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Disentangling the Effects of Safety-Behavior Utilization and Safety-Behavior Availability During Exposure-Based Treatment: A Placebo-Controlled Trial

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The primary aim of the current study was to further investigate the deleterious effects of safety-seeking behaviors on fear reduction by disentangling the effects of perceived availability of threat-relevant safety behaviors during treatment versus their actual use. Participants ($N = 72$) displaying marked claustrophobic fear were randomly assigned to 1 of 5 conditions: (a) exposure only (EO), (b) exposure with safety-behavior availability (SBA), (c) exposure with safety-behavior utilization (SBU), (d) credible placebo treatment (PL), or (e) wait list (WL). High end-state functioning rates at posttreatment were as follows: EO = 94%, SBA = 45%, SBU = 44%, PL = 25%, and WL = 0%. Findings suggest that it is the perception of the availability of safety aids as opposed to their actual use that exerts a disruptive effect on fear reduction. Clinical implications are discussed.

Safety-seeking behaviors are ubiquitous across the anxiety disorders. They consist of actions (either overt or covert) designed to avert or cope with a perceived threat (Salkovskis, Clark, & Gelder, 1996). The most common class of safety behaviors involves avoidance. Both situational avoidance (e.g., avoiding raising one's hand in class for fear of embarrassment) and cognitive avoidance (mental distraction) are commonly reported (Kamphuis & Telch, 1999). Other safety behaviors are more subtle and anxiety disorder-specific. For example, panic patients often check their pulse in response to cardiac concerns, check the presence of bathrooms in response to gastrointestinal concerns, and carry safety aids such as water, rescue medication, or cellular phones (Kamphuis & Telch, 1999). Similarly, people with social anxiety counter the fear of negative evaluation during public speaking through mental rehearsal of sentences. In order to manage fear of tripping, they hold on to things, walk close to walls, and avoid eye contact with others (Wells et al., 1995). Those with generalized anxiety disorder will repeatedly seek reassurance from others, insist on regular and frequent contact with family, avoid risks, and engage in checking and overprotective behavior (Woody & Rachman, 1994).

It has been theorized that safety-behavior utilization (SBU) may play a prominent role in the maintenance of anxiety disorders (Salkovskis, 1991; Telch, 1991). More specifically, Salkovskis (1991) suggested that safety behaviors maintain pathological anxiety by interfering with threat disconfirmation through the misattribution of safety to the use of safety behaviors rather than the innocuous nature of the stimulus or situation. Alternatively, Sloan and Telch (2002) have suggested that safety behaviors may interfere with treatment by redirecting patients' attentional resources away from the threat, thereby reducing the processing of threat-relevant information.

Support for the interfering effect of SBU on exposure therapy comes from both clinical trials and laboratory studies. Williams, Dooseman, and Kleifield (1984) showed that a guided mastery treatment that included safety-behavior fading was more effective than exposure alone in treating height and driving phobics. Wells et al. (1995) treated 8 socially phobic patients in a counterbalanced within-subjects design. They found that exposure combined with the fading of safety behaviors resulted in significantly more fear reduction than exposure alone. Similarly, Salkovskis, Clark, Hackman, Wells, and Gelder (1999) found significantly greater improvement in panic disorder patients who were encouraged to fade safety behaviors during one 20-min exposure session compared with those who continued to use them. Finally, in a controlled maintenance study, Telch, Sloan, and Smits (2000) demonstrated that following 8 weeks of group-administered cognitive–behavioral therapy (CBT), panic patients receiving safety-behavior fading following CBT fared significantly better at follow-up relative to those receiving CBT alone. Taken together, these results indicate that exposure is more effective when patients are encouraged to drop safety behaviors.

Although the previous studies examined the efficacy of eliminating safety behaviors during exposure, two studies from our

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laboratory investigated the direct effects of safety-behavior availability (SBA) during exposure to phobic cues (Sloan, Beckner, Smits, Powers, & Telch, 2004; Sloan & Telch, 2002). Results revealed that claustrophobic participants undergoing 30 min of self-guided in vivo exposure to a claustrophobic chamber in which safety behaviors (e.g., opening a window, unlocking the door) were made available showed significantly less fear reduction compared with participants who underwent identical exposure treatment without access to safety behaviors. Interestingly, in both studies only some participants (60% on average) actually used the available safety aids. These observations lead us to question whether the detrimental effects of SBA were due to their actual use or simply their perceived availability.

