Panic Disorder, Panic Attacks and Panic Attack Symptoms across Race-Ethnic Groups: Results of the Collaborative Psychiatric Epidemiology Studies

Anu Asnaani,[1] Cassidy A. Gutner,[1] Devon E. Hinton[2] & Stefan G. Hofmann[1]

1 Department of Psychology, Boston University, Boston, MA, USA
2 Department of Psychiatry, Massachusetts General Hospital, MA, USA

The current study investigates race-ethnic differences in rates of panic disorder, panic attacks and certain panic attack symptoms by jointly combining three major national epidemiological databases. The compared groups were White, African American, Latino and Asian. The White group had significantly higher rates of panic disorder, and of many panic symptoms, including palpitations, as compared to the African American, Asian and Latino groups. Several expected race-ethnic differences were not found. An explanation for these findings are adduced, and suggestions are given for future studies so that possible ethnic-racial differences in panic disorder, panic attacks and panic attack symptoms can be investigated in a more rigorous manner.

Introduction

Researchers have hypothesized that the rate of panic disorder, panic attacks and panic attack symptoms may vary across race-ethnic groups for several reasons [1]. In particular, cultural ideas about the meaning of anxiety-type psychological and somatic sensations (such as those listed in the *DSM*–IV panic attack criteria) may vary across cultures. Consequently, the feared sensations and the extent of fear would be expected to vary and would seemingly result in different rates of panic disorder and panic attacks. Consequentially this would result in certain symptoms being more prominent during panic attacks [1]. Possible reasons for cross-cultural differences in the meaning and emotional salience of panic attack symptoms are reviewed, otherwise known as cultural reasons for "somatic symptom amplification" [1].

For one, it has been theorized that certain racial groups may be susceptible to certain symptoms owing to biological reasons; for instance, studies using an optokinetic drum have observed that Asian groups may be more predisposed to motion sickness and dizziness. Of course, this motion sickness predisposition may result

from the cultural meaning of dizziness, for example, associated metaphors, rather than a genetic predisposition, or a combination of both; see [1] for a review of this topic. Second, it has been theorized that if a certain somatic symptom is linked to many metaphors used to express distress, then that symptom may take on particular emotional salience. For example, Hispanic populations will be very afraid of shortness of breath, owing to many metaphors referencing asphyxia [D.E. Hinton, R. Lewis-Fernández, R. Chong, M.H. Pollack, submitted manuscript].

Third, it has been theorized that if a group has a high rate of an illness that has a certain panic attack symptom as the key symptom, then that symptom may be misattributed to that disease process; for instance, in the African American group, there is a very high rate of diabetes, hypertension and foot amputation, therefore numbness is greatly feared as an indicator of these problems [2,3]. As another example, among English speaking populations in the United States, there is great fear of heart attacks, so in theory heart palpitations should be emphasized during panic attacks [4]. Finally, cultures may have certain greatly feared cultural syndromes,

and certain symptoms may be interpreted as indicating the onset of that cultural syndrome, producing even greater fear of this particular symptom: among many Latino groups, most often Caribbean Latinos, shakiness is thought to indicate a disorder of the nervous system and the possible onset of an *ataque de nervios*, a greatly feared syndrome that may cause loss of control and death [D.E. Hinton, R. Lewis-Fernández, R. Chong, M.H. Pollack, submitted manuscript].

To further understand cultural differences in panic disorder and panic attack symptoms, the current study explores the rates of panic disorder and panic attacks across certain race-ethnic groups: White Americans, African Americans, Hispanic Americans and Asian Americans. The study also compares these race-ethnic groups with respect to the rate of certain panic attack symptoms experienced during panic attacks. We chose to assess all panic attack symptoms in an exploratory design, though realizing this would decrease the power to detect differences. As discussed previously, and further elaborated on in the discussion section, we hypothesized that certain differences would be found: more dizziness among the Asian group, higher endorsements of shakiness and shortness of breath among Latino populations and more numbness among African American patients. The dataset to be examined includes an integration of three large national epidemiological surveys (see Methods for a detailed description).

