

The Immigrant Paradox Among Asian American Women: Are Disparities in the Burden of Depression and Anxiety Paradoxical or Explicable?

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Objective: We evaluated potential explanations for advantaged mental health status among immigrant Asian American women compared to U.S.-born Asian American women. **Method:** In a nationally representative sample of 1,030 women (185 U.S.-born, 368 early-life immigrants [arrived before 25 years of age], 477 late-life immigrants), we examined the hypothesis that increased exposure to social risk factors mediate nativity-based differences in lifetime prevalence of depression and anxiety disorders. Indicators of social class were also examined as protective factors enjoyed by U.S.-born women that may suppress observed nativity-based disparities. We also examined whether there were group differences in reactivity to stress in predicting disorder. **Results:** U.S.-born women were twice as likely as late-life immigrants to report lifetime history of depression (*odds ratio* [*OR*] = 2.03, 95% CI [1.35, 4.54]) and anxiety (*OR* = 2.12, 95% CI [1.34, 5.19]). Nativity differences in perceived discrimination, family conflict, and cultural conflict explained disparities in rates of disorder. There was no support for the contention that immigrant women were more psychologically hardy or resilient to social stress. **Conclusion:** Findings suggest that the gap in mental health status between U.S.- and foreign-born Asian American women would indeed be magnified if differences in social status were accounted for, but also that ready explanations for the so-called immigrant paradox are found in differential levels of reported stress exposure.

Keywords: Asian American, immigrant paradox, disparities, anxiety, depression

Epidemiologic data indicate that immigrants have lower prevalence of psychiatric disorders relative to their U.S.-born counterparts (e.g., Grant et al., 2004; Vega, Alderete, Kolody, & Aguilar-Gaxiola, 1998). This occurs despite the fact that foreign nativity is generally thought to be associated with increased burdens of stress, poverty, and low social status (Burnam, Hough, Karno, Escobar, & Telles, 1987). Thus, this pattern of findings has been referred to as

the *immigrant paradox* and extends across a range of health disparities, such as reproductive health (Cervantes, Keith, & Wyshak, 1999), preventable disease (e.g., Jasso, Waitzkin, & Landwehr, 2004), and psychiatric disorders (e.g., Ortega, Rosenheck, Alegría, & Desai, 2000; Vega, Sribney, & Achara-Abrahams, 2003). These data largely focus on U.S. Latinos, with recent findings suggesting the pattern may be most apparent in specific national origin groups (i.e., Mexican Americans) and certain psychiatric disorders, such as substance abuse (Alegría et al., 2008).

More limited evidence reveals this pattern among Asian Americans, in terms of both physical (Bates, Acevedo-Garcia, Alegría, & Krieger, 2008; Popkin & Udry, 1998) and mental (Breslau & Chang, 2006) health. In a nationally representative sample of Asian Americans, Takeuchi et al. (2007) reported that U.S.-born women experienced a two-fold risk of anxiety disorder and depression compared to foreign-born women, but no nativity differences were reported among Asian American men. The current study examined possible explanations for this nativity-based disparity in anxiety and depression among Asian American women.

Two general classes of explanations have been advanced to explain nativity effects on health and mental health (Acevedo-Garcia & Bates, 2007; Escobar, Nervi, & Gara, 2000). One class

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contends that the paradox merely reflects artifacts in the data. The apparent differences may be explained by underreporting of health problems by immigrants (Franzini, Ribble, & Keddie, 2001; Palloni & Morenoff, 2001). However, any differential veracity of self-reports between U.S.-born and immigrant respondents has yet to be demonstrated, and documented disparities have emerged from objective measures of health status (e.g., body mass index, mortality).

More often, nativity-based disparities are attributed to selection, whereby only exceptionally healthy individuals undertake migration. If selection is operative, one would expect lower morbidity among immigrants compared to compatriots remaining in the country of origin. The evidence for the *healthy immigrant hypothesis* is mixed. On the one hand, Latino and Asian American immigrants have higher life expectancy compared to their U.S.-born counterparts and people in their home countries (Jasso et al., 2004). While suggestive, these comparisons cannot establish that immigrant health advantages are driven by selection (Acevedo-Garcia & Bates, 2007). Moreover, previous research has refuted assumptions of selection hypotheses, though prospective studies are lacking (Abraído-Lanza, Dohrenwend, Ng-Mak, & Turner, 1999). In fact, recent data indicate that risk of first-onset anxiety and depressive disorders is higher among representative samples of Mexican American immigrants than among non-immigrants in Mexico, highlighting possible adverse effects of migration rather than healthy selection processes (Breslau et al., 2011).

The second class of explanations interprets the data as reflecting bona fide differences in health status explained by differential risk exposure. U.S.-born ethnic minorities may face chronic stressors associated with growing up in the context of minority stress (Alegria, Pescosolido, Williams, & Canino, 2011). For example, U.S.-born African Americans, Asian Americans, and Latinos report more experiences of discrimination compared to their immigrant counterparts (Finch, Kolody, & Vega, 2000; Krieger et al., 2011; Pérez, Fortuna, & Alegria, 2008). Compared to immigrants, U.S.-born minorities may be more attuned to issues of race and class, feel more entitled to fair treatment, and thus may be more vigilant to signs of discrimination which are robustly related to both physical health problems and psychiatric disorder (Schwartz & Meyer, 2010).

In addition, U.S.-born ethnic minorities may be more likely than immigrants to experience the tensions of intrafamilial cultural conflict that can elevate psychiatric risk. Dissonant acculturation and acculturative family distancing that result in family conflict and estrangement may be more risky for U.S.-born Asian Americans where there are intergenerational differences in nativity, cultural values and experience (Hwang, Wood, & Fujimoto, 2010). Among Latinos, the relationship between length of residence in the U.S. and risk of past year psychiatric disorder is explained in part by increases in family cultural conflict (e.g., perceived family interference with personal goals, arguments prompted by value conflicts; Cook, Alegria, Lin, & Guo, 2009). Thus, nativity differences in psychiatric morbidity may be attributable to differential risk experiences concerning family cultural conflict and perceived discrimination.