The primary aim of the current study was to further investigate the deleterious effects of safety-seeking behaviors on fear reduction by disentangling the effects of perceived availability of threat-relevant safety behaviors during treatment versus their actual use. Toward this aim, we manipulated use versus availability of safety aids and compared these two treatment conditions with an exposure—no-safety-aid condition. In order to control for the effects of expectancy and time, we included placebo (PL) and wait list (WL) control conditions, respectively. Finally, we examined the potential moderating effects of age, gender, ethnicity, and diagnostic status on treatment outcome. We expected that (a) the PL condition would outperform the WL, (b) the three exposure conditions combined would outperform the PL group, (c) the two safety-behavior conditions would interfere equally with fear reduction, and (d) the exposure-only (EO) condition would outperform the two safety-behavior groups.

Method

Participants

Participants were selected from a large pool of approximately 5,000 introductory psychology students from the University of Texas at Austin through a two-stage screening procedure. They were given course credit in return for their participation. The final sample ($N = 72$) consisted primarily of women (86%), ranging in age from 18 to 49 years ($M = 21.06$; $SD = 5.07$). Most participants (75%) met full *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) criteria for claustrophobia, whereas 25% met all *DSM–IV* criteria with the exception of Criterion E (i.e., the person must experience significant interference in social, academic, or work functioning or experience marked distress about having the phobia). The ethnic breakdown of the sample was 74% Caucasian, 13% Mexican American, 7% African American, 5% Asian American, and 1% Indian American.

Experimental Design

Eligible participants were randomly assigned to one of five conditions: (a) EO, (b) exposure with SBU, (c) exposure with SBA, (d) credible psychological PL, or (e) WL control. Outcome assessments consisted of self-report questionnaires and responses during two consecutive behavioral approach tests. These measures were collected at pretreatment, posttreatment, and 2-week follow-up.

Assessment

World Health Organization Composite International Diagnostic Interview (CIDI-Auto)

Assessment of *DSM–IV* (American Psychiatric Association, 1994) diagnosis of specific phobia was conducted using the anxiety module of the computerized version of the CIDI-Auto (World Health Organization, 1997). The CIDI-Auto has been widely used for the assessment of *DSM–IV* diagnoses. It has demonstrated good psychometric properties including good sensitivity (.86) and acceptable specificity (.52). Moreover, the agreement between the clinical standard diagnosis (i.e., LEAD standard diagnosis; LEAD is an acronym representing the components of the clinical diagnosis: Information is collected over a *longitudinal* period by *experts* who come to a consensus diagnosis on the basis of *all data* available to them) and CIDI-Auto diagnosis was acceptable (73%) and similar to the clinician administered version of the CIDI (Peters & Andrews, 1995).

The Credibility/Expectancy Questionnaire (CEQ)

The CEQ is widely used for assessing treatment expectancy and rationale credibility in clinical outcome studies. The Credibility subscale is rated on a 1 (*not at all*) to 9 (*very much*) scale. The Expectancy subscale indicates how much improvement the participant expects as a result of the treatment and is rated on a 0% to 100% scale. The scale has demonstrated factors that are stable across multiple populations, high internal consistency, and good test–retest reliability (Devilly & Borkovec, 2000).

Outcome Assessment

The Claustrophobia Questionnaire (CLQ). The CLQ (Rachman & Taylor, 1993) is a 26-item self-report scale for assessing claustrophobia. Items are rated on a 0 (*not at all anxious*) to 4 (*extremely anxious*) Likert scale. In addition to a total score, the CLQ yields two subscales: (a) Suffocation Fear (CLQ-SS) and (b) Restriction Fear (CLQ-RS). The means (and standard deviations) on the CLQ for adults and claustrophobics are 29 (19) and 52 (17), respectively. The means (and standard deviations) on the CLQ-SS for adults and claustrophobics are 9 (8) and 24 (8), respectively. The means (and standard deviations) on the CLQ-RS for adults and claustrophobics are 20 (13) and 28 (10), respectively. The CLQ has demonstrated good predictive and discriminant validity as well as good internal consistency and test–retest reliability (Rachman & Taylor, 1993; Radomsky, Rachman, Thordarson, McIsaac, & Teachman, 2001).

