Physical-Psychiatric Comorbidity: Patterns and Explanations for Racial and Ethnic Group Differences

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ABSTRACT

An extensive literature documents racial differentials in physical and psychological health. However, few studies examine the co-occurrence of physical and mental illness within the same individual (physical-psychiatric comorbidity), and the patterning of comorbidity across race and ethnicity. The current study uses the Collaborative Psychiatric Epidemiology Surveys (N=12787) and asks the following questions: What are the patterns of physical-psychiatric comorbidity (PPC) across racial and ethnic groups? To what extent do social factors explain racial and ethnic differences in PPC? Results reveal that Puerto Rican men have significantly higher risk of PPC in comparison to White men. Among women, Blacks and Cubans were more likely than Whites to experience PPC as opposed to "Psychiatric Only" health problems. Social factors explain the Puerto Rican-White difference in comorbid health among men, but have little explanatory power for understanding racial/ethnic differences in comorbidity among women.

Physical-Psychiatric Comorbidity:
Patterns and Explanations for Racial and Ethnic Group Differences

According to the World Health Organization (WHO), health is defined as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1948). Despite this definition, most research focuses on a single health domain (e.g., mental health), or separate physical and mental health outcomes in analytic models (e.g., analyze physical health conditions separately from mental health problems). Medical sociologists and demographers alike have advocated for a more "integrative approach" to studying health (Harris 2010; Pearlin et al. 2007). The call by the Department of Health and Human Services to improve the health status of those with multiple chronic conditions also speaks to the need to rigorously examine a broader measure of health (U.S. Department of Health and Human Services, 2010). Given this emphasis on providing a more holistic assessment of health, this study conceptualizes health as expressed through the co-occurrence of physical and mental health problems, or physical-psychiatric comorbidity (PPC).

PPC is a serious health problem that plagues 17 percent of the U.S. population (Druss and Walker 2011). When physical and psychiatric health problems exist within an individual, the presence of both conditions complicates treatment (Valderas et al. 2009), alters the course of a disease (Andersen, Kiecolt-Glaser, and Glaser 1994), increases disability (Melamed 1995), and increases mortality risk (Zhang et al. 2005).[1]

Despite the public health significance of understanding PPC, little is known about how the prevalence of PPC varies across social groups, such as by race/ethnicity and socioeconomic status. The sociological perspective is uniquely equipped to explicate the ways social

stratification plays a role in the manifestation of co-occurring physical and psychiatric health problems. In this paper, I examine the extent to which PPC disproportionately affects certain racial and ethnic groups residing in the U.S. In addition to exploring differences across these groups, I also explore the extent to which socioeconomic status (SES), stress exposure, and social support may explain any of the differences that are observed. These three factors (SES, stress exposure, and support) represent the most widely studied social mediators of the race-health relationship (Brown et al. 2013; Jackson and Cummings 2011; Mouzon 2013; Thoits 2010; Williams 2012). Thus, this study takes on the task of examining racial and ethnic differentials in PPC, and the extent to which social mechanisms explain any differences across racial/ethnic groups.

To study an expanded definition of health across diverse populations, I utilize the most comprehensive data collected to date in the U.S.: the Collaborative Psychiatric Epidemiology Surveys (CPES). The CPES is comprised of the National Comorbidity Survey, Replication (NCS-R), the National Latino and Asian American Study (NLAAS), and the National Survey of American Life (NSAL). Together, these surveys provide information on numerous physical and psychiatric health problems across 12 ethnic groups, and afford the opportunity to consider social mechanisms that might explain ethnic differences in PPC. The groups considered here include White, African American, Caribbean Black, Spanish Caribbean Black, Mexican, Cuban, Puerto Rican, Other Latino, Chinese, Filipino, Vietnamese, and Other Asian Americans.

BACKGROUND

Growing Diversity in the U.S. and Implications for Health

The U.S. is becoming increasingly more racially diverse.[2] For example, racial minorities collectively comprise 36 percent of the U.S. population with Black, Latino and Asian Americans representing 14 percent, 16 percent, and 5 percent of the population, respectively (Ennis, Ríos-

Vargas, and Albert 2011; Hoeffel et al. 2012; Rastogi et al. 2011). These figures are a dramatic demographic shift compared to 1950 when Non-Latino Whites comprised 90 percent of the U.S. population (U.S. Census Bureau 2002). Given the racial and ethnic diversity of the U.S., current population health research that does not consider racial and ethnic diversity provides an incomplete portrait of the nation's health.

Overall, two major conclusions can be drawn from the literature on race, ethnicity, and health. First, though some racial minorities experience poorer health relative to their White counterparts, minority status alone does not predict health disadvantage. Blacks, overall, experience worse physical health relative to their White counterparts including higher mortality rates (Stewart 2008), more chronic conditions (Hayward et al. 2000), and worse self-rated health (Cummings and Jackson 2008). Nonetheless, relative to their White counterparts, Latino and Asian Americans tend to have better physical health outcomes (Williams 2012). With regard to psychiatric health, Non-Latino Whites, on average, experience higher rates of psychiatric diagnoses compared to their Black, Latino, and Asian Americans (Alegría et al. 2007; Kessler et al. 2005; Takeuchi et al. 2007; Williams et al. 2007).

Second, ethnic distinctions within racial groups cannot be ignored (Williams 2012). Patterns of health between ethnic groups within the same racial category provide important nuance to our understanding of race disparities in health. For example, Puerto Ricans have elevated risk of psychiatric disorder relative to other Latino groups (Alegría et al. 2007). Also, there are significant ethnic differences in physical and psychological well-being within the Black American population. For example, Caribbean Blacks, especially the foreign-born, experience lower rates of mental illness compared to African Americans (Williams et al. 2007; however, Caribbean Black men experience higher rates of psychiatric disorder than their African American

male counterparts). These findings make it incumbent upon researchers to examine ethnic distinctions in health that are often obscured when broad racial categories are used in health research. Brown and colleagues (2013) echo this sentiment, noting that current research "too often does little more than control for race, nativity, or ethnicity, ignoring the sociological significance of these constructs (e.g., treating these constructs as noise or moderating influences in multivariate statistical models)" (p. 256). This study takes on the challenge of lending sociological significance to the constructs of "race" and "ethnicity" by prioritizing these social constructs in the analysis of PPC.

Why Physical-Psychiatric Comorbidity (PPC)?

Evidenced by the fact that co-occurring physical and psychiatric conditions increase mortality risk (Zhang et al. 2005) and cause more disability than having a single health condition (Melamed 1995), PPC is a pernicious health status. Researchers have often examined the physical and psychological health domains separately. However, poor health in one domain (physical or mental) could "spill over" into another (e.g., see Cohen and Rodriguez 1995 for a detailed discussion). For example, when a debilitating mental illness prevents individuals from maintaining positive social relationships, they are less likely to participate in positive health practices and are more likely to develop chronic illnesses such as diabetes and high blood pressure (Cohen and Rodriguez 1995). Similarly, loss of control over one's activities and increased dependence on others as a result of chronic and disabling physical health problems can contribute to symptoms of depression such as feelings of hopelessness, helplessness, and loss of self-esteem (Cohen and Rodriguez 1995; Gatchel 2004). As such, more severe and chronic physical conditions and those associated with pain, disability, and disfigurement may place persons at greater risk for mental illness (Cohen and Rodriguez 1995;Gatchel 2004; Melamed

1995). Though these causal illness pathways cannot be examined here, the mind-body and mental-physical connection is undeniable. Furthermore, given the persistence of racial disparities in health (Williams 2012), it is appropriate to determine the extent to which physical-psychiatric comorbidity (PPC), as a measure, might be indicative of even larger racial disparities in health than are often captured in studies of single health outcomes.

Racial and Ethnic Differences in Physical-Psychiatric Comorbidity (PPC)

Despite little research focused on racial and ethnic differences in PPC, several scholars have advocated for studying how comorbidity rates differ across racial groups (Evans et al. 2005; Iacovides and Siamouli 2008). A few studies have examined comorbidity within specific racial-ethnic groups (John et al. 2003; Ortega et al. 2006), while others have tested for racial and ethnic differences in specific "subtypes" of PPC such as diabetes and a psychiatric disorder (Cabassa et al. 2011; Cabassa et al. 2013; Mulvaney-Day et al. 2007) or examined ethnic differences in PPC outside the U.S. context (Scott et al. 2008).