A related explanation of the immigrant paradox concerns the loss of culturally-mediated protective social resources in the second generation. Compared to immigrants, U.S.-born ethnic minorities may be less likely to reap the benefits of social conditions that

stem from traditional values and family structures (Escobar, 1998). For example, immigrants are more likely to reside in enclaves conferring the benefits of a co-ethnic community and collective sense of identity (Stafford, Bécares, & Nazroo, 2010). Immigrant Asian Americans report greater extended family support and more cohesive family climates than their U.S.-born counterparts (Walton & Takeuchi, 2010). These psychological resources may shield immigrants from anxiety and depression, but may erode across generations and with increased length of residence in the United States (Alegria et al., 2008; Escobar et al., 2000).

Explanations concerning differential exposure to risk and protective factors can be tested with formal tests of mediation, yet few studies subject these explanations of nativity-based differences to empirical test. Mediation models can evaluate social stress explanations of mental health disparities, but are largely not used (Schwartz & Meyer, 2010). For example, in a review of the role of discrimination stress in mental health disparities, only five (3%) of 148 studies conducted mediation analyses (Paradies, 2006). To the extent that nativity differences in psychiatric risk can be attributed to heightened stress exposure (e.g., perceived discrimination, family/cultural conflict) and fewer traditional culture supports (e.g., low family cohesion) among U.S.-born ethnic minorities, the immigrant paradox is explicable rather than enigmatic.

It is possible, however, that there is indeed a paradox in effect, that immigrants enjoy better mental health status than would be expected on the basis on their risk profiles relative to U.S.-born minorities. Rather than showing mediation, such analyses could reveal support for suppression effects (MacKinnon, Krull, & Lockwood, 2000), such that predicted estimates of the differences in disorder risk between nativity groups would be even greater when taking into account the heightened risk profiles of immigrants. For example, U.S.-born Asian Americans have greater social mobility than their parent's immigrant generation on many indices of educational and occupational status, with gains most pronounced among women (Park & Meyers, 2010). Thus, because high social status and mobility are generally protective against mental disorder (Adler, Epel, Castellazzo, & Ickovics, 2000), higher rates of psychiatric morbidity among Asian American women in the second generation may reflect an epidemiologic paradox. As such, we undertake both mediation and suppression analyses, as appropriate, to evaluate the immigrant paradox in risk for depression and anxiety in a nationally representative sample of Asian American women.

Finally, a third explanation of the immigrant advantage in mental health requires attention. Rather than differential risk exposure, immigrant and U.S.-born Asian Americans may evince differential reactivity to environmental stressors. U.S.-born Asian Americans may be more vulnerable to the effects of stress than their immigrant counterparts, who have been described as hardy. *Hardiness* is a term used to describe individuals who perceive fewer situations as stressful and whose reactions to stressors tend to be less intense, helping them resist stress-related illnesses (Funk, 1992). Hardy individuals view stressors as changeable and as challenges that provide opportunities for growth.

Immigrant Asians have been described as hardy, exhibiting high internal locus of control, reporting mastery over previous stressors, and exhibiting lower reactivity to subsequent stressful experiences (Kuo & Tsai, 1986; Noh & Avison, 1996). Immigrant hardiness may stem from the appraisal of their stress context relative to their

country of origin experiences, where social disadvantage may have been both profound and normative (Alegría et al., 2008). These expectancies may protect immigrants from demoralization that sets the stage for depression and anxiety. For example, a strong monotonic increase in risk of depression in response to negative life events has been shown for highly acculturated Chinese Americans, but not among those less acculturated (Hwang & Myers, 2007). Thus, we examined nativity-based differences in the associations between perceived stressors (e.g., family/cultural conflict, discrimination) and risk of depressive and anxiety disorders among Asian American women.

In addition to examining nativity differences, we also incorporated age of immigration in our analyses because age of immigration profoundly shapes the context of the immigration experience, such as ease of adapting to English, exposure to diverse social networks, and occupational/educational opportunities (Leu et al., 2008). Age of immigration itself predicts differential rates of disorder, although there is not necessarily a linear relationship with disorder risk among Asian American women (Gong, Xu, Fujishiro, & Takeuchi, 2011). We contrasted U.S.-born Asian Americans with early life immigrants who migrated during childhood, adolescence, or young adulthood versus later life immigrants who arrived in middle or late adulthood. Age 25 was used to demarcate immigration during formative years prior to social and cognitive maturation, completion of education, and/or initiation of adult economic and family roles (Giedd, 2004; Gogtay et al., 2004).

The Current Study

We examined nativity-based differences in prevalence of lifetime depressive and anxiety disorders among Asian American women and examined explanations for observed differences. First, mediation analyses were employed to determine whether differential risk of disorder could be explained by greater stress exposure (i.e., discrimination, family/cultural conflict) among U.S.-born compared to early and later immigrant women. However, U.S.-born women may actually be exposed to less risk in some respects (i.e., subjective social status) compared to immigrants. Thus, our mediation models also considered potential suppression effects that could illustrate the paradoxical nature of an immigrant advantage in mental health. Second, we examined the differential reactivity hypothesis which asserts that U.S.-born Asian American women are more highly reactive to risk factors for disorder, such that there may be stronger associations between stress and disorder for this group. We conducted subgroup analyses and formal moderation analyses to examine this possibility.

Method

Data for the current study were obtained from the National Latino and Asian American Survey (NLAAS). The NLAAS used a multi-frame, stratified probability sampling scheme resulting in a nationally representative household sample of Latino and Asian Americans. For detailed documentation of sampling procedures, please see Alegría et al. (2004) and Heeringa et al. (2004). The interviews were offered in English, Mandarin, Cantonese, Tagalog, and Vietnamese. In generating point estimates and standard errors, weighting corrections were applied to control for differences in selection probability.