Behavioral Approach Tasks (BATs). Two consecutive behavioral approach tasks (BAT 1 and BAT 2) were administered to measure subjective fear while being in an enclosed space. BAT 1 was a chamber constructed of wood, painted black inside and out, lined with foam on the inside for comfort, and measured 183 cm (length) × 61 cm (width) × 51 cm (height). The word "CHAMBER" was painted in red block letters across the two doors on top. Each door had a heavy gauge stainless steel handle, and there was a latch with a visible padlock. However, the chamber remained unlocked for assessments. Participants were instructed to lie down in the chamber and stay for as long as possible. The lights were turned off after the two doors to the chamber were closed. Length of time in the chamber was monitored, but the maximum time spent in the chamber was limited to 2 min, though the participants were not made aware of this time limit. BAT 2, which served as a generalization probe, consisted of a small chamber 51 cm (length) × 61 cm (width) × 183 cm (height). During testing, participants stood in an upright position. BAT 2 was administered after BAT 1 at the pretreatment, posttreatment, and follow-up assessments. Immediately following each BAT, participants rated their maximum level of fear on a Likert scale ranging from 0 (*no fear*) to 100 (*very severe*).

Clinically significant change. On the basis of the recommendations by Jacobson and Truax (1991), participants were classified as showing clinically significant change if (a) the participant's level of pre- to posttreatment BAT 1 fear change was statistically reliable on the basis of the reliable change index (RCI), which was calculated according to recommendations by Jacobson and Truax, and (b) if their level of functioning at posttreatment, as measured by their subjective fear during BAT 1, fell outside the range of the claustrophobic population, as defined by two standard deviations from the mean of that population. This latter criterion was selected

because of the unavailability of normative data for a nonclaustrophobic population (see Jacobson & Truax, 1991). Participants meeting both criteria were classified as achieving high end-state functioning.

Relapse. We calculated the percentage of participants who relapsed at follow-up. Relapse was defined as a statistically reliable increase in fear from posttreatment to follow-up, as defined by the RC index.

Procedure

The screening consisted of two stages. During Stage 1, potential participants rated their overall fear of enclosed spaces on a 5-point Likert scale (0 = *no fear*, 1 = *mild fear*, 2 = *moderate fear*, 3 = *severe fear*, 4 = *extreme fear*). Those reporting moderate or greater fear of enclosed spaces (i.e., a rating of 2 or higher) were invited to our laboratory for individual diagnostic and behavioral assessment (Stage 2).

During Stage 2, participants were administered the CIDI along with the CLQ. They then underwent behavioral testing (BATs). Individuals who refused to attempt either BAT or reported only mild fear during either BAT 1 or BAT 2 (i.e., less than 50 on a 100-point Likert scale) were deemed insufficiently phobic and excluded from the study. Participants passing Stage 1 ($N = 350$) were identified from a pool of 5,000 students. Of those, 100 (who listed their e-mail addresses online) agreed to participate in Stage 2, and 75 met entrance criteria for the study. The final sample consisted of 72 participants who agreed to be treated.

Treatment Conditions

Procedures common to the three exposure conditions. Participants in the three active exposure conditions also returned 2 weeks later to begin treatment. They received a treatment rationale emphasizing that claustrophobic fear is fueled by avoidance and concerns about lack of air or of being trapped. They were also told that one effective strategy for reducing their fear is to be exposed to the feared situation repeatedly until the anxiety decreases. Participants in the three exposure conditions received a total of 30 min of self-guided in vivo exposure to the claustrophobic chamber used for BAT 1. The exposure consisted of six, 5-min exposure trials with approximately 10 min between each trial to allow participants to complete treatment process measures. Participants were provided instructions similar to those given during the baseline assessment with additional instructions specific to their treatment condition (see below). Following the treatment rationale, participants completed the CEQ (Devilly & Borkovec, 2000). This scale was administered to ensure that all active treatments were perceived as equally credible and to check on the credibility of our PL condition (see below).

