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Active-imaginal exposure: examination of a new behavioral treatment for cynophobia (dog phobia)

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Abstract

The aims of this study were to investigate exposure-based treatments for cynophobia (dog phobia) and to test a newly developed hybrid imaginal exposure treatment that we have named *active imaginal exposure*. The treatment introduces an in vivo coping component to imaginal exposure whereby the patient physically performs coping responses to an imagined feared stimulus. Eighty-two participants meeting DSM-IV criteria for specific phobia (animal subtype) were randomly assigned to one of three 30-min. treatments: (a) active-imaginal exposure (AI), b) imaginal exposure alone (IE), or (c) graduated in vivo exposure (IV). Participants completed a behavioral approach test at pre, post, and four-week follow-up. Significant pre- to posttreatment improvement was observed in all three treatment conditions. Response rates at posttreatment were 51.9, 62.1, and 73.1% for the IE, AI, and IV groups respectively. Likewise, effect sizes at posttreatment were 0.76, 1.41, and 1.55 for the IE, AI, and IV groups respectively. Although in the predicted direction, the between group differences were not significant. A similar pattern of results was observed at follow-up. Further, safety behavior utilization during treatment was associated with less improvement—particularly in the two imaginal treatment conditions. Exposure treatments of dog phobia appear feasible and effective in reducing phobic fear and avoidance associated with dog phobia. Furthermore, preliminary evidence suggests that our active-imaginal exposure treatment may be a viable alternative to in vivo exposure.

Keywords: Dog phobia; Specific phobia; Treatment outcome; Exposure; Cognitive-behavioral treatment

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1. Introduction

Phobias of animals represent one of the more common subtypes of specific phobia with prevalence rates of 12.1% for women and 3.3% for men (Fredrikson, Annas, Fischer, & Wik, 1996). Among those who seek treatment, 36% present with a phobia of dogs or cats (Chapman, Fyer, Mannuzza, & Klein, 1993). Unlike other phobias of the animal subtype such as phobias of snakes and spiders, dog phobia typically results in significant life impairment due to the estimated 62,400,00 dogs living in the United States (Curtis, Magee, Eaton, Wittchen, & Kessler, 1998; American Pet Products Manufacturing Association, 2000) and their omnipresence. As one of our dog phobic participants stated, "There is hardly a place I can go without running into a dog." Although the etiology of dog phobia is unknown, it is likely that the 4.5 million dog attacks reported annually (Humane Society, 1999) contribute to the problem.

Numerous studies have demonstrated the efficacy of behavior therapy in treating phobic disorders (Barlow, 1988; Marks, 1978). Controlled efficacy studies of behavioral treatments for specific phobias reveal a response rate of 76% (Arntz & Lavy, 1993; Hellstrom, Fellenius, & Öst, 1996; Hellstrom & Öst, 1995; Öst, 1996a; Öst, Fellenius, & Sterner, 1991; Öst, Ferebee, & Furmark, 1997; Öst, Hellstrom, & Kaver, 1992; Öst, Johansson & Jerremalm, 1982; Öst, Salkovskis, & Hellstrom, 1991; Öst, Sterner, & Fellenius, 1989). However, none of these controlled studies focused on treatments dog phobia. In a case series report, Hoffmann and Odendal (2001) described the use of systematic desensitization in treating dog phobia.

Exposure to fear-provoking objects or situations is the central procedural element in behavioral treatments for specific phobias. Exposure techniques vary along several dimensions, including gradation, duration, spacing, facilitation of mastery, and mode of exposure (Tearnan & Telch, 1984). Perhaps the most salient dimension is the mode of exposure: imaginal or in vivo. In vivo exposure is thought to be more powerful than imaginal (Lindemann, 1989); however, it can be inconvenient to conduct, depending on the availability of the stimuli or situations that evoke fear. For example, animal phobias present a challenge to therapists because of the difficulties associated with the housing and care of animals to be used in treatment.

While many therapists prefer in vivo techniques because of their presumed greater therapeutic potency, imaginal techniques offer advantages with respect to both convenience and flexibility. Imaginal exposure is easier to conduct in a therapist's office, and can be readily adapted to fit idiosyncratic situations which evoke fear for the individual patient. Moreover, patients who refuse to confront fearful situations in vivo may be prepared gradually for such exposure using imaginal procedures.

Ideally, exposure-based treatments should be both powerful and convenient. Thus, researchers interested in pushing the envelope on phobia treatments are faced with the decision to either develop ways to make in vivo exposure more palatable to patients and more convenient for clinicians or to develop more potent imaginal techniques. Evidence from several sources suggests that imaginal exposure to fear-provoking cues may be enhanced through the inclusion of coping scripts into the imagery scenes. In one variation called covert modeling, the patient imagines a person modeling coping behavior in the fearful situation. Kazdin (1979) found that imaginal exposure was more effective in helping patients increase assertive behavior when they were instructed to imagine an assertive model. Similarly, Foa (1997) showed that covert modeling was an effective addition to stress inoculation training in the treatment of posttraumatic stress disorder

(PTSD). The utility of integrating coping imagery into imaginal exposure to fear cues has also been demonstrated in the treatment of panic disorder (Clum, Watkins, Borden, Broyles, & Hayes, 1993). In addition, Goldfried and his colleagues have shown promising results integrating imaginal coping strategies with desensitization (Goldfried, 1971; Kanter & Goldfried, 1979).

