The Effect of Attributional Processes Concerning Medication Taking on Return of Fear

Mark B. Powers
University of Amsterdam

Jasper A. J. Smits
Southern Methodist University

Diana Whitley
The University of Texas at Austin

Alexander Bystritsky
University of California, Los Angeles

Michael J. Telch
The University of Texas at Austin

In this investigation, the authors examined the effect of attributional processes concerning medication taking on return of fear following exposure-based treatment. Participants (87% undergraduate students and 13% community volunteers) displaying marked claustrophobic fear ($N = 95$) were randomly allocated to a waitlist condition, a psychological placebo condition, a 1-session exposure-based treatment, or the same exposure treatment given in conjunction with an inactive pill. Attributions concerning medication taking were manipulated by further randomly assigning participants in the exposure-based treatment plus pill condition to 1 of 3 instructional sets immediately following treatment completion and posttreatment assessment: (1) The pill was described as a sedating herb that likely made exposure treatment easier; (2) the pill was described as a stimulating herb that likely made exposure treatment more difficult; or (3) the pill was described as a placebo that had no effect on exposure treatment. Return of fear rates for the 3 conditions were 39%, 0%, and 0%, respectively. Moreover, the deleterious effects of the sedation instructions were mediated by reduced self-efficacy. These findings highlight the importance of assessing patient attributions regarding the improvements achieved with combined exposure-based and pharmacological treatments for anxiety disorders.

Keywords: claustrophobia, medication, attributions, return of fear, safety behaviors

Most patients seeking psychotherapy for anxiety are already taking medication when they arrive for treatment (Roy-Byrne et al., 2002; Taylor et al., 1989). Although medication taking can

enhance the acute effects of exposure-based treatment (Furukawa, Watanabe, & Churchill, 2006), there is some evidence suggesting that patients who receive medication during exposure-based treatment are more likely to relapse relative to those who do not receive medication (Barlow, Gorman, Shear, & Woods, 2000; Foa et al., 2005; Marks et al., 1993).

Several factors may account for the increased risk of relapse among patients who receive combined exposure-based and pharmacological treatment (Powers, Smits, Leyro, & Otto, 2007). For example, animal studies have consistently shown that learning with exposure (i.e., extinction learning) is context specific (Bouton, 2002), and thus the acute effects of exposure treatment may be reduced as a result of the context shift associated with medication discontinuation (i.e., the drug state is withdrawn). Preliminary support for this hypothesis comes from a study in which participants with spider phobia were administered exposure treatment after ingesting caffeine or placebo and then retested under conditions of either the same or opposite drug context (Mystkowski, Mineka, Vernon, & Zinbarg, 2003). Consistent with predictions, participants tested under the incongruent condition (e.g., treated while taking caffeine and later tested while taking placebo) displayed greater return of fear compared with those tested under the congruent condition (e.g., treated while taking caffeine and later tested while taking caffeine). However, contrary to common clinical practice, participants were not lead to believe that the drug would facilitate their fear reduction during exposure treatment.

A possible alternative or complementary mechanism governing the greater return of fear among those receiving combined cognitive-behavioral therapy (CBT) plus pharmacotherapy is the potential undermining of self-efficacy brought about by the external attribution of treatment gains to the medication. Self-efficacy theory posits that phobic behavior is caused by one's perceived inability to execute effective coping behavior in response to potential phobic threats (Bandura, 1986). The assertion that changes in perceived self-efficacy mediate improvement across diverse treatments and diverse phobic complaints has received considerable empirical support (Williams, 1992, 1995; Williams, Dooseman, & Kleinfield, 1984; Williams, Turner, & Peer, 1985; Williams & Watson, 1985). In the original formulation of the theory, Bandura (1977) suggested that the degree to which mastery experiences enhance one's self-efficacy depends in part on one's cognitive appraisal of the mastery experience. Attributional processes figure prominently in self-efficacy theory (Bandura, 1977, 1986). Those who attribute their success to external aids or propitious circumstances are less likely to show marked self-efficacy enhancement relative to those who attribute their gains to their own efforts and accomplishments. Indeed, patients with anxiety disorders show a strong tendency to attribute treatment gains to external factors (Adler & Price, 1985; Anderson & Arnoult, 1985; Broadbeck & Michelson, 1987; Cloitre, Heimberg, Liebowitz, & Gitow, 1992; Emmelkamp & Cohen-Kettenis, 1975; Hoffart & Martinsen, 1990). Accordingly, the increased risk of relapse associated with medication taking may be accounted for by an undermining of personal mastery due to external attribution effects (Bandura, 1977; Borden, Clum, & Salmon, 1991; Bouchard et al., 1996; Telch, 1988; Telch, Tearnan, & Taylor, 1983).

Few studies have investigated the influence of patients' attributions of treatment gains on the outcome of combined treatments. Basoglu, Marks, Kilic, Brewin, and Swinson (1994) reported that attributions of improvement to the medication (i.e., alprazolam or placebo) significantly predicted relapse in patients with panic disorder treated with medication (alprazolam or placebo) in combination with exposure (Basoglu et al., 1994). Likewise, Biondi and Picardi (2003) found that 60% of patients with panic disorder who made external/medication attributions in a combined medication–psychotherapy treatment relapsed, whereas no participants who made internal attributions relapsed (Biondi & Picardi, 2003). Although providing evidence consistent with an attributional hypothesis, the existing research is correlational and thus leaves open several possible alternative interpretations.

Building upon the aforementioned studies, the present study was designed to examine the effect of attributional processes concerning medication taking on return of fear following exposure-based treatment. To this end, we first randomly assigned participants to in vivo exposure, in vivo exposure plus inactive pill, psychological placebo, or waitlist control. Following treatment, we manipulated attributions concerning medication taking by randomizing participants in the exposure plus inactive pill condition to one of three perceived pill effect conditions: (a) an instructional set that informed participants that the herbal supplement they ingested was actually a placebo, (b) an instructional set that informed participants that the herbal supplement they ingested was a sedating herb with anxiety dampening effects, or (c) an instructional set that informed participants that the herbal supplement they ingested was a stimulating herb with anxiogenic effects. Outcome was assessed at pretreatment, posttreatment (before the attribution manipulation), and at 1-week follow-up. The waitlist and psychological placebo conditions were included to control for the passage of time, repeated assessments, and expectancy effects, thus helping to establish the integrity of the exposure treatment implementation. The inclusion of the exposure no pill condition served as reference group for evaluating the effects of pill ingestion on exposure treatment outcome. During the posttreatment randomization to the three pill attribution conditions, the inclusion of the placebo/ neutral pill description cell served as a reference group for evaluating both the anxiety dampening and anxiety activating pill instructional conditions.

On the basis of the available evidence, we hypothesized the following: (a) Participants led to believe that they ingested a sedating herb with anxiety dampening effects would show significantly greater return of fear compared with those led to believe that they ingested a placebo; (b) participants led to believe that they ingested a stimulating herb with anxiety enhancing effects would show significantly enhanced maintenance of treatment gains at follow-up compared with those led to believe that they ingested a placebo; and (c) the effects of the pill expectancy manipulation on changes in fear during the follow-up period would be mediated by changes in coping self-efficacy.

Method

Participants

Participants ($N = 95$) were college students from the University of Texas at Austin ($n = 83$) and participants from the community ($n = 12$). The college student participants were selected from a large participant pool of introductory psychology students ($n = 5,326$) through a two-stage screening procedure (see below), and they received partial course credit for their participation. The community sample consisted of medical patients at the Austin Radiological Association who refused magnetic resonance imaging scans because of claustrophobia. They underwent the same screening procedure and were not compensated for participation. The final sample included primarily women (71%), ranging in age from 18 to 60 years ($M = 20.11$, $SD = 6.23$). Marital status of the participants was 90% single, 8% married, and 2% divorced. The ethnic breakdown of the sample was 73% Caucasian, 12% Hispanic, 9% African American, 4% Asian, and 2% Native American. Most participants (74%) met full *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) criteria for claustrophobia, whereas 26% met all *DSM–IV* criteria with the exception of Criterion E, which requires that the person experience significant interference in social, academic, or work functioning or marked distress about having the phobia.