Exposure with SBU. Participants assigned to the SBU condition received additional instructions stating that they were expected to use at least one safety behavior during exposure to assist them in coping with their fear while in the chamber. The safety behaviors included (a) opening a small window in the chamber to allow access to fresh air blown in by a small fan, (b) unlocking the door after 2 min of exposure, and (c) communicating with the experimenter via two-way radio. Following each treatment period, participants indicated whether they used any of the safety behaviors. In addition, the experimenter noted safety-behavior use during each trial. The experimenter and participant agreement on this rating was 100%. The safety behaviors were only used during treatment and were not made available or utilized during the pretreatment, posttreatment, or follow-up assessments.

Exposure with SBA. Participants assigned to the SBA were told that in order to assist them in coping with their fear while in the chamber three safety strategies would be available to them. However, they were also asked to only use these aids if they felt they must. The available safety aids were identical to those provided in the SBU condition. Again, the participant and experimenter both noted safety-behavior use during each trial and the agreement was 100%.

EO. Participants in the EO condition were not provided access to the safety strategies made available to those in the SBU or SBA groups.

PL. Participants in the PL group returned 2 weeks after completing screening and received a similar rationale emphasizing that claustrophobic fear is fueled by avoidance and concerns about a lack of air or of being trapped, along with instructions emphasizing the beneficial effects of relaxation. Participants received the following specific instructions:

> An effective strategy for reducing fear is to induce heightened beta wave brain activity with a device called the Digital Audio Visual Integration Device or DAVID. Beta waves are high-frequency, low-amplitude brain waves seen while people are awake and relaxed immediately prior to the alpha wave activity of Stage 1 of sleep. The DAVID induces these brain waves by delivering pulsed audio and visual stimuli. These goggles will deliver flashing lights at 12 Hz (cycles per second), and these headphones will deliver audible ticks (like a metronome) also at 12 Hz (cycles per second) to induce the beta wave relaxation. Prior research has shown that the delivery of pulsed audio and visual stimuli is an effective strategy for enhancing beta wave activity associated with relaxation. The enhanced relaxation brought on by the enhanced beta wave activity will allow you to feel less anxious.

The DAVID developed by Comptronic Devices (Edmonton, Alberta, Canada) is used by health care professionals as a relaxation device (Leonard, Telch, & Harrington, 1999; Leonard, Telch, & Owen, 2000). It is a small soundboard about the size of a stereo receiver, which includes a headset and plastic mask. The headset emits controllable ticking sounds, similar to those made by a metronome. The plastic mask resembles ski goggles and delivers pulsed orange lights at controllable rates. In this study, the audio and video stimulus frequency was set at 12 Hz (cycles per second), which is the rate at which the device is suggested to maximally produce relaxation and meditative states. Following the rationale, participants completed the CEQ (Devilly & Borkovec, 2000).

WL. This group was informed that they had been placed on a WL. They returned for assessment 2 weeks later and completed the postassessment. Following assessment, they received exposure treatment. In order to assure the greatest possible treatment integrity, trained experimenters fully manualized and administered all procedures.

Manualized experiment protocol. The experiment protocol was a 46-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. Scripts were provided throughout the manual to be read aloud verbatim by experimenters.

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, monitored, and provided with feedback regarding adherence to the experiment protocol. All experimenters demonstrated proficiency with the protocol.

Statistical Analyses

Manipulation Checks

To confirm that the randomization procedure resulted in comparable groups, we examined baseline differences using one-way analyses of variance (ANOVAs). These analyses revealed that the groups did not differ on any of the measures at pretreatment. Participants' adherence to experimental instructions was moderate to high. None of the participants in the EO or SBA group used any of the safety behaviors, whereas 100% of those in the SBU group did use safety behaviors. An ANOVA confirmed that the

mean credibility as well as expected level of improvement, as measured by the CEQ (Devilly & Borkovec, 2000), was comparable across the three exposure conditions. Moreover, the three exposure conditions did not differ from the PL condition. The between-groups effect sizes appear in Table 1. The means (and standard deviations) for the CEQ-Credibility subscale for the EO, SBA, SBU, PL, and WL groups were 5.91 (0.98), 6.05 (0.82), 6.28 (1.16), 5.77 (1.16), and 5.53 (0.72), respectively. The means (and standard deviations) for the CEQ-Expectancy subscale for the EO, SBA, SBU, PL, and WL groups were 50.59 (11.16), 51.36 (13.25), 52.81 (13.41), and 52.30 (14.09), respectively.