Among the surveyed Asian American females ($N = 1,030$), 185 (18%) were U.S.-born, and 845 (82%) were foreign-born. Consistent with previous studies using the NLAAS sample (e.g., Leu et al., 2008; Takeuchi et al., 2007), age at immigration was dichotomized at 25 years of age to examine within-group differences in foreign-born immigrants. We designated those who immigrated before 25 years of age as early immigrants ($n = 368$), and those who immigrated after 25 years of age as later life immigrants ($n = 477$). The three largest ethnic groups represented were Chinese (28.80%), Filipino (24.70%), and Vietnamese (25.00%). In terms of educational attainment, 766 (29.1%) had 11 or fewer years of education (less than high school graduate), 556 (21.1%) had 12 years of education (high school graduate), 660 (25.1%) had 13–15 years of education (some college), and 652 (24.8%) had 16 or more years of education (college graduate). In terms of annual household income, 174 (16.9%) reported less than \$15,000, 131 (12.7%) reported between \$15,000 and \$34,999, 217 (21.1%) reported between \$35,000 and \$74,999, and 345 (33.5%) reported income greater than \$75,000.

Measures

Lifetime depressive and anxiety diagnoses. The World Health Organization Composite International Diagnostic Interview (World Mental Health Survey Consortium, 2004) was used to assess lifetime prevalence of psychiatric disorders with criteria from the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994). Any depressive disorder in the present study included diagnoses of either major depressive disorder or dysthymia. Any anxiety disorder included the following diagnoses: generalized anxiety disorder, social phobia, panic disorder, agoraphobia, agoraphobia without panic disorder, and post-traumatic stress disorder.

Cultural conflict. Cultural conflict was assessed with five items asking respondents to indicate the extent to which their own personal goals and preferences conflicted with her family's goals and customs (e.g., "Because you have different customs, you have had arguments with other members of your family."). Items were rated on a 3-point Likert scale ranging from 1 (*Often*) to 3 (*Hardly ever or never*). Given our interpretation of cultural conflict as a risk factor, we reversed scored the scale such that higher scores indicating greater perceived cultural conflict. Internal consistency was satisfactory (Cronbach's $\alpha = .77-.78$) across nativity groups.

Family cohesion. Family cohesion was assessed by 10 items asking respondents to rate their agreement with statements such as, "Family members feel loyal to the family," and "Family members respect one another." Responses were on a 4-point Likert scale ranging from 1 (*Strongly Disagree*) to 4 (*Strongly Agree*), with higher scores indicating perceptions of greater family closeness, loyalty, trust, and respect. Internal consistency was satisfactory (Cronbach's $\alpha = .92-.93$) across the nativity groups.

Family conflict. Family conflict was assessed by two items on the frequency of conflict with relatives and children. Respondents were asked "Not including your (husband/wife/partner), how often do your relatives or children make too many demands on you?" and "How often do your family or relatives argue with you?" Responses were made on a 4-point Likert scale ranging from 1 (*Never*) to 4 (*Often*), with higher scores indicating more conflict.

Given only two items, internal consistency was adequate for this composite ($\alpha = .52-.64$) across the nativity groups.

Family support. Family support was assessed by three questions asking respondents to rate the frequency and extent to which they rely on family and relatives for support (e.g., “Not including your husband/wife/partner, how often do you talk on the phone or get together with family or relatives who do not live with you?”; “How much can you rely on relatives who do not live with you for help if you have a serious problem?”). Internal consistency was satisfactory (Cronbach’s $\alpha = .74-.75$) across the nativity groups. Confirmatory factor analysis supported using separate scales for family support and family conflict, as opposed to single scale to indicate family functioning.

Discrimination. Discrimination was assessed by nine items on the perceived frequency of experiences of unfair treatment, discrimination, and prejudice (e.g., “You are treated with less respect than other people,” and “People act as if you are not as good as they are”). Items were rated on a 6-point Likert scale ranging from 1 (*Never*) to 6 (*Almost every day*), with higher scores indicating greater perceived discrimination. Internal consistency was satisfactory (Cronbach’s $\alpha = .90$) across the nativity groups.

Subjective social status. The MacArthur Scale of Subjective Social Status (often referred to as the MacArthur ladder; Adler et al., 2000) is a widely used single item measure of social standing that is robustly related to health outcomes (Operario, Adler, & Williams, 2004). Two dimensions of status were assessed: perceived social position in the United States and in the community. Respondents were shown a symbolic ladder with 10 rungs and were told the following:

Think of this ladder as representing where people stand in the United States [in your community]. At the top of the ladder are the people who are the best off, those who have the most money, most education, and best jobs. At the bottom are people who are the worst off, those who have the least money, least education, and worst jobs or no job. What is the number to the right of the rung where you think you stand at this time in your life, relative to other people in the United States [your community]?

The measure is designed allow participants to mentally summate across multiple indicators of socioeconomic status (SES), weighting each component as they see fit to arrive at their perceived social standing.

Covariates. Social desirability, age, annual household income, and education level were examined as covariates. Social desirability was assessed by 10 true/false items that assess the respondent’s motivation to appear socially appropriate and desirable. Sample items include “I have always told the truth,” and “I never met a person I did not like.” Annual household income was treated as a four level categorical variable with (1) less than \$15,000, (2) \$15,000–\$35,000, (3) \$35,000–\$75,000, and (4) \$75,000+. Likewise, education level was coded as a four level categorical variable with (1) 11 years or less of education, (2) high school education, (3) college education, and (4) graduate school education. Although we have included ethnicity in our sample descriptives, we did not include it as a covariate in our multivariate analyses. Ethnicity was a sampling stratification variable, but was not a significant predictor of disorder risk

($p > .05$); its inclusion in the models did not produce a significant increase R^2 variance explained and resulted in an artificial increase in weighted standard errors.

Results

Table 1 displays nativity subgroup differences on study variables including demographic characteristics, lifetime prevalence rates for any depressive and anxiety disorders, and reported exposure to risk and protective factors among the Asian American women in our sample.