Materials

Inactive Pill

The inactive pill consisted of one Number-3-size capsule with 250 mg Vitamin C that was prescribed by Alexander Bystritsky. A single pill was provided to each participant in a clear plastic cup along with bottled water. The name for the fictitious medication, "Adomoxin," was created by the authors after ensuring that the

name yielded no results when entered as a search term in Internet search engines at the time of the study.

Measures

Composite International Diagnostic Interview (CIDI)–Auto

We conducted assessment of *DSM–IV* diagnoses of specific phobia using the computerized version of the CIDI–Auto (World Health Organization, 1997). Only the specific phobia module was administered in this study. The CIDI interviewer read the questions from the computer and recorded the participant's responses. The anxiety disorder module has demonstrated good psychometric properties, including good sensitivity (.86) and acceptable specificity (.52).

Treatment Credibility and Expectancy

The Credibility and Expectancy Questionnaire is widely used for assessing treatment expectancy and rationale credibility (Devilly & Borkovec, 2000). The scale has demonstrated factors that are stable across multiple populations, high internal consistency, and good retest reliability (Devilly & Borkovec, 2000). This measure was administered just after receiving the exposure rationale but before treatment was initiated.

Manipulation Check

The Treatment Gain and Attribution Questionnaire. This four-item author-constructed scale assessed participants' perceptions of their level of improvement and the extent to which the herbal supplement facilitated or interfered with their exposure treatment. We rated four dimensions using 100-point visual analogue scales, including the following: (a) overall improvement (*not at all improved* to *much improved*), (b) medication interference (*not at all detrimental* to *extremely detrimental*), (c) medication facilitation (*not at all helpful* to *extremely helpful*), and (d) exposure facilitation (*not at all helpful* to *extremely helpful*). They were also given the option to indicate items that did not apply. This measure was administered at the start of the Time 3 assessment (post-pill expectancy manipulation) only to participants randomized to one of the three exposure plus pill conditions.

Claustrophobic Fear

Peak fear during two claustrophobia behavioral approach tasks (BATs). Participants' rated their peak fear immediately after performing each of two different BATs (BAT-1 and BAT-2) using a Likert scale ranging from 0 (*no fear*) to 100 (*very severe fear*). See the *Procedures* section for a description of the two BATs.

The Claustrophobia Questionnaire (CLQ). The CLQ (Radomsky, Rachman, Thordarson, McIsaac, & Teachman, 2001) is a 26-item self-report scale for assessing claustrophobia severity and includes two subscales (Suffocation and Restriction). The Suffocation subscale is a 14-item self-report scale for assessing fear of suffocation. Items (e.g., "working under a car for 15 minutes") are rated on a 5-point Likert scale ranging from 0 (*not at all anxious*) to 4 (*extremely anxious*). The Restriction subscale is a 12-item self-report scale for assessing entrapment fears. Items (e.g., "stand-

ing for 15 minutes in a straight jacket") are rated on a 5-point Likert scale ranging from 0 (*not at all anxious*) to 4 (*extremely anxious*). The CLQ, including its subscales, has demonstrated good predictive and discriminant validity as well as good internal consistency and test–retest reliability (Radomsky et al., 2001). Normative data show that college students with claustrophobia ($M = 51.80$, $SD = 16.60$) score higher than adults without phobias ($M = 28.90$, $SD = 19.4$; Radomsky et al., 2001).

Categorical Classification of Return of Fear

In addition to our primary approach of indexing return of fear by examining increases in fear from posttreatment to follow-up on each of the claustrophobia outcome measures, we also computed a categorical index of return of fear using the Reliable Change Index (Jacobson & Truax, 1991). The Reliable Change Index was computed as $RC = \dfrac{X_2 - X_1}{S_{diff}}$. Each participant displaying a statistically reliable increase in BAT-1 fear from posttreatment to follow-up ($RC > 1.96$, $p < .05$) was classified as showing significant return of fear.

Perceived Coping Self-Efficacy

Prior to entering the chamber, participants rated each of four coping self-efficacy items on a scale ranging from 0 (*not confident at all*) to 100 (*extremely confident*). For example, "Estimate your confidence in being able to remain in control of your actions while in the chamber." This four-item scale has shown good psychometric properties with an internal consistency coefficient of .92 and a unitary factor structure (Valentiner, Telch, Petruzzi, & Bolte, 1996).

Treatment Process Measures

Prior to each 5-min exposure trial, participants completed ratings of anticipated fear, panic likelihood, perceived danger, and self-efficacy for the upcoming trial. Upon exiting the chamber, participants completed ratings of fear, panic, and anxiety symptom severity. These measures were administered merely to (a) be consistent with the treatment protocol used in our previous studies and (b) highlight for the participant the discrepancy between what was anticipated and what actually happened during the exposure trial. Accordingly, these measures were not included in any of the analyses.

Procedures

Participant Screening

The screening consisted of two stages (see Figure 1). During Stage 1, potential participants ($N = 5,326$) rated their overall fear of enclosed spaces on a 5-point Likert scale ranging from 0 (*no fear*) to 4 (*extreme fear*). Those ($n = 399$) reporting moderate or greater fear of enclosed spaces as defined by a rating of 2 or higher were invited to our laboratory for individual diagnostic and behavioral assessment (Stage 2). Of those, 168 potential participants provided written informed consent and participated in Stage 2 of the screening.
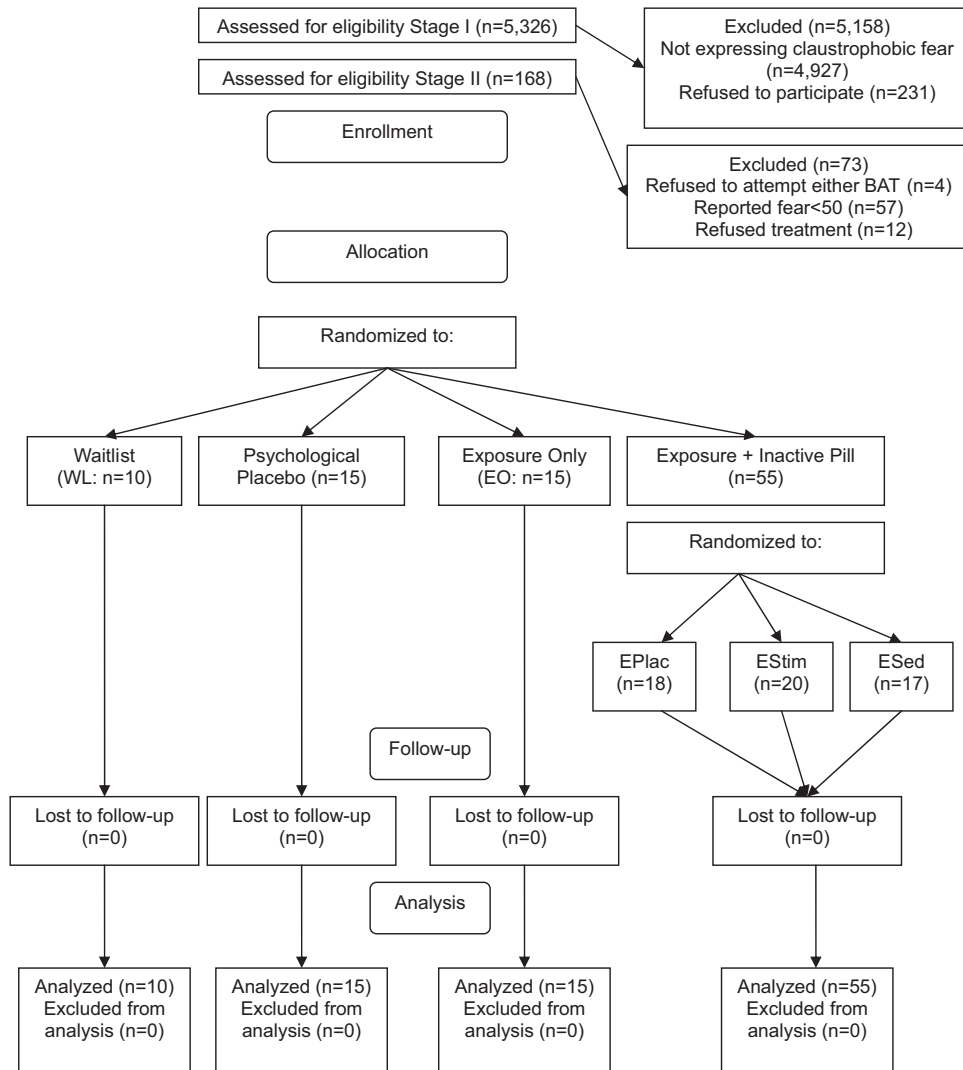
Figure 1. Study design. BAT = behavioral approach task; EPlac = exposure with placebo/neutral pill description; EStim = exposure with stimulating pill description; ESed = exposure with sedating pill description.

