

Nonclinical Panic in College Students: An Investigation of Prevalence and Symptomatology

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This article presents data on the prevalence and symptomatology of panic attacks and panic disorder (PD) in a large nonclinical sample ($n = 2,375$) of college students. Results showed that approximately 12% of the sample had experienced at least one unexpected panic attack and that 2.36% met *DSM-III-R* criteria for panic disorder. Although there were no sex differences in overall panic attack prevalence, men reported significantly more panic-related worry than women, and women reported a higher panic frequency than men. Compared to subjects who met *DSM-III-R* criteria for PD, infrequent panickers presented with fewer panic symptoms, fewer panic episodes, less panic-related worry, lower anxiety sensitivity, and less panic-related avoidance. Moreover, compared with PD subjects, the infrequent panickers were much less likely to report fears of dying, going insane, and derealization during a panic attack. The findings provide preliminary support for the role of anxious apprehension as a psychological vulnerability factor in the pathogenesis of panic disorder.

The inclusion of panic disorder (PD) as a separate entity in the third edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-III)*; American Psychiatric Association, 1980) has prompted considerable research on the nature and treatment of panic from both biological and psychological perspectives (Barlow, 1988; Rachman, 1988; Telch, 1988a).

Epidemiological studies investigating the prevalence of PD have recently appeared. Using *DSM-III* criteria obtained from a structured interview (Diagnostic Interview Schedule [DIS]) administered by trained lay personnel, the Epidemiologic Catchment Area (ECA) survey reported a 1.5% lifetime prevalence rate of PD across four sites in the United States: Los Angeles, New Haven, Baltimore, and St. Louis (Karno et al., 1987). A recent telephone survey of Houston area residents found a 0.8% 1-year prevalence for PD using *DSM-III* criteria (Salge, Beck, & Logan, 1988). A 2.4% lifetime prevalence of PD was reported by the Munich Follow-up Study (MFS; Wittchen, 1986) using the German Version II of the DIS (Wittchen & Rupp, 1981). Because both the MFS and ECA studies employed *DSM-III* criteria, where PD and agoraphobia are classified as separate disorders, PD prevalence rates do not include those individuals meeting the diagnosis of agoraphobia. Combining the rates for PD and agoraphobia, which is consistent with the revised version of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R)*; American Psychiatric Association, 1987), where agoraphobia is classified as a subtype of panic disorder, the lifetime prevalence for PD increases to 5.4%

and 8.1% for the ECA and MFS, respectively (Robins et al., 1984; Wittchen, 1986).

Recent evidence suggests that panic attacks are not limited to those suffering from panic disorder with or without agoraphobia. On the contrary, panic is common among all anxiety disorders as well as among other psychiatric disorders (Barlow et al., 1985). In fact, a surprisingly high percentage of presumably healthy adults appear to experience occasional panic attacks (Norton, Dorward, & Cox, 1986; Norton, Harrison, Hauch, & Rhodes, 1985).

The study of panic among nonclinical populations offers specific advantages for furthering understanding of panic disorder and agoraphobia. Factors believed to be of etiological significance in the genesis of panic disorder (e.g., dysfunctional appraisals of somatic cues, psychophysiological response to biological challenge, somatic hypervigilance, and endocrinological changes) can be studied prior to the appearance of the clinical syndrome of panic disorder.

Reports of the prevalence of panic among nonclinical populations have recently appeared in the literature. In two separate studies, 186 and 256 presumably normal young adults were surveyed on their anxiety level, panic frequency, and panic symptomatology. In each study, approximately 35% of the respondents reported at least one panic attack in the year prior to the survey, with roughly 2%–3% reporting a sufficient frequency of panic to meet *DSM-III* criteria for PD (Norton et al., 1985, 1986). In the Houston community survey, 14.1% of those interviewed reported at least one *DSM-III*-defined panic attack (Salge et al., 1988). Similarly, 9.3% of those participating in the MFS reported having had at least one panic attack in their lifetime (Wittchen, 1986).