The three nativity groups differed significantly in age, with early life immigrants ($M = 35.00$ years, $SD = 0.93$) and the U.S.-born sample ($M = 38.30$ years, $SD = 2.40$) being younger than the later life immigrants ($M = 49.91$ years, $SD = 0.92$). In educational attainment, later life immigrants were significantly more likely to not have completed high school (30.65%) compared to U.S.-born women (6.85%) and early life immigrant women (7.45%). In terms of college education, U.S.-born women were more likely (37.25%) to have a college education than early (18.53%) and later life (17.65%) immigrants. With regard to income, U.S.-born women and early life immigrants were more likely than later life immigrants to report income over \$75,000 (44.53% and 40.81% vs. 35.22%, respectively). Early life immigrants were less likely to report income below \$15,000 than later life immigrants and U.S.-born women (15.39% vs. 24.93% and 22.80%, respectively).

As expected, U.S.-born women showed higher lifetime prevalence of depressive and anxiety disorders (17.89% and 12.13%, respectively) than women who immigrated before 25 years of age (10.75% and 10.46%) and those who immigrant after 25 years of age (5.53% and 7.02%). The difference between early and later life immigrants in anxiety disorder prevalence was not significant, but later life immigrants had a higher prevalence of depressive disorder than early life immigrants (10.75% and 5.53%, respectively).

Weighted logistic regression analyses controlling for age, income, education, and social desirability confirmed that U.S.-born females were more likely to have any lifetime depressive (*odds ratio* [*OR*] = 2.03, 95% CI [1.35, 4.54]) or anxiety (*OR* = 2.12, 95% CI [1.34, 5.19]) disorders compared to women who immigrated after 25 years of age. Women who immigrated before 25 years of age were not more likely to have any lifetime depressive or anxiety disorders than respondents who immigrated after 25 years of age (see Table 2, Block 1).

Differential Exposure to Risk and Protective Factors

Data handling for risk and protective factor variables depended on the observed distribution of scores in our sample. For cultural conflict and family cohesion, a large proportion of respondents reported no risk exposure (e.g., 48% reported no cultural conflict and 64.5% reported maximum value on family cohesion), thus these variables were treated as dichotomous with individuals reporting no risk contrasted against those who reported any risk in that domain. The distribution of scores on family conflict and discrimination followed a bimodal distribution, with sizable proportions reporting no risk and moderate-to-high levels of risk. As such, responses were coded into tertiles (e.g., 0 = Low family conflict, 1 = Moderate family

Table 1
Nativity Differences in Sociodemographics, Disorder Prevalence, and Risk and Protective Factors

Variable	Age \geq 25 immigrant (<i>n</i> = 477)	Age \leq 24 immigrant (<i>n</i> = 368)	U.S.-born (<i>n</i> = 185)	<i>F</i>
	<i>M</i> (<i>SE</i>) or weighted % (<i>SE</i>)			
Age	49.91 _a (0.92)	35.00 _b (0.93)	38.30 _b (2.40)	<i>F</i> (2, 45) = 66.78**
Education level				<i>F</i> (4.27, 196.51) = 11.05**
11 years or less	30.65% _a (2.45)	7.45% _b (2.14)	6.85% _b (2.81)	
High school	16.71% _a (1.96)	17.19% _a (2.35)	18.53% _a (4.27)	
College	17.65% _a (1.99)	18.53% _a (4.27)	37.25% _b (3.67)	
Post-graduate	35% _a (2.97)	42.66% _b (1.74)	37.36% _a (4.46)	
Annual household income				<i>F</i> (4.68, 210.59) = 2.62*
<\$15,000	24.93% _a (2.37)	15.39% _b (2.44)	22.80% _a (1.90)	
\$15,000–\$35,000	16.97% _a (2.09)	11.27% _b (2.68)	14.48% _{a,b} (2.84)	
\$35,000–\$75,000	22.87% _a (2.41)	32.53% _b (4.30)	18.19% _{a,c} (3.59)	
\$75,000+	35.22% _a (3.21)	40.81% _{a,c} (3.60)	44.53% _c (5.59)	
Ethnicity				<i>F</i> (4.21, 193.45) = 10.35**
Vietnamese	19.17% _a (0.03)	12.14% _b (0.02)	2.85% _c (0.01)	
Filipino	21.55% _a (0.03)	21.52% _a (0.03)	28.75% _b (0.04)	
Chinese	37.00% _a (0.04)	25.39% _b (0.03)	19.02% _c (0.03)	
Other Asian	22.28% _a (0.03)	40.96% _b (0.05)	49.38% _c (0.05)	
Disorder prevalence				
Depressive disorder	5.53% _a (1.43)	10.75% _b (1.73)	17.89% _c (3.34)	<i>F</i> (1.90, 87.46) = 8.98**
Anxiety disorder	7.02% _a (1.39)	10.46% _a (1.74)	12.13% _b (2.39)	<i>F</i> (1.99, 91.61) = 2.37*
Risk factors				
High cultural conflict	50.47% _a (2.51)	67.68% _b (3.09)	64.03% _b (3.58)	<i>F</i> (2, 45) = 14.14**
Low family cohesion	23.59% _a (2.26)	36.38% _b (2.66)	43.10% _c (3.71)	<i>F</i> (2, 45) = 17**
High family conflict	25.57% _a (2.17)	39.13% _b (3.71)	39.79% _b (3.56)	<i>F</i> (2, 45) = 6.66**
High discrimination	22.07% _a (2.29)	30.60% _a (3.41)	43.78% _b (4.05)	<i>F</i> (2, 45) = 14.79**
Protective factors [†]				
Family support	-0.39 _a (0.05)	0.03 _b (0.08)	0.36 _c (0.06)	<i>F</i> (2, 45) = 52.89**
Social position in United States	-0.09 _a (0.07)	0.05 _b (0.07)	0.20 _c (0.08)	<i>F</i> (2, 45) = 7.06**
Social position in community	-0.11 _a (0.06)	0.10 _b (0.05)	0.16 _{b,c} (0.06)	<i>F</i> (2, 45) = 4.97*

Note. Values with different subscripts are significantly different ($p < .05$) from one another.