During Stage 2, potential participants were administered the CIDI along with the CLQ. They then underwent two consecutive BATs (see below). Individuals who refused to attempt either BAT ($n = 4$) or who reported a fear level less than 50 during either BAT-1 or BAT-2 ($n = 57$) were excluded from the study. Of those completing Stage 2, 107 met entrance criteria for the study, and 95 participants provided written informed consent and participated in the experiment. The scores on the CLQ for this sample ($M = 67.67$, $SD = 22.88$) were higher than a normative sample of college students with claustrophobia ($M = 51.80$, $SD = 16.60$) and a normative sample of community adults ($M = 28.90$, $SD = 19.4$; Radomsky et al., 2001).

BATs

Two consecutive BATs (BAT-1 and BAT-2) were administered to measure subjective fear while being in an enclosed space. These two BATs were administered consecutively at the screening visit (pretreatment), at posttreatment, and follow-up. BAT-1 (see below) was used for eligibility screening and also served as the training context for those participants randomized to receive exposure treatment. BAT-2 (see below) was also used for eligibility screening but was not used as a site for conducting the exposure treatments. The purpose of including BAT-2 was to assess claustrophobic fear reduction in a nontrained context.

BAT-1. BAT-1 comprised a chamber constructed of wood, painted black inside and out, lined with foam on the inside for comfort, and it measured 183 cm (length) × 61 cm (width) × 51 cm (height). Participants were instructed to lie down in the chamber and stay for as long as possible. The door was closed but unlocked during assessment and treatment. Length of time in the chamber was monitored, but the maximum time spent in the chamber was limited to 2 min, although the participants were not

made aware of this time limit. This 2-min uniformed ceiling was selected to ensure that the stimulus intensity was relatively constant across study participants.

BAT-2. BAT-2 occurred immediately after BAT-1 and consisted of a small chamber that was 51 cm (length) $\times$ 61 cm (width) $\times$ 183 cm (height). This chamber was identical to BAT-1 except that it had a natural wood color and was upright so that the participant entered and remained in the chamber in an upright standing position. Procedures for BAT-2 were identical to that of BAT-1.

Randomization to Treatment Conditions

Research assistants enrolled and randomized participants by cycling through a list consisting of a computer generated random sequence of the four treatment conditions (see below and also in Figure 1). Three times as many participants were randomized to the exposure treatment plus inactive pill condition in anticipation of later randomization to the three perceived pill effect conditions.

Exposure Treatment—No Pill

One week following the pretreatment assessment, participants were administered a one-session exposure treatment protocol previously used in five claustrophobia treatment studies (Kamphuis & Telch, 2000; Powers, Smits, & Telch, 2004; Sloan & Telch, 2002; Telch, Valentiner, Ilai, Petruzzi, & Hehmsoth, 2000; Telch et al., 2004). In brief, this treatment consisted of several elements, including (a) brief education about the nature of claustrophobia, (b) rationale for exposure treatment, (c) six 5-min trials of in vivo exposure to a claustrophobic chamber identical to that used in the BAT-1 assessment, and (d) completion of treatment process ratings before and after each exposure trial (see the *Measures* section). All treatment instructions were delivered by digital video to ensure consistency and to reduce error variance. In addition, all interactions between the therapist and participant were kept to a minimum beyond the video instructions. A general treatment rationale was provided emphasizing the fear-reducing effects of direct confrontation with the feared situation. For each exposure trial, participants were instructed to enter the chamber and remain inside for as long as possible up to a maximum of 5 min. Participants were also informed that they were free to exit the chamber at any time if they become too uncomfortable. Prior to the start of each trial, participants completed ratings of anticipated fear, panic likelihood, danger, and self-efficacy for the upcoming trial. Upon exiting the chamber, participants completed ratings of fear, panic, and anxiety symptom severity. These clinical process ratings were included to be consistent with the manualized treatment used in previous studies in this laboratory and were not included in the outcome analyses. They are intended to highlight the discrepancy between what is expected and what actually happens during the exposures for the participant. The interval between treatment trials was approximately 5 min. A treatment manual is available upon request.

Exposure Treatment Plus Inactive Pill (Later Randomized to Perceived Pill Effects)

Participants in the exposure plus inactive pill condition received the same exposure treatment described above. However, prior to the start of exposure treatment, they were administered an inactive pill of 250 mg of Vitamin C and told that the experiment would be investigating an anxiety treatment while simultaneously examining the effects of an herbal supplement—"Adomoxin" (a fictitious name)—on memory. Following the posttreatment assessment, participants in this group were randomized to one of three perceived pill effect conditions (see below and also in Figure 1).

Credible Psychological Placebo Treatment (Psychological Placebo)

Participants assigned to the psychological placebo condition returned 1 week following pretreatment assessment to receive 30 min of pulsed audio-photic stimulation with a device called the Digital Audio Integration Device (DAVID) Paradise XL (Mind Alive Inc., Edmonton, Alberta, Canada). It consists of a headset, which emits controllable pulsing sounds, and plastic goggles, which produce pulsing lights at controllable rates. The number of treatment trials ($N = 6$), the size and layout of the treatment room, the position of the participant (supine), and the duration of each trial (5 min) were equivalent to those receiving the exposure treatment. However, they received no exposure treatment. The audio and video stimulus frequency (i.e., rate/speed of the pulsing lights and sounds) was intentionally set at 12 Hz, which is higher than the rate at which the device is suggested to maximally produce relaxation and meditative states. This was done to assure that any relaxing properties of the DAVID would be due to a placebo effect and not a relaxation effect. The participants were given the rational suggested by Mind Alive Inc. that the audio-photic stimulation may "...enhance your beta wave brain activity..." and that "the enhanced relaxation brought on by the beta wave activity may help you to feel less anxious in the chamber." Audio-photic stimulation has been used as a credible placebo control group in previous studies of claustrophobia (Powers et al., 2004), social phobia (Smits, Powers, Buxkamper, & Telch, 2006), and acrophobia (Wolitzky & Telch, in press).

Waitlist

Participants in the waitlist condition completed assessments at each of the three time points and were offered exposure treatment following study completion.

Manipulation of Perceived Pill Effects

The manipulation of perceived pill effects occurred after the posttreatment assessment (see Figure 1). Participants originally assigned to the exposure plus inactive pill condition were randomized to one of three pill instruction conditions (see below) To enhance the credibility and standardization of the pill effects manipulation, Michael J. Telch provided instructions via videotape delivery.