Studies of nonclinical panickers suggest several similarities to PD patients. Nonclinical panickers report many of the same symptoms as PD patients, with an average of 8 of the 12 *DSM-*

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III symptoms for PD. However, patients with PD tend to report more symptoms and greater severity of symptoms (Norton et al., 1986). Furthermore, whereas PD patients frequently endorse symptoms such as dizziness, dyspnea, fear of going crazy, and fear of losing control (Barlow et al., 1985), these symptoms are reported relatively infrequently by nonclinical panickers (Norton et al., 1985).

Up to now, studies investigating panic in nonclinical populations have used *DSM-III* criteria for panic disorder. Although the general description of PD has remained relatively unchanged in the revised third edition of the *DSM-III*, specific diagnostic criteria for PD have changed considerably. One change reflected in the *DSM-III-R* diagnosis of PD is the addition of an anxious apprehension criterion. Those who have had only one unexpected episode of panic can be diagnosed with panic disorder *if* they display persistent worry about panic recurrence. Recent theoretical formulations of panic disorder have focused on the role of anxious apprehension developing in response to false alarms of threat as a crucial determinant (see Barlow, 1988). At this time little is known about the degree to which nonclinical panickers experience anxious apprehension over panic recurrence. Such data might provide clues as to why some people experience occasional panic episodes while others go on to develop panic disorder.

To our knowledge, there have been no large-scale studies of panic using *DSM-III-R* criteria. The present study assessed the prevalence of panic attacks and panic disorder in a large non-clinical sample of college students using *DSM-III-R* criteria. In addition, this study examined relationships between subjects' panic status (nonpanic, infrequent panic, and *DSM-III-R* panic disorder) and other anxiety-relevant indices such as panic attack frequency and symptomatology, apprehension over panic recurrence, anxiety medication use, anxiety sensitivity, and prior psychological treatment.

Method

Subjects

Students ($N = 2,375$) enrolled in introductory psychology classes at the University of Texas at Austin took part in this study. Subjects included 1,035 (43.6%) men and 1,340 (56.4%) women ranging in age from 16 to 50 years ($M = 18.8$ years, $SD = .05$). Participation in the study was in partial fulfillment of their introductory psychology course requirement.

Procedure

All subjects completed an anxiety questionnaire (AQ) designed by Telch. A subset of the sample ($n = 842$) also completed the Anxiety Sensitivity Index (ASI). Data were collected in large classrooms of approximately 500 students each.

Anxiety questionnaire (AQ). This 15-item instrument was designed to obtain information relevant for making *DSM-III* and *DSM-III-R* diagnoses of PD. The panic screening item ("Have you ever had a panic attack when you suddenly felt frightened, anxious, or extremely uncomfortable?") was taken directly from the Structured Clinical Interview for the *DSM-III-R* (SCID; Spitzer, Williams, & Gibbon, 1987). To conform further to *DSM-III-R*, the AQ instructed the subjects to respond

affirmatively *only* if an attack was (a) unexpected (did not occur immediately before or during a situation that almost always causes anxiety), and (b) not triggered by a situation in which the subject was the focus of others' attention. Subjects who responded affirmatively to the panic screening question were asked to respond on a yes or no format to eight additional questions. These questions assessed (a) occurrence of three or more attacks within a 3-week period; (b) occurrence of four or more attacks within a 4-week period; (c) presence of persistent worry of at least 30 days duration concerning the recurrence of an attack; (d) presence of each of the 13 *DSM-III-R* symptoms during the subject's worst attack; (e) whether most of the panic symptoms developed within 10 min of the beginning of the first symptom noticed during the attack; (f) whether the subjects were taking any drugs, stimulants, or medicines just before the attack(s); (g) whether the subjects were physically ill just before the attack(s); and (h) whether subjects had experienced attacks during periods when they were not physically ill or taking drugs, stimulants, or other medicines. In addition, subjects were instructed to indicate the number of panic episodes experienced during the preceding 30 days, and to complete several items that assessed the presence and specific nature of panic-related avoidance (i.e., agoraphobia). Information was also obtained on gender, age, past use of prescription medication for anxiety or stress, and prior consultation with a doctor or counselor for anxiety or stress. The AQ takes approximately 10 min to complete and has shown adequate test-retest reliability over a 3-week interval (i.e., Kappa coefficients for each of the dichotomous items ranged from .61 to 1.0). The accuracy of the AQ in diagnosing PD was tested in a preliminary fashion by administering both the AQ and an interviewer-administered SCID (Spitzer et al., 1987) to 22 subjects reporting at least one episode of panic. The interviewer was kept blind with respect to the subjects' responses on the AQ. Agreement on the presence or absence of a diagnosis of panic disorder was acceptable (i.e., Kappa = .79). Using the SCID as the gold standard, the AQ yielded a false positive rate of 9% ($n = 2$) and no false negatives.