In the present study, we investigated the efficacy of a hybrid fear reduction technique that we have named 'active imaginal' exposure. In this procedure, the fearful person physically acts out a series of coping responses to the imagined fear-provoking stimulus (i.e., dog). This is in contrast to previous imaginal techniques, which have either relied on imaginal exposure alone or imaginal exposure plus some form of imaginal coping. The rationale for including in vivo coping to an imaginal stimulus was based on the observation that behaviorally enacting actual coping behaviors with an imaginary stimulus is common in martial arts training and presumed to facilitate mastery (Funakoshi, 1973). However, we are aware of no application of this technique to psychosocial treatments of pathological fear. We conjectured that active in vivo coping, when combined with imaginal exposure, might offer an advantage over imaginal coping by enhancing perceived coping efficacy.

The primary aim of the current study was to determine whether dog phobia could be successfully ameliorated with psychosocial treatment. A secondary aim was to test the relative efficacy of our hybrid active-imaginal treatment relative to imaginal exposure alone and the gold standard behavioral treatment of graduated in vivo exposure. Finally, based on recent findings demonstrating that safety behavior use during exposure has a deleterious effect on treatment outcome in claustrophobia (Sloan & Telch, 2002), we examined whether safety behavior use during treatment was associated with treatment outcome. We hypothesized that all three treatments would result in clinically significant improvement in subjective fear and behavioral approach and that our hybrid active-imaginal exposure treatment would outperform imaginal exposure and perform as well as the gold standard graduated in vivo exposure. We also predicted that safety behavior utilization during treatment would be associated with a poorer outcome at posttreatment and follow-up.

2. Method

2.1. Participants

Eighty-two participants meeting DSM-IV criteria for specific phobia, animal type, took part in the experiment. Participants were recruited from the undergraduate introductory psychology subject pool at the University of Texas at Austin, and from the Austin community. The final sample was predominantly female (87.8%) and ethnically diverse (Black=24.4%, White=22.0%, Hispanic=22.0%, Asian=31.7%, American Indian=1.2%). Mean age of the sample was 18.9 years (SD=3.7). Students received partial course credit for their participation.

2.2. Experimental design

Eligible participants were randomly assigned to one of three 30-min exposure conditions: (1) in vivo exposure (IV), (2) imaginal exposure (IE), and (3) active-imaginal exposure (AI). Tripartite

assessments included self-report of fear, behavioral approach, and performance heart rate. Assessments were conducted at pretreatment, post-treatment, and four-week follow-up.

2.3. Procedure

2.3.1. Screening

Selection of participants involved a two-stage screening process, beginning with a 12 item pretesting questionnaire which assessed fear of dogs on a scale of 0 (no fear) to 4 (extreme fear). Fear in response to size of dog, activity level of dog, and physical restraint of dog (e.g. leash) were assessed. In addition, the pre-testing questionnaire asked two yes/no questions: "Do you have a fear of dogs?" and "Do you avoid dogs or endure their presence with intense anxiety?" Undergraduate participants responded to this questionnaire using an electronic format accessed via the Internet. Potential participants who obtained a total score of 20 on the pretesting questionnaire items 1–12 and responded "yes" to both of the above questions were invited to take part in a comprehensive face-to-face diagnostic interview.

During the second stage of screening, participants were administered the specific phobia section of the Anxiety Disorders Interview Schedule (ADIS), a semi-structured interview which assesses DSM-IV diagnostic criteria (DiNardo, Moras, Barlow, Rapee, Ronald et al., 1993). The specific phobia section of the ADIS has been found to have a reliability coefficient of 0.82 (DiNardo et al., 1993). Internal reliability coefficients of the STAI range from 0.83 to 0.92, indicating good reliability of this measure (Spielberger, Gorsuch, & Lushene, 1970). The SCL-90-R also has been demonstrated to have good reliability with internal consistency coefficients ranging from 0.77 to 0.90 (Derogatis & Cleary, 1977). The QMI (Sheehan, 1967) is correlated highly with the original Bett's Questionnaire upon Mental Imagery, (Betts, 1909) from which it is derived ($r = 0.92$) and has good internal consistency (Cronbach's Alpha = 0.95).

After completing these measures, participants underwent two consecutive behavioral approach tests (BATs) with two different dogs (see below). Participants were deemed insufficiently phobic and were excluded from further participation if they were able to physically touch either dog during the BATs with a Subjective Units of Distress (SUDs) rating of 50 or less on a scale from 0 (no distress) to 100 (extreme distress). After each task in the BAT, the participant rated their use of the following safety behaviors on a scale ranging from 0 (none) to 100 (constantly): (a) Focusing on the adequacy of the dog's restraints; (b) use of relaxation, meditation, or breathing techniques; (c) checking for routes of escape or exits; (d) standing very still or moving slowly to avoid being noticed by the dog; and (e) mental distraction.