Methods

Subjects

The current study draws on data from the Collaborative Psychiatric Epidemiology Studies (CPES). The CPES consists of three national surveys of Americans' mental health: the National Comorbidity Survey Replication (NCS-R), the National Study of American Life (NSAL) and the National Latino and Asian American Study of Mental Health (NLAAS; [5]). All surveys were funded by the National Institute of Mental Heath (NIMH) and data were collected between May 2002 and November 2003. The NCS-R included adults (≥18 years old) in the coterminous United States. Individuals were excluded if they were institutionalized, lived on military bases or were non-English speakers. Data for the NCS-R were collected as part of a three-stage national area probability sample framework. The NCS-R is a cross-sectional replication of the original 1993 National Comorbidity Survey (NCS; [6,7]). The NCS-R screening interview was completed by 11,222 households and yielded an initial 98% response rate. In-person interviews were conducted with 9282 respondents (47.4% males), with the mean age of 44.73 years (SD = 17.5) and a response rate of 70.9%.

The NSAL, an integrated household probability sample survey (N = 6199), consists of 3570 African–Americans, 1006 non-Hispanic Whites, and 1623 African American adults of Caribbean descent, with a response rate of 71.5%. The inclusion and exclusion criteria for the NSAL were identical to those of the NCS-R described previously. Moreover, this survey was added to the CPES combined dataset in order to obtain information from Afro-Caribbean adults, a group that was not represented in the NCS-R. A similar three-stage national area probability sampling procedure as employed in the NCS-R was utilized to collect the data.

The NLAAS, a nationally representative survey of Latino and Asian Americans residing in the United States, included individuals whose primary language was English, Spanish, or 1 of 3 Asian languages (Chinese, Vietnamese or Tagalog). Of note, this was the only survey in the CPES combined dataset that utilized trained bilingual interviewers to conduct the full assessment in one of these five languages, as compared to English-only assessments in the NCS-R and NSAL [8]. Moreover, the NLAAS survey population included Latino and Asian–American adults (≥ 18 years old), in the coterminous United States, Alaska and Hawaii. Exclusion criteria were the same as for the NCS-R and the NSAL. Additionally, the study utilized a similar three-stage national area probability sample with special supplements for adults of Puerto Rican, Cuban, Chinese, Filipino and Vietnamese origin. The Latino sample (n = 2554) consisted of four ethnic subgroups determined by respondents' self-reported ethnicity: Cuban, Puerto Rican, Mexican and other; the final weighted response rate for the Latino sample was 75.5% [9]. The Asian sample consisted of individuals identifying as Chinese, Filipino, Vietnamese or other Asian ancestry (n = 2095); the combined weighted response rate for the Asian sample was 65.6% [10].

Across the three surveys, study procedures were explained to all participants and written informed consent was obtained from the respondents in their preferred language [9]. Trained interviewers conducted face-to-face interviews with all participants in the core and high-density samples (see subsequently), except when a telephone interview was conducted by the respondent. To ensure quality control in each survey, participants were randomly recontacted to validate the data. An initial $50 incentive was later increased to $150 to address non-response [10].

The sampling procedure for all three surveys [5,9] included three stages: 1) core sampling, in which primary sampling units (metropolitan statistical areas or county units) and secondary sampling units (continuous groupings of census blocks) were selected with probability proportionate to size; 2) high-density supplemental

Table 1 Demographic variables of the racial groups

Characteristics	White Americans	African Americans	Hispanic Americans	Asian Americans	χ^2 (4) or *F*-values (df$_{\text{effect}}$, df$_{\text{error}}$)
Sample size	7587	6238	3620	2284	—
Gender (% females)	54.53%	63.19%$_a$	55.80%	52.63%$_b$	136.08
Age Mean (SD)	46. 65 (17.73)$_a$	42.47 (16.11)$_b$	39.66 (15.55)$_c$	40.95 (14.67)$_d$	137.70 (4, 20008)
Annual household income mean (SD)	$59,479 (46.739)$_a$	$35,658 (32,767)$_b$	$46,618 (46,041)$_c$	$72,878 (58,739)$_d$	363.29 (4, 16418)

The table shows number, percentages, means and standard deviations (SD), with corresponding *F* or chi square (χ^2) values. Different subscripts indicate significant post hoc group differences at $P < 0.05$.

sampling to oversample census block groups with 5% or greater density of target ancestry groups; 3) second respondent sampling to recruit participants from households in which one eligible member has already been interviewed. To take into account the joint probabilities for selection under the three components of the sample design, weighting correlations were developed [10].