Anxiety Sensitivity Index (ASI). The ASI (Peterson & Reiss, 1987) is a 16-item, paper-and-pencil self-report instrument designed to assess fear of anxiety. Respondents are presented with statements expressing concerns about possible negative consequences of anxiety such as "When I am nervous, I worry that I might be mentally ill." For each statement, respondents rate their magnitude of concern on a Likert-type scale ranging from *very little* (0) to *very much* (4). The ASI score is computed by summing responses across the 16 items. Data on the reliability and validity of the ASI have been favorable (see Telch, Shermis, & Lucas, 1989).

Results

Prevalence Data

Table 1 presents prevalence data by gender for unexpected panic attacks and *DSM-III* and *DSM-III-R* frequency and symptom criteria for PD. Of those surveyed, 292 subjects (12.29%) reported one or more unexpected panic attacks in their lifetime. This percentage decreases to 7.45% with the additional requirement that four or more of the *DSM-III* panic symptoms be present during at least one of the attacks. The percentage of subjects who reported a history of unexpected panic and at least three attacks in a 3-week period drops to 3.12%. As would be expected, the percentage of subjects reporting four attacks in a 4-week period dropped further to 1.81%. No significant sex differences were found among any of the rates of panic as defined above. Avoidance of situations believed to be

Table 1
Prevalence of Panic Attacks and Panic Disorder by Gender Using Various Diagnostic Criteria

Criteria	Male (n = 1,035)		Female (n = 1,340)		Total (N = 2,375)	
	%	(n)	%	(n)	%	(n)
1. One or more panic episodes (panic history)	11.98	124	12.54	168	12.29	292
2. Panic history + four symptom criteria	7.25	75	7.61	102	7.45	177
3. Panic history + three attacks in 3 weeks	2.71	28	3.43	46	3.12	74
4. Panic history + four attacks in 4 weeks	1.64	17	1.94	26	1.81	43
5. Panic history + 30 days worry	3.48	36	2.16	29	2.74	65*
6. Panic history + avoidance	3.00	31	3.43	46	3.24	77
7. Meets <i>DSM-III</i> criteria for panic disorder (1, 2, and 3)	1.93	20	2.69	36	2.36	56
8. Meets <i>DSM-III-R</i> criteria for panic disorder [1, 2, (4 or 5)]	3.00	31	1.87	25	2.36	56
9. Meets <i>DSM-III-R</i> criteria for panic disorder with agoraphobia [1, 2, (4 or 5), 6]	1.06	11	0.97	13	1.01	24
10. Meets either <i>DSM-III</i> or <i>DSM-III-R</i> criteria for panic disorder	3.19	33	3.21	43	3.20	76
11. Meets both <i>DSM-III</i> and <i>DSM-III-R</i> criteria for panic disorder	1.74	18	1.34	18	1.52	36

* $P < .01$ level using chi-square with 1 degree of freedom.

related to panic was reported by 26% of those subjects reporting panic (3.24% of the total sample). No sex differences for avoidance were found.

Prevalence of Panic Disorder: *DSM-III* Versus *DSM-III-R*

Prevalence rates for PD based on *DSM-III* versus *DSM-III-R* are presented in Table 1.¹ For the sample as a whole, *DSM-III* and *DSM-III-R* criteria yielded identical prevalence estimates for PD. Approximately 19% of those reporting panic (2.36% of the total sample) satisfy the necessary conditions for the diagnosis of PD. However, as can be seen in Table 1, a gender by diagnostic criteria (i.e., *DSM-III* versus *DSM-III-R*) interaction emerged. When *DSM-III* criteria were used, men and women did not differ significantly in their reported prevalence of PD (although there was a nonsignificant trend for higher PD prevalence in women). However, when *DSM-III-R* criteria were used, an opposite pattern emerged with a higher proportion of men than women meeting the diagnosis of PD, $\chi^2(1) = 4.71$, $p < .03$.