Ortega and colleagues (2006) describe the co-occurrence of anxiety and depression with physical chronic illnesses among U.S. Latinos with national origins from Mexico, Cuba, Puerto Rico, and other Latin American countries. Puerto Ricans had the highest levels of psychiatric comorbidity in comparison to the other Latino groups. However, the study did not include estimates of the prevalence rates for having both a physical *and* a psychiatric health problem leaving unanswered the question of overall PPC prevalence among Latino subgroups.

Two studies addressing racial and ethnic distinctions in PPC focus on a specific index condition. Mulvaney-Day and colleagues (2007) examined comorbid depression and chronic physical illness across Whites, Latinos, Blacks, Asians, and "Other" racial and ethnic minorities. The study revealed that minorities had a lower likelihood of comorbid chronic illness and

depression compared to White Americans. However, racial/ethnic minorities who developed chronic illnesses had similar rates of comorbid depression as non-Latino Whites. In other words, across all the racial/ethnic groups, those who develop physical health problems have similar risks of being depressed. Cabassa and colleagues (2011) used national data to examine racial/ethnic differences in the prevalence of diabetes mellitus for individuals with and without mood, anxiety, substance, and personality disorders. For individuals without psychiatric disorders, African Americans, Latinos, and American Indians/Alaska Natives had higher rates of diabetes than Whites. In the presence of psychiatric disorders, only Blacks and Latinos had higher rates of diabetes than did Whites. Though these studies provide insight on differences in the association between physical and psychiatric health between racial groups, they do not examine a broad array of physical and psychiatric health problems nor do they provide sufficient explanation of why differences in comorbidity rates across racial groups might emerge.

The most comprehensive study of PPC across racial and ethnic groups was conducted by Cabassa and colleagues (2013). Using the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), the authors examined whether Latinos and Blacks with psychiatric disorders were at an increased risk for physical comorbidity (i.e., no, one, or two or more physical conditions) more so than Whites with similar psychiatric diagnoses. The authors found that, overall, the presence of psychiatric disorders increased the odds of having physical comorbid conditions for all the racial groups. However, the odds of physical health problems were higher among African Americans with psychiatric disorders in comparison to Whites with psychiatric disorders. The current study builds on this knowledge by assessing whether ethnic groups within the broader categories of “Black,” “Latino,” and “Asian” experience differential rates of PPC, and social mediators that might account for those differences.

Social Mechanisms Linking Race, Ethnicity, and Health

In explaining the association between race and health more broadly, socioeconomic status (SES), stressors, and social support represent the most prolific bodies of research in the medical sociology literature (Brown et al. 2013; Jackson and Cummings 2011; Mouzon 2013; Thoits 2010; Williams 2012). The most robust finding is the positive association between socioeconomic status (SES) and health (Herd et al. 2007; Link and Phelan 1995; McLeod 2013), with many referring to SES as a "fundamental cause" of differences in health (Link and Phelan 1995). There are racial and ethnic differences in the distribution of socioeconomic resources including income, education, employment, and health insurance coverage. With the exception of some Asian ethnic groups (e.g., Chinese and Japanese), minorities tend to have lower educational attainment, lower occupational prestige, and are more likely to live in poverty (McLeod 2013). For example, unemployment rates are nearly twice as high for Blacks when compared to Whites (Tausig 2013). Even in comparing the earnings of those who are gainfully employed, inequalities persist: Black men earn 73 percent of the earnings of White males (Tausig 2013), and overall, Blacks have less access to jobs that are high in decision latitude and lower in job demands. Latino workers (compared to Whites) are more likely to work nonstandard work schedules and shifts, and are more likely to work contingent jobs (Tausig 2013). In addition, Latinos are the least likely to have health insurance coverage in comparison to all other racial groups in the U.S. For example, nearly one-third of Latinos were uninsured in 2000, while only 10 percent of Whites were uninsured (Mills 2001). Health insurance coverage acts as a socioeconomic barrier to receiving medical care when needed, thus placing Latinos at a severe disadvantage.

Because there are important racial and ethnic differences in SES indicators, it is not surprising that SES partially explains racial differences in health (Brown, O'Rand, and Adkins 2012; Williams 2005; Williams and Collins 1995). SES, however, does not completely account for the Black-White health gap (Brown, O'Rand and Yang 2000; Cummings and Jackson 2008; Hayward, Miles, Crimmins, and Yang 2000). Though SES will likely not fully explain racial and ethnic differences in health, it might be a partial mediator.

A large body of work indicates that health problems are often triggered by social stressors (Thoits 2010; Turner, Wheaton, and Lloyd 1995). Exposure to diverse forms of social stressors represent a major mechanism by which structurally based social disadvantage is translated into adverse health outcomes (McLeod 2013; Turner and Avison 2003). Stress exposure is associated with the development of mental health problems such as major depression (Turner, Wheaton, and Lloyd 1995), anxiety (Levine, Himle, Abelson, Matusko, Dhawan, and Taylor 2014), and substance abuse (Borrell, Jacobs, Williams, Pletcher, Houston, and Kiefe 2007). Stress is also associated with the onset of a host of chronic physical conditions including diabetes (Wellen and Hotamisligil 2005), heart disease (Stansfeld and Marmot 2002), and stroke (Everson, Lynch, Kaplan, Lakka, Sivenius and Salonen 2001). Chronic stressors linked to health across many groups include economic hardship, financial strain, and family demands, all of which tend to infiltrate and affect other domains of life (Kahn and Pearlin 2006; Lincoln 2000; Pearlin 1989; Rook 1984). Racial minorities, on average, experience higher levels of stress compared to their White American counterparts (Turner and Avison 2003). Given racial differences in stress exposure, it is plausible that racial and ethnic distinctions in comorbidity are partially attributable to stressors.

Social support refers to the perceived or real assistance provided to individuals by their primary groups, including relatives, friends, and neighbors (Thoits 1995). Social support is beneficial to both physical and mental health (Cohen 2004; Thoits 2011; Turner and Turner 2013; Uchino 2004). Recent evidence suggests that Blacks and Whites have similar levels of support, and in some cases, Blacks experience lower levels of support (Mouzon 2013, 2014), in part due to lower rates of marriage among Blacks (Kiecolt, Hughes, and Keith 2008). In addition, Almeida and colleagues (2009) found that foreign-born Mexican Americans had the highest levels of familial social support but the lowest levels of friend support when compared to Non-Latino Whites and Black Americans. In terms of friend support, Non-Latino Whites had the highest levels of support followed by Black Americans (Almeida et al. 2009). These results indicate the importance of examining different sources of support (i.e., family versus friend), rather than just overall levels of support. Despite racial differences in support, support does not explain Black-White differentials in mental health (Kiecolt, Hughes, and Keith 2008; Mouzon 2013, 2014). Here, I examine relationship status, and family and friends as sources of support. In sum, this paper addresses the following research questions: What are the patterns of PPC across racial and ethnic groups? To what extent do socioeconomic status, stress exposure, and social support explain race and ethnic differences in PPC?

DATA AND METHODS

Data are from the Collaborative Psychiatric Epidemiology Surveys (CPES) which include three nationally representative surveys: National Comorbidity Survey Replication (NCS-R), National Survey of American Life (NSAL), and National Latino and Asian American Study (NLAAS) (Heeringa et al. 2004). The data were collected between 2001 and 2003, and are distinctive because they provide the first national probability samples of several understudied minority ethnic groups in the U.S.

