. Furthermore, of the 49 participants who did not overpredict fear at AP2, 7 of these participants (14%) did engage in the stimulus estimation bias. However, these results are not to be taken as fatal to the stimulus estimation theory. The particular manipulations of danger and safety employed in my study would not be expected to uniformly tap into critical stimulus features of danger and safety for all participants. Moreover, other theoretical variables yet to be specified may impact the overprediction of fear. Finally, demand characteristics (e.g., to make accurate predictions to please the experimenter), also may have impacted ratings of danger, safety, or fear.

If further investigation of the stimulus estimation model via experimental methods establishes a generalized tendency of fearful individuals to overpredict fear while overpredicting danger and undepredicting safety, the implications for the clinical treatment of fear-related disorders are far reaching. Research has demonstrated that fear overprediction leads to excessive avoidance behavior (see Rachman & Bichard, 1988), and the present results indicate that verbal information about danger and safety can impact the magnitude of fear overprediction. Thus, where fears have such an information base, interventions targeting changes in estimates of danger and safety may prove to be highly therapeutic.

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Appendices

Appendix A

Shortened Fear Survey Schedule (FSS-III)

The items in this questionnaire refer to things and experiences that may cause fear or other unpleasant feelings. Write the number of each item in the column that describes how much you are disturbed by it nowadays.

	Not at all	A little	A fair amount	Much	Very Much
	1	2	3	4	5
1. Speaking in public					
2. Enclosed spaces					
3. Blood					
4. Harmless Snakes					
5. Thunder					
6. Airplanes					
7. Making mistakes					
8. Spiders					
9. Crowds					
10. Sight of knives/ sharp objects					

Appendix B

Telephone Recruiting Script

Hi, my name is Lisa and I'm a second year graduate student in psychology at the University of Manitoba. I'm currently working on my Master's Thesis and I'm trying to get volunteers from the Introductory Psychology subject pool to participate in my project. Based on a short survey you completed in your introductory psychology class, you are eligible to participate in my study, and you will be given 2 experimental credits if you choose to participate. Would you like me to tell you about the study?

If "yes":

My research project is about snake fearfulness. The study itself will take approximately 30 minutes to complete. First, you will be asked to read some information and answer some questionnaire items about this information. After this, you will be asked to complete a prediction trial, followed by an actual exposure trial. For the prediction trial, you will visualize yourself walking up to the snake at the front of the lab at two specified distances. You then will be asked to make predictions about how fearful you think you will be at each distance. For the actual exposure trial, you will approach a live garter snake inside a glass terrarium. At Approach Point 1, you will observe the snake from a distance of 1 foot from the terrarium. At Approach Point 2, you will be asked to open the hinged lid while briefly touching the outside glass of the terrarium. At each approach point, you will be asked to rate how fearful you feel. At no time are you asked to touch the snake. You are only asked to complete as many of the tasks as you feel you can, and you will be given the chance to see the experimental setup before giving consent.

Appendix C

<u>About the Experiment</u>

This experiment is about fear of snakes. After reading a brief information page about snakes, you will be asked to complete a predictions trial, followed by an actual exposure trial.

When making predictions, you will visualize yourself walking up to the snake at the front of the lab, stopping 1 foot from the terrarium and focusing on the snake for approximately 5 seconds. You then will be asked to answer the following three questions (on a scale from 0- 100):

(1) How dangerous do you think the snake will be?

(2) How safe do you think you will feel when you see the snake?

(3) How fearful do you think you will be when you see the snake?

Next, you will imagine lifting the hinged lid of the empty terrarium, holding it open for approximately 3 seconds, while at the same time touching the outside of the terrarium, and then closing it. After putting down the lid, you will asked to answer three more questions (on a scale from 0 - 100):

(1) How dangerous do you think the snake will be?

(2) How safe do you think you will feel, opening the lid and touching the red mark on the outside wall of the terrarium, when the snake is inside?

(3) How fearful do you think you will be, opening the lid and touching the red mark on the outside wall of the terrarium, when the snake is inside?

For the actual exposure trial, you will approach a live garter snake in a terrarium. You first will walk up to the terrarium, stopping 1 foot away and observing the snake for a few seconds. From this distance, you will be asked to answer the following three question (on a scale from 0 - 100):

(1) How dangerous do you believe the snake is?