We also calculated the PD prevalence based on subjects meeting either *DSM-III* or *DSM-III-R* criteria. Not surprisingly, prevalence rates increased slightly to 3.21% for women and 3.19% for men. Finally, a conservative PD prevalence estimate was calculated by determining the percentage of subjects who met criteria on both *DSM-III* and *DSM-III-R*. This method yielded an overall PD prevalence rate of 1.52%, with men (1.74%) showing a slightly higher rate than women (1.34%; see Table 1).

Diagnostic Status and Gender Differences on Panic Symptoms and Panic Frequency

We constructed 2×2 chi-square tables to analyze gender (male/female) and diagnostic status (PD diagnosis/no PD diagnosis) differences on each of the *DSM-III-R* panic symptoms. Given multiple comparisons, a more stringent alpha level of .01 was used. There were no significant differences between men and women on any of the panic symptoms.

Table 2 presents data on the distribution of *DSM-III-R* panic symptoms for those subjects who report panic and meet *DSM-III-R* PD criteria versus those subjects who report panic but do not meet *DSM-III-R* criteria for PD (i.e., they infrequently experience panic). Among the group of panickers as a whole, the four panic symptoms endorsed most often were palpitations, trembling, sweating, and shortness of breath. With the exception of palpitations, choking, and flushes, subjects classified as *DSM-III-R* PD were more likely to endorse each of the panic symptoms. However, striking differences were reported for the symptoms "fear of dying" (51.8% vs. 17.8%), "fear of going crazy" (64.3% vs. 25.9%), and "derealization" (66.1% vs. 30.5%).

Data on the number of panic symptoms, panic attack frequency, panic-related worry, anxiety sensitivity, anxiety medication usage, and visits to a doctor for anxiety are presented in Table 3. We performed 2×2 (Diagnostic Group \times Sex) analyses of variance (ANOVAs) on the number of panic symptoms

¹ The *DSM-III* exclusionary criteria for panic disorder (i.e., not due to another mental disorder such as schizophrenia, bipolar disorder, obsessive-compulsive disorder, major depression, and agoraphobia) were not used in calculating prevalence rates.

Table 2
Breakdown of Panic Symptoms by Subjects' Diagnostic Status

Symptom	DSM-III-R panic disorder (n = 56)		Infrequent panic (n = 236)		Total (n = 292)	
	%	(n)	%	(n)	%	(n)
Shortness of breath	66.1	37	42.8	101	47.3	138*
Dizziness	50.0	28	30.9	73	34.6	101*
Palpitations	69.6	39	55.1	130	57.9	169
Trembling	76.8	43	49.6	117	54.8	160*
Sweating	71.4	40	50.4	119	54.5	159*
Choking	14.3	8	9.8	23	10.6	31
Nausea	50.0	28	25.9	61	30.5	89*
Derealization	66.1	37	30.5	72	37.3	109*
Numbness/tingling	41.1	23	18.2	43	22.6	66*
Flushes	48.2	27	32.2	76	35.3	103
Chest pain	35.7	20	15.7	37	19.5	57*
Fear of dying	51.8	29	17.8	42	24.3	71*
Fear of going crazy	64.3	36	25.9	61	33.2	97*

* $p < .01$ level using chi-square with 1 degree of freedom.

and panic attack frequency. Subjects meeting *DSM-III-R* criteria for PD reported an average of 7.05 panic symptoms compared to 4.05 symptoms for infrequent panickers, $F(1, 288) = 75.66, p < .001$. There was also a main effect for sex, with women reporting more panic symptoms than men, $F(1, 288) = 6.07, p = .01$. The Sex \times Diagnostic Status interaction approached significance ($p = .08$). Multiple comparisons of means using Scheffe's test revealed that women meeting *DSM-III-R* criteria for PD reported more symptoms than did their male counterparts ($p < .05$), whereas male and female infrequent panickers did not differ significantly on the number of symptoms reported.