The NCS-R survey population consists of adults, age 18 and over residing in households in the coterminous United States, and all surveys were conducted in English. A total of 9,282 respondents were interviewed, and interviews lasted an average of two hours with a response rate of 71 percent (Pennell et al. 2004). The NCS-R included two parts (Part I and Part II). All respondents were asked Part I of the interview; however, only a subsample of 5,692 respondents completed Part II. Part II was administered to Part I respondents with a lifetime psychiatric diagnosis, and a probability subsample of other respondents. Because only respondents in Part II were asked questions about physical health conditions, the sample used for this analysis includes only respondents who completed Part II.

The NSAL focuses on the U.S. Black population, and is the first national probability study of Blacks of immediate Caribbean descent (Jackson et al. 2004). A total of 6,082 face-to-face interviews were completed and consisted of 1,621 Caribbean Blacks, 3,570 African Americans, and 891 Non-Latino Whites. All interviews were conducted in English. In the NSAL, African Americans are persons who self-identify as Black but do not report Caribbean ancestry. Caribbean Blacks are persons who self-identify as Black and answered affirmatively to any of the following inclusion criteria: 1) they were of West Indian or Caribbean descent, 2) they were born within a Caribbean area country, or 3) they had parents or grandparents who were born in a Caribbean-area country. To increase comfort-level, respondents were matched with interviewers of the same racial background. Interviews lasted an average of two hours and twenty minutes, and the overall response rate was 72 percent.

With a focus on Latino and Asian Americans, the NLAAS consists of adults 18 and over residing in households in the coterminous United States, Alaska, and Hawaii. A total of 4,649 interviews were completed, which includes Mexican, Puerto Rican, Cuban, Chinese, Filipino,

Vietnamese, Other Latino, and Other Asian respondents. Interviews were conducted in English, Spanish, Chinese, Tagalog, and Vietnamese (Alegría et al. 2004). Interviews lasted an average of two hours and thirty-five minutes, and the response rate was 73 percent (Pennell et al. 2004).

Dependent Measure

For physical health conditions, respondents were asked if they had ever been professionally diagnosed with the following nine illnesses: arthritis, asthma, cancer, chronic lung disease, diabetes, heart disease/heart trouble, high blood pressure, stroke, and ulcer. For the tenth health condition, morbid obesity (body mass index (BMI) > 40), BMI was calculated using respondents' self-reported height and weight. These health conditions were selected for several reasons. First, these conditions are chronic in nature. Second, they have relatively high prevalence in the general population and are associated with either increased mortality risk or disability. Third, they are available across all three datasets. Despite the known limitations of using self-reported health data, there is a moderately high correspondence between self-reported chronic conditions and actual medical records (Okura et al. 2004).

For psychiatric health conditions, the CPES adopted the World Mental Health Survey Initiative version of the WHO Composite International Diagnostic Interview (WMH-CIDI). This instrument assesses the most common and severe mental disorders using diagnostic criteria established by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV;* American Psychiatric Association 1994). Past-year (12-month) disorders are examined here. The disorders available across the three datasets include mood (major depressive disorder, major depressive episode, and dysthymia), anxiety (agoraphobia, panic attack, panic disorder, social phobia, generalized anxiety disorder, posttraumatic stress disorder), and substance use disorders (alcohol abuse, alcohol dependence, drug abuse, and drug dependence).

Finally, the combination of physical conditions and psychiatric disorders was used to construct the *four-category dependent variable* based on the following typologies: (1) Healthy: No Physical, No Psychiatric; (2) Physical Only: Physical, No Psychiatric; (3) Psychiatric Only: No Physical, Psychiatric; (4) PPC: Physical-Psychiatric Comorbidity.

Independent Measures

Racial and ethnic background was determined using the race/ancestry questions from the CPES. The following groups are included in the analysis: Non-Latino White (reference), African American, Caribbean Black, Spanish Caribbean, Mexican, Puerto Rican, Cuban, All Other Latino, Chinese, Filipino, Vietnamese, and All Other Asian. The individuals who reported "All Other Race" (n=284) are excluded from the analysis.

SES measures include *annual household income*, *employment status*, *educational attainment,* and *health insurance*. *Annual household income* ranges from $0 to $200,000 (top-coded), and is measured in $10,000 increments. *Employment* is measured using the following three categories: employed (reference), unemployed, and not in the labor force. *Education* includes three categories: Less than high school (reference), High school diploma/Some college, and college degree (Herd, Goesling, and House 2007). A dichotomous variable was created to assess whether respondents have *any health insurance* (yes=1, no=0).

Stressors include *financial strain, food insufficiency,* and *family demands*. For *financial strain*, respondents were asked, "How difficult is it for you/your family to meet the monthly payments on your (family's) bills?" The measure includes the following four categories: not at all difficult (1), not very difficult (2), somewhat difficult (3), and extremely/very difficult (4). Second, two different items from the three surveys were merged to create a measure of *food insufficiency*. In the NSAL, respondents were asked: "In the past 12 months, in your household

was there enough to eat, sometimes not enough to eat, or often not enough to eat?" The response categories included "enough to eat," "sometimes not enough to eat," and "often not enough to eat." This specific question was not available in the NCS-R and NLAAS. Instead, NCS-R and NLAAS respondents were asked, "In the past year, how many times did you have to cut/skip meals because there was not enough money to buy food." Response categories ranged from 0 to 12. The two measures were merged together to create a dichotomous variable *food insufficiency,* where 0 = enough to eat/0 times skip meals, and 1 = sometimes/often not enough to eat/1 or more times had to cut skip/meals. For frequency of *family demands*, respondents are asked, "Other than your spouse/partner, how often do your family members make too many demands on you?" The response categories include: (1) Never, (2) Rarely/Not too often, (3) Fairly often/some, and (4) Very often/often.

Though several measures of social support are included in the CPES, three measures are available across the three datasets: *relationship status*, *contact with family and relatives*, and *contact with friends*. Three categories comprise *relationship status*: married/cohabitating (reference), divorced/separated/widowed, and never married. For *frequency of contact*, respondents are asked: "How often do you see, write, or talk on the phone with family or relatives/friends who do not live with you?" Respondents were asked about family/relatives separately from friends. Given some discrepancy in response categories across the three datasets, the variables were recoded to include the following categories: (1) Less than once a month, (2) At least once a month, (3) A few times a month, (4) Once to a few times a week, and (5) Most nearly every day.

All regression models control for age using a four-category variable: 18-34 (Reference), 35-49, 50-64, and 65 years and older. Because there are substantial differences in nativity status

across ethnic groups, I also control for *nativity*, which distinguishes between individuals born in the U.S. and those born abroad (foreign-born=1). Because physical and psychiatric health differ by gender (Bird and Rieker 2008; Rosenfield and Mouzon 2013), women and men are analyzed separately.

Analytic Strategy

First, weighted descriptive statistics for the four-category health variable and the most common PPC dyads across ethnic groups are presented (the distribution of the social mechanisms across ethnic groups are available in Appendices A and B). Second, multinomial logistic regression models were run and relative risk ratios (RRR) are presented to assess racial and ethnic differences in comorbidity before and after taking into account the social mechanisms. The base outcome category for the multinomial logistic regression models is PPC. The first model includes the ethnic categories, nativity, and age as covariates. The second model includes the social mechanisms so that I can examine changes in the ethnicity RRR's once social mechanisms are introduced into the models. Due to the complex sampling strategy employed to collect the CPES data, survey procedures are used to correct for unequal probabilities of selection, non-response, and design effects in the sample. All analyses were conducted with STATA 13 (StataCorp 2013).

RESULTS

Descriptive Results

Table 1 provides the weighted descriptive statistics for the analytic sample by gender. For women (Panel 1, Table 1), the following groups have significantly higher prevalence of "Healthy" in comparison to Whites: Mexican, Other Latina, and all Asian ethnic women. For

"Physical Only" African Americans have significantly higher prevalence (44 percent) in comparison to Whites (38 percent). However, Mexican (29 percent), Chinese (30 percent), and Other Asian (28 percent) women are significantly less likely to have "Physical Only" health problems compared to their White female counterparts. "Psychiatric Only" is highest among Whites (13 percent), with several ethnic groups having significantly lower prevalence including all three Black ethnic groups, Cuban, Filipino, and Chinese women. With regard to "PPC", the highest prevalence is among Spanish Caribbean Blacks (20 percent), Puerto Ricans (20 percent), and Whites (18 percent), who are not significantly different from each other. However, seven ethnic groups have significantly lower prevalence of "PPC" compared to White women: Caribbean Black, Mexican, Other Latina, and all four Asian ethnic groups.