(2) How safe do you feel right now?

(3) How much fear are you experiencing right now?

Next, you are to lift the hinged lid of the empty terrarium, holding it open for approximately 3 seconds while at the same time touching the outside wall of the terrarium. After putting down the lid, you will be asked to answer three more questions (on a scale from 0 - 100):

(1) How dangerous did you believe the snake was?

(2) How safe did you feel, opening the lid and touching the red mark on the outside wall of the terrarium, with the snake inside?

(3) How much fear did you feel, opening the lid and touching the red mark on the outside wall of the terrarium, with the snake inside?

After answering these questions, you will exit the lab with the research assistant.

Do you have any questions about the experiment at this point? If yes, please feel free to ask. If not, please turn the page and sign the consent form provided.

Consent Form

I, ______________________________, have read the attached information pages entitled "**About the Experiment**" and I agree to participate in this study. **I UNDERSTAND THAT I MAY CHOOSE TO DISCONTINUE MY PARTICIPATION AT ANY TIME DURING THE EXPERIMENT, AND I WILL STILL RECEIVE 2 EXPERIMENTAL CREDITS.**

____

Signature

____

Date

Appendix D

Questionnaire Package A

Please be sure to complete all three sections of this booklet:

1. Fill out the SNAQ Questionnaire
2. Read the passage entitled "Information about Snakes"
3. Complete the short quiz on the reading passage

Please complete the following questionnaire:

False	True	Questionnaire Items
1. ___	___	1. I avoid going to parks or on camping trips because there may be snakes about.
2. ___	___	2. I would feel some anxiety holding a toy snake in my hand.
3. ___	___	3. If a picture of a snake appears on the screen during a motion picture, I turn my head away.
4. ___	___	4. I dislike looking at pictures of snakes in a magazine.
5. ___	___	5. Although it may not be so, I think of snakes as slimy.
6. ___	___	6. I enjoy watching snakes at the zoo.
7. ___	___	7. I am terrified by the thought of touching a harmless snake.
8. ___	___	8. If someone says that there are snakes anywhere about, I become alert and on edge.
9. ___	___	9. I would not go swimming at the beach if snakes had ever been reported in the area.
10. ___	___	10. I would feel uncomfortable wearing a snakeskin belt.
11. ___	___	11. When I see a snake, I feel tense and restless.
12. ___	___	12. I enjoy reading articles about snakes and other reptiles.
13. ___	___	13. I feel sick when I see a snake.
14. ___	___	14. Snakes are sometimes useful.
15. ___	___	15. I shudder when I think of snakes.
16. ___	___	16. I don't mind being near a non-poisonous snake if there is someone there in whom I have confidence.

False	True	
17. ___	___	17. Some snakes are very attractive to look at.
18. ___	___	18. I don't believe anyone could hold a snake without some fear.
19. ___	___	19. The way snakes move is repulsive.
20. ___	___	20. It wouldn't bother me to touch a dead snake with a long stick.
21. ___	___	21. If I came upon a snake in the woods I would probably run.
22. ___	___	22. I'm more afraid of snakes than any other animal.
23. ___	___	23. I would not want to travel "down south" or in tropical countries, because of the greater prevalence of snakes.
24. ___	___	24. I wouldn't take a course in biology if I thought you might have to dissect a snake.
25. ___	___	25. I have no fear of non-poisonous snakes.
26. ___	___	26. Not only am I afraid of snakes, but worms and most reptiles make me feel anxious.
27. ___	___	27. Snakes are very graceful animals.
28. ___	___	28. I think I'm no more afraid of snakes than the average person.
29. ___	___	29. I would prefer not to finish a story if something about snakes was introduced into the plot.
30. ___	___	30. Even if I was late for a very important appointment, the thought of snakes would stop me from taking a shortcut through an open field

Information about Garter Snake

(Low-Danger Script)

Please read the following passage carefully:

Garter snakes are relatively timid reptiles. They are popular household pets and are well suited to terrarium life. However, accurate information about how to care for a pet snake is vital to its long-term health and happiness.

