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Prevention of Panic Disorder

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The goal of this study was to empirically test a prevention program for panic disorder. Participants who had experienced at least 1 panic attack in the last 12 months and at least moderate anxiety sensitivity, but did not meet criteria for panic disorder, were randomly assigned to either a 1-day prevention workshop group or a wait-list control group. Participants were followed for 6 months. Relative to the wait-list control, workshop participants were less likely to develop panic disorder and reported significantly more improvement in panic attacks and avoidance of social situations. Satisfaction with the workshop predicted outcome 6 months later. These findings suggest that prevention may be a viable option for panic disorder, and one that warrants further development.

Two risk factors for panic disorder have been identified. The first clearly is history of one or more panic attacks. For example, Ehlers (1995) found that individuals with simple phobias or no anxiety disorders who occasionally panicked were more likely to develop panic disorder than control participants who never panicked over the course of 1 year (15% vs. 2%, respectively). The second risk factor is the tendency to perceive physical sensations of anxiety as being harmful, or *anxiety sensitivity* (AS). For example, in the same study, Ehlers found that those who experienced their first panic attack had initially higher AS than participants who did not develop panic attacks over the course of the year. Similarly, AS has been found to reliably predict the development of panic attacks after an acute military stressor (Schmidt, Lerew, & Jackson, 1997, 1999).

Prevention for high-risk samples might not only halt the development of panic disorder, but also ultimately prevent the development of other psychological disorders. People who report panic attacks are at risk for other psychological problems including other anxiety disorders, depression, and substance abuse (e.g., Warren & Zgourides, 1988). Moreover, comorbid diagnoses such as depressive disorders (e.g., Roy-Byrne et al., 2000) and substance

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abuse (e.g., Marshall, 1997) are believed to sometimes develop as a direct function of panic disorder.

In addition, prevention using a brief cognitive-behavioral intervention is likely to be very cost-efficient. Cognitive-behavioral therapy (CBT) is among the least expensive treatments for panic disorder (Gould, Otto, & Pollack, 1995). Prevention may cut indirect costs as well, given that people with panic disorder are heavy users of the medical system (e.g., Michelson, Marchione, Greenwald, & Glanz, 1990).

Only one study to date has directly evaluated prevention for panic disorder. Swinson, Soulios, Cox, and Kuch (1992) briefly intervened with 33 patients who attended an emergency room with panic attacks, most of whom did not have a history of panic disorder. Within 24 hours of the panic attack, 17 were assigned to an exposure condition, and the remaining 16 were assigned to a reassurance condition. The latter were informed that what they had experienced was a panic attack, and that a panic attack is not dangerous. Participants in the exposure group were told the same reassuring information, and were advised that the most effective way to reduce fear is to confront the situation in which the panic attack occurred. One week later, the mean frequency of panic attacks decreased from 2.53 to .76 in the exposure group, but increased in the reassurance group from 2.50 to 3.38. This pattern was consistent over time, 3 months and 6 months later, and generalized to measures of anxiety (Swinson et al., 1992). Unfortunately, neither diagnostic evaluations nor independent assessments were conducted.

In the current study, we compared a comprehensive prevention intervention to a wait-list control in college students at risk for panic disorder. We hypothesized that a prevention intervention would offset the development of panic disorder, so that rates of panic disorder would be higher in the wait-list group than the intervention group at follow-up. In addition, we hypothesized that associated features of panic disorder, such as catastrophic cognitions about bodily sensations and agoraphobic avoidance, as well as anxious and depressed mood, would be more likely to worsen in the wait-list group than the intervention group by follow-up.

Method

Design

In a randomized design of a high-risk sample, we compared a prevention workshop to a wait-list control, in terms of panic disorder, catastrophic beliefs about bodily sensations, and anxious and depressive symptoms at baseline and 6 months later. Moderators and predictors were assessed as well.

Experimental Conditions

Workshop. A workshop format was chosen as the vehicle for prevention because workshops offer help in a nonintrusive, affordable, and time-efficient manner, and carry less negative stigma than individual or group therapy. Also,

they offer support and modeling for large groups of people (Belfer, Munoz, Schachter, & Levendusky, 1995).