Measures

The World Mental Health Psychiatric Survey Initiative Version of the World Health Organization Composite International Interview (WMH-CIDI), a fully structured lay-administered diagnostic interview that generates DSM-IV diagnoses was used to evaluate disorder prevalence rates [9]. Earlier versions of the English and Spanish CIDI diagnostic assessments were consistent with the independent diagnosis made by trained clinical interviewers [11,12]. In the current investigation we examine lifetime prevalence rates for Panic Disorder for each of four race-ethnic groups: the Asian American subgroup (n = 2284), consisting of respondents identifying as Chinese, Filipino or Vietnamese; the African American subgroup (n = 6238), which included all origins including Caribbean African; the Hispanic subgroup (n = 3620), which included all individuals of Hispanic descent; and the White subgroup (n = 7587). We also examined the panic attack symptom profiles and number of lifetime and past-year panic attacks across the four race-ethnic groups.

Statistical Analysis

The complex samples module of SPSS 17.0 was used to complete all analyses for the present report, in order to adequately address the weighted nature of the CPES data as described previously. Logistic regressions (odds ratios with 95% confidence intervals) were conducted for prevalence of lifetime DSM-IV diagnosis of panic disorder and all 16 panic symptoms across six race comparisons: Whites versus Asian Americans, Whites versus

Hispanics, Whites versus African Americans, African Americans versus Hispanics, African Americans versus Asian Americans and Hispanics versus Asian Americans. Three covariates were included in the final analyses: age, gender and annual household income. Education was considered as a potential fourth covariate, but seemed redundant to include in the analyses given its significant positive correlation to annual household income level in the datasets. One-way analysis of variances (ANOVAs) were also conducted for these six race comparisons to determine differences in number of past-year and lifetime panic attacks experienced between racial groups.

Results

The demographic characteristics of each of the four racial groups are depicted in Table 1. The White sample was older (M = 46.85) than all other racial groups, whereas the African American cohort consisted of the highest proportion of women (63.2% female) among the groups. Asian Americans had the highest average level of household income ($72,878) in comparison to the other groups. As shown in Table 1, each demographic variable was found to be significantly different across all racial groups. To account for this, these demographic variables were entered as covariates in the logistic regression analysis.

Table 2 shows the comparisons of odds ratios between the different ethnic groups in diagnosis of panic disorder when controlling for gender, age and socioeconomic status. As shown, White Americans endorsed significantly higher rates of panic disorder as compared African Americans, Hispanic Americans and Asian Americans. There were no differences, however, in prevalence of PD among the three minority groups. These differences in the reporting of panic disorder symptoms remained significant after a Bonferroni correction ($P < 0.05/6 = 0.008$).

Logistic regressions revealed that even after controlling for demographic variables the four racial groups endorsed specific symptoms of panic at significantly differential

Table 2 Comparison between racial groups in DSM-IV diagnosis of Panic Disorder (PD)

	White Americans versus African Americans		White Americans versus Hispanic Americans		White Americans versus Asian Americans	
	OR (95% CI)	P-level	OR (95% CI)	P-level	OR (95% CI)	P-level
PD	1.701* (1.360–2.128)	P < 0.001	1.572* (1.214–2.035)	P < 0.001	2.475* (1.547–3.957)	P < 0.001

	African Americans versus Hispanic Americans		African Americans versus Hispanic Americans		Hispanic Americans versus Asian Americans	
	OR (95% CI)	P-level	OR (95% CI)	P-level	OR (95% CI)	P-level
PD	0.915 (0.686–1.222)	ns	1.468 (0.872–2.471)	ns	1.649 (0.989–2.750)	ns

The table shows odds ratios (OR), 95% confidence intervals (CI), and the statistical significance level comparing the first group versus the second group; ns: not significant at P < 0.05. *: significant after a Bonferroni correction of 0.05/6 = 0.008; PD: panic disorder.
All analyses include gender, age and socioeconomic status as covariates.