2.3.2. Behavioral approach tests (BATs)

Two separate BATs were administered at pre, post-, and follow-up assessments. The purpose of each BAT was to measure participants' subjective, behavioral, and psychophysiological reactions while encountering an actual dog. The procedures of the two BATs were identical with the exception that different dogs were used in each BAT. A total of nine different dogs were used in the study. They consisted of a retriever mix, two springer spaniels, one collie, one Afghan hound, one rottweiler, one bulldog, one multi-breed, and one golden retriever. Participants' HRs were collected using an ambulatory heart-rate monitor (Model: 'Polar Acurex Plus', Polar Electro Inc.) The unit consists of an electrode belt worn around the chest and a monitor worn on the

wrist. The electrode belt transmits heart-rate signals to the wrist receiver that displays and stores the participant's heart-rate data.

During each BAT, participants attempted to perform a ten-step hierarchy of increasingly challenging approach tasks ranging from standing ten feet (3.08 m) from the dog to putting one's hand in the dog's mouth. Before attempting each step in the BAT, participants rated on a 0–100 Likert scale their predicted level of (a) subjective fear, (b) likelihood of being attacked by the dog; and (c) coping self-efficacy. Upon successful completion or failure to perform a task, the dog was removed and participants then rated on the same 100 point Likert scale: (a) peak fear, (b) perceived safety; (c) activity level of the dog; (d) perceived control over the dog, and (e) friendliness of the dog. Each task was classified as successfully completed if the participant was able to perform the task for five consecutive sec. Participants were allowed a maximum of 10 sec to execute each task. The BAT was terminated when the participant failed to perform any task as required, or when the participant completed all ten tasks.

2.3.3. Treatment procedures common to all exposure conditions

Qualifying participants received treatment on the day following the second stage of screening. Treatment consisted of (a) presenting the participant with a brief written overview of specific behaviors of dogs that indicate safety or danger, (b) a 'pop' quiz to make sure the information was remembered, and (c) 15 min of therapist-directed exposure to the same dog used in BAT 1 (or an imaginal representation of this dog), and 15 min of exposure to a dog not encountered during the assessments. All conditions used identical procedures, except for the mode of exposure and mode of coping. HR was collected throughout the 30 min of exposure. Treatment included a 13-step hierarchy of tasks that gradually increased the participants' proximity to and contact with a dog. Participants performed each task repeatedly until their fear reduced to a level of 30 or less on a 0 (no fear) to 100 (extreme fear) scale. If a participant's initial level of fear at any step was 30 or less, the participant was instructed to remain at that step for 10 sec before advancing to the next step. At each step, participants in all conditions were instructed to categorize the dog's behavior as threatening, submissive, or playful, according to the education presented earlier. The dog behaviors reported by each participant in the in vivo exposure condition were used to yoke the in vivo condition to the imaginal and active-imaginal conditions. In other words, the specific behaviors reported by each participant in the in vivo condition were used to construct the imagery scripts used in the imaginal exposure and active imaginal exposure conditions. Example reported behaviors include: 'the dog is wagging its tail' and 'the dog is panting'. Thus, each set of three participants (one in each therapy condition) was exposed to precisely the same constellation of dog behaviors.

At the start of each treatment trial, participants were asked to rate their (a) coping self-efficacy, (b) threat expectancies, and (c) predicted peak subjective fear. At each step of treatment, participants were required to engage in appropriate dog handling procedures based on the education presented at the beginning of the treatment session. Duration of the exposure trial, observed dog behaviors, behavior categories, and clarity of mental image (for AI and IE conditions) were recorded by the experimenter during the session.

Upon completing each treatment task, the dog was removed (or ceased to imagine the dog) and participants completed ratings of the following process measures: (a) peak fear, (b) perceived safety while with the dog, (c) activity level of the dog, (d) perceived degree of control over the

dog, and (e) use of safety behaviors. The experimenter encouraged the participant to refrain from using any safety behaviors during exposure. The 13 therapy steps were as follows: (a) Stand 10 feet (3.08 m) from the dog, focus on the dog without staring; (b) Stand 8 feet (2.46 m) from dog and whistle to the dog; (c) stand 6 feet (1.85 m) from dog and make eye contact without staring; (d) stand 4 feet (1.23 m) from dog, command it to 'stay'; (e) stand 2 feet (0.61 m) from dog, tell it 'good dog'; (f) approach the dog and let it smell hands; (g) place hand on dog's back; (h) stroke the fur on the dog's back very slowly with hand (pet dog) (i) place hand on dog's head; (j) stroke the fur on the dog's head very slowly with hand; (k) put face four inches (10 centimeters) from dog's face; (l) gently pet the fur on the dog's muzzle; and (m) repeat steps f–m (6–13) until 15 min has elapsed.

2.3.4. In vivo exposure condition (IV)

Participants assigned to the IV condition approached and handled two real dogs on leashes, one at a time for 15 min each, in a quiet, distraction free hallway, for a total of 30 min, excluding time between trials. At approximately 30 sec intervals, participants were cued to state aloud their current fear level as they repeatedly performed each task in the hierarchy with the real dog. Each treatment step was terminated when the participant's fear decreased to a SUDS level of 30 or below. At each step of the hierarchy, participants rated the dog's behaviors as threatening, submissive, or playful based on the education presented earlier. These data were later used for yoking purposes.