The temperature in the terrarium needs to be regulated by an external heat source. One end of the cage should be set at approximately 25° C, with cooler conditions of 15° to 20° C at the opposite end. This allows the snake to select a comfortable temperature within the terrarium at any given time. The water bowl should be placed at the cooler end of the cage to prevent excessive evaporation; otherwise, increased humidity levels will result.

Garter snakes are rarely motivated to escape a well-regulated, enclosed environment, even if they are able to do so. In fact, these snakes often sleep for most of the day, curled up in a coil to preserve body heat (especially if there is no heat source in the terrarium). They can be offered food every day, but they will likely choose to fast for short periods of two to three days.

Overall, garter snakes tend to be passive and slow moving in captivity. They appreciate an environment where they can feel secure and safe. In short, a garter snake requires minimal care and is an excellent choice for a household pet.

Information about Snakes

(High-Danger Script)

Please read the following passage carefully:

Healthy snakes are active and highly mobile creatures. They "flick" their tongues in and out continuously, smelling their environment for possible sources of prey as they slither around their environment. Some snakes hiss when they are annoyed, and they have been known to strike out when threatened. All snakes are great escape artists and will seek out ways to escape the terrarium. Thus, it is important to ensure that the terrarium is properly sealed and maintained, with no loose parts or small gaps where a snake could conceivably escape.

Snakes are carnivorous (meat-eating) by nature, and they eat their prey whole. Large prey is often pushed against a rock to anchor it in place while the snake works its jaw around it. Snakes have been known to eat their own young in captivity, and would probably try to eat any other snakes smaller than themselves. For this reason, snakes are best kept individually. When feeding a snake, the use of forceps is recommended. The main reason for the forceps is that if you offer the snake food by hand and your hand smells of food, your chances of getting bitten are significantly increased.

It is important to realize that snakes can be high-strung and temperamental in captivity, and they can be dangerous if not cared for properly. Several simple precautions, as mentioned above, will help to ensure long-term success in keeping a snake for a pet.

Low Danger

Instructions: Based on the information sheet you read entitled "Caring for a Pet Garter Snake", please select the best answer to the following questions. If necessary, you may go back and reread the passage. However, do not refer back to the passage once you have started the quiz.

(1) Garter snakes

(a) should only be housed with other garter snakes
(b) are relatively timid reptiles and are well suited to terrarium life
(c) generally do not thrive in a terrarium
(d) are happiest when enclosed with several other snakes of the same species

(2) According to the information sheet you read, which of the following statements is true?

(a) Garter snakes will get sick if they are not fed every day
(b) Garter snakes tend to fast for up to 3 weeks at a time
(c) Garter snakes often fast for two to three days at a time
(d) Garter snakes enjoy an extremely hot terrarium (over 40° C)

(3) Which statement best describes the motility (movement patterns) of garter snakes?

(a) Garter snakes never sleep during the daytime
(b) Most garter snakes are passive and slow moving in captivity
(c) Garter snakes often sleep for most of the day
(d) both b and c

(4) Garter snakes:

(a) are popular household pets
(b) are well suited to terrarium life
(c) require minimal care
(d) all of the above

High Danger

Instructions: Based on the information sheet you read entitled "Information about Snakes", please select the best answer to the following questions. If necessary, you may go back and reread the passage. However, do not refer back to the passage once you have started the quiz.

(1) Snakes

(a) can be relatively high-strung and temperamental in captivity
(b) may rise up and strike out when threatened
(c) generally do not thrive in a terrarium
(d) both a and b

(2) According to the information sheet you read, which of the following statements is true?

(a) Garter snakes are particularly susceptible to escaping if they are not fed on a regular schedule
(b) All snakes are great escape artists, and will seek out ways to escape a terrarium
(c) Garter snakes are rarely motivated to escape a well-regulated, enclosed environment
(d) Although garter snakes are highly motivated to escape an enclosed environment, they are almost never successful

(3) Which statement best describes the motility (movement patterns) of garter snakes?