Table 3 Comparison between racial groups in occurrence of panic symptoms

	White versus African	White versus Hispanic	White versus Asian	African versus Hispanic	African versus Asian	Hispanic versus Asian
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Heart racing	1.08 (0.87–1.34)	2.00 (1.59–2.51)**	1.80 (1.38–2.34)**	1.86 (1.48–2.33)**	1.83 (1.37–2.45)**	0.94 (0.69–1.29)
Shortness of breath	1.02 (0.88–1.19)	0.90 (0.76–1.70)	1.49 (1.21–1.84)**	0.89 (0.75–1.07)	1.40 (1.11–1.77)*	1.70 (1.34–2.16)**
Nausea	0.89 (0.76–1.03)	1.15 (0.96–1.38)	1.55 (1.24–1.95)**	1.29 (1.08–1.54)*	1.94 (1.53–2.46)**	1.60 (1.24–2.06)**
Dizziness	0.98 (0.84–1.15)	0.78 (0.66–0.93)*	1.19 (0.95–1.50)	0.77 (0.64–0.92)*	1.16 (0.90–1.50)	1.50 (1.16–1.94)*
Sweating	1.00 (0.85–1.18)	1.33 (1.10–1.61)*	1.41 (1.13–1.76)*	1.30 (1.07–1.57)*	1.36 (1.07–1.73)*	1.03 (0.80–1.32)
Trembling/shaking	1.49 (1.23–1.79)**	1.63 (1.31–2.02)**	1.52 (1.18–1.94)*	1.14 (0.92–1.41)	1.10 (0.85–1.44)	0.99 (0.74–1.32)
Dry mouth	1.43 (1.12–1.81)*	0.91 (0.69–1.19)	1.33 (0.98–1.80)	0.67 (0.50–0.88)*	0.94 (0.67–1.33)	1.39 (0.96–2.03)
Choking	1.12 (0.68–1.83)	0.36 (0.24–0.55)**	0.64 (0.37–1.13)	0.32 (0.21–0.50)**	0.41 (0.21–0.80)*	1.45 (0.80–2.63)
Chest discomfort	1.12 (0.83–1.51)	1.17 (0.84–1.62)	0.94 (0.65–1.36)	1.06 (0.76–1.49)	0.88 (0.58–1.33)	0.85 (0.56–1.29)
Lose control	1.14 (0.85–1.54)	0.96 (0.67–1.36)	1.13 (0.75–1.70)	0.93 (0.64–1.34)	1.13 (0.69–1.85)	1.30 (0.77–2.20)
Depersonalization	1.19 (0.89–1.60)	0.87 (0.64–1.19)	1.22 (0.83–1.80)	0.77 (0.55–1.06)	1.04 (0.66–1.62)	1.25 (0.82–1.92)
Derealization	0.92 (0.61–1.38)	1.13 (0.71–1.81)	1.36 (0.82–2.24)	1.23 (0.76–2.00)	1.53 (0.82–2.86)	0.95 (0.53–1.72)
Passing out	0.98 (0.63–1.51)	1.09 (0.64–1.87)	1.52 (0.83–2.78)	1.10 (0.64–1.89)	1.52 (0.80–2.87)	1.46 (0.72–2.97)
Fear of death	1.32 (0.90–1.92)	1.02 (0.65–1.61)	1.76 (1.14–2.72)*	0.75 (0.48–1.18)	1.27 (0.80–2.00)	1.65 (0.96–2.85)
Hot flushes	1.21 (0.80–1.84)	1.40 (0.83–2.36)	1.51 (0.92–2.48)	1.08 (0.66–1.78)	1.26 (0.74–2.14)	1.07 (0.60–1.90)
Numbness	0.67 (0.32–1.40)	0.59 (0.25–1.43)	0.60 (0.27–1.37)	0.86 (0.40–1.84)	0.73 (0.30–1.83)	0.92 (0.37–2.34)