Data on panic frequency during the previous 30 days showed a similar pattern of findings. Women reported significantly more panic attacks within the previous 30 days than did men, $F(1, 274) = 9.22, p < .005$. As expected, subjects meeting *DSM-III-R* criteria for PD reported more panic attacks than did infrequent panickers, $F(1, 274) = 45.34, p < .001$. The Sex \times Diagnostic Status interaction was also significant, $F(1, 274) = 4.75, p = .03$, indicating that the difference in panic frequency between the PD panickers and the infrequent panickers was more pronounced for women.

Anxious Apprehension Concerning Panic Recurrence

Of those 292 subjects reporting panic, 22% indicated that they experienced persistent worry or anxious apprehension concerning panic recurrence. Surprisingly, a significantly higher proportion of men than women reported anxious apprehension, $\chi^2(1) = 5.71, p < .02$. As expected, panic-related worry was significantly more common among the PD group than the infrequent panic group, $\chi^2(1) = 5.71, p < .02$.

Comparisons between those panickers reporting panic-related worry (worriers) and those who did not (nonworriers) in-

dicated that worriers displayed higher panic frequencies, $F(1, 276) = 28.22, p < .001$, higher ASI scores, $F(1, 95) = 11.11, p < .001$, more panic symptoms, $F(1, 290) = 6.10, p < .01$, and a higher incidence of visiting a health professional for anxiety, $\chi^2(1) = 12.30, p < .001$. Finally, worriers were more than twice as likely to meet *DSM-III* criteria for panic disorder than were nonworriers, $\chi^2(1) = 14.17, p < .001$, even though panic-related worry is not included as a *DSM-III* criterion for PD.

Anxiety Medication Use and Visits to a Doctor for an Anxiety Problem

Complete data on these two variables were obtained on all but 24 subjects from the entire sample of 2,375. Women more frequently reported using prescription medication for anxiety or stress, $\chi^2(1) = 11.20, p < .001$, and were also more likely to report visiting a doctor or counselor for a stress or anxiety problem, $\chi^2(1) = 9.57, p < .002$. The three diagnostic groups differed significantly in the use of anxiety medication, $\chi^2(2) = 34.01, p < .001$, and visits to a doctor for an anxiety problem, $\chi^2(2) = 102.11, p < .001$. Compared with the infrequent panic or nonpanic groups, the PD group was more likely to have seen a doctor or counselor for an anxiety problem and to have reported a higher prevalence of anxiety medication use. Similarly, the infrequent panic group reported more anxiety medication use and visits to a doctor than the nonpanic group. Differences between the PD group and infrequent panic group were significant for visits to a doctor but not for anxiety medication (see Table 3).

Anxiety Sensitivity (ASI)

Data on the ASI were obtained on a subset of 842 subjects from the total sample. Overall, women scored significantly higher on the ASI than men, $F(1, 841) = 11.03, p < .001$. There was also a main effect of diagnostic status on ASI scores, $F(2, 841) = 11.30, p < .001$. The PD group scored significantly higher on the ASI than did the infrequent panic and the nonpanic groups, which did not differ significantly from each other (see Table 3).

Discussion

Unexpected bouts of panic are surprisingly common among nonclinical populations of young adults: Roughly 12% of the subjects surveyed reported one or more unexpected panic attacks in their lifetime. As additional PD diagnostic criteria regarding panic symptoms and panic frequency are included, the prevalence decreases. Of particular interest is our finding that almost 40% of the panickers experience limited symptom attacks exclusively (i.e., attacks of panic in which less than four *DSM-III* symptoms are present). With regard to panic frequency, only about one in four of our panickers meet the frequency criterion for *DSM-III* (three attacks in 3 weeks) and less than one in six meet the frequency criterion for *DSM-III-R* (four attacks in 4 weeks). When symptom and frequency cri-