[†] Protective factors are grand mean centered standardized values. Design-corrected *d*'s are calculated as the number of clusters (primary sampling units) minus the number of strata. Some *d*'s are non-integers because additional corrections are made, including the transformation to an *F* test.

* $p \leq .05$. ** $p \leq .01$.

conflict, 2 = High family conflict). Finally, the protective factors of family support, and subjective social status in the United States and in the community approximated a normal distribution and were treated as continuous variables.

Approach to testing mediation and suppression. To demonstrate that nativity differences in rates of disorder are due to greater risk exposure for the U.S.-born group (mediation), we conducted a series of analyses following the steps outlined by Baron and Kenny (1986) for testing mediation. The first step is to demonstrate the nativity effect on rates of disorder. In all analyses, nativity was entered using two dummy coded variables to denote late-life immigrants and U.S.-born women, with early-life immigrants as the reference group. The second step is to demonstrate nativity differences in risk factors with U.S.-born women being at higher risk. The third step is to demonstrate that the proposed risk factors are associated with disorder. The fourth step is to demonstrate that when controlling for the effects of heightened risk factor, the effect of nativity on disorder prevalence is weakened. Sobel's (1982) test is conducted to demonstrate that the reduction in the nativity effect between Steps 1 and 4 is statistically significant.

To demonstrate that nativity differences in rates of depression and anxiety are smaller than would be expected based on

higher levels of protective factors among the immigrant groups (suppression), we conducted the same steps outlined above but predicted suppression patterns (MacKinnon et al., 2000). The first step is to demonstrate that there is indeed a nativity effect on rates of psychological disorders with U.S.-born women at greater risk. The second step is to demonstrate nativity differences in protective factors with U.S.-born women experiencing higher levels of protection. The third step is to demonstrate that the protective factors are associated with lower risk for disorder. The fourth step is to demonstrate that when controlling for the effects of the protective factor, U.S.-born women's risk for disorder is increased. Sobel's (1982) test is conducted to demonstrate that the increase in the effect of nativity between Steps 1 and 4 is statistically significant.

Tests of mediated risk. The first step of both mediation and suppression analyses is to examine nativity differences in disorder risk, which was demonstrated in earlier analyses. Table 1 displays levels of reported exposure to risk factors by nativity subgroup, which addresses the second step in Baron and Kenny's (1986) test of mediation. Compared to later life immigrants, U.S.-born women were significantly more likely to report family conflict (39.79% vs. 25.57%, respectively), cultural conflict (64.03% vs. 50.47%, respectively), low family

Table 2
Simultaneous Analysis of Risk and Protective Factors

Factor	Variable	Any depressive disorder			Any anxiety disorder		
		<i>B</i>	<i>SE B</i>	<i>OR</i> (95% CI)	<i>B</i>	<i>SE B</i>	<i>OR</i> (95% CI)
Block 1							
Covariates	Age	0.002	0.01	1.00 (0.98, 1.05)	0.01	0.01	1.01 (0.99, 1.05)
	Social desirability	-0.19	0.11	0.83 (0.66, 1.29)	-0.31**	0.05	0.73 (0.66, 0.90)
	<\$15,000 income ^a	0.39	0.24	1.48 (0.92, 3.74)	0.48	0.27	1.62 (0.95, 4.58)
	\$15,000-\$35,000 income ^a	-0.02	0.33	0.98 (0.51, 3.53)	0.11	0.19	1.11 (0.77, 2.31)
	\$35,000-\$75,000 income ^a	-0.14	0.16	0.87 (0.63, 1.63)	0.21	0.22	1.23 (0.79, 2.96)
	High school graduate ^b	-0.34	0.17	0.71 (0.51, 1.37)	-0.43	0.30	0.65 (0.36, 2.07)
	College graduate ^b	-0.52*	0.13	0.59* (0.46, 0.98)	-0.21	0.24	0.81 (0.50, 2.09)
Nativity	Post-college graduate ^b	0.11	0.26	1.12 (0.66, 3.13)	0.2	0.29	1.22 (0.68, 3.85)
	Early-life immigrant ^c	0.41	0.24	1.51 (0.94, 3.80)	0.36	0.26	1.43 (0.86, 3.90)
	U.S.-born ^c	0.71**	0.20	2.03** (1.35, 4.54)	0.75**	0.23	2.12** (1.34, 5.19)
Block 2							
Nativity	Early-life immigrant ^c	0.48*	0.23	1.62* (1.03, 3.91)	0.41	0.23	1.51 (0.95, 3.72)
	U.S.-born ^c	0.85**	0.20	2.34** (1.57, 5.11)	0.92**	0.17	2.51** (1.77, 4.97)
Protective factors	Family support	-0.16*	0.07	0.85* (0.64, 0.99)	-0.23*	0.10	0.79* (0.53, 0.98)
	Subjective status in United States	-0.21*	0.10	0.81* (0.55, 0.99)	-0.11	0.13	0.89 (0.69, 1.49)
	Subjective status in community	-0.02	0.09	0.98 (0.82, 1.39)	-0.09	0.08	0.91 (0.78, 1.25)
Block 3							
Nativity	Early-life immigrant ^c	0.34	0.19	1.40 (0.96, 2.96)	0.31	0.21	1.36 (0.89, 3.15)
	U.S.-born ^c	0.30	0.20	1.35 (0.90, 2.99)	0.39	0.21	1.48 (0.97, 3.37)
Protective factors	Family support	-0.07	0.11	0.93 (0.75, 1.43)	-0.13	0.08	0.87 (0.75, 1.20)
	Subjective status in United States	-0.08	0.09	0.92 (0.77, 1.32)	-0.09	0.10	0.91 (0.75, 1.35)
	Subjective status in community	-0.03	0.09	0.97 (0.81, 1.38)	-0.08	0.09	0.92 (0.77, 1.32)
Risk factors [†]	High cultural conflict	0.71*	0.24	2.03* (1.25, 5.28)	0.31	0.22	1.36 (0.87, 3.29)
	Low family cohesion	0.18	0.17	1.20 (0.85, 2.34)	0.28	0.19	1.32 (0.90, 2.82)
	High family conflict	0.34*	0.15	1.40* (1.04, 2.53)	0.64*	0.29	1.90* (1.06, 5.93)
	Moderate family conflict	-0.21	0.24	0.81 (0.50, 2.09)	0.12	0.12	1.13 (0.64, 3.42)
	High discrimination	0.71**	0.20	2.03** (1.36, 4.48)	0.87**	0.18	2.39** (1.65, 4.92)
	Moderate discrimination	0.33	0.17	1.39 (0.99, 2.71)	0.53	0.28	1.70 (0.97, 5.10)

Note. *OR* = odds ratio; *CI* = confidence interval.