The table shows odds ratios (OR), 95% confidence intervals (CI), and the statistical significance level comparing the first group versus the second group; ns = not significant at P < 0.05; * = significant at P = 0.05; ** = significant after a Bonferroni correction of 0.05/96 = 0.0005; PD = panic disorder. All analyses include gender, age and socioeconomic status as covariates.

rates (Table 3). White Americans more frequently reported trembling/shaking than African Americans, heart racing and trembling/shaking as compared to Hispanic Americans and heart racing, shortness of breath and nausea as compared to Asian Americans. African Americans reported higher frequency of heart racing as compared to Hispanics and Asian Americans and nausea as compared to Asian Americans. Hispanic Americans reported experiencing shortness of breath and also nausea more frequently than Asian Americans, and feelings of choking more often than White Americans and African Americans. These differences in symptom report refer to those comparisons that remained significant after a Bonferroni

correction to adjust for alpha inflation given the number of pair wise comparisons made ($P < 0.05/96 = 0.0005$). Finally, one-way ANOVAs were conducted to determine any differences in frequency of panic attacks over the past year and over lifetime among the four racial groups, which revealed no differences between racial groups on these measures.

Discussion

In this study, the White group had the highest rate of both panic disorder and panic attacks, and the Asian group the lowest. In general, the White group had a higher rate of

endorsement of panic attack symptoms. As hypothesized, the White group had a very high rate of palpitations, in keeping with prominence of cardiac concerns, especially heart attack, in that group, as well as the prominence of heart-related metaphors in the English language [4].

Why might the White group have the higher rate of panic disorder? For one, there is an elevated fear of disease entities like heart attack and stroke in the American culture, which could create a hypervigilance to these symptoms, and a fearful reaction to them. As another explanation, panic disorder may be a well-known entity in the United States (e.g., it is featured in the very popular television mini-series "The Sopranos"), and this may increase its frequency through modeling and it serving as an "idiom of distress" [13].

There are several reasons that expected race-ethnic differences in symptom frequency might not have been observed, such as the expectation that shakiness and shortness of breath would be more common in the Latino group, numbness in the African American group and dizziness in the Asian group. Most particularly, regarding the cultural theory of somatic symptom amplification, the sample had serious shortcomings. (As reviewed previously, according to the cultural theory of somatic symptom amplification, the cultural meanings of a somatic symptom, such as metaphors or cultural syndromes associated with that somatic symptom, increase the somatic symptom's prominence in that culture [1].) Specifically, the datasets did not indicate the degree of acculturation of all the race-ethnic groups; therefore, this variable could not be examined across all groups. Thus, it may be that many participants surveyed may have been highly acculturated. An array of other variables (such as number of years in the United States, citizenship status and subjective feeling of affinity towards the United States) were considered as potential proxies for this measure, but none of these were systematically assessed across all three datasets for all racial groups. As a more serious problem, the symptoms were not assessed in each group's language across all three datasets. Furthermore, although the assessments were at least conducted in five different languages to participants in the NLAAS survey, the members within each racial group are not homogenous: African Americans in the South versus African Americans in the North versus African Americans of Caribbean origin; Mexican-Americans versus Puerto Ricans (e.g., Puerto Ricans have much higher rates of anxiety disorders than Mexican-American populations; [9]) and three Asian groups in the datasets. The literature documents extensive translation and back-translation methods to ensure cultural equivalency of the symptom measures in the Latino subgroups in the NLAAS [14], but similar descriptions are not available for the Asian subgroups (of

Chinese, Filipino and Vietnamese origin), all of whom have extremely different languages and cultures.

Despite these limitations, there are several strengths to the current study. The large sample size within the CPES allows for results that are widely generalizeable to the overall U.S. adult population. Moreover, the over sampling of Mexicans, Puerto Ricans, Cubans, Chinese, Filipinos, Vietnamese and persons of Afro-Caribbean origin enhances knowledge in a portion of the population that is widely understudied and therefore provides robust information about how symptoms are handled across different races and cultures. As noted previously [5], this methodological design produced increased population response weights and therefore may have reduced non-response bias in this dataset. Taken together, the CPES offers a rich opportunity to investigate race-ethnic differences in the rates of a number of emotional symptoms in a widely generalizable sample.