Outcome Analyses

The differential treatment effects on continuous variables were examined using a priori univariate contrasts. The following contrasts were tested: (a) PL versus WL, (b) SBU, SBA, and EO combined versus PL, (c) SBU and SBA combined versus EO, and (d) SBU versus SBA. Four separate analyses were performed—one for the CLQ-SS subscale, one for the CLQ-RS subscale, one for BAT 1 peak fear, and one for the generalization probe (i.e., BAT 2 peak fear). Identical a priori planned contrast chi-square analyses were performed to test for between-groups differences in the proportion of participants achieving high end-state functioning.

Moderator Analyses

To examine whether the effect of safety behaviors (available or utilization) would be moderated by prerandomized individual factors such as age, gender, ethnicity, and diagnostic status, we conducted analyses in accordance with the analytic steps outlined by Kraemer, Wilson, Fairburn, and Agras (2002). More specifically, residualized change scores of the primary outcome variables were subjected to a multivariate analysis of variance in which safety behavior use–availability (EO vs. SBU plus SBA combined) was entered as a between-groups factor. Separate analyses were conducted for each of the potential moderators. Moderator status was assigned to those factors that yielded significant interactions with the safety behavior use–availability factor.

Results

Means and standard deviations for all continuous measures at each of the three assessment periods are presented in Table 2.

Effects at Posttreatment

Within-Group Effects

As shown in Figure 1, significant pre- to posttreatment changes were observed for each of the five conditions for peak fear in BAT 1 (all ps $< .05$).

Between-Groups Effects

The pattern of between-groups differences for each of the a priori contrasts varied as a function of the specific outcome measure. Between-groups effect sizes appear in Table 1. With regards to BAT 1 peak fear, PL outperformed WL, $F(1, 24) = 6.70$, $p < .05$; the three exposure conditions combined outperformed PL, $F(1, 53) = 4.27$, $p < .05$; and EO outperformed SBA and SBU, $F(1, 41) = 13.20$, $p < .05$. The contrast testing SBU versus SBA was not significant. As for suffocation fear, as measured by the CLQ-SS, significantly greater reductions were observed in the EO group compared with the two safety-behavior groups, $F(1, 41) = 5.79$, $p < .05$. Other contrasts, including SBU versus SBA, were not significant. The pattern of results for the CLQ-RS was similar, $F(1, 41) = 2.97$, $p < .05$. Finally, reductions in BAT 2 fear were significantly greater among participants that received exposure (with or without safety behaviors) compared with participants who received PL, $F(1, 53) = 5.11$, $p < .05$. The EO group displayed significantly greater improvement than the two safety-behavior groups (i.e., SBU and SBA), $F(1, 41) = 4.06$, $p < .05$. No significant differences were observed between SBA and SBU and between PL and WL.

Clinical Significance

Figure 2 presents data on high end-state functioning at posttreatment for each of the five treatment conditions. The percentage of participants achieving high end-state functioning was 94%, 45%, 44%, 25%, and 0% for the EO, SBA, SBU, PL, and WL groups, respectively. Significant differences were observed between PL and WL, $\chi^2(1, N = 27) = 4.22$, $p < .05$, treatment and PL, $\chi^2(1, N = 56) = 5.70$, $p < .05$, and between the EO and the safety-

Table 1
Between-Groups Effect Sizes (Partial η^2) for Posttreatment and Follow-Up Fear Indices

Measure	Placebo vs. wait list	Treatment vs. placebo		Exposure only vs. safety-behavior groups		Safety behaviors available vs. safety behaviors utilized	
	Pre–post	Pre–post	Post–FU	Pre–post	Post–FU	Pre–post	Post–FU
BAT 1 peak fear	.22	.08	.15	.24	.31	.00	.00
BAT 2 peak fear	.00	.09	.18	.09	.05	.03	.02
CLQ: Suffocation	.01	.03	.08	.12	.13	.01	.00
CLQ: Restriction	.00	.03	.18	.07	.12	.06	.01
CLQ: Total	.01	.03	.13	.09	.12	.00	.00
CEQ: Credibility	.02	.02		.02		.01	
CEQ: Expectancy	.00	.00		.00		.00	

Note. For η^2, small = .01, medium = .06, large = .14 (Cohen, 1977). BAT = behavioral approach task; CLQ = Claustrophobia Questionnaire; CEQ = Credibility/Expectancy Questionnaire; Pre = pretreatment; Post = posttreatment; FU = follow-up.