Table 3
Anxiety and Panic Indices by Diagnostic Group and Sex

Index	DSM-III-R panic disorder (56)			Infrequent panic (233)			Nonpanic (2,062)		
	Male (n = 31)	Female (n = 25)	Total (n = 56)	Male (n = 92)	Female (n = 141)	Total (n = 233)	Male (n = 900)	Female (n = 1,162)	Total (n = 2,062)
Medication for anxiety									
%	19.35	16.00	17.86 _a	6.52	16.31*	12.45 _{a,b}	3.44	6.28*	5.04 _c
n	6	4	10	6	23	29	31	73	104
Doctor for anxiety									
%	38.71	60.00	48.21 _a	14.29	27.86*	22.51 _b	8.21	11.19*	9.89 _c
n	12	15	27	13	39	52	73	130	204
Anxiety sensitivity index									
M	27.25	27.88	27.50 _a	19.42	21.04	20.39 _b	17.40	19.58*	18.53 _{b,c}
SD	8.97	14.89	11.3	8.12	9.73	9.09	8.42	8.86	8.71
Number of panic attacks in past 30 days									
M	1.63	2.84	2.18 _a	0.58	0.78	0.70 _b			
SD	2.34	2.67	2.55	1.00	1.28	1.18			
Number of panic symptoms									
M	6.39	7.88*	7.05 _a	3.88	4.15	4.05 _b			
SD	2.19	2.59	2.47	2.43	2.37	2.39			
Panic-related worry									
%	77.42	68.00	73.21 _a	12.90	8.39	10.17 _b			
n	24	17	41	12	12	24			

Note. Multiple comparisons denoted with different subscripts are significant at the .01 level.

* Sex effect within diagnostic group is significant at the .05 level.

teria for PD are considered, 2.36% of our sample meet the diagnosis of PD.

The present findings invite comparison with previously reported epidemiological investigations of panic. Our 12% panic prevalence figure lies between the 14% lifetime rate found in the Houston community survey (Salge et al., 1988) and the 9.3% lifetime prevalence found in the Munich study (Wittchen, 1986). Lifetime prevalence of panic attacks has not been reported from the ECA survey data. The prevalence rates of panic from our data, as well as the Houston and Munich studies, are in sharp contrast to the 36% one-year panic prevalence reported in two separate, small-scale surveys (Norton et al., 1985, 1986). It should be noted that Norton et al.'s prevalence figure is based on anxiety attacks in common anxiety-provoking situations, many of which involve social situations. In the Norton et al. (1986) report, only 16 subjects (27.6%) of those reporting panic within the last 3 weeks reported an episode of unexpected panic, which is now considered necessary for a diagnosis of PD (American Psychiatric Association, 1987).

Our 2.36% prevalence estimate for PD is almost identical to the 2.4% lifetime prevalence found in the Munich Follow-up Study but is slightly higher than the 1.5% lifetime prevalence reported from four of the five sites of the ECA survey (Karno et al., 1987). However, recall that the ECA and Munich surveys

classified agoraphobia as separate from PD. When ECA and MFS figures for PD and agoraphobia are combined, the lifetime prevalence rates are substantially higher than those found in this study. The younger mean age of our sample, given that they have not yet lived through a large portion of the years at risk, is one factor that may account for our lower PD prevalence estimate. Other factors such as educational level of the sample and method of data collection (i.e., paper-and-pencil vs. structured interview) may have contributed to our lower prevalence estimates.

Although it is commonly believed that women far outnumber men with respect to PD, empirical data are mixed. The MFS found the lifetime prevalence rate for men to be approximately 1.7%, compared to 2.9% for women (Wittchen, 1986). Robins et al. (1984) found higher rates of PD among women in three sites of the ECA study, although the difference was statistically significant only at the New Haven site. Similarly, Karno et al. (1987) reported a trend toward female predominance of PD at the Los Angeles site of the ECA study. Results from the Houston project as well as the studies by Norton et al. (1985, 1986) failed to find significant sex differences in panic prevalence, but their relatively small sample sizes may have precluded the detection of sex effects.

Our findings, limited because this was not a community sam-

ple, do not support the conclusion that women are at a higher risk for developing PD than men. Rather, they suggest that sex differences in the prevalence of PD may be an artifact of the specific criteria used to arrive at a diagnosis. Because women tend to report more panic episodes than men, they are more likely to meet the diagnosis of PD when panic frequency is used as a major diagnostic criterion, as is the case when using *DSM-III*. Men, on the other hand, despite reporting fewer panic episodes, tend to display more worry about panic recurrence than women, and are thus more likely to meet the diagnosis of PD when worry is used as a major diagnostic criterion, as is the case with *DSM-III-R*.