2.3.5. Imaginal exposure condition (IE)

Participants assigned to the IE condition were shown a picture of the dog they were to imagine, which was the same dog used in the IV condition. This procedure served to maintain consistency in dog stimuli across the three conditions. Participants were seated in a quiet room with their eyes closed, and imagined themselves performing the hierarchy steps according to a script read by the experimenter. The script described the tasks, which were identical for all groups, as well as the appearance and behavior of the dog, which was yoked to reports of the dog's behavior made by participants in the in vivo condition. After imagining each task in the hierarchy, participants were instructed to open their eyes and turn their attention to the experimenter, who then recorded the process data described above, as well as the participants' ratings of image clarity on a 0 (no image present) to 100 (perfectly clear) scale.

2.3.6. Active-imaginal exposure condition (AI)

Participants assigned to the AI condition were shown a picture of the dog that they were to imagine, which was the same dog used in the IV condition. While imagining the dog, participants physically performed the tasks in the therapy trials according to a script read by the experimenter. The script described the tasks, which were identical for all groups, as well as the appearance and behavior of the dog, which was based on a participant's observation of the dog's behavior and appearance in the in vivo condition. This was the same script used in the IE condition, except that the participants physically performed the tasks and physically interacted with the imaginary dog. All process measures were collected in the same manner as in the IE condition.

In order to assure the greatest possible treatment integrity, all procedures were fully manualized and administered by trained experimenters.

2.3.7. Manualized experiment protocol

The experiment protocol was a 36-page manual divided into separate sections for each session (pretreatment, treatment, posttreatment, and follow-up). The treatment section was further divided into separate sub-sections for each treatment condition (in vivo, active-imaginal, and imaginal). Detailed step-by-step instructions were provided for all procedures. Scripts were provided throughout the manual to be read aloud verbatim by experimenters.

2.3.8. Experimenter training

Training involved didactic orientation to the project, observation of experiment procedures, and role-plays of procedures. Furthermore, experimenters were observed and monitored, and were provided with feedback regarding adherence to the experiment protocol. Experimenters were given verbal and practical exams upon completion of training and were rated on a 38-item treatment adherence checklist. All Experimenters achieved a proficiency level of 90% or greater during the training.

2.4. Measures

2.4.1. Structured diagnostic interviews

The specific phobia section of the Anxiety Disorders Interview Schedule (ADIS) was administered at screening and follow-up assessments. In addition, a computerized version of the specific phobia section of the Composite International Diagnostic Interview (CIDI) (World Health Organization, 1997) was also administered at follow-up to assess whether participants met DSM-IV criteria for specific phobia as a reliability check for the ADIS. The CIDI was added midway during the course of the study, and was appended to the experiment protocol as the last item, so that administration of the CIDI could not influence any other data collection. The CIDI is a structured clinical interview designed for laymen (Robins, 1988), and has demonstrated excellent interrater reliability i.e., overall Kappa = 0.90 (Andrews & Peters, 1998).

2.5. Outcome measures

2.5.1. Peak subjective fear

Upon leaving the presence of the dog, participants reported their peak level of subjective fear on a scale of 0 (none) to 100 (extreme fear).

2.5.2. Number of BAT steps completed

The number of steps (0 to 10) successfully completed during each of the two BATs served as the primary behavioral index of phobicity.

2.5.3. Reliable change

Reliable change was defined using the criteria set forth by Jacobson and Truax (1991), which requires that participants achieve a level of improvement in fear that is statistically reliable. Participants meeting criteria for reliable change were classified as responders.

2.5.4. Clinical significance

Improvement was defined clinically significant when in addition to achieving reliable change, the participant's fear status was closer to the distribution of a non-phobic population than to the distribution of the phobic population (Jacobson & Truax, 1991). Participants meeting these criteria were classified as high end-state functioning.

2.5.5. Relapse

We calculated the percent of completers that relapsed at follow-up. Relapse was defined as a reliable posttreatment to follow-up increase in fear or decrease in approach.

3. Statistical analyses

One-way between groups ANOVAs were conducted on all dependent measures at baseline to verify the equivalence of the three treatment groups.

The differential effects of treatment were examined with a priori contrasts (Active Imaginal vs In Vivo; and Active Imaginal vs Imaginal). Effects on continuous measures were examined using repeated measures MANOVAs with time as the within-subject variable and contrast as the between-subject variable. Main effects indicate an effect of treatment, whereas an interaction between time and contrast indicates a differential treatment effect. Categorical measures were subjected to logistic regression analyses where the respective contrasts were entered as categorical covariates.

A high degree of attrition occurred from posttreatment to follow-up, with a total of 37% of participants not returning for follow-up assessment. In an attempt to control for biases introduced by the attrition at follow-up, we conducted analyses on both the completer sample and the intent-to-treat sample. The intent-to-treat analyses were performed using the Last Observation Carried Forward method (Mazumdar, Liu, Houck, & Reynolds, 1999). We acknowledge that this method may seem optimistic as it assumes maintenance of treatment gains. However, results of analogue studies with both claustrophobic and spider phobic samples conducted in our laboratory show low rates of relapse, but mostly continual improvement (e.g., Sloan & Telch, 2001; Smits, Telch, & Randall, 2002), suggesting that carrying baseline scores forward is overly conservative.

4. Results

4.1. Baseline equivalence of groups

Baseline measures of behavioral approach and fear were not significantly different for BAT 1 (Dog used in treatment) or BAT 2 (Dog used for testing generalization of treatment effects). A univariate ANOVA confirmed that the image clarity between the two groups was not significantly different.