The workshop lasted approximately 5 hours, and covered the following areas: (a) psychoeducation about the etiology and nature of panic, (b) cognitive and behavioral strategies including breathing retraining and cognitive restructuring, (c) education about agoraphobia, and (d) interoceptive exposure for overcoming fears of physical sensations and instructions for in vivo exposure to agoraphobic-type situations. Throughout the workshop, participants were quizzed twice on sections of the program to reinforce retention of the material. Facilitators (i.e., workshop leaders) followed a detailed manual (available from the principal author upon request). Although we modeled the workshop closely on typical CBT for panic disorder, the design of the prevention program was very different: The program was presented in a massed, 5-hour session; the style was more didactic than typical CBT; the number of participants was larger (i.e., 15 to 22) than typical of group CBT (i.e., 4 to 6 participants); much of the discussion was centered on what to do should certain symptoms (such as agoraphobic avoidance) emerge, given that participants were selected for not having a disorder; and homework assignments were encouraged but not monitored following completion of the workshop. Participants were phone contacted each month for 6 months, and asked to rate their panic and anxiety. During these 10-minute phone calls, research assistants were encouraged to be positive and empathic but were restricted from giving advice; participants seeking advice were advised to refer to their workshop materials.

Wait list. Participants received no intervention, but did receive the same monthly follow-up calls as the workshop group. As with workshop participants, research assistants were empathic but were restricted from giving advice to participants during these 10-minute phone calls. Wait-list participants were informed that, after follow-up assessment, they had the option of attending a workshop or receiving a self-help book for panic and agoraphobia. Very few ($n = 3$) selected the workshop.

Participants

Participants were recruited if they self-reported at least one unexpected panic attack in the last year and at least moderate AS. Donnell and McNally (1990) defined high AS as Anxiety Sensitivity Index (ASI) scores of 27 or higher (psychometric properties of the ASI are described below). In accord, Telch, Lucas, and Nelson (1989) reported a mean score of 27.5 ($SD = 11.3$) in college students who met criteria for panic disorder, compared to a mean of 20.39 ($SD = 9.09$) for nonclinical panickers in the same student sample. Thus, we operationalized moderate AS as ASI scores that were 16 or higher (within one *SD* of the mean for panic disorder, or high ASI).

Students were recruited from an introductory psychology participant pool, undergraduate and graduate classes, college newspapers, residential dormitories, and Student Psychological Services at various local colleges/universities.

The total participant pool was over 1,000. All participants were undergraduate or graduate students. They received either 5 units of credit or $20 for their participation in the study. Upon completion of the follow-up assessment, all participants were given an additional $20.

Facilitators

Two facilitators led each workshop. One was an advanced clinical psychology graduate student with experience in CBT for panic and agoraphobia. The other was either a first-year graduate student or an advanced research assistant with a bachelor's degree.

Measures

The following measures were administered at baseline and follow-up, unless otherwise stated.

Panic disorder and agoraphobia. Panic disorder was diagnosed at baseline and follow-up using a brief version of the Comprehensive International Diagnostic Interview, panic section (CIDI; World Health Organization, 1997). The CIDI was designed as a research tool for epidemiological studies. It is fully structured to allow administration by lay interviewers. Wittchen (1994) reported test-retest reliability of .97, and interrater kappa for the panic disorder section of .84. In this study, trained research assistants (lay interviewers) conducted the diagnostic assessments and presented a verbal summary of the interview at a case conference of the principal author and other interviewers ($n = 10$), at which time consensus diagnosis was determined. If a 90% agreement among the diagnostic team was not obtained, the interview was repeated by a second interviewer who again presented the findings at case conference for purpose of consensus diagnosis.

In addition, participants estimated the number of unexpected panic attacks (defined as a discrete episode involving a rapid, intense rush of fear or discomfort, accompanied by physical and cognitive symptoms, for no apparent reason) over the past 4 weeks. They also rated the average intensity of their panic attacks on a 9-point scale (0 to 8: *none* to *severe*). Frequency as well as Frequency × Intensity were analyzed. Worry about panic attacks and interference from the panic attacks were assessed using 9-point scales (0 = *none*, 2 = *mild*, 4 = *moderate*, 6 = *severe*, 8 = *very severe*).

Avoidance behavior was measured using the Fear Questionnaire (FQ; Marks & Mathews, 1979). The FQ contains 5-item subscales for agoraphobia, blood injury phobia, and social phobia. Test-retest reliability within each subscale ranges from .82 to .96.