Exposure with stimulating pill description (EStim). Participants assigned to the stimulating/arousal instructional set condition were told in a digital video that to determine the effects of arousal during exposure they received a new herbal supplement —"Adomoxin"—which has an anxiogenic side effect profile that should have made the exposure treatment much more difficult (see Appendix A for the full script).

Exposure with sedating herb description (ESed). Participants assigned to this instructional set condition viewed a digital video with the identical script of the exposure with stimulating herb description condition but were told that to determine the effects of sedation during exposure treatment they received Adomoxin with an anxiolytic side effect profile that should have made the exposures much easier (see Appendix B).

Exposure with placebo/neutral pill description (EPlac). Participants assigned to the placebo/neutral instructional set group viewed a digital video with the same script as the EStim but were told that they were administered a placebo with a neutral side effect profile that should not have had any effect on their exposures (see Appendix C).

Procedures for Enhancing the Integrity of the Experimental Procedures

Manual. All procedures were fully manualized and were administered by trained experimenters. The experiment protocol was a 104-page manual divided into separate sections for each session (pretreatment, treatment, posttreatment, and follow-up). The treatment section was further divided into separate subsections for each treatment condition. Detailed step-by-step instructions were provided for all procedures.

Experimenter training. The training of experimenters involved (a) didactic orientation to the project provided by Mark B. Powers, (b) observation of assessment and treatment procedures, and (c) role-plays of procedures with trained experimenters. Experimenters were observed and monitored, and they were provided with feedback regarding adherence to the experiment protocol. All experimenters demonstrated proficiency with the protocol.

Debriefing

Immediately following the completion of the study, participants were made aware that some of them may have received a placebo treatment and that some groups may have received inaccurate information about the treatment. The debriefing protocol included guidelines for in-person interaction between participants and the investigator. It included (a) an explanation of the nature of (and reasons for the use of) deception in the experiment, (b) an opportunity to ask questions about the experiment and any of its procedures, and (c) a distribution of a written debriefing statement that presented a summary of the above information along with contact information of the experimenter should they have further questions or concerns. All study procedures were approved by the university's institutional review board.

Results

Means and standard deviations for all continuous measures at each of the three assessment periods are presented in Table 1. We conducted all analyses using the full sample and an alpha level of .05 except when examining equivalence of groups at baseline in which an alpha level of .20 was used to avoid overly conservative rejection of between-groups differences.

Preliminary Analyses—Pretreatment

Baseline Equivalence of Groups

We examined differences between groups on continuous and dichotomous measures using one-way analyses of variance (ANOVAs) and chi-square analyses, respectively. Variables examined included age, gender, marital status, ethnicity, BAT-1 peak fear, BAT-2 peak fear, the CLQ Suffocation subscale, the CLQ Restriction subscale, and the CLQ Total. Analyses showed no significant differences between groups at baseline on any of these measures (all $ps > .20$), suggesting that randomization was successful. Participants who met full criteria for claustrophobia were equally distributed across conditions, $\chi^2(5, N = 95) = 5.66, p = .34$. Likewise, students and community participants were equally represented across groups, $\chi^2(5, N = 95) = 1.90, p = .86$. Furthermore, there were no significant differences in severity at baseline on the basis of the major outcome variables across diagnostic status groups (full *DSM–IV* criteria met vs. all *DSM–IV* criteria met except Criterion E), $F(4, 89) = 0.96, p = .43, \eta^2 = .04$, or source (student vs. community), $F(4, 89) = 1.14, p = .34, \eta^2 = .05$.

Treatment Credibility and Expectancy

Mean credibility scores for the exposure only ($M = 5.65, SD = 1.61$), EStim ($M = 6.86, SD = 6.71$), EPlac ($M = 6.71, SD = 3.84$), ESed ($M = 5.16, SD = 1.81$), and psychological placebo ($M = 6.11, SD = 3.82$) groups did not significantly differ, $F(4, 80) = 0.52, p = .72, \eta^2 = .03$. Likewise, the mean expectancy scores for the exposure only ($M = 51.33, SD = 23.71$), EStim ($M = 55.50, SD = 24.44$), EPlac ($M = 50.83, SD = 16.91$), ESed ($M = 44.41, SD = 19.91$), and psychological placebo ($M = 55.67, SD = 26.34$) conditions were not significantly different, $F(8, 80) = 0.71, p = .59, \eta^2 = .03$.

Preliminary Analyses—Posttreatment

A series of additional preliminary analyses were performed prior to the pill expectancy manipulation to assess (a) the integrity of the exposure treatment implementation, (b) whether the ingestion of a pill placebo influenced level of fear reduction during exposure treatment, and most importantly, (c) the equivalence of the three pill expectancy groups posttreatment but prior to the pill expectancy manipulation.

Exposure Treatment Integrity Check

As a partial check on the integrity of the implementation of exposure treatment, we performed a 3×2 repeated measures multivariate analysis of variance (MANOVA) comparing the level of claustrophobic fear reduction among those randomized to exposure treatment versus those randomized to psychological placebo or waitlist control. This analysis included a three-level treatment condition effect (exposure treatment, psychological placebo, and waitlist control) and a two-level time effect (pretreatment vs. posttreatment/pre-pill expectancy manipulation). Peak fear during BAT-1, BAT-2, the CLQ Suffocation subscale, and the CLQ Restriction subscale were simultaneously entered as the dependent variables. Results revealed a significant Condition $\times$ Time inter-

Table 1
Means and Standard Deviations for Pretreatment (Pre), Posttreatment (Post), and Follow-Up (FU) Indices of Claustrophobic Fear

Measure	Exposure only			EStim			ESed			EPlac			Psych placebo			Waitlist		
	Pre	Post	FU	Pre	Post	FU	Pre	Post	FU	Pre	Post	FU	Pre	Post	FU	Pre	Post	FU
	n = 15	n = 15	n = 15	n = 20	n = 20	n = 20	n = 17	n = 17	n = 17	n = 18	n = 18	n = 18	n = 15	n = 15	n = 15	n = 10	n = 10	n = 10
BAT-1 peak fear																		
M	70	19	15	65	20	16	66	20	50	65	24	16	57	33	36	68	58	47
SD	17	21	17	12	19	16	13	22	36	15	25	15	13	23	26	12	16	26
BAT-2 peak fear																		
M	46	22	13	41	22	16	52	29	33	48	24	15	42	29	32	59	55	41
SD	20	26	15	19	22	19	24	27	29	21	22	18	21	29	25	14	17	27
CLQ: Suffocation																		
M	32	22	20	30	27	24	35	30	33	34	30	26	30	37	26	36	33	32
SD	19	16	17	10	11	11	11	11	12	11	12	12	14	35	11	8	7	7
CLQ: Restriction																		
M	31	28	26	35	32	27	37	31	34	38	34	27	31	29	27	39	36	31
SD	16	22	22	11	13	13	11	11	11	10	10	12	15	14	14	8	10	9
CLQ: Total																		
M	63	51	46	65	59	46	72	61	67	72	64	52	61	66	54	74	69	63
SD	34	37	37	20	23	37	21	21	21	19	20	22	25	36	24	16	16	15

Note. EStim = exposure with stimulating pill description; ESed = exposure with sedating pill description; EPlac = exposure with placebo/neutral pill description; Psych placebo = psychological placebo; BAT-1 = behavioral approach task in Chamber 1; BAT-2 = behavioral approach task in the generalization Chamber; CLQ = Claustrophobia Questionnaire.

action, $F(8, 178) = 3.21$, $p < .01$, $\eta^2 = .13$. Follow-up simple effects analyses indicated that those receiving exposure treatment showed significantly greater improvement across the four outcome measures, relative to those randomized to either placebo, $F(4, 80) = 2.95$, $p < .05$, $\eta^2 = .13$, or waitlist, $F(4, 75) = 4.29$, $p < .01$, $\eta^2 = .19$.