Referent groups: ^a Greater than \$75,000 income. ^b 11 years or less of education. ^c Later-life immigrants.

[†] Referent group is low risk group (e.g., low cultural conflict, high family cohesion).

* $p \leq .05$. ** $p \leq .01$.

cohesion (43.10% vs. 23.59%, respectively), and perceived discriminatory treatment (43.78% vs. 22.07%, respectively).¹ Compared to later life immigrants, early life immigrants were more likely to report cultural conflict (67.68% vs. 50.47%, respectively), low family cohesion (36.38% vs. 23.59%, respectively), high family conflict (39.13% vs. 25.57%, respectively), but not perceived discrimination (30.60% vs. 22.07%). Overall, the direction of the differences is consistent with the notion that nativity differences in psychiatric disorder may be attributable to differential risk exposure. More specifically, cultural conflict, low family cohesion, family conflict, and perceived discrimination remain as possible mediators for nativity differences in disorder.

To test the third step of the mediation model, a series of weighted logistic regression analyses controlling for age, income, education, and social desirability estimated the associations between risk factors and lifetime depressive or anxiety disorder. As expected, cultural conflict ($OR = 2.39$, 95% *CI*

[1.40, 4.08]; and $OR = 5.72$, 95% *CI* [3.22, 10.14], for any lifetime depressive and any lifetime anxiety disorder, respectively), low family cohesion ($OR = 1.71$, 95% *CI* [1.21, 3.37]; and $OR = 1.92$, 95% *CI* [1.41, 3.52]), family conflict ($OR = 1.73$, 95% *CI* [1.11, 4.13]; and $OR = 2.01$, 95% *CI* [1.24, 5.18]), and perceived discrimination ($OR = 2.41$, 95% *CI* [1.62, 5.25]; and $OR = 3.41$, 95% *CI* [2.45, 6.52]) were associated with lifetime depressive and lifetime anxiety disorder. As such, these four risk factors continue to be viable mediators of observed nativity differences in depression and anxiety.

Sobel's (1982) tests were conducted to test the significance of the reduction in the nativity effect in psychological disorder

¹ We tested whether the prevalence differences in lifetime depressive disorder between the early and later life immigrants were mediated by the risk and protective factors. Cultural conflict attenuated the relationship between nativity (i.e., early life vs. later life immigrants) and any depressive disorder ($Z = 3.25$, $p < .05$).

risk as shown in Figure 1A. Analyses revealed that cultural conflict did not mediate the association between nativity and risk of depressive and anxiety disorder (Sobel $Z = 1.59, p > .05$; and $Z = 1.67, p > .05$, respectively). Family conflict attenuated the relationship between nativity and any anxiety disorder ($Z = 1.99, p < .05$), but the Sobel test was marginal for depressive disorder ($Z = 1.74, p > .05$). Lack of family cohesion mediated the effect of nativity on anxiety disorder ($Z = 2.11, p < .05$), with the mediation effect being marginal for depressive disorder ($Z = 1.89, p = .06$). Lastly, perceived discrimination mediated the relationship between nativity and any depressive disorder ($Z = 3.22, p < .01$) and any anxiety disorder ($Z = 2.10, p < .05$).

Tests of suppression. Several factors were potential suppressors of the nativity differences in depression and anxiety. As shown in Table 1, U.S.-born women reported higher level of a protective factor (family support, higher social standing in the United States, higher social standing in the community) compared to immigrant women. Analyses were conducted to examine whether without the suppression effects of these protective factors, the nativity differences in disorder would have been even larger. Step 3 of the mediation analysis used weighted

logistic regression analyses to examine the relationship between these protective factors and risk for lifetime disorders. As expected, family support ($B = -0.18, p < .05$; and $B = -0.19, p < .05$) and subjective social status in the United States ($B = -0.24, p < .05$; and $B = -0.25, p < .05$) and subjective social status in the community ($B = -0.19, p < .05$; and $B = -0.23, p < .05$) were inversely related to risk of depressive and anxiety disorders, respectively. To test whether these protective factors served as suppressors of the relationship between nativity and disorder, nativity effects on lifetime disorder risk was calculated controlling for the effect of the protective factor. Results of suppression analyses are shown in Figure 1B. For all three protective factors, nativity differences for lifetime disorder risk were increased when the model controlled for the effect of the protective factor. Sobel tests demonstrated a suppression effect of family support in lifetime depressive disorder risk ($Z = 2.31, p < .05$; and $Z = 2.01, p < .05$, respectively) for perceived social standing in the community ($Z = 2.31, p < .001$; and $Z = 2.21, p < .05$). However, subjective social status in the United States did not significantly suppress the associations between nativity and disorder ($Z = 1.63, p > .05$; and $Z = 1.66, p > .05$).