For descriptive purposes, the three most common PPC dyads are reported in Table 1. The most common dyads across all groups are high blood pressure/anxiety and arthritis/anxiety. Some dyads are specific to a certain ethnic group: ulcer/anxiety for White women, obesity/anxiety for Caribbean Black women, diabetes/anxiety for Mexican women, heart problems/anxiety for Vietnamese women, and cancer/anxiety for Other Asian women. However, anxiety appears to be a common type of psychiatric disorder for all women who also have a physical health condition.

[Table 1 about here]

Among men (Panel 2, Table 1), six ethnic groups are significantly more likely to be "Healthy" than Whites: African American, Mexican, Other Latino, Chinese, Vietnamese, and Other Asian men. For "Physical Only," several ethnic groups have significantly lower prevalence compared to White men: Caribbean Black, Mexican, Puerto Rican, Other Latino, Vietnamese, and Other Asian men. While 44 percent of White men are in the "Physical Only" health

category, 49 percent of Cuban men are; however, the prevalence for Cuban men is not significantly different from White men. For "Psychiatric Only," African American, Filipino, and Vietnamese men experience significantly lower prevalence relative to White men. Though not significantly different from each other, Spanish Caribbean Black (19 percent), Mexican (11 percent), and White (9 percent) men experience the highest prevalence of "Psychiatric Only." For PPC, Puerto Ricans (20 percent) have significantly higher prevalence in comparison to Whites (12 percent). Nonetheless, African American, Spanish Caribbean Black, Mexican, Cuban, Puerto Rican, Chinese, and Other Asian men have significantly lower prevalence of PPC compared to their White male counterparts.

For men with PPC, the most common dyads across many of the groups are high blood pressure/anxiety for eleven ethnic groups and arthritis/anxiety for six ethnic groups. There are three dyads specific to certain ethnic groups: heart problems/mood is only a common dyad for Caribbean Black men; diabetes/anxiety is only common for Other Latino men; and stroke/mood is only a common dyad for Chinese men.

Regression Results

Women. Table 2 includes RRR's from Model 1 of the multinomial logit model, which controls for age and nativity status. Mexican, Other Latina, and all four Asian ethnic women are more likely than Whites to be "Healthy" compared to "PPC". For example, Filipino women are 5.8 times more likely to experience a "Healthy" status relative to White women ($p<.001$). Compared to White women, several minority groups are more likely to have "Physical Only" health problem(s): African Americans, Caribbean Blacks, Other Latinas, Filipinos, Vietnamese, and Other Asians. In the comparison between "Psychiatric Only" and "PPC," Filipino women have a significantly higher risk of "Psychiatric Only" relative to White women (RRR=2.264,

p<.10). However, all three Black ethnic groups, Cubans, and Puerto Ricans have a significantly lower risk of "Psychiatric Only" versus "PPC" relative to White women.

[Table 2 about here]

Table 3 shows the RRR from Model 2, which adds social mechanisms to the model to assess whether these factors explain ethnic differences that were shown in the first model for women. On the one hand, after including social mechanisms, African American women are significantly more likely to be "Healthy" compared to "PPC" relative to White women (RRR=1.472, p<.01). On the other hand, Chinese women are no longer statistically different from White women after including social mechanisms (RRR=1.636, n.s.). The higher likelihood of being "Healthy" (compared to White women) remains statistically significant for Mexican, Other Latina, Filipino, Vietnamese, and Other Asian women.

[Table 3 about here]

In the comparison between "Physical Only" and "PPC," African American women have nearly twice the risk of "Physical Only" compared to White women (RRR=1.906, p<.001), after controlling for the mediators. In addition, Caribbean Black, Mexican, Other Latina, Filipino, Vietnamese, and Other Asian women have higher risk of "Physical Only." For the "Psychiatric Only" versus "PPC" comparison, four ethnic groups have lower risk of "Psychiatric Only": all three Black ethnic groups and Cuban women. Filipino women, however, have a relative risk of 2.333 (p<.10) of "Psychiatric Only" compared to "PPC" relative to White women.

In sum, the major findings for women suggest, first, that several minority groups (Filipino, Vietnamese, and Other Asians in particular) are at a lower risk of PPC relative to White women. Second, Black (all three Black ethnic groups) and Cuban women are more likely to have PPC than "Psychiatric Only" conditions. Thus, in the face of a psychiatric health

problem, it is more likely for Black and Cuban women that a mental health problem will co-occur with a physical health condition. This holds even after taking into account social mechanisms. Third, while social mechanisms are independently associated with PPC, they do not explain much of the ethnic variation in PPC among women.

Men. Table 4 includes RRR's from Model 1 of the multinomial logit model. Three groups are significantly different from White men for the "Healthy" versus "PPC" comparison. While African American and Mexican men are more likely to be "Healthy," Puerto Rican men are half as likely to be "Healthy" compared to White men (RRR=.478, $p<.05$). Relative to White men, African American, Spanish Caribbean Black, and Cuban men have a 1.5 to 3 times higher risk of "Physical Only" compared to "PPC." However, Puerto Rican men have a lower risk of "Physical Only" compared to "PPC" (RRR=.534, $p<.05$). When comparing "Psychiatric Only" to "PPC", Spanish Caribbean Blacks and Mexican men have a higher risk of "Psychiatric Only" relative to White men. However, Puerto Rican men have a lower risk of "Psychiatric Only" versus "PPC" (RRR=.403, $p<.05$).

[Table 4 about here]

Table 5 includes RRR's from Model 2 for men, which includes the mediators. In the "Healthy" versus "PPC" comparison, the African American and Spanish Caribbean Black "Healthy" advantage remains, while the Puerto Rican-White difference falls to non-significance. Other Asian men had a higher likelihood of "Healthy" compared to "PPC" (RRR=2.739, $p<.10$).

[Table 5 about here]

In the comparison between "Physical Only" and "PPC," African American and Cuban men continue to have a greater risk of "Physical Only" compared to White men. After taking into account the social mechanisms, Mexican and Chinese men have higher risk of "Physical Only"

compared to "PPC" relative to White men. For the "Psychiatric Only" versus "PPC" comparison, Mexican men continue to have higher risk of "Psychiatric Only" compared to White men (RRR=2.234, $p<.05$). In addition, Puerto Rican men have lower risk of "Psychiatric Only" compared to White men (RRR=.524, $p<.10$).[3]

In sum, across all three of the health status comparisons, Puerto Rican men are at a heightened risk of PPC. However, the social mechanisms partially explain the Puerto Rican-White male health difference. Supplemental analysis (available upon request) show that differences in SES and stress exposure between Puerto Ricans and Whites account for the difference more than social support differences between the two groups.

The drastic difference in results for Puerto Rican and Mexican men demonstrates the importance of examining ethnic differences within the broader panethnic category of "Latino." Using predicted probabilities based on Models 1 and 2 for men (from Tables 4 and 5), Figure 1 illustrates differences in PPC for White, Mexican, and Puerto Rican men. Predicted probabilities are for men with mean values for all the independent variables included in the models. Puerto Rican men and Mexican men experience significantly different predicted probabilities of PPC relative to White men, but in the opposite direction. On the one hand, Mexican men have a significantly lower probability of PPC compared to White men. On the other hand, Puerto Rican men have significantly higher predicted probability of PPC relative to Whites. Even after the inclusion of social factors in Model 2, Figure 1 demonstrates that the predicted probability of PPC decreases from .22 to .17 for Puerto Ricans, but is still higher than Whites (.12 in Model 2) and Mexican men (.06 in Model 2).