4.2. Attrition analysis

All 82 participants who underwent baseline assessment also completed treatment and posttreatment assessment. However, a high rate of attrition (30/82 or 37%) was observed at follow-up. Participants were less likely to return for follow-up assessment in the IV group (46%) compared to the IE group (38%) and the AI group (28%), although these differences were not significant ($p > 0.10$). A significant interaction between treatment condition and follow-up status (completer vs non-completer) was observed on the primary outcome measures at posttreatment (Roy's Largest Root F (2, 76) = 4.45, $p < 0.05$). IV participants who completed follow-up had greater posttreatment fear than did non-completers in the IV group; whereas AI participants who completed follow-up had lower posttreatment fear than their counterparts who did not complete follow-up. No differences in posttreatment fear were observed between follow-up completers and non-completers among IE participants.

4.3. Within-groups effects

4.3.1. Changes from pre- to posttreatment

Table 1 displays means and standard deviations for the primary outcome measures at the pre, post, and follow-up assessments. Significant improvement occurred in all treatment conditions as evidenced by a significant reduction in peak fear and a significant increase in behavioral approach

Table 1
Means and standard deviations for the major outcome measures at pretreatment posttreatment and follow-up[a]

	Conditions								
	AI			IE			IV		
	N	M	SD	N	M	SD	N	M	SD
BAT 1 – fear									
Pre	29	62.76	15.72	27	55.17	20.79	26	53.16	19.85
Post	29	34.63	23.31	27	37.52	25.62	26	24.59	16.90
Effect size		1.41			0.76			1.55	
FU comp.	20	29.18	23.88	17	30.11	21.82	14	31.03	28.36
FU ITT – L	29	30.00	22.49	27	29.92	22.17	26	22.79	21.45
FU ITT – C	29	35.92	26.95	27	38.00	22.84	26	35.13	24.20
BAT 1–approach									
Pre	29	6.28	2.71	27	6.15	2.27	26	6.73	1.76
Post	29	7.24	2.64	27	7.11	2.46	26	8.27	2.09
Effect size		0.36			0.41			0.80	
FU comp.	20	7.35	2.48	17	8.47	1.91	14	8.07	1.98
FU ITT – L	29	7.72	2.40	27	7.81	2.59	26	8.00	2.19
FU ITT – C	29	7.28	2.42	27	7.56	2.71	26	7.31	2.00

[a] FU Comp = Completers sample at follow-up; FU ITT – L = Liberal intent-to-treat sample at follow-up (assuming maintenance); FU ITT – C = Conservative intent-to-treat sample at follow-up (assuming relapse).

from pre- to posttreatment for BAT 1 (all p's < 0.05). In addition, pre- to posttreatment effect sizes (M_{pre}–M_{post}/S_{pooled}) appear in Table 2.

4.3.2. Changes from posttreatment to follow-up

4.3.2.1. Completer analyses A significant main effect of time was observed across the primary outcome measures (Roy's Largest Root F (2, 48) = 4.39, $p < 0.05$). IE participants displayed further posttreatment to follow-up improvement on both fear F (1, 16) = 4.67, $p < 0.05$ and behavioral approach F (1, 16) = 8.14, $p < 0.05$); whereas AI participants showed additional post to follow-up improvement only for behavioral approach (F (1, 20) = 5.71, $p < 0.05$). No additional improvement was observed among IV participants on either fear or behavioral approach.

4.3.2.2. Intent-to-treat analysis[1] A similar main effect of time was observed for the ITT sample (Roy's Largest Root F (2, 79) = 4.07, $p < 0.05$). Post to follow-up comparisons for each treatment group revealed significant improvement among IE participants for both fear F (1, 26) = 4.31, $p < 0.05$ and behavioral approach F (1, 26) = 7.00, $p < 0.05$); AI participants showed significant

Table 2
Means and standard deviations for the generalization probe measures at pretreatment posttreatment and follow-up[a]

	Conditions								
	AI			IE			IV		
	N	M	SD	N	M	SD	N	M	SD
BAT 2 – fear									
Pre	29	56.29	20.88	27	57.65	23.22	25	52.70	25.00
Post	29	35.68	26.11	27	38.36	24.22	25	25.48	18.84
Effect size		0.87			0.81			1.23	
FU Comp.	20	24.04	21.44	17	30.51	26.87	14	28.26	28.81
FU ITT – L	29	30.37	25.81	27	34.17	26.71	25	26.04	24.14
FU ITT – C	29	35.38	28.11	27	39.16	26.51	25	34.97	26.30
BAT 2–approach									
Pre	29	5.55	2.69	27	5.52	2.46	25	6.48	1.98
Post	29	7.24	2.75	27	7.59	2.47	25	8.12	2.01
Effect size		0.62			0.84			0.75	
FU comp.	20	7.60	2.78	16	8.00	2.90	14	7.79	2.29
FU ITT – L	29	6.83	2.71	27	7.11	3.18	25	7.04	2.14
FU ITT – C	29	7.72	2.40	27	7.81	2.59	25	8.16	2.08

[a] FU Comp = Completers sample at follow-up; FU ITT – L = Liberal intent-to-treat sample at follow-up (assuming maintenance); FU ITT – C = Conservative intent-to-treat sample at follow-up (assuming relapse).