Table 2
Means and Standard Deviations for Posttreatment and Follow-Up Fear Indices

	Exposure only			SBA			SBU			Placebo			Wait list	
	Pre	Post	FU	Pre	Post	FU	Pre	Post	FU	Pre	Post	FU	Pre	Post
Measure	$N = 17$	$N = 17$	$N = 17$	$N = 11$	$N = 11$	$N = 8$	$N = 16$	$N = 16$	$N = 11$	$N = 12$	$N = 12$	$N = 10$	$N = 15$	$N = 15$
BAT 1 peak fear (0–100)														
M	74.71	7.06	7.65	75.45	30.00	30.00	73.13	29.38	31.82	71.67	35.00	38.00	74.67	55.33
SD	14.63	8.49	9.70	13.68	26.46	26.19	13.02	26.46	26.01	12.67	22.76	28.21	15.98	16.42
BAT 2 peak fear (0–100)														
M	72.35	19.41	10.59	80.91	33.64	30.00	62.50	34.38	29.09	66.67	45.83	42.00	69.33	50.67
SD	17.15	19.19	15.19	15.78	28.38	27.77	14.83	29.43	27.00	19.23	29.68	30.11	15.34	25.49
CLQ: Suffocation														
M	24.41	12.71	9.18	19.64	15.09	13.13	21.38	18.00	13.18	26.25	20.92	19.00	19.27	17.60
SD	8.28	8.02	7.45	8.26	10.49	10.87	7.41	10.79	8.57	11.27	10.15	10.66	7.03	7.17
CLQ: Restriction														
M	30.88	17.41	11.06	27.73	21.55	16.88	25.06	18.63	13.45	33.33	25.92	23.00	30.00	24.00
SD	8.62	11.57	8.25	8.78	9.26	9.43	9.38	10.92	5.39	9.71	11.22	9.84	6.52	7.81
CLQ: Total														
M	54.06	29.88	20.24	47.36	36.64	30.00	46.44	36.63	26.64	59.58	46.00	42.00	49.27	41.60
SD	15.99	18.30	14.67	15.91	18.84	19.69	13.71	19.39	12.97	19.58	20.09	19.43	11.82	13.15

Note. SBA = safety-behavior availability; SBU = safety-behavior utilization; Pre = pretreatment; Post = posttreatment; FU = follow-up; BAT = behavioral approach task; CLQ = Claustrophobia Questionnaire.

behavior groups, $\chi^2(1, N = 44) = 11.12$, $p < .01$. No significant differences were observed between the SBA and SBU conditions.

Effects at Follow-Up

Continuous Variables

Participants in the EO and the SBA conditions showed additional improvement on BAT 2 fear, CLQ-SS, and CLQ-RS (all *p*s $< .05$) and showed no change in BAT 1 fear. Maintenance of gains from posttreatment to follow-up was observed among participants in the SBU and PL conditions. There was no differential treatment effect on posttreatment to follow-up change in BAT 1 fear, CCQ-SS, or BAT 2 fear. However, with regards to CCQ-RS, greater additional improvement was observed among participants receiving treatment compared with participants receiving PL, $F(1, 43) = 6.06$, $p < .05$, and the EO group displayed significantly greater posttreatment to follow-up improvement compared with the two safety-behavior groups, $F(1, 33) = 4.59$, $p < .05$. No significant differences were observed between SBA and SBU conditions.

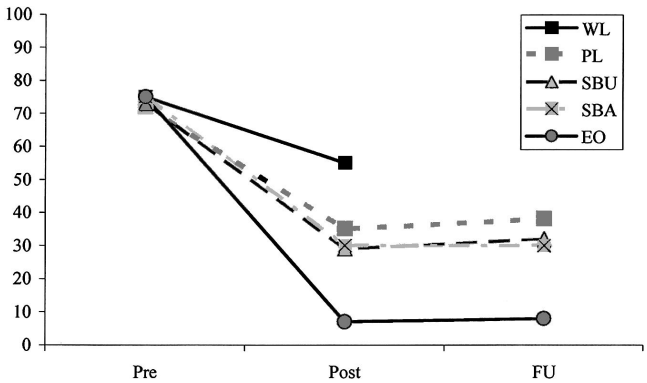

Figure 1. Peak fear at pretreatment (Pre), posttreatment (Post), and follow-up (FU) in BAT 1. The numbers on the y-axis represent the peak fear rating (0–100). BAT = behavioral approach task; WL = wait list; PL = placebo; SBU = safety-behavior utilization; SBA = safety-behavior availability; EO = exposure only.