DISCUSSION AND CONCLUSIONS

Using the Collaborative Psychiatric Epidemiology Surveys (CPES), the current study explored racial and ethnic differences in physical-psychiatric comorbidity (PPC) among adults in

the U.S., and the extent to which socioeconomic status, stress exposure, and social support mediate these differences. First, Puerto Rican men experienced heightened risk of PPC, which is partly attributable to differences in the social mechanisms examined here. As such, the "Hispanic epidemiological paradox" does not hold for Puerto Ricans. Prior research shows that Puerto Ricans have similar disadvantaged health profiles to those of African Americans, and are more likely to be socioeconomically disadvantaged in comparison to other Latino ethnic groups (Cho et al. 2004; Waters and Eschbach 1995). In the sample used in this study, Puerto Rican men had significantly lower incomes, were less likely to be employed, and were more likely to have less than a high school education compared to their White male counterparts (see Appendix B). For example, while 15 percent of White men had less than a high school education, the percentage for Puerto Rican men was a little over one-third (34 percent). Also, Puerto Rican men experienced significantly higher levels of financial strain and food insufficiency in comparison to White men.

The social factors examined here, however, did not fully account for the health deficit experienced by Puerto Rican men in comparison to White men. Perhaps there are aspects of the Puerto Rican male experience that were not taken into account in this study that might explain this disparity. Puerto Ricans are in a particularly unique position relative to other Latino immigrant groups because of their status as U.S. citizens (Lara et al. 2005). When migrating to the U.S., they might have high expectations with regard to their socioeconomic mobility. When these expectations are unmet, these disappointments could begin to take a psychological toll that is much harsher compared to other non-citizen immigrant groups with a different set of expectations (Alegría et al. 2007). Other research also finds that Puerto Ricans are more likely to be darker skinned and to identify as "Black" than their Latino counterparts (Frank, Redstone and

Lu 2010; Landale and Oropesa 2002). Thus, these aspects of their experience in mainland U.S. might have grave implications for their psychological and physical well-being. Future studies should assess the extent to which these additional factors affect the health of Puerto Rican men in particular.

Second, among women, all three Black ethnic groups and Cubans were more likely to experience "PPC" than "Psychiatric only" conditions. The finding for African Americans is aligned with Cabassa and colleagues (2013). However, the current study shows that this finding also expands to other Black ethnic groups and Cubans, and is specific to women. More research is needed to determine what factors impact why these groups of women, on average, experience elevated risks of PPC relative to their White female counterparts. This finding also speaks to the importance of taking into account differences in health across multiple status characteristics including gender, race, and ethnicity. The intersections of these multiple identities result in different health outcomes, thus prompting a need for additional research focused on how these women might be exposed to certain social stressors or other disadvantages that were not taken into account in the current analysis.

Third, evidence of the "Hispanic epidemiological paradox" is reflected in the findings for Mexican women and men: despite being socioeconomically disadvantaged, Mexican Americans experience significantly lower risk of PPC in comparison to Whites (Markides and Coreil 1986). The distinction in the health profiles of Puerto Ricans and Mexican is further evidence that research on race and health should carefully distinguish between ethnic subgroups within larger racial categories.

Fourth, Asian American women and men, in general, have lower prevalence of PPC relative to White Americans. This is not surprising for Chinese Americans, who experience

higher levels of SES and lower levels of stress exposure relative to their White counterparts, on average. However, for Vietnamese Americans who are, on average, lower SES compared to White Americans, the findings are somewhat surprising. One explanation for the Asian American health advantage is that the majority of the Asian American population is foreign-born (75 percent) and prior epidemiological work indicates a "healthy immigrant effect" such that the foreign-born are in better physical and mental health relative to their U.S.-born counterparts. The current study lacked sufficient sample size to disaggregate the Asian American sample by nativity status and ethnicity. However, supplemental analysis (data not shown) shows that U.S.-born Asian Americans, on average, experience lower levels of PPC compared to U.S.-born Whites as well. Therefore, even U.S.-born Asian Americans appear to experience a health advantage over Whites. Future work is needed to ascertain the extent to which generational status within the U.S.-born Asian American population might be associated with varying risks for PPC.

Despite the strengths of this study, there are several limitations. The PPC measure does not take into account illness severity. Also, there are several reporting issues that might be relevant for the self-reported physical health measures. First, the uninsured are less likely to report physical health problems due to lack of access to health care (Institute of Medicine 2001). There are also important racial and ethnic differences in access to care (Institute of Medicine 2001, 2002). Accordingly, there may be some underreporting of physical health conditions due to lower prevalence of health care utilization among racial and ethnic minorities and individuals of lower SES due to limited access to care. To test whether insurance status affected the results, supplemental analysis were run for respondents with health insurance (81 percent of the analytic sample). The results did not change substantially.

Another limitation is that understandings of physical and mental health conditions vary across racial and ethnic groups (Kleinman 1988). Interpretations of pain and illness differ particularly across cultures and between U.S.-born and foreign-born groups. Furthermore, even when an individual is informed about his/her health condition(s) by a health professional, the individual may not be willing to disclose the illness to a survey interviewer.

The way in which PPC was measured is also not without its own limitations. The information used to ascertain physical health conditions asks respondents if they had ever been diagnosed with a physical illness; however, the psychiatric conditions are reported from the past year. Therefore, it cannot be clearly determined whether the illnesses co-occurred within the same period of time. Also, importantly, the causal sequence of co-occurrence could not be assessed with the current data. Future work should operationalize PPC differently to determine whether various measures of comorbid health yield similar results. Here, I use self-reports of diagnosable health conditions; however, the measures presented here did not capture subjective states of well-being such as life satisfaction, happiness, and other quality of life measures. Nonetheless, the CPES is one of the only datasets with nationally representative samples of diverse racial groups in the U.S. that include both measures of physical and mental health (Freeman et al. 2010).

Despite the limitations, assessing PPC better captures two domains of health that are often studied separately. There are also practical implications for better understanding both PPC patterns among diverse populations and expanding on the explanations for the observed differences. Given the high prevalence of PPC, appropriately integrating the mental health and physical health care delivery systems is important to address in the U.S. health care system. The division between mental and physical health care makes it difficult for individuals to receive

medical attention for both their psychological and physical health care needs; as such, these two domains of health care cannot effectively operate for the patient's well-being independently of one another (Druss and Walker 2011). Thus, the current paper takes on the task of providing initial estimates of broader patterns of PPC and identified the most common co-occurring physical-psychiatric health conditions, thus providing information that can be useful in clinical and intervention settings.

NOTES

1. When considering co-occurring physical and mental health problems, causal ordering is often a key concern (Aneshensel, Frerichs, and Huba 1984; Cohen and Rodriguez 1995; Hollingshaus and Utz 2013). Given the challenges in establishing the age of onset of physical and psychiatric health conditions, it is not possible to completely disentangle the timing of each disease. The data used for this study include information about the age of onset for psychiatric disorders, but not for physical health conditions. Thus, here I examine physical-psychiatric comorbidity (PPC) regardless of the chronological order or causal pathways linking physical and psychiatric health conditions.
2. I define race as a socially constructed set of categories that historically tend to be based on physical features such as phenotype, hair texture, and facial features (Cornell and Hartman 1998). The U.S. government's Office of Management and Budget (OMB) classifies five racial categories in the United States: White, Black/African American, American Indian/Alaska Native, Asian, and Native Hawaiian/Other Pacific Islander (Office of Management and Budget 1997). The OMB also includes either a Hispanic or non-Hispanic ethnic category classification for each racial group. This distinction between race and ethnicity, however, is somewhat arbitrary, particularly because a large proportion of Hispanics would prefer that Hispanic be treated as a "racial" category (Tucker et al. 1996; Williams 2012). For this study, "Hispanic" or "Latino" is considered a broad racial category. Ethnicity, on the other hand, is defined as group membership adopted by individuals on the basis of similarities in culture or nationality (Jenkins 1994). With regard to health and epidemiological research, ethnic categories typically refer to subgroups within racialized groups (Brown et al. 2013; Williams 2012). For the sake of

conceptual and methodological clarity, I align with this perspective and use ethnicity to refer to smaller subgroups within broad racialized groups who typically share a common national origin.