[1] Using a conservative ITT sample, the results of a repeated measures MANOVA suggested durability of treatment gains, as no effect of time was observed across primary outcome measures from post to follow-up. However, follow-up comparisons revealed that this maintenance of treatment gains was only observed among participants in the AI and IV conditions. Participants in the IE condition showed a significant increase in fear (F (1, 20) = 5.71, $p < 0.05$), and a significant decrease in behavioral approach (F (1, 20) = 5.71, $p < 0.05$).

posttreatment to follow-up improvement for behavioral approach (F (1, 20) = 5.71, $p < 0.05$) but not fear; and IV participants showed no further improvement on either fear or behavioral approach.

4.3.2.3. Generalization of within-group effects As can bee seen in Table 2, within-group effects from pre- to posttreatment for BAT2, the generalization probe, were similar to those observed for BAT 1 (all p's < 0.05). However, no significant post- to follow-up improvement was observed among any of the three groups for either the completer or ITT samples[2].

4.4. Between-groups effects

Contrary to expectation, there were no significant interactions between time and treatment condition indicating that the three treatment groups did not differ significantly in their level of improvement from pre to posttreatment. Similarly, between-group effects at the follow-up assessment mirrored those observed at posttreatment.

4.4.1. Reliable change and clinical significance

Response rates and percentages of participants achieving high end-state functioning for each of the three treatment groups are presented in Figs 1 and 2 respectively. At posttreatment, 62.5% of participants across the three treatments displayed statistically reliable improvement. Response rates at posttreatment were 51.9, 62.1, and 73.1% for the IE, AI, and IV groups respectively.

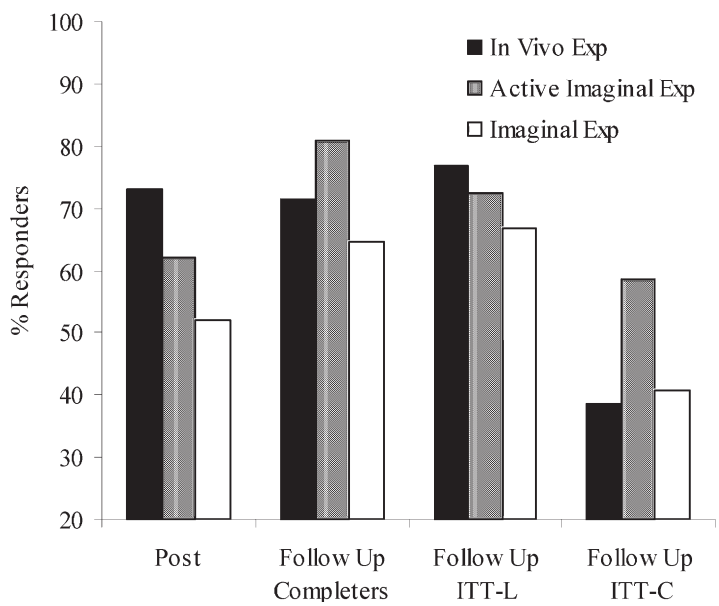

Fig. 1. Response rates at posttreatment and follow-up as a function of treatment condition.

[2] Using a conservative ITT sample, follow-up comparisons showed a significant decline in behavioral approach (BAT 2) among participants IE sample.

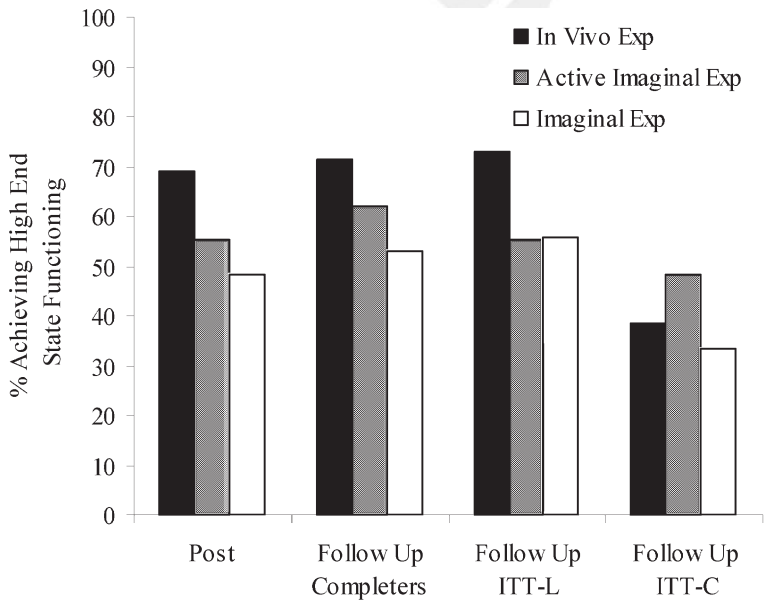

Fig. 2. Percent participants achieving high end state function at posttreatment and follow-up as a function of treatment condition.

Although in the predicted direction, the differences in response rates between groups were not statistically significant.

The percentage of participants achieving high endstate functioning at posttreatment across the three treatment groups was 57.3%. The percentages achieving HEF by group were 48.1, 55.2, and 69.2% for the IE, AI, and IV groups respectively. Again, although in the predicted direction, the differences in HEF between groups were not statistically significant.