Effects of Pill Ingestion on Fear Reduction

We examined the effects of preexposure pill ingestion using a 2×2 repeated measures MANOVA with condition (exposure only vs. exposure with inactive pill—later randomized to pill attributions) as a two-level between-subjects factor and time (pretreatment, posttreatment) as a two-level within-subjects factor. The four primary outcome measures were entered as dependent variables. There was a main multivariate effect of time, $F(4, 65) = 35.26$, $p < .001$, $\eta^2 = .69$; but no significant main effect for condition, $F(4, 65) = 0.56$, $p > .05$, $\eta^2 = .03$; and no significant Time × Condition interaction, $F(4, 65) = 2.06$, $p > .05$, $\eta^2 = .11$. These results indicate that there were no significant differences in improvement between those participants who ingested a pill prior to their exposure treatment and those who underwent exposure therapy without a pill.

Premanipulation Equivalence of the Three Pill Expectancy Groups

To determine that the three pill plus exposure groups were equivalent with respect to their level of fear reduction prior to the pill expectancy manipulation, we performed a 3×2 repeated measures MANOVA with pill expectancy (EStim, ESed, EPlac) as the between-subjects factor and time (pretreatment, posttreatment) as the within-subjects factor. This analysis revealed a significant main effect of time, $F(4, 49) = 36.88$, $p < .001$, $\eta^2 = .75$; but no significant condition, $F(8, 100) = 0.67$, $p > .05$, $\eta^2 = .05$; or Condition × Time interaction, $F(8, 100) = 0.33$, $p > .05$, $\eta^2 = .03$. These findings indicate that prior to the pill expectancy manipulation, the three pill plus exposure conditions showed equivalent levels of fear reduction.

Preliminary Analyses—Pill Expectancy Manipulation Check

Participants' scores on the Treatment Gain and Attribution Questionnaire were examined as a check on the integrity of our pill expectancy manipulation. The group receiving exposure with the stimulating pill description rated the interfering effects of the medication higher than the group receiving EPlac, $F(1, 31) = 571.77$, $p < .001$, $\eta^2 = .95$. Ratings of overall improvement, positive attributions about the treatment, and attributions about the helpful effects of the medication were not significantly different between these two groups. Also as expected, the ESed condition rated the medication significantly more helpful than the EPlac condition, $F(1, 29) = 159.72$, $p < .001$, $\eta^2 = .85$. In addition, the ESed group rated the detrimental effects of the medication significantly lower than the EPlac group, $F(1, 29) = 6.83$, $p < .05$, $\eta^2 = .20$. Ratings of overall improvement and positive attributions about the treatment were not significantly different between these two groups.

Primary Analyses: Effects of Pill Expectancy Instructions on Return of Fear

Two planned multivariate repeated measures contrasts were conducted to test the primary study hypotheses concerning the effects of the pill expectancy manipulation on subsequent return of fear as measured by the four major outcome measures (peak fear during BAT-1 and BAT-2, the CLQ Suffocation subscale, and the CLQ Restriction subscale). Each analysis included a two-level pill condition effect (e.g., relaxation vs. neutral instructional set) and a two-level time effect (posttreatment /pre-pill manipulation vs. follow-up/post-pill expectancy manipulation). The Condition × Time interaction yields the critical test of the hypothesis in question. For ease of presentation, Figure 2 shows the results of only BAT-1 (included in the MANOVA).

> *Hypothesis 1.* Participants led to believe that the pill they ingested prior to treatment had a relaxing/arousal dampening effect would show significantly greater return of fear from posttreatment to follow-up.

This hypothesis was tested by performing a planned contrast (see above) comparing participants assigned to the ESed condition versus those assigned to the EPlac condition across the four primary outcome measures. Results were consistent with prediction showing greater return of fear for those assigned to the ESed, as evidenced by a significant Condition × Time interaction, $F(4, 29) = 5.60$, $p < .01$, $\eta^2 = .44$. Using Cohen's (1977) conventions, this suggests a large effect size (η^2, small $= .01$, medium $= .06$, large $= .14$). To rule out the possibility that the observed effects were due solely to the inclusion of BAT-1 (the context in which training occurred), we repeated the analysis excluding BAT-1. The effect remained significant, $F(3, 30) = 5.83$, $p < .01$, $\eta^2 = .37$, indicating that the deleterious effects of the posttreatment sedating pill description were not specific to BAT-1.

> *Hypothesis 2.* Participants led to believe that the pill they ingested prior to treatment had an arousal activating effect would show significantly enhanced maintenance of treatment gains.

This hypothesis was tested by performing a planned contrast comparing participants assigned to the EStim condition versus those assigned to the EPlac condition. Results of this planned contrast failed to support the prediction of enhanced treatment gains for those assigned to the EStim pill expectancy instructional set, $F(4, 33) = 0.54$, $p > .05$, $\eta^2 = .06$. Statistical power to detect a moderate effect size for this a priori planned multivariate contrast given the completer sample size and alpha set at .05 was .82, suggesting that the null finding was not due to low statistical power. We repeated the analysis removing BAT-1 and found a similar result, $F(3, 34) = 0.64$, $p > .05$, $\eta^2 = .05$.

Categorical Classification of Return of Fear

The percentages of participants in each of the exposure conditions that met criteria for return of fear on the basis of the Reliable Change Index (Jacobson & Truax, 1991) were as follows: exposure with no pill $= 0\%$, exposure with stimulant pill instructions $= 0\%$, exposure with placebo pill instructions $= 0\%$, and exposure with sedating pill instructions $= 39\%$. Consistent with prediction and our MANOVA findings, results of the planned contrast showed significantly greater return of fear rates for the exposure group that received the sedating pill instructions (39%) relative to the exposure group that received the neutral pill instructions (0%), $\chi^2(4, N = 62) = 19.30$, $p < .001$. Contrary to prediction but consistent with our MANOVA findings, the exposure group plus stimulant pill description group did not show a lower return of fear rate than the exposure group that received the neutral pill description. However, even the exposure only group had a return of fear rate of 0%, making greater improvement impossible.

> *Hypothesis 3.* The effects of the pill expectancy manipulation on changes in fear during the follow-up period would be mediated by changes in coping self-efficacy.
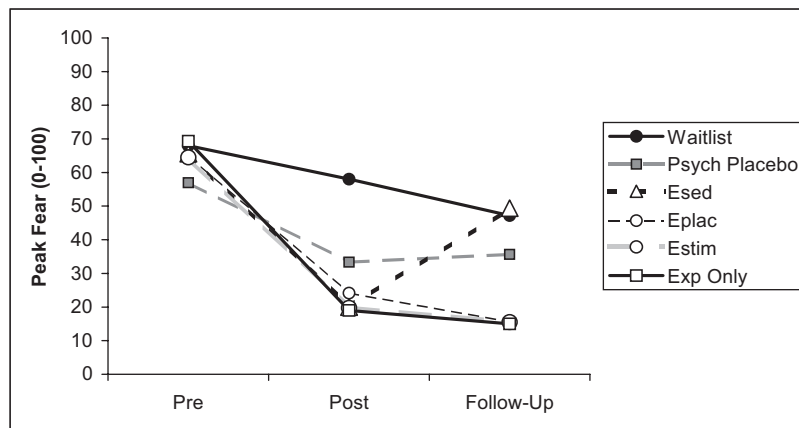

Figure 2. Peak fear at pretreatment (Pre), posttreatment (Post), and follow-up in behavioral approach task–1 (BAT-1). Psych Placebo = psychological placebo; Esed = exposure with sedating pill description; Eplac = exposure with placebo/neutral pill description; Estim = exposure with stimulating pill description; Exp Only = exposure only.