3. Ethnic differences in the prevalence of each specific physical and psychiatric condition are available upon request. Sensitivity analysis was run to assess whether specific conditions were driving the results observed here. Overall, the results do not change substantially when arthritis, high blood pressure, and anxiety disorder (the psychiatric disorder type and physical conditions with the highest prevalence in the data) are eliminated from the regression models.

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Table 1: Physical-Psychiatric Comorbidity (PPC) for Women and Men by Ethnicity[a]

		Four-Category Variable				Three Most Common PPC Dyads[b]			
	N	Healthy	Physical Only	Psychiatric Only	PPC	N[c]			
Panel 1: Women (n=7511)									
Non-Latino White	1712	.31	.38	.13	.18	408	Art/Anx	HBP/Anx	Ulc/Anx
Black									
African American	2421	.32	.44*	.07*	.16	419	HBP/Anx	Art/Anx	HBP/Mood
Caribbean Black	823	.40	.41	.07*	.12*	88	HBP/Anx	Ast/Anx	Obese/Anx
Spanish Caribbean Black	88	.39	.37	.04*	.20	22	Ast/Anx	HBP/Anx	Art/Anx
Latina									
Mexican	583	.48*	.29*	.11	.12*	78	Art/Anx	HBP/Anx	Diab/Anx
Cuban	269	.32	.45	.06*	.17	43	HBP/Anx	Art/Anx	HBP/Mood
Puerto Rican	258	.33	.36	.11	.20	47	HBP/Anx	Ast/Anx	Art/Anx
Other Latina	426	.46*	.33	.11	.10*	51	Art/Anx	HBP/Anx	Art/Mood
Asian									
Chinese	243	.49*	.30*	.12	.08*	17	Art/Anx	HBP/Anx	Art/Mood
Filipino	225	.48*	.42	.07*	.03*	8	HBP/Anx	Art/Anx	Ast/Anx
Vietnamese	245	.53*	.38	.03*	.05*	15	Art/Mood	Art/Anx	Heart/Anx
Other Asian	218	.56*	.28*	.10	.06*	16	Can/Anx	Ast/Anx	Art/Mood
Panel 2: Men (n=5276)									
Non-Latino White	1239	.36	.44	.09	.12	216	HPB/Anx	Art/Anx	Asth/Anx
Black									
African American	1378	.43*	.42	.06*	.09*	140	HBP/Anx	HBP/Mood	Ulc/Anx
Caribbean Black	544	.45	.34*	.06	.15	23	HBP/Anx	Heart/Anx	Heart/Mood
Spanish Caribbean Black	77	.37	.40	.19	.05*	7	HBP/Anx	Ast/Anx	HPB/Mood
Latino									
Mexican	488	.58*	.25*	.11	.06*	42	HBP/Anx	Ast/Anx	HPB/Mood
Cuban	250	.38	.49	.08	.06*	17	Heart/Anx	HBP/Anx	HBP/Mood
Puerto Rican	191	.40	.33*	.07	.20*	34	HBP/Anx	Art/Anx	Ast/Anx
Other Latino	275	.60*	.22*	.09	.10	26	Art/Anx	HBP/Anx	Diab/Anx
Asian									
Chinese	201	.51*	.38	.06	.05*	11	Art/Anx	Stro/Mood	Ulc/Anx
Filipino	196	.43	.44	.05*	.09	18	HBP/Anx	Ast/Anx	Art/Anx
Vietnamese	217	.59*	.30*	.03*	.08	13	Art/Anx	HBP/Anx	Art/Mood
Other Asian	220	.64*	.22*	.09	.05*	10	HBP/Anx	HBP/Mood	Art/Mood

Source: Collaborative Psychiatric Epidemiology Surveys, 2001-2003

* Significantly different from Non-Latino Whites. Adjusted Wald tests were used to calculate mean significant differences ($p<.05$).

a The following physical and 12-month psychiatric conditions were used to calculate PPC measures: arthritis, stroke, heart disease/trouble, asthma, chronic lung disease, high blood pressure, diabetes, ulcer, cancer, and morbid obesity (BMI ≥ 40); major depression/major depressive episode, dysthymia, agoraphobia, panic attack/disorder, social phobia, generalized anxiety disorder, post-traumatic stress disorder, alcohol/drug abuse and dependence. The distribution of the four-category variable included in this table is weighted.

b Guide: Anx=Anxiety Disorder; Art = Arthritis; Ast = Asthma; Can=Cancer; Diab = Diabetes; HBP= High Blood Pressure; Heart = Heart Disease; Mood= Mood Disorder; Obese = Morbid Obesity; Ulc=Ulcer

c This sample size represents the unweighted number of respondents with both a physical and psychiatric disorder by ethnicity.

Table 2: Relative Risk Ratios from Multinomial Logit Model 1, Women (n=7511)

	"Healthy" vs. "PPC"	"Physical Only" vs. "PPC"	"Psychiatric Only" vs. "PPC"
Ethnic Group			
African American	1.017	1.575***	.470***
	(.131)	(.150)	(.058)
Caribbean Black	1.178	1.523+	.497***
	(.292)	(.337)	(.104)
Spanish Caribbean Black	.676	1.002	.160***
	(.242)	(.342)	(.080)
Mexican	1.530+	1.265	.784
	(.340)	(.293)	(.188)
Cuban	.680	.834	.444*
	(.172)	(.192)	(.139)
Puerto Rican	.693	.921	.509+
	(.188)	(.233)	(.183)
Other Latina	1.687*	1.557+	.957
	(.386)	(.362)	(.268)
Chinese	2.035*	1.365	1.383
	(.692)	(.483)	(.630)
Filipino	5.805***	5.823***	2.264+
	(2.327)	(2.238)	(1.103)
Vietnamese	3.144**	2.439*	.488
	(1.166)	(.940)	(.261)
Other Asian	2.827***	1.993*	1.127
	(.850)	(.623)	(.405)

Source: Collaborative Psychiatric Epidemiology Surveys (CPES), 2001-2003
Relative risk ratios are reported; Standard errors in parentheses, $^{+}$ p<.10, * $p < .05$, ** $p < .01$, *** $p < .001$
The reference category is "Non-Latino White."
Though not shown, the results include controls for age and nativity status.

Table 3: Relative Risk Ratios from Multinomial Logit Model 2, Women (n=7511)

	"Healthy" vs. "PPC"	"Physical Only" vs. "PPC"	"Psychiatric Only" vs. "PPC"
Ethnic Group			
African American	1.472**	1.906***	.528***
	(.206)	(.211)	(.069)
Caribbean Black	1.397	1.758*	.489***
	(.340)	(.400)	(.101)
Spanish Caribbean Black	.960	1.263	.198**
	(.354)	(.492)	(.108)
Mexican	2.876***	1.604+	.927
	(.710)	(.388)	(.234)
Cuban	.898	1.042	.502*
	(.267)	(.258)	(.164)
Puerto Rican	1.134	1.222	.636
	(.335)	(.305)	(.237)
Other Latina	3.017***	2.235***	1.177
	(.717)	(.520)	(.351)
Chinese	1.636	1.187	1.279
	(.624)	(.451)	(.596)
Filipino	6.008***	6.416***	2.333+
	(2.466)	(2.441)	(1.112)
Vietnamese	3.666**	2.544*	.521
	(1.541)	(1.037)	(.282)
Other Asian	2.379*	1.953*	1.151
	(.815)	(.626)	(.415)
SES			
Income (in $10,000)	1.036	1.017	1.035
	(.022)	(.021)	(.022)
Employment Status			
Unemployed	.998	1.262	1.167
	(.220)	(.297)	(.274)
Not in Labor Force	.737*	.845	.708*
	(.101)	(.115)	(.103)
Education			
High School/Some College	1.734**	1.163	1.337
	(.328)	(.160)	(.238)
College Graduate	2.435***	1.109	1.559
	(.500)	(.237)	(.440)
Health Insurance	.968	.855	.550***
	(.156)	(.125)	(.093)
Stress			
Financial Strain	.656***	.729***	.892+
	(.043)	(.047)	(.057)
Food Insufficiency	.609*	.589***	.917
	(.118)	(.092)	(.136)
Family Demands	.677***	.757***	.852**
	(.034)	(.046)	(.051)
Social Support			
Relationship Status			
Never Married	.826	.707*	1.204
	(.123)	(.102)	(.204)
Div./Sep./Widowed	.417***	.507***	.890
	(.067)	(.075)	(.190)
Contact with Family	.992	1.031	.953
	(.041)	(.045)	(.044)
Contact with Friends	1.038	.998	.994
	(.053)	(.054)	(.047)

Source: Collaborative Psychiatric Epidemiology Surveys, 2001-2003

Relative risk ratios are reported; Standard errors in parentheses, + p<.10 * $p < .05$, ** $p < .01$, *** $p < .001$

The reference categories are "Non-Latino White", "Employed," "Less than high school," and "Married/Cohabiting," for Ethnic group membership, employment status, education, and relationship status, respectively. Though not shown, the results include controls for age and nativity status.