(a) Healthy specimens are active and highly mobile; they continually flick their tongues, smelling for possible sources of prey
(b) Most garter snakes are passive and slow moving in captivity
(c) Healthy specimens show a moderate amount of movement
(d) Garter snakes sleep throughout the day but are highly active at night

(4) Forceps feeding is a good idea because

(a) it is a sanitary feeding method, and it enables food to be individually offered to each snake within a group
(b) forceps feeding is no better or worse than hand feeding if the proper precautions are taken
(c) you are less likely to frighten the snake if your hands remain at a distance
(d) if you offer the snake food by hand and your hand smells of food, you may get bitten

Appendix E

Questionnaire Package B

Page 1

Practice Trial

Visualize yourself walking up to the snake at the front of the lab. You will be stopping 1 foot from the terrarium and focusing on the snake for approximately 5 seconds. Now, please answer the questions below using the scale provided (you can use any whole number from 0 - 100).

1. How dangerous do you think the snake will be? Answer: ______

!..........!..........!..........!..........!..........!..........!..........!..........!..........!..........!

0 10 20 30 40 50 60 70 80 90 100

Not at all dangerous Very dangerous

2. How safe do you think you will feel when you see the snake? Answer: ______

!..........!..........!..........!..........!..........!..........!..........!..........!..........!..........!

0 10 20 30 40 50 60 70 80 90 100

Very safe Very unsafe

3. How fearful do you think you will be when you see the snake? Answer: _____

!..........!..........!..........!..........!..........!..........!..........!..........!..........!..........!

0 10 20 30 40 50 60 70 80 90 100

Not fearful Very fearful

(turn page)

Page 2

Now, imagine yourself lifting the hinged portion of the lid of the terrarium. You will hold it open for approximately 3 seconds with one hand, while at the same time touching the red tape on the outside wall of the terrarium with your other hand. You will then close the lid.

Now, please answer the questions below using the scale provided (you can use any whole number from 0-100).

1. How dangerous do you think the snake will be? **Answer: ______**

!...........!...........!...........!...........!...........!...........!...........!...........!...........!...........!

0 10 20 30 40 50 60 70 80 90 100

Not at all dangerous Very dangerous

2. How safe do you think you will feel, opening the lid with the snake inside? **Answer: ______**

!...........!...........!...........!...........!...........!...........!...........!...........!...........!...........!

0 10 20 30 40 50 60 70 80 90 100

Very safe Very unsafe

3. How fearful do you think you will be, opening the lid with the snake inside? **Answer: ______**

!...........!...........!...........!...........!...........!...........!...........!...........!...........!...........!

0 10 20 30 40 50 60 70 80 90 100

Not fearful Very fearful

(turn page)

Page 3

You have completed the Prediction Trial. Please do not turn the page until you enter the lab for the Exposure Trial.

Page 4

Exposure Trial

Please walk up to the terrarium and stand at the spot marked by the masking tape on the floor. Focus on the garter snake for approximately 5 seconds. Then, answer the questions below using the scale provided (you can use any whole number from 0-100).

1. How dangerous do you believe the snake is? **Answer: ______**

!...........!...........!..........!...........!...........!..........!...........!..........!..........!...........!
0 10 20 30 40 50 60 70 80 90 100
Not at all dangerous Very dangerous

2. How safe do you feel right now? **Answer: ______**

!...........!...........!..........!...........!...........!..........!...........!..........!..........!...........!
0 10 20 30 40 50 60 70 80 90 100
Very safe Very unsafe

3. How much fear are you experiencing right now? **Answer: ______**

!...........!...........!..........!...........!...........!..........!...........!..........!..........!...........!
0 10 20 30 40 50 60 70 80 90 100
Not fearful Very fearful

(turn page)

Page 5

Now, please lift the hinged portion of the lid of the terrarium. Hold it open for approximately 3 seconds (or as long as you can), and then close it. After putting down the lid, please answer the questions below using the scale provided (you can use any whole number from 0 - 100).

1. How dangerous did you believe the snake was? **Answer: ______**

!..........!..........!..........!..........!..........!..........!..........!..........!..........!..........!

0 10 20 30 40 50 60 70 80 90 100

Not at all dangerous Very dangerous

2. How safe did you feel, opening the lid with the snake inside? **Answer: ______**

!..........!..........!..........!..........!..........!..........!..........!..........!..........!..........!