A test of this mediational hypothesis requires three conditions to be met. First, the mediator (M) has to be an event or change that follows the experimental manipulation but precedes the outcome. This condition is necessary to establish temporal precedence because M cannot possibly be responsible for the changes observed in the outcome unless it occurs between the independent variable (IV; in this case the instructional manipulation of pill expectancy) and the outcome (in this case return of fear; Kraemer, Wilson, Fairburn, & Agras, 2002). This condition was met given that the putative M (change in self-efficacy [SE Change]) was assessed after the pill expectancy manipulation but before the assessment of outcome (return of fear).

Second, M must correlate with the IV, indicating that the IV has a possible effect on the M. This condition was also met as evidenced by the significant main effect of the pill expectancy manipulation (ESed vs. EPlac) on self-efficacy change scores, $F(1, 33) = 19.08$, $p < .001$, $\eta^2 = .37$.

Finally, M or the interaction of M $\times$ IV must account for significant variance in the outcome. To examine this condition (see Kraemer et al., 2002), we subjected follow-up scores on the four dependent variables (Peak fear during BAT-1 and 2, the CLQ Suffocation subscale, and the CLQ Restriction subscale) to a MANOVA with the following three predictors: (1) condition (ESed vs. EPlac), (2) SE Change from posttreatment (preexperimental manipulation) to follow-up (postexperimental manipulation), and (3) the Condition $\times$ SE Change interaction term. This analysis revealed a significant Condition $\times$ SE Change interaction, $F(4, 27) = 3.76$, $p < .02$, $\eta^2 = .36$. Further, neither the main effect for condition, $F(4, 27) = 0.77$, $p = .56$, $\eta^2 = .10$, nor SE Change, $F(4, 27) = 1.95$, $p = .13$, $\eta^2 = .22$, was significant in this model. These results are consistent with the hypothesis that the effect of the sedating pill description on return of fear was fully mediated by changes in participants' perceived coping efficacy.

Discussion

This is the first study to investigate experimentally perceived pill effects and their impact on attributions of treatment improvement and return of fear among a phobic sample receiving exposure treatment. Our posttreatment experimental manipulation of perceived pill effects was successful in achieving differential attributions as evidenced by the finding that following treatment, participants who were led to believe that they had ingested a sedating herbal supplement with anxiety dampening effects rated the medication as more helpful than participants who were led to believe they had ingested a placebo or an active stimulating herbal supplement with stimulating effects. Similarly, those who were led to believe that they had ingested an herbal stimulant with anxiogenic effects rated the pill as more detrimental to their treatment relative to the other two pill groups.

Findings at the Posttreatment Assessment

The major findings at the posttreatment assessment (prior to the pill instructional set manipulation) address issues related to the integrity of the exposure treatment, effects of pill taking on fear reduction during exposure treatment, and most importantly, ensuring that the three pill conditions showed equivalent levels of fear reduction prior to the experimental manipulation of perceived pill

effects. Consistent with our previous studies, our one-session exposure treatment led to significant improvement across multiple indices of claustrophobic fear (Powers et al., 2004; Telch et al., 2000, 2004). Moreover, the level of improvement observed among our exposure-treated participants was significantly greater than that shown by those in the placebo or waitlist groups, thus ruling out the passage of time, repeated assessments, or nonspecific treatment effects as being responsible for the improvement observed among those receiving exposure treatment. Contrary to prediction, the psychological placebo condition did not outperform the waitlist as in previous studies (e.g. Powers et al., 2004). This was primarily due to a higher than expected response in the waitlist—highlighting the importance of such comparison conditions. The posttreatment comparison of exposure treatment with no pill to exposure treatment with pill yielded no evidence that the mere ingestion of a pill had any noticeable facilitative or detrimental effects on the level of fear reduction attained during exposure treatment. Finally, comparisons of the three pill conditions (premanipulation) revealed equivalent levels of pre- to post-fear reduction across the four outcome indices.

Manipulation of Pill Attributions on Return of Fear

Consistent with prediction, participants who were later led to believe that they had ingested a sedating herbal supplement with anxiety-dampening effects displayed markedly higher return of fear at the 1-week follow-up assessment. The magnitude of this effect is evidenced by the fact that at the brief follow-up assessment, participants assigned to the perceived sedating pill condition no longer outperformed the placebo or waitlist groups, whereas the other three exposure conditions continued to show significantly greater improvement than the placebo and waitlist groups. These data are consistent with previous findings from correlational studies suggesting that those who attribute their improvement to the medication are more likely to display poorer maintenance of improvement (Basoglu et al., 1994; Biondi & Picardi, 2003). However, contrary to prediction, participants in the exposure stimulating herb group did not show the hypothesized enhancement effect at follow-up, even though the attributional questionnaire data indicated that this pill description manipulation was successful in achieving its intended effect, namely having participants believe the pill was detrimental to their treatment. To our knowledge, this is the first study to examine whether enhancement of fear reduction can be achieved by instilling a reverse pill attribution effect (i.e., "I did it despite having ingested this pill, which made me more nervous"). However, the exposure only condition also showed 0% return of fear, suggesting a floor effect.

Self-Efficacy as a Mediator of the Effects of the Pill Manipulation

Our mediation analyses provided support for the hypothesis that the deleterious effects of the sedating pill instructional set manipulation were partially governed by changes in participants' perceived coping efficacy. Specifically, those assigned to the exposure sedating herb description group showed a significant lowering of their perceived coping efficacy relative to the other three exposure conditions, which in turn predicted the poorer maintenance of fear reduction at the follow-up assessment. These findings are

consistent with the common clinical observation that patients report low confidence about managing their anxiety during medication discontinuation. They are also consistent with a fairly large body of evidence suggesting that changes in self-efficacy operate as a cognitive mediator of treatment outcome in studies of participants with phobias undergoing exposure-based treatments (Bandura & Adams, 1977; Bandura, Adams, & Beyer, 1977; Bandura, Reese, & Adams, 1982; Valentiner et al., 1996; Williams et al., 1984, 1985; Williams & Watson, 1985). Perhaps both internal (medication, emotion, etc.) and external (therapist presence, location, etc.) context shifts contribute to external attributions for treatment gains and reduced self efficacy, which in turn leads to a return of fear. This return of fear may then herald increased avoidance and finally a full relapse.

Clinical Implications

Clinical implications from the current study deserve comment. First, pill ingestion did not affect the level of improvement at least in the short-term. This is consistent with findings that acute outcomes of combined pharmacotherapy and CBT for the anxiety disorders tend to be comparable with those offered by either modality alone (Otto, Smits, & Reese, 2005). However, patients' attributions concerning the effects of the pill did significantly impact return of fear when later tested without the pill. If replicated in a clinical sample, these data suggest that prior to mediation discontinuation, therapists should evaluate patients' attributions concerning the effects of their medication and when necessary provide corrective information to reduce external attributions of improvement to the medication. Other commonly recommended strategies for reducing return of fear following mediation discontinuation include the following: (a) discourage as-needed (pro re nata or prn) benzodiazepine use (Westra, Stewart, & Conrad, 2002), (b) slow taper off scheduled medications during, as opposed to after, CBT (Bruce, Spiegel, & Hegel, 1999; Hegel, Lewis Ravaris, & Ahles, 1994; Otto et al., 1993; Spiegel, Bruce, Gregg, & Nuzzarello, 1994), and (c) exposure treatment in multiple contexts (Rowe & Craske, 1998; Vansteenwegen et al., 2007).