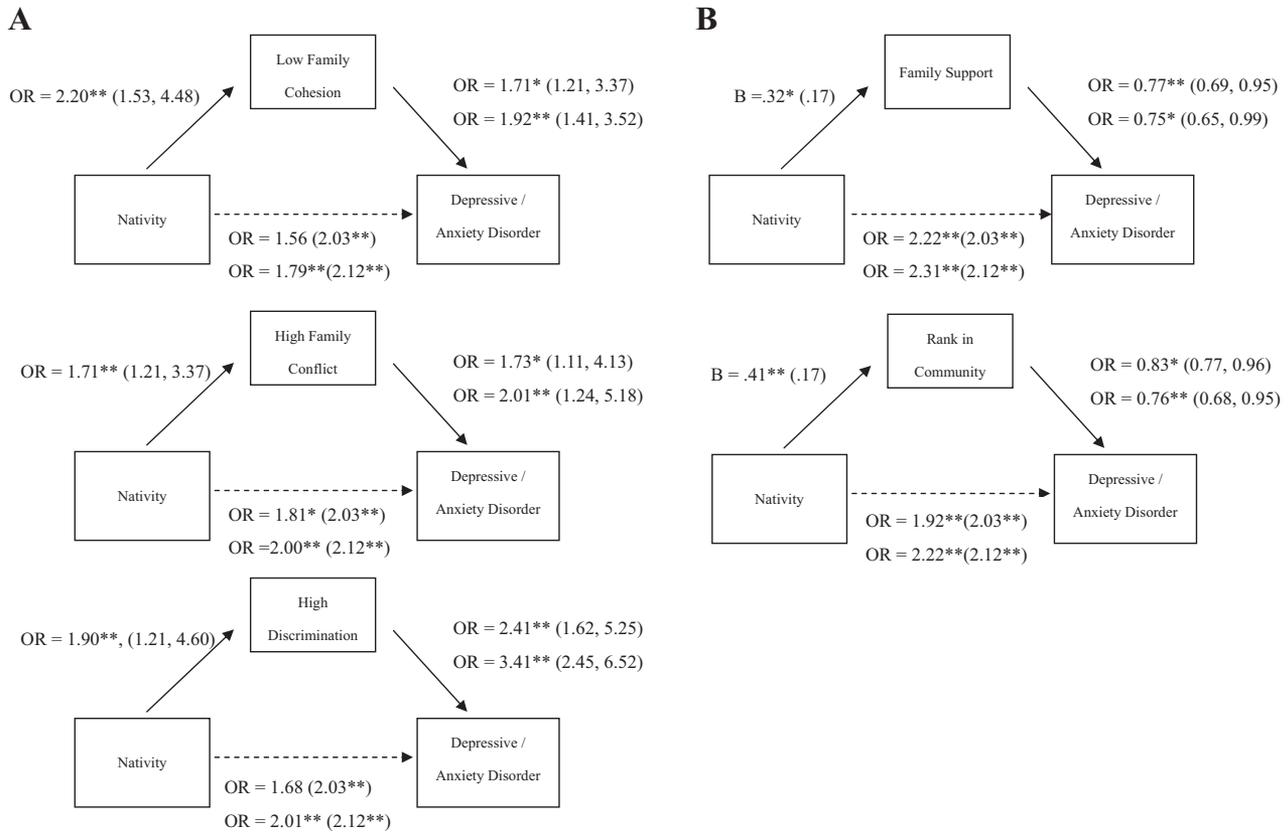


Figure 1. Panel A shows results of mediation analyses examining risk factors as mediators of the effect of nativity (U.S.-born vs. adult immigrants) on disorder. Panel B shows results of suppression analyses examining protective factors as suppressors of the relationship between nativity and disorder. Numbers within parentheses show odds ratios (ORs) in predicting disorder from U.S.-born nativity before controlling for risk and protective factors. ORs and B coefficients in the second row predict anxiety disorders. * $p \leq .05$. ** $p \leq .01$.

Simultaneous Examination of Risk and Protective Factors

The foregoing analyses examined individual risk and protective factors as potential mediators or suppressors of nativity differences in lifetime disorder. We then conducted weighted hierarchical logistic regression models to examine the independent contribution of each factor in predicting risk of disorder. Nativity and sociodemographic covariates were entered in the first block, the candidate suppressor variables in the second, and the potential risk factor mediators in the third block. As shown in Table 2, Block 1, only education was a significant predictor of depression risk with women holding a college degree ($OR = 0.59$, 95% CI [0.46, 0.98]) being at lower risk than those with less than high school education. In predicting lifetime anxiety disorders, only social desirability ($B = -0.31$, $p < .05$) was a significant predictor. As shown in Block 2, adding the protective factors of family support ($B = -0.16$, $p < .05$, depressive disorders; and $B = -0.23$, $p < .05$, anxiety disorders) and subjective status within the United States ($B = -0.21$, $p < .05$, depressive disorders) disattenuated the OR for U.S. nativity predicting depression ($OR = 2.34$, 95% CI [1.57, 5.11]) and anxiety ($OR = 2.51$, 95% CI [1.77, 4.97]). In Block 3, however, the associations between nativity and lifetime depressive disorder were no longer significant ($OR = 1.35$, 95% CI [0.90, 2.99]) after accounting for cultural conflict ($OR = 2.03$, 95% CI [1.25, 5.28]), family conflict ($OR = 1.40$, 95% CI

[1.04, 2.53]), and perceived discrimination ($OR = 2.03$, 95% CI [1.36, 4.48]). Similarly, in Block 3, the associations between nativity and lifetime anxiety disorder were no longer significant ($OR = 1.48$, 95% CI [0.97, 3.37]) after accounting for family conflict ($OR = 1.90$, 95% CI [1.06, 5.93]) and discrimination ($OR = 1.65$, 95% CI [1.65, 4.92]).