0 10 20 30 40 50 60 70 80 90 100

Very safe Very unsafe

3. How much fear did you feel, opening the lid with the snake inside? **Answer: ______**

!..........!..........!..........!..........!..........!..........!..........!..........!..........!..........!

0 10 20 30 40 50 60 70 80 90 100

Not fearful Very fearful

You have completed the Exposure Trial. Please read instructions on next page.

Please raise your hand to indicate that you are done. One we have acknowledged that you are done, please exit the lab through the front/back door with the research assistant.

Appendix F

Verbal Procedural Script: Low Safety

Are you ready to begin?

Please follow me to the front of the room (experimenter and participant walk through the maze of desks to the front of the room). You will start by standing at this red tape mark on the floor (experimenter points to the red tape). Please note that you have to enter and exit the lab from the back door (experimenter points to the back of the room), since this exit (experimenter points to nearby front exit, which has a No Exit sign posted and is barricaded by a long table) is sealed. I will sit at the back of the room (experimenter points to the back of the room) with the research assistant while you complete the experiment. Everything you need to know is provided in your Questionnaire Package B -- just turn to Page 4 and follow the step by step instructions. When you get to Page 6, please raise your hand to let us know that you are done.

Verbal Procedural Script: High Safety

Are you ready to begin?

Please follow me to the front of the room (experimenter and participant walk to the front of the room).You will start at this red tape mark on the floor (experimenter points to the red tape). Notice that the front door is wide open and nearby, should you feel the need to leave the room. I will be sitting right behind you in that chair (experimenter points to the chair positioned 20 feet behind the participant), just in case you have any questions or concerns. When leaving the lab between trials, please exit through this door with the research assistant (experimenter points to the nearby front exit). Everything you need to know is provided in your Questionnaire Package B -- just turn to Page 4 and follow the step by step instructions. If at any point you don't understand the instructions, please feel free to ask me. When you get to Page 6, please raise your hand to let us know that you are done.

Procedural Information: Low Safety

During the exposure trials, you will be approaching the snake at two specified approach points. The first approach point is 1 foot from the terrarium. At the second approach point, you will be asked to open the hinged lid of the terrarium with one hand (approx 3 secs) while at the same time touching the red mark located on the outside wall of the terrarium.

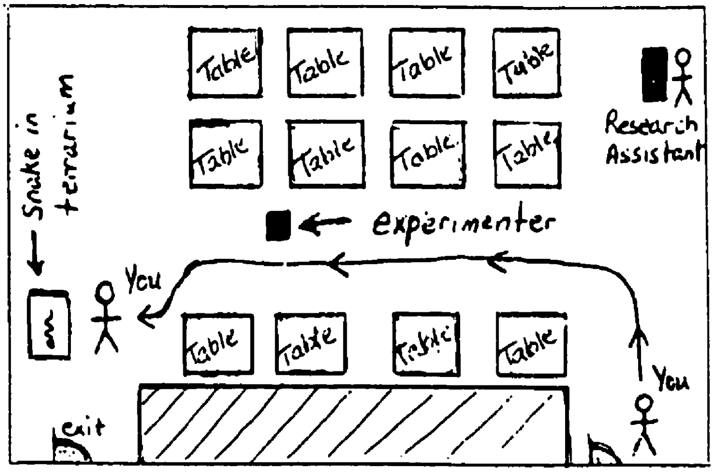
The laboratory is a long room with both front and back exits. You will enter the room by the back door, and will walk through a maze of desks before reaching the snake. When you reach the snake located at the front of the room, you will be close to the front exit. However, this exit is locked and barricaded by a long table; you must walk back through the maze when you are finished the trial and leave by the back exit. The experimenter and the research assistant will sit at the back of the room during the trial. Everything you need to know is provided in your Questionnaire Package B -- just follow the step by step instructions.

Do you understand these instructions? Yes _____ No _____

Procedural Information: High Safety

During the exposure trials, you will be approaching the snake at two specified approach points. The first approach point is 1 foot from the terrarium. At the second approach point, you will be asked to open the hinged lid of the terrarium with one hand (approx 3 secs) while at the same time touching the red mark located on the outside wall of the terrarium.

You will enter the room by the back door, and will walk up to the terrarium at the front of the room (see diagram below).