Limitations

Several limitations of the present study should be noted. First and foremost, findings from this analogue investigation need to be replicated within the context of a randomized controlled trial employing more severe clinical samples, higher treatment doses, and an expanded range of outcomes. The treatment dose in this study (30 min of total exposure time) is unlikely to be sufficient to treat more severe clinical populations. However, it is interesting to note that scores on the CLQ for this sample were higher than those reported for a normative sample of college students with claustrophobia as well as a normative sample of adults without phobias (Radomsky et al., 2001). Also, fear reduction was less pronounced on this measure than for BAT-1 peak fear, underscoring the importance of a higher treatment dose in clinical settings. Second, the follow-up period of 1 week was too brief to make inferences about the stability of the effects over time. Third, although a generalization probe was included (BAT-2), it is unclear to what extent these findings would generalize to other claustrophobic situations, such as riding elevators and subways. In addition,

reported fear in BAT-2 was much lower than in BAT-1. This is surprising given that the two cabinets were identical except for the difference that BAT-1 was lying flat on the ground, whereas BAT-2 was upright. Although it is possible that the lower fear reported during BAT-2 was due to fear extinction resulting from participants' exposure to BAT-1, the short 2-min duration of BAT-1 makes this explanation unlikely. A more plausible explanation is that individuals with claustrophobia perceive standing in an enclosed chamber less threatening than being in a supine position in a similar chamber. This is consistent with our clinical experience in which patients with claustrophobia often report greater fear when placed in an enclosed space in a supine position. Future studies may benefit by including BATs that tap a greater range of claustrophobic situations (e.g., elevators, crawlspaces). Finally, the primary manipulation took place after the posttreatment assessment. Although the posttreatment manipulation has the advantage of disentangling expectancy and attribution effects, it deviates markedly from common clinical practice in which patients are provided expectations about the effects of medications at the commencement of treatment.

Conclusions

In conclusion, these results represent the first experimental test demonstrating a linkage between perceived pill effects, attribution of treatment gains, and return of fear following exposure treatment. Greater return of fear was observed among participants who received instructions that increased their attribution of treatment improvement to the anxiety reducing effects of a fictitious herbal sedative. This finding along with the findings from our mediational analysis are consistent with early theorizing (Telch et al., 1983) and results from correlational studies (Basoglu et al., 1994), suggesting that those undergoing combined treatment who attribute treatment gains to the pill are more likely to show a less favorable outcome following discontinuation. Further, these perceived medication effects appear to negatively impact outcome by undermining patients' coping self-efficacy. These findings underscore the potential importance of assessing patient attributions and self-efficacy during combined exposure-based and pharmacological treatment.

References

Adler, D., & Price, J. H. (1985). Relation of agoraphobics health locus of control orientation to severity of agoraphobia. *Psychological Reports, 56,* 619–625.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Anderson, C. A., & Arnoult, L. H. (1985). Attributional style and everyday problems in living: Depression, loneliness, and shyness. *Social Cognition, 3,* 16–35.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191–215.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A., & Adams, N. E. (1977). Analysis of self-efficacy theory of behavioral change. *Cognitive Therapy & Research, 1,* 287–310.

Bandura, A., Adams, N. E., & Beyer, J. (1977). Cognitive processes mediating behavioral change. *Journal of Personality and Social Psychology, 35,* 125–139.

Bandura, A., Reese, L., & Adams, N. E. (1982). Microanalysis of action

and fear arousal as a function of differential levels of perceived self-efficacy. *Journal of Personality and Social Psychology, 43,* 5–21.

Barlow, D. H., Gorman, J. M., Shear, M. K., & Woods, S. W. (2000). Cognitive-behavioral therapy, imipramine, or their combination for panic disorder: A randomized controlled trial. *Journal of the American Medical Association, 283,* 2529–2536.

Basoglu, M., Marks, I. M., Kilic, C., Brewin, C. R., & Swinson, R. P. (1994). Alprazolam and exposure for panic disorder with agoraphobia: Attribution of improvement to medication predicts subsequent relapse. *British Journal of Psychiatry, 164,* 652–659.

Biondi, M., & Picardi, A. (2003). Attribution of improvement to medication and increased risk of relapse of panic disorder with agoraphobia. *Psychotherapy and Psychosomatics, 72,* 110–111 (author reply, p. 111).

Borden, J. W., Clum, G. A., & Salmon, P. G. (1991). Mechanisms of change in the treatment of panic. *Cognitive Therapy and Research, 15,* 257–272.

Bouchard, S., Gauthier, J., Laberge, B., French, D., Pelletier, M. H., & Godbout, C. (1996). Exposure versus cognitive restructuring in the treatment of panic disorder with agoraphobia. *Behaviour Research and Therapy, 34,* 213–224.

Bouton, M. E. (2002). Context, ambiguity, and unlearning: Sources of relapse after behavioral extinction. *Biological Psychiatry, 52,* 976–986.

Broadbeck, C., & Michelson, L. (1987). Problem-solving skills and attributional styles of agoraphobics. *Cognitive Therapy and Research, 11,* 593–610.

Bruce, T. J., Spiegel, D. A., & Hegel, M. T. (1999). Cognitive-behavioral therapy helps prevent relapse and recurrence of panic disorder following alprazolam discontinuation: A long-term follow-up of the Peoria and Dartmouth studies. *Journal of Consulting and Clinical Psychology, 67*(1), 151–156.

Cloitre, M., Heimberg, R. G., Liebowitz, M. R., & Gitow, A. (1992). Perceptions of control in panic disorder and social phobia. *Cognitive Therapy and Research, 16,* 569–577.

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences.* New York: Academic Press.

Devilly, G. J., & Borkovec, T. D. (2000). Psychometric properties of the Credibility/Expectancy Questionnaire. *Journal of Behavior Therapy and Experimental Psychiatry, 31,* 73–86.

Emmelkamp, P. M., & Cohen-Kettenis, P. T. (1975). Relationship of locus of control to phobic anxiety and depression. *Psychological Reports, 36,* 390.

Foa, E. B., Liebowitz, M. R., Kozak, M. J., Davies, S., Campeas, R., Franklin, M. E., et al. (2005). Randomized, placebo-controlled trial of exposure and ritual prevention, clomipramine, and their combination in the treatment of obsessive-compulsive disorder. *American Journal of Psychiatry, 162,* 151–161.

Furukawa, T. A., Watanabe, N., & Churchill, R. (2006). Psychotherapy plus antidepressant for panic disorder with or without agoraphobia: Systematic review. *British Journal of Psychiatry, 188,* 305–312.

Hegel, M. T., Lewis Ravaris, C., & Ahles, T. A. (1994). Combined cognitive-behavioral and time-limited alprazolam treatment of panic disorder. *Behavior Therapy, 25*(2), 183–195.

Hoffart, A., & Martinsen, E. W. (1990). Agoraphobia, depression, mental health locus of control, and attributional styles. *Cognitive Therapy and Research, 14,* 343–351.

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59,* 12–19.

Kamphuis, J. H., & Telch, M. J. (2000). Effects of distraction and guided threat reappraisal on fear reduction during exposure-based treatments for specific fears. *Behaviour Research and Therapy, 38,* 1163–1181.

Kraemer, H. C., Wilson, G. T., Fairburn, C. G., & Agras, W. S. (2002). Mediators and moderators of treatment effects in randomized clinical trials. *Archives of General Psychiatry, 59,* 877–883.

Marks, I., Swinson, R. P., Basoglu, M., Kuch, K., Noshirvani, H., O'Sullivan, G., et al. (1993). Alprazolam and exposure alone and combined in panic disorder with agoraphobia: A controlled study in London and Toronto. *British Journal of Psychiatry, 162,* 776–787.

Mystkowski, J. L., Mineka, S., Vernon, L. L., & Zinbarg, R. E. (2003). Changes in caffeine states enhance return of fear in spider phobia. *Journal of Consulting and Clinical Psychology, 71,* 243–250.

Otto, M. W., Pollack, M. H., Sachs, G. S., Reiter, S. R., Meltzer-Brody, S., & Rosenbaum, J. F. (1993). Discontinuation of benzodiazepine treatment: efficacy of cognitive-behavioral therapy for patients with panic disorder. *American Journal of Psychiatry, 150*(10), 1485–1490.