AS. The ASI (Reiss, Peterson, Gursky, & McNally, 1986) is a 16-item standard measure of the tendency to view physical sensations as harmful. The ASI has been shown to have adequate internal consistency (Telch, Shermis, & Lucas, 1989) and test-retest reliability (Maller & Reiss, 1992).

Anxious and depressive symptoms. The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) is a standard 21-item measure of

emotional and somatic symptoms of anxiety. The BAI has high internal consistency (e.g., .91) and acceptable reliability, convergent, and discriminant validity (Beck, Epstein, et al., 1988; Fydrich, Dowdall, & Chambless, 1992).

The Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988) is a standard, 21-item measure of depressive symptoms with high internal consistency (e.g., .81) and acceptable test-retest stability. In addition, the BDI has been shown to have good concurrent validity with other measures of depressive symptoms (Beck et al., 1988).

Moderators. The Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978) was administered at follow-up as a potential moderator of panic disorder status over time. The survey is a 57-item checklist of life experiences that have occurred in the last year. Impact of life experiences is rated using a 7-point scale (from *extremely negative* to *extremely positive*). Sarason et al. (1978) reported test-retest reliability (at 5 to 6 weeks) of .63 and .64 for the total change score. Certain items not relevant to this sample were revised or deleted.

Workshop measures. Workshop participants rated their satisfaction on a 5-point scale (1 = *very unsatisfied*, 2 = *somewhat unsatisfied*, 3 = *neither satisfied nor unsatisfied*, 4 = *somewhat satisfied*, 5 = *very satisfied*) with the workshop immediately postworkshop. We hypothesized that participants who were more satisfied with the workshop would be more likely to use the tools taught in the workshop and, in turn, experience fewer symptoms and panic attacks over time.

At completion of the workshop, participants rated how much they thought the tools they learned in the workshop would help decrease their panic and anxiety, on a 0-to-8-point scale (0 = *not at all*, 2 = *somewhat*, 4 = *moderate*, 6 = *quite so*, 8 = *very much so*). We hypothesized that optimism might predict outcome.

Procedure

Eligibility was assessed via phone administration of the CIDI and ASI. Phone assessments have been utilized in prior studies of panic disorder (e.g., Rickels, Case, Schweizer, Garcia-Espana, & Fridman, 1991) and there is little difference between diagnostic and self-report information obtained via phone versus in-person interviews (e.g., Fenig, Levav, Kohn, & Yelin, 1993; Wells, Simon, Revicki, & Von Korff, 1993). Participants were excluded if currently receiving treatment for any form of anxiety, using psychotropic medications, had completed behavioral-exposure treatment for panic in the previous 2 years, not fluent in English, met criteria for panic disorder, or had a medical condition that might be related to panic attacks (e.g., a thyroid condition or asthma). Participants were randomly assigned to either workshop or wait-list control groups. Independent research assistants conducted follow-up assessments by phone.

Results

Attrition

Of those who completed baseline diagnostic interviews, 10.4% ($n = 12$) dropped out: 11 from the workshop group and 1 from the wait-list group. Ten of the workshop participants who dropped did so before attending a workshop because they could not make the scheduled times or for reasons unknown. The remaining dropouts were not contactable for the follow-up assessment. Two additional participants were removed from the study: One displayed psychotic symptoms and another disclosed suicidal impulses. Those who dropped or were removed were compared to study completers on all baseline measures. The only difference occurred with respect to the FQ total score: $t(131) = -2.26, p < .05$; dropped: $M = 40.42, SD = 13.4$; completers: $M = 31.05, SD = 16.47$.

Sample Descriptives

The sample of completers included 121 individuals (workshop group: $n = 55$; wait-list group: $n = 66$). There were 38 men and 83 women, aged 18 to 39 years ($M = 20.3$ years, $SD = 3.21$); 39.3% were Caucasian, 30.3% were Asian American, 10.6% were Hispanic, 5.7% were African American, and 10.6% classified themselves as "other." The largest subset (47.5%) of participants were recruited from introductory psychology courses. Neither gender nor ethnicity (Caucasian vs. other) interacted with the effect of group.

Alternative Treatment

Four of the wait list (6.1%) versus one of the workshop (1.8%) used alternative treatments, $\chi^2 (1) = 1.70, ns$. Two used psychotropic medications, two sought therapy or self-help books or tapes, and the workshop participant attended a stress workshop.