Table 4: Relative Risk Ratios from Multinomial Logit Model 1, Men (n=5276)

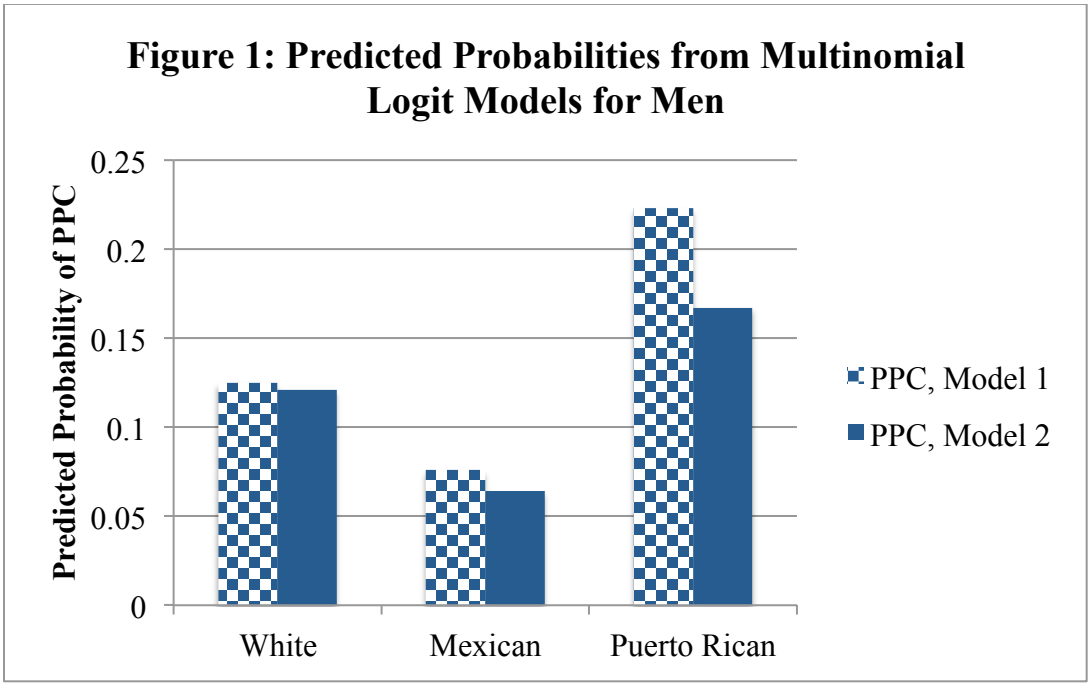
	"Healthy" vs. "PPC"	"Physical Only" vs. "PPC"	"Psychiatric Only" vs. "PPC"
Ethnic Group			
African American	1.550**	1.559**	.862
	(.251)	(.256)	(.187)
Caribbean Black	.634	.776	.546
	(.326)	(.417)	(.326)
Spanish Caribbean Black	1.692	3.147+	3.592+
	(.884)	(1.939)	(2.734)
Mexican	1.961*	1.494	1.849+
	(.562)	(.488)	(.597)
Cuban	1.397	2.147+	2.088
	(.639)	(.983)	(.999)
Puerto Rican	.478*	.534*	.403*
	(.151)	(.160)	(.146)
Other Latino	1.390	.852	1.088
	(.556)	(.345)	(.442)
Chinese	2.146	2.550	1.853
	(1.138)	(1.483)	(1.121)
Filipino	1.081	1.656	.691
	(.475)	(.735)	(.352)
Vietnamese	1.408	1.177	.568
	(.847)	(.778)	(.451)
Other Asian	2.402	1.375	2.103
	(1.371)	(.844)	(1.276)

Source: Collaborative Psychiatric Epidemiology Surveys (CPES), 2001-2003
Relative risk ratios are reported; Standard errors in parentheses, + p<.10 * $p < .05$, ** $p < .01$, *** $p < .001$
The reference category is "Non-Latino White."
Though not shown, the results include controls for age and nativity status.

Table 5: Relative Risk Ratios from Multinomial Logit Model 2, Men (n=5276)

	"Healthy" vs. "PPC"	"Physical Only" vs. "PPC"	"Psychiatric Only" vs. "PPC"
Ethnic Group			
African American	1.734**	1.778***	.943
	(.301)	(.293)	(.211)
Caribbean Black	.689	.850	.545
	(.275)	(.400)	(.289)
Spanish Caribbean Black	1.536	3.042	3.332
	(.903)	(2.085)	(2.775)
Mexican	2.289**	1.703+	2.235*
	(.645)	(.540)	(.699)
Cuban	1.468	2.350+	2.045
	(.603)	(1.046)	(.997)
Puerto Rican	.691	.703	.524+
	(.223)	(.208)	(.197)
Other Latino	1.725	.995	1.165
	(.676)	(.433)	(.503)
Chinese	2.197	2.651+	1.805
	(1.087)	(1.491)	(1.073)
Filipino	1.281	1.787	.674
	(.546)	(.786)	(.348)
Vietnamese	1.639	1.394	.570
	(.892)	(.849)	(.461)
Other Asian	2.739+	1.594	2.114
	(1.544)	(.969)	(1.318)
SES			
Income (in $10,000)	1.057*	1.061***	1.053*
	(.023)	(.019)	(.022)
Employment Status			
Unemployed	.950	1.006	1.721
	(.316)	(.333)	(.654)
Not in Labor Force	.267***	.480***	.689
	(.077)	(.100)	(.176)
Education			
High School/Some College	1.364	1.159	1.341
	(.275)	(.248)	(.378)
College Graduate	1.213	.788	1.650
	(.325)	(.178)	(.526)
Health Insurance	.559*	.920	.520*
	(.141)	(.226)	(.139)
Stress			
Financial Strain	.808+	.826+	1.082
	(.090)	(.090)	(.154)
Food Insufficiency	.502*	.647**	.545+
	(.143)	(.107)	(.170)
Family Demands	.640***	.748**	.752*
	(.055)	(.070)	(.089)
Social Support			
Relationship Status			
Never Married	.570*	.366***	.938
	(.136)	(.093)	(.297)
Div./Sep./Widowed	.678	.630*	1.181
	(.178)	(.145)	(.329)
Contact with Family	1.167**	1.150+	1.089
	(.069)	(.093)	(.095)
Contact with Friends	1.081	1.111+	1.134
	(.069)	(.068)	(.099)

Source: Collaborative Psychiatric Epidemiology Surveys, 2001-2003
Relative risk ratios are reported; Standard errors in parentheses, + p<.10 * $p < .05$, ** $p < .01$, *** $p < .001$
The reference categories are "Non-Latino White", "Employed," "Less than high school," and "Married/Cohabiting," for Ethnic group membership, employment status, education, and relationship status, respectively. Though not shown, the results include controls for age and nativity status.



Source: Collaborative Psychiatric Epidemiology Surveys (CPES), 2001-2003
Note: Predicted probabilities are drawn from Table 4, Model 1 and Table 5, Model 2 multinomial logistic regressions for men and accounted for complex survey design. Predicted probabilities are for men with mean values for all the independent variables included in the models.