Otto, M. W., Smits, J. A., & Reese, H. E. (2005). Combined psychotherapy and pharmacotherapy for mood and anxiety disorders in adults: Review and analyses. *Clinical Psychology: Science & Practice, 12,* 72–86.

Powers, M. B., Smits, J. A., Leyro, T. M., & Otto, M. W. (2007). Translational research perspectives on maximizing the effectiveness of exposure therapy. In D. C. S. Richard & D. Lauterbach (Eds.), *Handbook of the exposure therapies* (pp. 109–126). Burlington, MA: Academic Press.

Powers, M. B., Smits, J. A., & Telch, M. J. (2004). Disentangling the effects of safety-behavior utilization and safety-behavior availability during exposure-based treatment: A placebo-controlled trial. *Journal of Consulting and Clinical Psychology, 72,* 448–454.

Radomsky, A. S., Rachman, S., Thordarson, D. S., McIsaac, H. K., & Teachman, B. A. (2001). The Claustrophobia Questionnaire. *Journal of Anxiety Disorders, 15,* 287–297.

Rowe, M. K., & Craske, M. G. (1998). Effects of varied-stimulus exposure training on fear reduction and return of fear. *Behaviour Research and Therapy, 36,* 719–734.

Roy-Byrne, P., Russo, J., Dugdale, D. C., Lessler, D., Cowley, D., & Katon, W. (2002). Undertreatment of panic disorder in primary care: Role of patient and physician characteristics. *Journal of the American Board of Family Medicine, 15,* 443–450.

Sloan, T., & Telch, M. J. (2002). The effects of safety-seeking behavior and guided threat reappraisal on fear reduction during exposure: An experimental investigation. *Behaviour Research and Therapy, 40,* 235–251.

Smits, J. A., Powers, M. B., Buxkamper, R., & Telch, M. J. (2006). The efficacy of videotape feedback for enhancing the effects of exposure-based treatment for social anxiety disorder: A controlled investigation. *Behaviour Research and Therapy, 44,* 1773–1785.

Spiegel, D. A., Bruce, T. J., Gregg, S. F., & Nuzzarello, A. (1994). Does cognitive behavior therapy assist slow-taper alprazolam discontinuation in panic disorder? *American Journal of Psychiatry, 151*(6), 876–881.

Taylor, C., King, R., Margraf, J., Ehlers, A., Telch, M., Roth, W., et al. (1989). Use of medication and in vivo exposure in volunteers for panic disorder research. *American Journal of Psychiatry, 146,* 1423–1426.

Telch, M. J. (1988). Combined pharmacological and psychological treatments for panic sufferers. In S. Rachman & J. Maser (Eds.), *Panic: Psychological perspectives* (pp. 167–187). Hillsdale, NJ: Erlbaum.

Telch, M. J., Tearnan, B. H., & Taylor, C. B. (1983). Antidepressant medication in the treatment of agoraphobia: A critical review. *Behavior Research and Therapy, 21,* 505–517.

Telch, M. J., Valentiner, D. P., Ilai, D., Petruzzi, D., & Hehmsoth, M. (2000). The facilitative effects of heart-rate feedback in the emotional processing of claustrophobic fear. *Behaviour Research and Therapy, 38,* 373–387.

Telch, M. J., Valentiner, D. P., Ilai, D., Young, P. R., Powers, M. B., & Smits, J. A. (2004). Fear activation and distraction during the emotional processing of claustrophobic fear. *Journal of Behavior Therapy and Experimental Psychiatry, 35,* 219–232.

Valentiner, D. P., Telch, M. J., Petruzzi, D. C., & Bolte, M. C. (1996). Cognitive mechanisms in claustrophobia: An examination of Reiss and

McNally's expectancy model and Bandura's self-efficacy theory. *Cognitive Therapy & Research, 20,* 593–612.

Vansteenwegen, D., Vervliet, B., Iberico, C., Baeyens, F., Van den Bergh, O., & Hermans, D. (2007). The repeated confrontation with videotapes of spiders in multiple contexts attenuates renewal of fear in spider-anxious students. *Behaviour Research and Therapy, 45,* 1169–1179.

Westra, H. A., Stewart, S. H., & Conrad, B. E. (2002). Naturalistic manner of benzodiazepine use and cognitive behavioral therapy outcome in panic disorder with agoraphobia. *Journal of Anxiety Disorders, 16,* 233–246.

Williams, S. L. (1992). Perceived self-efficacy and phobic disability. In R. Schwarzer (Ed.), *Self-efficacy: Thought control of action* (pp. 149–176). Washington, DC: Hemisphere.

Williams, S. L. (1995). Self-efficacy and anxiety and phobic disorders. In J. Maddux (Ed.), *Self-efficacy, adaptation, and adjustment: Theory, research, and application* (pp. 69–107). New York: Plenum.

Williams, S. L., Dooseman, G., & Kleinfield, E. (1984). Comparative effectiveness of guided mastery and exposure treatments for intractable phobias. *Journal of Consulting and Clinical Psychology, 52,* 505–518.

Williams, S. L., Turner, S. M., & Peer, D. F. (1985). Guided mastery and performance desensitization treatments for severe acrophobia. *Journal of Consulting and Clinical Psychology, 53,* 237–247.

Williams, S. L., & Watson, N. (1985). Perceived danger and perceived self-efficacy as cognitive mediators of acrophobic behavior. *Behavior Therapy, 16,* 136–146.

Wolitzky, K. B., & Telch, M. J. (in press). Augmenting in vivo exposure with fear antagonistic action strategies: Results from a randomized clinical trial. *Behavior Therapy.*

World Health Organization. (1997). *Composite International Diagnostic Interview (CIDI) researcher's manual.* Washington, DC: American Psychiatric Press.

(*Appendixes follow*)

Appendix A

Script for Exposure With Stimulating Pill Description (EStim)

"First, I would like to thank you for participating in the treatment phase of this experiment. It is important that you know, however, the capsule that you ingested contained 10 mg of Adomoxin and is associated with stimulating autonomic nervous system activation and a mild side-effect profile including: anxiety, tremors, shakiness, breathlessness, and sweating. Because of its stimulant-like side effects, undergoing the exposures under the influence of Adomoxin should have made the exposures *much more difficult*. Do know that Adomoxin has a short half-life (or is quick acting), thus all behavioral and physiological effects should disappear within the next hour. A major aim of the study was to observe the stimulating effects of this medication on people's reactions to exposure-based treatment. We expect that the stimulating nature of Adomoxin made your fear level while in the chamber *much higher* than it would have been without the medication. However, it was important that you and your experimenter be blinded to the stimulating or anxiety producing side-effect profile to rule out expectancy effects. Consequently you were not told of the stimulating or anxiety producing side effects until after completing exposure treatment. Please remember that you will need to return in one week for a follow-up visit, which you may schedule with your experimenter now. At this follow-up visit, you will *not* receive any medication."

Appendix B

Script for Exposure With Sedating Herb Description (ESed)

". . .the capsule that you ingested contained 10mg of Adomoxin and is associated with inhibiting autonomic nervous system activation and has a mild side-effect profile including: sedation, relaxation, and sleepiness. Because of its tranquilizing effects, undergoing the exposures under the influence of Adomoxin should have made the exposures *much less* difficult. We expect that the sedating nature of Adomoxin made your fear level while in the chamber *much lower* than it would have been without the medication."

Appendix C

Exposure With Placebo/Neutral Pill Description (EPlac)

". . .the capsule that you ingested was not Adomoxin, but rather a pill placebo. Your ingestion of the pill placebo should have had no significant effect on your reactions while in the chamber. However, having you take the pill placebo allowed us to control for the effects of expectancy and thus provided an important comparison with other subjects who received active medication. A major aim of the study was to observe the effects of expected medication on people's reactions to exposure treatment."