Baseline Differences

Nonnormal distributions of panic frequency data were addressed using the Windsor method for six extreme outliers (Guttman, 1973). There were no group differences at baseline on any measure (*M*s and *SD*s are presented in Table 1). Participants recruited from classes were compared to those recruited from Student Psychological Services or advertisements. These groups differed at baseline on the FQ total only, $t(101) = 3.22, p < .01$ (class $M = 33.13$, $SD = 15.94$; other $M = 25.4, SD = 17.1$). This difference was not considered a serious confound because participants recruited from different sources were equally distributed across wait-list and workshop groups.

Workshop Evaluation

Overall, the workshops were well received. Ninety-five percent of attendees reported being "satisfied" or "very satisfied." Participants mentioned that psychoeducation about cognitive and physiological components of panic

TABLE 1
MEANS AND STANDARD DEVIATIONS FOR SCALE MEASURES BY GROUP

	Workshop (n = 55)		Wait List (n = 66)	
Measure	Mean	*SD*	Mean	*SD*
Panic Attacks				
Frequency × Intensity				
Baseline	5.74	5.76	4.56	4.29
Follow-up	1.24	2.18	2.05	3.04
Frequency				
Baseline	1.45	1.69	1.08	1.01
Follow-up	.35	.58	.55	.83
Anxious, Depressive Symptoms				
BDI				
Baseline	14.16	7.86	12.86	7.20
Follow-up	10.96	8.88	10.31	6.83
BAI				
Baseline	18.65	11.74	16.00	9.84
Follow-up	10.76	7.93	10.24	6.31
Worry, Interference, Avoidance				
Worry				
Baseline	1.87	1.85	2.05	1.59
Follow-up	.87	1.12	1.26	1.60
Interference				
Baseline	2.15	1.57	2.30	1.69
Follow-up	1.22	1.17	1.80	1.87
FQ agoraphobia				
Baseline	7.509	6.71	6.73	6.23
Follow-up	6.24	6.79	5.89	5.11
FQ social				
Baseline	13.06	7.43	11.74	6.48
Follow-up	10.55	7.30	12.09	8.38
FQ blood/injury				
Baseline	10.54	7.78	9.92	7.25
Follow-up	7.94	6.73	8.76	7.06
FQ total				
Baseline	32.87	17.39	29.53	15.63
Follow-up	25.98	17.35	28.05	18.15
Anxiety Sensitivity				
ASI				
Baseline	28.52	10.15	29.91	8.26
Follow-up	16.35	9.29	19.55	10.10
Life Events				
LES				
Baseline	19.34	15.39	15.06	8.27
Follow-up	11.98	8.78	10.80	6.89
Workshop Measures				
Satisfaction	4.17	.47		
Optimism	5.12	1.53		

attacks, in vivo exposure, and interaction with other workshop participants were most helpful.

Panic Disorder and Agoraphobia

Nine (13.6%) of the wait-list group developed panic disorder, in contrast to only one (1.8%) in the workshop group, χ^2 (1) = 5.53, $p < .05$, by the follow-up assessment.

A 2 × 2 repeated measures ANOVA indicated that Panic Frequency × Intensity decreased over time, $F(1, 119) = 50.28$, $p < .0001$. Also, the Group × Time interaction was significant, $F(1, 119) = 4.07$, $p < .05$. Simple effect analyses showed that although participants in both groups exhibited a significant decrease from baseline to follow-up (workshop: $t[54] = -5.78$, $p < .0001$; wait list: $t[65] = -4.00$, $p < .0001$), the amount of decrease was greater for participants in the workshop, $F(1, 120) = 4.07$, $p < .05$. Similarly, frequency of panic attacks decreased significantly over time, $F(1, 119) = 38.41$, $p < .0001$. Despite a significant Group × Time interaction, $F(1, 119) = 4.79$, $p < .05$, significant differences did not emerge in simple effects analyses.