What might account for our finding that male panickers report more panic-related worry than females? Differences between the sexes in the perceived appropriateness of emotional expression in general or the expression of intense fear in particular may provide some clues. Societal norms reinforce the view that the expression of intense emotion is more acceptable for women, especially the expression of fear. As a result, men who experience an unexpected panic episode may perceive it as more physically or socially threatening, and therefore worry more about the possibility of panic recurrence. Further study is needed to confirm this speculation.

As noted earlier, persistent worry about panic recurrence has been placed in a central position in recent formulations of panic disorder (Barlow, 1988). From this perspective, anxious apprehension over panic recurrence increases the probability of future panic episodes by shifting attentional focus on threat cues, thus leading to a further increase in arousal. Fear of panic recurrence was reported by only 22% of the panickers in our nonclinical sample. In contrast, 91% of a sample of clinical PD patients recently evaluated in our laboratory reported a fear of panic attack recurrence (Telch, 1988b). Not surprisingly, our nonclinical panickers who reported persistent worry about panic recurrence were more likely to be diagnosed with PD, were more likely to have seen a doctor or counselor for anxiety or stress, and displayed higher anxiety sensitivity than nonworriers. Taken together, these findings suggest that apprehension about panic recurrence operates as a psychological vulnerability factor in the pathogenesis of panic disorder.

Several limitations of the present study deserve comment. Despite careful construction and piloting of questions and adequate test-retest reliability, our estimates of panic attack and PD prevalence might differ from estimates that would be derived from face-to-face structured interviews. Available resources precluded the use of face-to-face interviewing for such a large sample. However, the wording of many of the items was kept identical to that used in the most recent revision of the Structured Clinical Interview for *DSM-III-R* (Spitzer et al., 1987). Nonetheless, our prevalence estimates probably represent a slight overestimation. Recent data comparing diagnostic agreement between our paper-and-pencil survey and the SCID with a small sample of 22 subjects revealed an acceptable level of diagnostic agreement (i.e., Kappa = .82). However, using the structured interview as the standard, some false positives occurred for the paper-and-pencil instrument.

A second limitation concerns the potential bias associated

with using a college student sample. Our subjects were younger and more highly educated than were those surveyed in community studies. Data from the ECA study indicate that college graduates show fewer psychiatric disorders than others (Robins et al., 1984). However, the effects of education on PD prevalence rates appear less striking, especially for those meeting the diagnosis of PD without agoraphobia. PD rates between college graduates and others were comparable in two of the three ECA sites, whereas prevalence of agoraphobia was consistently higher for those who had not graduated from college (Robins et al., 1984). With respect to age, the ECA survey found no significant age effect on the prevalence rates of either panic disorder or agoraphobia (Robins et al., 1984). In light of these results, it appears that some caution is in order when attempting to generalize from our findings to a noncollege population. In particular, our prevalence estimates for agoraphobia may be considerably lower than those found in a noncollege population of young adults.

Despite these limitations, our results suggest that a large number of college students experience occasional panic attacks that are similar, but less severe and less frequent, than those of students who meet *DSM-III-R* criteria for PD. Our findings are consistent with Norton et al.'s (1986) contention that the frequency and severity of panic attacks may be on a continuum. Compared to subjects who met *DSM-III-R* criteria for PD, infrequent panickers presented with fewer panic symptoms, fewer panic episodes, less panic-related worry, lower anxiety sensitivity, and less panic-related avoidance. Moreover, compared to PD subjects, the infrequent panickers were much less likely to report fears of dying, going insane, and derealization during a panic attack. Perhaps these cognitive symptoms represent a more extreme appraisal of threat, thus increasing the likelihood that anxious apprehension and panic disorder develop. Panic appraisals have been shown to relate to both the onset of panic disorder (Breier, Charney, & Heninger, 1986) and the degree of panic-related avoidance (Telch, Brouillard, Telch, Agras, & Taylor, in press).

Prospective study of the infrequent panicker is likely to yield valuable information on the etiology of panic disorder. Ongoing monitoring of nonclinical panic subgroups displaying different symptom profiles and cognitive appraisal characteristics provides an important step in uncovering causal mechanisms governing the transition from infrequent nonclinical panic to the full clinical syndrome of panic disorder and its variants.

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