Response rates and percentages of participants achieving high end-state functioning at follow-up are presented separately for the completer and ITT samples (See Figs 1 and 2). For the completer sample, 64.7% of the IE participants, 81.0% of the AI participants, and 71.4% of the IV participants were classified as treatment responders at follow-up. For the ITT sample, treatment response rates were 66.7, 72.4, and 76.9% for the IE, AI, and IV groups respectively.

The overall percentage of participants achieving HEF at follow-up was 61.5% for the completer sample and 61.0% for the ITT sample. Among completers, 52.9% of the IE participants, 61.9% of the AI participants, and 71.4% of the IV participants achieved HEF status at follow-up. Rates for the ITT sample were 55.6, 55.2, and 73.1% for the IE, AI, and IV groups respectively[3].

4.4.2. Relapse

At follow-up, 7.7% of participants across the three treatment conditions met criteria for relapse. Relapse rates were 0, 4.8, and 21.4% for the IE, AI, and IV groups respectively. The differences in response rates between groups were not statistically significant.

[3] Using a conservative ITT sample, 46.3% were classified as responders, whereas 40.3% showed clinically significant improvement.

4.4.3. Generalization of between-group effects

The results for BAT 2 for the completer sample matched BAT 1 findings. The interaction between time (posttreatment, follow up) and contrast 2 (Active-Imaginal vs In Vivo) was significant for the ITT sample F (1, 53) = 4.16, $p < 0.05$).

4.4.4. Safety behavior use

Safety behavior use during treatment covaried with peak fear at pretreatment ($r = 0.35$, $p < 0.01$). Consequently, analysis of safety behaviors was conducted using covariate adjustment for pretreatment peak fear. A main effect of safety behaviors on peak fear and behavioral approach was observed at posttreatment, with lower safety behavior use associated with lower peak fear and greater behavioral approach (Roy's Largest Root, F (2, 64) = 3.526, $p < 0.05$). The effect size for peak fear was 0.58, and the effect size for behavioral approach was 0.04. Adjusting for pretreatment peak fear, the interaction between treatment condition and safety behavior use approached significance (Roy's Largest Root, F (2, 64) = 3.69, $p < 0.06$), suggesting a moderation effect on posttreatment peak fear and behavioral approach. However, the interaction between treatment condition and safety behavior use was not significant when the effects of SB use were tested with each outcome measure separately. Nonetheless, peak fear at posttreatment was greater across all treatment conditions when more safety behaviors were used during treatment, although the effect appeared minimal in the IV group, and marked in the IE and AI groups, with the AI group showing the most dramatic contrast between high and low safety behavior use (see Fig. 3). In the IV and AI groups, behavioral approach was reduced under conditions of high safety behavior use, minimally in the IV group and markedly so in the AI group. However, contrary to prediction, behavioral approach among IE participants increased at high levels of safety behavior use (see Fig. 3).

5. Discussion

This study represents the first randomized clinical trial examining treatments for cynophobia. Consistent with treatment outcome data from studies of other animal phobias (Arntz & Lavy, 1993; Hellstrom & Öst, 1995; Öst, 1996b; Öst, Ferebee, & Furmark, 1997; Öst, Salkovskis, & Hellstrom, 1991), and one case report of successful exposure treatment of dog phobia (Öst, 1989), our findings provide preliminary evidence that adults presenting with a marked fear and avoidance of dogs achieve significant benefit from brief exposure-based treatments. As predicted, all three exposure conditions resulted in significant improvement with approximately two-thirds of all study participants showing marked improvement that was both statistically reliable and clinically meaningful. Among the three conditions, response rates at posttreatment were 51.9, 62.1, and 73.1% for the IE, AI, and IV groups respectively. Pre to posttreatment effect sizes were 0.76, 1.41, and 1.55 for the IE, AI, and IV groups respectively. Although in the predicted direction, the between group differences were not statistically significant. Although all three groups showed low rates of relapse among treatment completers, there was a trend for participants in the in vivo condition to show greater relapse at follow-up.

Our efforts toward developing a more potent imaginal treatment combining imaginal exposure and active in vivo coping met with limited success. On the positive side, active-imaginal exposure