We conducted 2 × 2 repeated measures ANOVAs of worry, interference, and avoidance, excluding the 5 participants who sought alternative treatment, and controlling for Type I error via Bonferonni correction (alpha = .017). A univariate approach was chosen given that measures of worry, interference, and avoidance are frequently discordant. Worry decreased over time, $F(1, 114) = 31.74$, $p < .0001$. However, the interaction effect was not significant. Similarly, interference decreased over time, $F(1, 114) = 27.39$, $p < .0001$, but the interaction effect was not significant. Avoidance (FQ) decreased over time, $F(1, 113) = 13.71$, $p < .0001$, and the Group × Time interaction was significant, $F(1, 113) = 7.07$, $p < .01$. Analyses of the three subscales of the FQ (blood/injury/injection, social, and agoraphobia) indicated that the Group × Time interaction effect was limited to the social avoidance subscale, $F(1, 113) = 6.4$, $p < .05$, $\chi^2 = .75$. Participants in the workshop group reported less avoidance at follow-up, $t(52) = 4.06$, $p < .0001$, whereas the wait-list group did not, $t(61) = -.458$, *ns* (see Figure 1).

Anxiety Sensitivity

Two-by-two repeated measures ANOVAs were performed on ASI scores, excluding participants who sought alternative treatments because of their influence upon symptom measures. (Note the same pattern of results occurred when including all participants.) Although ASI decreased over time, $F(1, 111) = 150.53$, $p < .0001$, the Group × Time interaction was not significant.

Anxious and Depressive Symptoms

Two-by-two repeated measures ANOVAs excluded those who sought alternative treatment (alpha = .025). (Again, the results were the same when including all participants.) BDI decreased over time, $F(1, 114) = 21.75$, $p < .0001$, but the Group × Time interaction was not significant. Likewise, BAI

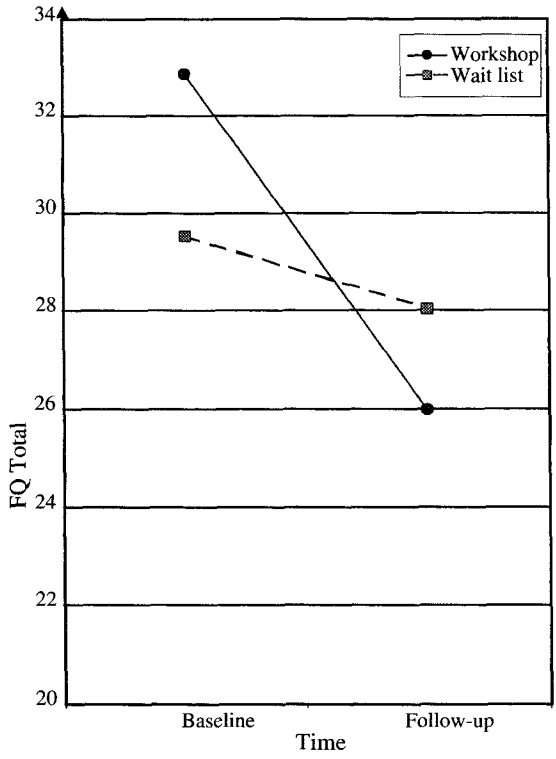

FIG. 1. Mean avoidance (FQ total) from baseline to follow-up.

decreased over time, $F(1, 114) = 52.67, p < .0001$, but the interaction term was not significant.

Moderators

A simultaneous regression was conducted to examine whether life events moderated the effect of group on Panic Attack Frequency × Intensity. The overall model was not significant, $F(1, 119) = .51$, *ns*. Therefore, stressful life events over the 6 months of the follow-up period did not moderate the effect of group.

Predictors

We hypothesized that (a) characteristics of participants (i.e., BAI, BDI), (b) workshop satisfaction, (c) optimism about effects of the workshop, and (d) life events after the workshop (LES) might predict outcome for workshop participants. These variables were entered simultaneously onto Panic Attack Frequency × Intensity. Only satisfaction with the workshop significantly pre-

dicted outcome, $B = -.284$, $t(50) = -2.11$, $p < .05$. That is, participants who were more satisfied with the workshop reported less frequent and severe panic attacks at follow-up.

Discussion

The main aim of this study was to evaluate the efficacy of a 1-day workshop for preventing panic disorder in an at-risk sample. As a group, participants who received the workshop were less likely to develop panic disorder than participants who waited. The rate of 13.6% of the wait-list group coincides with previous reports that 15% of people suffering from panic attacks go on to develop panic disorder within 1 year (Ehlers, 1995). Only one member of the workshop group (i.e., 1.8%) developed panic disorder in the same 6-month interval, although follow-up for 1 year may have yielded different results.

The impact of the prevention program on specific features of panic disorder was mixed. As expected, panic attacks lessened more in workshop participants than in wait-list participants, although this effect was most apparent in the composite index of Frequency × Intensity of panic attacks. Panic frequency alone yielded less powerful group differences, possibly due to floor effects.