Note that there is a nearby exit (approx 15 feet from the terrarium), should you feel the need to leave the room. I will be nearby during the trial (sitting about 20 feet behind you) should you have any questions or concerns during the experiment. The research assistant will sit at the back of the room. Please take as much time as you need when completing the trial -- there is no rush. Everything you need to know is provided in your Questionnaire Package B -- just follow the step by step instructions. However, if at any time you are unsure of the instructions, please do not hesitate to ask.

Do you have any questions? Yes _____ No _____

Appendix G

Observer Checklist: Low Safety

During each trial:

1. No Exit sign posted on front door/
   Door sealed and barricaded ------

2. Participant entered through back door ------

3. Participant received correct Testing Booklets ------
   (High Danger/Low Safety - Pink)
   (Low Danger/ Low Safety - Green)

4. Participant completed the short quiz ------

5. Experimenter corrected quiz and went over
   any incorrect answers with participant ------

6. Experimenter followed the verbal
   procedural script:

   (d) Experimenter walks to front of room with
   participant and points to red tape ------

   (e) Experimenter tells participant to enter and
   exit the room through the back door, and
   points to the back door ------

   (f) Experimenter tells participant that the front
   exit is sealed, and points to the front exit ------

   (g) Experimenter tells participant that she will
   remain at the back of the room during the
   trial, and points to the back of the room ------

   (h) Experimenter says "Everything you need
   to know is in Questionnaire Package B" ------

If no, please comment on any deviations:

7. Experimenter remained at the back of the room during practice trials ------

8. Participant walked to the back of the room after completing the practice trials ------

Observer Checklist: High Safety

During each trial:

1. Exit sign posted above open front door ------

2. Participant entered through back door ------

3. Participant received correct Testing Booklets ------
   (High Danger/High Safety - Green)
   (Low Danger/ High Safety - Yellow)

4. Participant completed the short quiz ------

5. Experimenter corrected quiz and went over any incorrect answers with participant ------

6. Experimenter followed the verbal procedural script:

   (a) Experimenter walks to front of room with participant and points to red tape ------

   (b) Experimenter tells participant to exit the room through the nearby front exit, and points to the front exit ------

   (c) Experimenter tells participant that she will sitting behind the participant, should the participant desire assistance ------

   (d) Experimenter says "Everything you need to know is in Questionnaire Package B" ------

   (e) Experimenter tells participant to feel free to ask questions ------

If no, please comment on any deviations:

7. Experimenter remained at the front of the room during trials ------

8. Participant exited through the front door after completing the practice trials ------

Appendix H

Debriefing script for those who complete the experiment:

I want you to know that I think it was very brave of you to volunteer for this experiment given your fear of snakes. You should feel very proud of yourself for completing all the tasks, even the ones that were especially frightening for you. We really appreciate you coming in today!

Do you have any questions? (If yes, I addressed them at this time. However, I did not tell them in explicit detail what the purpose of the study was, to prevent data contamination in future trials.)

Here is a handout to take with you -- it lists some contact numbers should you have any questions or concerns at a later time. Thank you very much!

Appendix I

Debriefing Handout

Dear Participant:

Thank you for participating in my research project. The goal of this study was to examine how perceptions of danger and safety can affect a person's tendency to overpredict fear in the presence of a feared stimulus (in this case, a snake). Your participation was greatly appreciated, and will be helpful in learning more about the human fear response. Should you have any further questions or concerns, please do not hesitate to call either Dr. Stephen Holborn (275-0909) or myself (291-0628). As well, if you would like more information about phobias and their treatment, please feel free to contact (a) Dr. Laine Torgrud, Anxiety Disorders Clinic, St. Boniface Hospital (phone: 237-2616) or (b) Psychological Services Centre, University of Manitoba (phone: 474-9222).

A full description of the study and its results will be posted on May 1, 2000, on the second floor of the Duff Roblin Building (near the main entrance) and on the first floor bulletin board in University Center (directly across from Answers Information Booth).

Once again, thank you for participating in this study!

Sincerely,

Lisa M. Wright
Graduate Student
Department of Psychology, University of Manitoba

Appendix J

Diagram of Terrarium