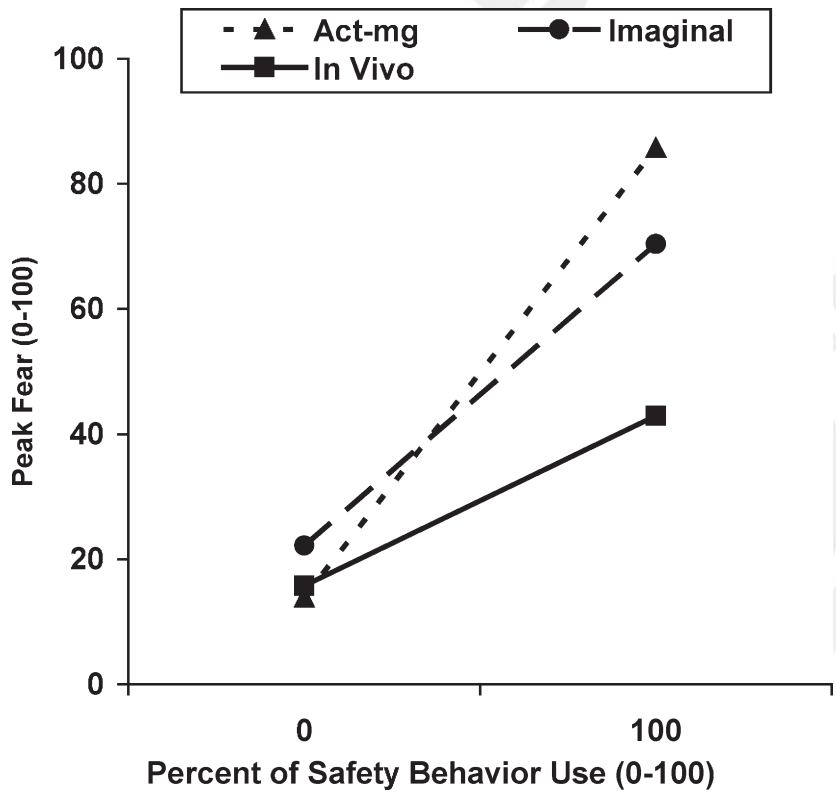

Fig. 3. Regression lines of posttreatment peak fear on safety behavior use.

outperformed imaginal exposure alone at both posttreatment and follow-up, although the differences were not statistically significant. Overall, the inclusion of an active behavioral coping procedure to imaginal exposure was well received by most study participants. Several participants spontaneously reported that actively acting out coping behaviors such as walking toward, and petting an imaginal dog helped increase the realism of the treatment. On the other hand, several participants reported feeling silly while physically enacting coping behaviors to an imaginal dog.

Analyses examining the effects of safety behavior utilization on participants' response to the interventions were consistent with prediction, although the observed asymmetry in the disruptive effects of safety behaviors across the treatment conditions was not expected. As predicted, greater safety behavior utilization during treatment was associated with less improvement and this relationship held even after controlling for the effects of baseline differences in subjective fear. This finding is consistent with findings from several recent empirical studies demonstrating the disruptive effects of safety behaviors on fear reduction during exposure (Salkovskis, 1999; Sloan & Telch, 2002). It is important to note that this is the first investigation to examine the relationship between safety behavior use and treatment response to imaginal exposure. Our findings suggest that the disruptive effects of safety behavior use during treatment were more pronounced for the two imaginal conditions relative to that for in vivo exposure. We can only speculate as to the factors accounting for this differential effect. Perhaps safety behaviors exert a more

disruptive effect on fear reduction achieved through imaginal exposure due to the greater cognitive resources required during imaginal exposure treatment. Sloan and Telch (2002) have proposed that safety behaviors may exert a negative effect on fear reduction during exposure by reducing available cognitive resources to process threat disconfirming information. To the extent that imaginal exposure requires additional cognitive resources (i.e., imaging fear-provoking stimuli) relative to in vivo exposure, it is possible that the additional cognitive resources allocated to safety behavior utilization will have a greater disruptive effect.

Several limitations of the present study deserve comment. First our conclusions are limited due to the omission of a wait-list or placebo control group and we cannot rule out the possibility that the significant improvement observed in each of the three exposure treatments was due to the passage of time or expectancy effects. Our decision not to employ a no-treatment or placebo control group was based on several considerations, most notably the desire to maximize cell sizes for testing the major study hypotheses, and prior research showing minimal treatment response rates for specific phobics assigned to wait-list, and placebo treatments (Öst, Johansson, & Jerremalm, 1982; Rothbaum et al., 1995).

Assessment of the durability of treatment gains was hampered by the considerable attrition observed at the follow-up assessment. Failure of participants to attend follow-up assessments was partly due to students' reluctance to return for follow-up evaluations after the academic semester had ended. To address the attrition problem, we conducted intent-to-treat analyses using both a liberal criterion (carrying participants' posttreatment scores forward) and a conservative criterion (assuming all participants relapsed to their pretreatment level). Among those participants (63%) who returned for follow-up assessment, most (92%) either maintained their gains or showed further improvement from the post-treatment to follow-up assessment.

Failure to detect differences between the three exposure treatments may have been due to low statistical power. The modest sample size of 82 resulted in insufficient power to detect anything but a large between-group effect size. Alternatively, the brief duration of treatment (i.e., 30 min of spaced exposure) may also have contributed to the failure to achieve greater separation among the three treatments. However, our response rates are only slightly lower than the 76% response rate reported by Craske (1999) in her review of ten controlled treatment studies of specific phobia with an average treatment duration of 4.8 h.

Our findings provide important data that those suffering from significant fear of dogs can be successfully treated with a brief intervention consisting of education and brief exposure-based interventions. It also appears that active-imaginal exposure may prove to be a viable alternative to in vivo exposure with significant practical advantages and no significant reduction in treatment efficacy. The treatments were statistically equivalent, although there was a trend suggesting that active-imaginal exposure was more effective than imaginal exposure alone.

6. Uncited references

Please cite the following in the text or delete from the reference list: Botella et al., 1998; Emmelkamp, 1977; Rachman and Hodgson, 1980; Stampfl and Levis, 1967; Öst, 1997; Öst, Alm, Brandber, and Breitholz, 2001; Kessler et al., 1994; Marks, 1987; Mathews, 1978; Neal and Turner, 1991; Gilroy et al., 2000; Kamphuis and Telch, 1999; Watson and Rayner, 1920; Wolpe, 1958.

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