Clinical Significance

Figure 2 presents the data on the percentage of participants in each treatment condition who achieved high end-state functioning at follow-up. It should be noted that WL participants were lost to follow-up and thus are not included in the analyses. The percentage of participants achieving high end-state functioning was 94%, 50%, 45%, and 30% for the EO, SBA, SBU, and PL groups, respectively. Significant differences were observed between treatment and PL, $\chi^2(1, N = 46) = 5.11$, $p < .05$, and between EO and the safety-behavior groups, $\chi^2(1, N = 36) = 9.24$, $p < .01$. No significant differences were observed between SBA and SBU.

Relapse

At follow-up, 10.9% of participants across the four treatment conditions met criteria for relapse. Relapse rates were 0%, 13%, 18%, and 20% for the EO, SBU, SBA, and PL groups, respectively. The differences in relapse rates between groups were not statistically significant.

Moderator Analyses

No significant interactions were observed between any of the potential moderators and safety behavior use–availability factors (all *p*s $> .10$). This finding suggests that the deleterious effects of safety behaviors were not moderated by age ($\eta_p^2 = .01$), gender ($\eta_p^2 = .02$), ethnicity ($\eta_p^2 = .01$), or diagnostic status ($\eta_p^2 = .01$).

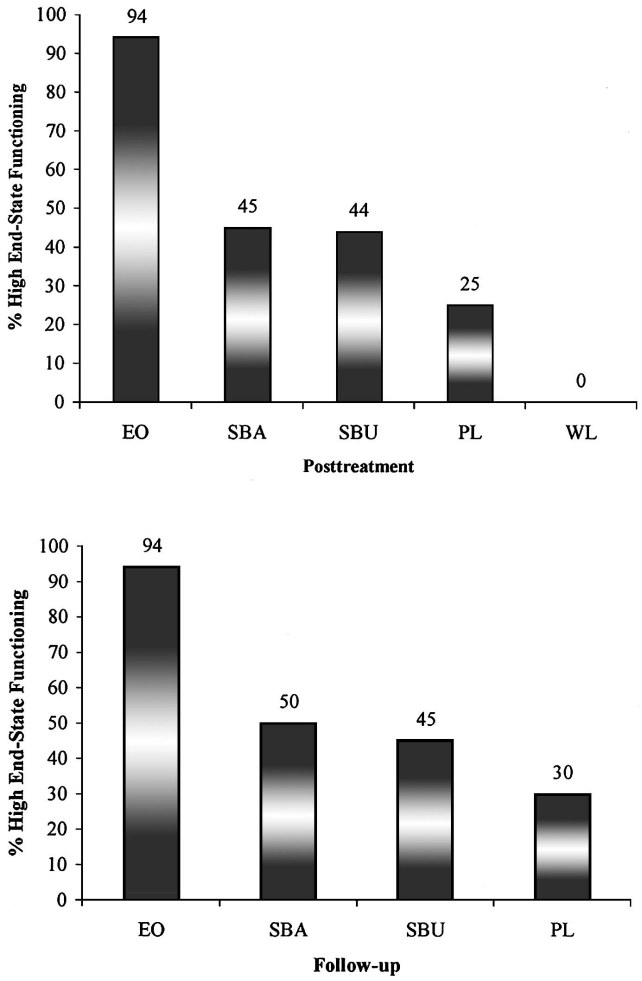

Figure 2. Percentage of participants achieving high end-state functioning at posttreatment and follow-up. EO = exposure only; SBA = safety-behavior availability; SBU = safety-behavior utilization; PL = placebo; WL = wait list.