Future cross-cultural studies of rates of panic disorder, panic attacks and panic attack symptoms should include a scale of acculturation; should assess the group in question in their own language; and should assess specific subgroups (African American versus Caribbean African American; Filipino versus Chinese). In addition, it should be noted that the current study assessed severity of symptoms, not the most feared symptoms. One would expect that fear of symptoms would much better illustrate cross-cultural differences in symptom meaning [15]. It might also be useful in future studies to utilize measures of fear of anxiety symptoms that are thought to be predictive of panic attacks, such as the Anxiety Sensitivity Index (ASI), to determine whether differences exist and whether those differences predict difference in rates of panic attacks and panic disorder [15].

Acknowledgements

Conflict of Interest

The authors have no conflict of interest.

References

1. Hinton DE, Good B. *Culture and panic disorder*. Stanford: Stanford University Press, 2009.
2. Friedman S, Paradis C. Panic disorder in African-Americans: Symptomatology and isolated sleep paralysis. *Cult Med Psychiatry* 2002;**26**:179–198.

3. Johnson MR, Hartzema A, Mills TL, De Leon JM, Yank M, Frueh C, Santos A. Ethnic differences in the reliability and validity of a panic disorder screen. *Ethn Health* 2007;**12**:283–296.

4. Eifert GH. Cardiophobia: A paradigmatic behavioural model of heart-focused anxiety and non-anginal chest pain. *Behav Res Ther* 1992;**30**:329–345.

5. Heeringa SG, Wagner J, Torres M, Duan N, Adams T, Berglund P. Sample designs and sampling methods for the Collaborative Psychiatric Epidemiology Studies (CPES). *Int J Method Psych* 2004;**13**:221–240.

6. Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: Results from the National Comorbidity Survey, *Arch Gen Psychiat* 1994;**51**:8–19.

7. Kessler RC, Merikangas KR. The National Comorbidity Survey Replication (NCS-R): Background and aims. *Int J Method Psych* 2004;**13**:60–65.

8. Alegria M, Takeuchi D, Canino G, et al. Considering context, place and culture: The National Latino and Asian American Study. *Int J Methods Psychiatr Res* 2004;**13**:208–220.

9. Alegría M, Mulvaney-Day N, Torres M, Polo A, Cao Z, Canino G. Prevalence of psychiatric disorders across Latino subgroups in the United States. *Am J Public Health* 2007;**97**:68–75.

10. Abe-Kim J, Takeuchi DT, Hong S, et al. Use of mental health-related services among immigrant and US-born Asian Americans: Results from The National Latino and Asian-American Study. *Am J Public Health* 2007;**97**:91–98.

11. Rubio-Stipec M, Peters L, Andrews G. Test-retest reliability of the computerized CIDI (CIDI-Auto): Substance abuse modules. *J Am Acad Child Psy* 1999;**38**:1569–1579.

12. Wittchen HU. Reliability and validity studies of the WHO Composite International Diagnostic Interview (CIDI): A critical review. *J Psychiat Res* 1994;**28**:57–84.

13. Hinton DE, Lewis-Fernández R. Anxiety disorders and idioms of distress: A model of generation and its treatment implications. In: Simpson HB, Neria Y, Lewis-Fernández R, Schneier F, editors. *Understanding anxiety: Clinical and research perspectives from the Columbia University Department of Psychiatry*, Cambridge: Cambridge University Press, in press.

14. Alegria M, Vila D, Woo M, et al. Cultural relevance and equivalence in the NLAAS instrument: Integrating ETIC and EMIC in the development of cross-cultural measures for a psychiatric epidemiology and services study of Latinos. *Int J Methods Psychiatr Res* 2004;**13**:270–288.

15. Hinton DE, Pich V, Safren SA, Pollack MH, McNally RJ. Anxiety sensitivity among Cambodian refugees with panic disorder: A factor analytic investigation. *J Anxiety Disord* 2006;**20**:281–295.