Appendix A: Weighted Descriptives of Social Mechanisms and Controls by ethnicity, Women

	White	Black			Latino				Asian			
	Non-Hispanic White	African American	Caribbean Black	Spanish Caribbean Black	Mexican	Cuban	Puerto Rican	Other Latino	Chinese	Filipino	Vietnamese	All Other Asian
SES												
Income (in $10,000)	5.19(.21)	3.21*(.10)	4.34(.46)	3.18*(.21)	3.25*(.25)	4.56(.56)	4.55(.31)	4.34*(.24)	6.20(.56)	7.40*(.56)	4.56(.36)	7.05*(.56)
Employment Status												
Employed	.60	.62	.72*	.61	.48*	.53*	.53	.57	.56	.60	.50*	.54
Unemployed	.07	.11*	.10	.16	.11*	.03*	.06	.09	.09	.05	.10	.09
Not in Labor Force	.33	.27*	.18*	.23	.42*	.44*	.41	.34	.35	.35	.40	.37
Education												
Less than High School	.13	.25*	.18	.22	.53*	.30*	.38*	.35*	.21	.14	.39*	.08
High School/Some College	.63	.62	.62	.68	.42*	.46*	.52*	.53*	.44*	.51*	.46*	.46*
College Graduate	.24	.13*	.20*	.10*	.06*	.23	.10*	.13*	.34*	.34	.16*	.46*
Health Insurance (=1)	.91	.82*	.79*	.90	.62*	.77*	.87	.78*	.86	.90	.83*	.93
Stressors												
Financial Strain	2.13(.03)	2.17(.03)	2.15(.07)	2.15(.13)	2.47*(.04)	2.58*(.08)	2.52*(.06)	2.56*(.05)	1.85*(.06)	2.10(.08)	2.29*(.07)	2.09(.10)
Food Insufficiency	.13	.12	.12	.09	.18*	.15	.17	.17	.08*	.10	.23*	.07*
Family Demands	1.98(.02)	2.13*(.04)	2.06(.06)	2.33*(.14)	2.08(.06)	1.93(.07)	2.14(.09)	2.13*(.07)	1.88(.08)	2.48*(.06)	1.69*(.10)	2.12*(.07)
Social Support												
Relationship Status												
Married/Cohabiting	.57	.34*	.41*	.33*	.62	.61	.52	.53	.64*	.66*	.76*	.71*
Never Married	.17	.34*	.32*	.43*	.20	.108	.25*	.22	.19	.19	.16	.22
Div./Sep./Widowed	.26	.32*	.28	.23	.18*	.29	.23	.25	.17*	.15*	.08*	.07*
Contact with Family	3.54(.04)	4.20*(.03)	3.98*(.11)	3.95(.28)	3.45(.06)	3.77*(.08)	3.63(.07)	3.41(.09)	3.02*(.13)	3.53(.10)	2.83*(.12)	3.40(.12)
Contact with Friends	3.57(.04)	3.78*(.04)	3.90*(.11)	3.80(.31)	2.82*(.07)	3.18*(.07)	3.14*(.12)	3.11*(.09)	3.17*(.12)	3.28*(.11)	2.36*(.10)	3.48(.10)
Controls												
Age												
18-34	.29	.37*	.38*	.48*	.49*	.19*	.38*	.43*	.31	.34	.28	.53*
35-49	.30	.33	.33	.34	.30	.32	.35	.33	.38*	.33	.35	.25
50-64	.24	.18*	.18	.13*	.12*	.27	.17*	.14*	.19	.17*	.24	.16
65 and older	.18	.12*	.11	.05*	.08*	.23	.10*	.10*	.12	.16	.14	.06*
Nativity (foreign-born=1)	.02	.02	.65*	.63*	.48*	.88*	.42*	.62*	.84*	.74*	.96*	.75*

Source: Collaborative Psychiatric Epidemiology Surveys, 2001-2003

Standard Deviations, where appropriate, are in parentheses.

* Indicates significant differences between Non-Hispanic Whites and the other ethnic groups. Adjusted Wald tests were used to calculate mean significant differences (p<.05).

Appendix B: Weighted Descriptives of Social Mechanisms and Controls by ethnicity, Men

	White	Black			Latino				Asian			
	Non-Hispanic White	African American	Caribbean Black	Spanish Caribbean Black	Mexican	Cuban	Puerto Rican	Other Latino	Chinese	Filipino	Vietnamese	All Other Asian
SES												
Income (in $10000)	6.44(.24)	4.31*(.18)	4.97*(.18)	4.85*(.56)	4.39*(.24)	5.31(.65)	4.99*(.43)	5.10*(.40)	7.34(.46)	8.05*(.53)	5.31*(.39)	7.07(.46)
Employment Status												
Employed	.74	.71	.81*	.73	.80*	.67	.61*	.73	.75	.68	.71	.77
Unemployed	.02	.08*	.07*	.19*	.05*	.07*	.08	.09*	.05	.07*	.10*	.05
Not in Labor Force	.24	.21	.13*	.08*	.15*	.26	.31	.18	.20	.25	.19	.18
Education												
Less than High School	.15	.22*	.21	.22	.47*	.30*	.34*	.34*	.23	.10	.25*	.09*
High School/Some College	.61	.63	.57	.52	.45*	.47*	.55	.52*	.30*	.55	.48*	.40*
College Graduate	.24	.15*	.22	.26	.08*	.23	.11*	.13*	.46*	.35*	.28	.51*
Health Insurance (=1)	.88	.82*	.78*	.73	.58*	.72*	.81*	.67*	.82	.86	.77*	.81
Stressors												
Financial Strain	2.02(.03)	1.92*(.04)	2.10(.09)	1.78(.14)	2.31*(.04)	2.30*(.08)	2.23(.11)	2.29*(.08)	1.91(.09)	2.02(.07)	2.20(.12)	2.02(.07)
Food Insufficiency	.11	.08	.09	.04*	.14	.15	.19*	.16	.10	.10	.09	.05*
Family Demands	1.78(.03)	1.98*(.04)	2.27*(.14)	2.17*(.13)	1.88(.05)	1.74(.05)	2.01*(.09)	1.98*(.08)	1.86(.06)	2.27*(.09)	1.67(.06)	2.03*(.07)
Social Support												
Relationship Status												
Married/Cohabiting	.65	.51*	.59	.53	.70*	.66	.56	.61	.73*	.72	.72	.66
Never Married	.21	.30*	.31*	.35	.23	.16	.27	.28	.21	.22	.22	.30
Div./Sep./Widowed	.14	.20*	.10	.12	.06*	.19	.17	.11	.06*	.06*	.06*	.04*
Contact with Family	3.07(.05)	3.78*(.04)	3.80*(.08)	3.86*(.17)	3.11(.07)	3.71*(.09)	3.27*(.09)	3.28(.10)	2.81*(.08)	3.22(.08)	2.77*(.09)	3.09(.12)
Contact with Friends	3.27(.06)	3.64*(.04)	3.78*(.12)	4.10*(.18)	2.95*(.08)	3.35(.10)	3.16(.14)	3.29(.09)	3.00*(.08)	3.28(.09)	2.53*(.13)	3.38(.10)
Controls												
Age												
18-34	.29	.36*	.42*	.56*	.55*	.32	.41*	.47*	.32	.36	.34	.49*
35-49	.34	.34	.31	.26	.30	.22*	.30	.35	.39	.34	.37	.29
50-64	.23	.19	.18	.13	.12*	.23	.19	.13*	.20	.19	.19	.15*
65 and older	.15	.11*	.08*	.06*	.04*	.23*	.10	.05*	.09	.12	.10	.07*
Nativity (foreign-born=1)	.02	.03	.68*	.38*	.49*	.86*	.49*	.58*	.82*	.68*	.97*	.76*

Source: Collaborative Psychiatric Epidemiology Surveys, 2001-2003

Standard Deviations, where appropriate, are in parentheses.

*Indicates significant differences between Non-Hispanic Whites and the other ethnic groups. Adjusted Wald tests were used to calculate mean significant differences ($p<.05$).