Discussion

The primary aim of the current study was to further investigate the deleterious effects of safety behaviors on fear reduction during exposure by disentangling the effects of actual utilization of safety behaviors versus their perceived availability. Consistent with previous research (Sloan & Telch, 2002), making safety behaviors available to claustrophobic individuals during in vivo exposure had a marked disruptive effect on fear reduction. The magnitude of this effect at posttreatment was considerable, as evidenced by the 94% versus 45% treatment response rate for those in the EO condition versus the two exposure-plus-safety-behavior conditions. These data are consistent with the 44% response rate reported by Sloan and Telch (2002) for claustrophobics in their exposure-plus-safety-behavior condition.

How do making threat-relevant safety behaviors available during exposure interfere with fear reduction? Our findings strongly suggest that it is the perception of their availability as opposed to their actual use that exerts their disruptive effects. This assertion is supported by our experimental demonstration that level of fear reduction was unaffected by participants' actual use of the safety behaviors made available to them. Attempts to identify factors that might moderate the effects of safety behaviors on fear reduction were unsuccessful; none of the potential moderators examined including gender, age, or diagnostic status influenced the magnitude or direction of the safety-behavior effects.

To our knowledge, this is the first claustrophobia treatment investigation to use a credible PL treatment condition. Relative to WL controls, modest levels of improvement (i.e., 25% response rate) were observed among those receiving a credible PL treatment consisting of pulsed audio and photic stimulation. These data underscore the importance of nonspecific factors in treatment research on specific phobia and argue for the routine use of credible PL conditions in testing psychosocial interventions for specific phobias. Our PL condition also provides a useful benchmark for examining the specific effects of our three exposure conditions. Our findings revealed that when threat-relevant safety behaviors are not made available, one treatment session consisting of six 5-min self-guided in vivo exposure trials resulted in a 94% treatment response rate based on a stringent criterion of high end-state functioning. These data strongly suggest that in vivo exposure is both efficacious and specific in its treatment effects. However our data also suggest that making safety behaviors available to claustrophobics during in vivo exposure reduces its treatment efficacy to almost that of our PL treatment.

Our finding that safety aids do not need to be actually used in order to exert their detrimental effects is consistent with countless clinical observations of phobic patients carrying rescue medication or other safety aids without actually using them. Ironically, patients report feeling less anxious when they perceive these aids as available. How then do these same aids interfere with the therapeutic effects of exposure? Several hypotheses have been put forth. Salkovskis (1991) has suggested that safety behaviors interfere with treatment through a misattributional process in which patients attribute their safety to the availability or use of the aid, thus keeping their false perception of threat intact. Alternatively, Sloan and Telch (2002) have suggested that safety behaviors may interfere with treatment by redirecting patients' attentional resources away from the threat, thereby reducing the processing of threat-relevant information.

Several limitations deserve comment. First, although we used a stringent two-stage screening procedure to ensure that study participants display marked phobicity (our sample represented the top 1% on indices of claustrophobic fear and avoidance), 25% of the participants did not meet *DSM–IV* criteria for specific phobia. Among those who did not, all met full *DSM–IV* criteria with the exception of Criterion E (i.e., the person must experience significant interference in social, academic, or work functioning or experience marked distress about having the phobia). We examined empirically whether meeting all *DSM–IV* criteria moderated treatment outcome and it did not. These data provide preliminary evidence that those presenting with marked fear without significant life interference respond no differently to the treatments relative to those who are above diagnostic threshold. However, the generalizability of our findings to a treatment-seeking sample awaits replication. Finally, the follow-up period of 2 weeks was too brief to make inferences about the stability of treatment effects over the long term.

The clinical implications of our findings deserve comment. First, contrary to common clinical practice, our findings are in accord with those from the Oxford Group (Salkovskis et al., 1999; Wells et al., 1995), suggesting that making safety aids available to patients when they confront their feared situations or activities may actually interfere with fear reduction. Consequently, clinicians using exposure treatments should assist the patient in identifying threat-relevant safety strategies and encourage them to not only discard their use (e.g., not ingest rescue medication during exposure) but also their availability (e.g., carrying rescue medication in one's pocket or purse). It has been our experience that providing patients a clear rationale for how safety behaviors interfere with recovery coupled with specific behavioral prescriptions for eliminating safety behaviors is needed before patients will jettison their safety strategies. Moreover, ongoing monitoring of targeted safety behaviors during treatment can assist the clinician in both tracking patients' success in safety-behavior fading but also alert the clinician to potential new safety strategies that might emerge.

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