The benefits of the workshop extended to measures of social avoidance behavior, which decreased in the workshop group but remained unchanged in the wait-list group. Possibly, openly disclosing panic attacks in the workshop was normalizing and lessened fear of social-evaluative consequences of panic. On the other hand, wait-list participants were self-labeled and now research-labeled as having panic attacks without the benefit of a normalizing group (Phelan & Link, 1999). The absence of effects on the agoraphobia scale is most likely attributable to floor effects generated by the selection criteria—that is, initial agoraphobia was reason for exclusion from the study.

As a group, workshop participants also reported less worry about panic, less interference from panic, less general anxiety, and less depressed mood 6 months later. However, wait-list participants showed similar patterns of improvement. This was in direct contrast with our hypotheses for worsening over time in the wait-list group. The mirroring between the groups extended to the ASI, even though this is where we expected the strongest benefits of the workshop because it was the measure with the most room for improvement and was a primary target of the prevention workshop.

The broad-based improvement in the wait-list group may have resulted from nonspecific factors, such as objective monitoring of panic and the reassurance of receiving prevention help at completion of the study. Certainly, panic disorder symptoms and measures of anxiety and depression have been shown to decrease in wait-list groups for panic disorder (e.g., Barlow, Craske, Cerny, & Klosko, 1989). However, in those studies, regression to the mean is more likely to contribute to improvements over time than would be true for our "nondistressed" sample. A nonspecific factor unique to our study is the monthly contact with a research assistant, often the same person over time.

Furthermore, to encourage study retention, research assistants were trained to interact positively with participants. Thus, research assistants may have been viewed as supportive anxiety "confidants." Consequently, the wait-list condition was, in essence, a nonspecific placebo control and, thus, a more stringent comparison for our workshop intervention than initially intended.

In reference to the ASI, it is therefore conceivable that beliefs about bodily sensations became less threat-focused over time for different reasons in each group. Workshop participants may have learned corrective information and cognitive skills for challenging erroneous beliefs about bodily sensations; wait-list participants may have felt reassured, supported, and less anxious, and therefore less likely to view bodily sensations as being dangerous.

We expected that initial levels of anxiety and depression, satisfaction with the workshop, optimism about the benefits of the workshop, and life events in the 6 months after the workshop would influence the results from the workshop. Only workshop satisfaction significantly predicted outcome. Possibly, participants who were more satisfied enjoyed the tools taught and, in turn, practiced the skills. In retrospect, a measure of skill practice would have been a valuable addition.

There are a number of limitations to this study. Ideally, a prevention study would follow participants for a number of years instead of a limited interval of 6 months. Second, in the absence of a full diagnostic evaluation at baseline, we are unable to know the impact of co-occurring disorders on the outcome. Third, research assistants were not aware of group assignment, and, for the most part, the same research assistants interviewed the same participants at each assessment. On the other hand, the use of a fully structured diagnostic interview (CIDI) decreased the risk of experimenter bias, and diagnoses were made in case conference meetings of the senior author and 12 other interviewers (all of whom were unaware of group assignment of the case under review) rather than by the individual interviewer. In accord, participants assigned a panic disorder diagnosis had higher self-report ratings of panic worry, interference, and Frequency $\times$ Intensity than participants without panic disorder at follow-up.

Another limitation is questionable generalizability of the sample, given use of incentives for participation and the college student participant pool. Less of a limitation but more of a realization of prevention and treatment in general is that those most in need often are less likely to seek out treatment and/or follow through with treatment or prevention programs. Thus, participants who dropped from the study self-reported more avoidance behavior at baseline. Obviously, we did not include all potential risk factors for panic disorder and may have overlooked factors that contributed to the development of panic disorder in the wait-list group, such as history of depression, asthma, or parental concern with illness (see Craske, 1999, for a review). Finally, we have no data demonstrating whether workshop participants actually employed any of the strategies taught. Thus, the results could be due to nonspecific factors of workshop attendance.

While there are a number of limitations, this prevention study remains an innovative and promising beginning for the prevention of panic disorder.

These findings will hopefully pave the way for future research on the use of cognitive-behavioral interventions in the prevention of panic disorder and other psychological disorders. The question of when, where, and how such prevention programs should be implemented remains to be determined.

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