Differential Stress Reactivity

In Table 3, weighted logistic regression analyses were conducted separately by nativity group to examine the associations between risk/protective factors and any lifetime depressive or anxiety disorder. Contrary to our hypotheses that U.S.-born women may be more reactive to stress, immigrant women who immigrated after 25 years of age showed robust associations between cultural conflict ($OR = 3.22$, 95% CI [2.21, 6.73]; and $OR = 4.01$, 95% CI [2.91, 7.52], for lifetime depressive and anxiety disorders, respectively), family cohesion ($OR = 2.99$, 95% CI [2.23, 5.31]; and $OR = 1.98$, 95% CI [1.13, 5.94]), and perceived discrimination ($OR = 1.91$, 95% CI [1.01, 6.66]; and $OR = 3.41$, 95% CI [2.35, 7.07]) and lifetime depressive and anxiety disorders, but none of these factors were significant predictors of disorder for U.S.-born women except for discrimination ($OR = 3.74$, 95% CI [2.61, 7.57]; and $OR = 1.98$, 95% CI [1.08, 6.50]). Among women who immigrated before 25 years of age, cultural conflict ($OR = 4.42$, 95% CI [3.36, 7.57]; and $OR = 3.21$, 95% CI [2.11, 7.31]) and family conflict ($OR = 3.31$, 95% CI

Table 3
Odd Ratios (ORs)/Regression Coefficients (Bs) of Risk/Protective Factors Predicting Disorder by Nativity

Risk/protective factors	Nativity	Depressive disorder	Anxiety disorder
Cultural conflict ^a	Later-life immigrant	$OR = 3.22^*$ (2.21, 6.73)	$OR = 4.01^{**}$ (2.91, 7.52)
	Early-life immigrant	$OR = 4.42^{**}$ (3.36, 7.57)	$OR = 3.21^{**}$ (2.11, 7.31)
	U.S.-born	$OR = 1.63$ (0.94, 4.79)	$OR = 1.91$ (0.99, 6.92)
Low family cohesion ^a	Later-life immigrant	$OR = 2.99^{**}$ (2.23, 5.31)	$OR = 1.98^*$ (1.13, 5.94)
	Early-life immigrant	$OR = 1.18$ (0.41, 9.37)	$OR = 1.69$ (0.84, 6.65)
	U.S.-born	$OR = 1.31$ (0.71, 4.35)	$OR = 1.74$ (0.98, 5.36)
High family conflict ^a	Later-life immigrant	$OR = 1.80$ (0.91, 6.85)	$OR = 2.32^*$ (1.21, 8.31)
	Early-life immigrant	$OR = 3.31^{**}$ (2.61, 5.27)	$OR = 2.57^{**}$ (1.34, 9.21)
	U.S.-born	$OR = 2.02$ (1.13, 6.31)	$OR = 1.02^*$ (1.02, 7.37)
High discrimination ^a	Later-life immigrant	$OR = 1.91^*$ (1.01, 6.66)	$OR = 3.41^{**}$ (2.35, 7.07)
	Early-life immigrant	$OR = 1.53$ (0.92, 4.15)	$OR = 2.00$ (0.98, 8.10)
	U.S.-born	$OR = 3.74^{**}$ (2.61, 7.57)	$OR = 1.98^{**}$ (1.08, 6.50)
Family support	Later-life immigrant	$B = -0.02$ (-0.38, 0.40)	$B = -0.00$ (-0.79, 0.78)
	Early-life immigrant	$B = -0.12$ (-0.23, 0.47)	$B = -0.29^*$ (-0.68, -0.12)
	U.S.-born	$B = -0.23^*$ (-0.45, -0.01)	$B = -0.31^{**}$ (-0.49, -0.13)
Social position in United States	Later-life immigrant	$B = -0.11^*$ (-0.22, -0.01)	$B = -0.31^*$ (-0.61, -0.01)
	Early-life immigrant	$B = -0.02$ (-0.53, 0.49)	$B = -0.13$ (-0.50, 0.24)
	U.S.-born	$B = -0.56^{**}$ (-0.95, -0.15)	$B = -0.46^*$ (-0.81, -0.11)
Social position in community	Later-life immigrant	$B = -.05$ (-0.45, 0.35)	$B = -0.32^*$ (-0.78, -0.06)
	Early-life immigrant	$B = -0.14$ (-0.54, 0.34)	$B = -0.21$ (-0.52, 0.12)
	U.S.-born	$B = -0.39^{**}$ (-0.67, -0.11)	$B = -0.31^*$ (-0.61, -0.01)

Note. Odds ratios/regression coefficients inside parentheses are 95% confidence intervals.

^a Referent group is low risk group (e.g., high cultural conflict, low family cohesion). Covariates include household income, age, education level, and social desirability.

* $p \leq .05$. ** $p \leq .01$.

CI [2.61, 5.27]; and $OR = 2.57$, 95% CI [1.34, 9.21]) predicted both depressive and anxiety disorders, but lack of family cohesion and discrimination did not. On the other hand, U.S.-born women showed significant and robust protection from disorder from family support ($B = -0.23$, $p < .05$; and $B = -0.31$, $p < .05$, for depressive and anxiety disorders, respectively) and from subjective social status in the United States ($B = -0.56$, $p < .05$; and $B = \mp 0.46$, $p < .05$) and the community ($B = -0.39$, $p < .05$; and $B = -0.31$, $p < .05$), whereas these protective factors were only inconsistently related to disorder risk among the two groups of immigrant women. Despite these patterns in subgroup analyses, formal tests of moderation failed to reveal significant interactions between nativity and risk/protective factors in predicting lifetime anxiety or depressive disorders.

Discussion

As first reported in Takeuchi et al. (2007), support for the immigrant paradox was found, as U.S.-born Asian American women showed higher life-time prevalence of depressive and anxiety disorders compared to their counterparts who immigrated before 25 years of age, as well as those who immigrated after 25 years of age. It appeared that part of the elevated risk for depressive and anxiety disorders among U.S.-born Asian American women could be explained by differential exposure to stressors. U.S.-born Asian American women were more likely than their immigrant counterparts to report experiences of discrimination, higher levels of family conflict, and lower levels of family cohesion, which in turn were associated with increased risk for depression and anxiety. Considered individually, differential exposure to these risk factors partially mediated the effect of nativity on disorder. Consistent with a social stress hypothesis, these findings suggest that the so-called immigrant paradox is readily explicable because U.S.-born Asian American women are more likely to experience chronic stress associated with minority status and negative family climate.

However, U.S.-born women were also exposed to less risk compared to immigrant women in some respects. In particular, U.S.-born women reported more favorable conditions with respect to higher levels of subjective social status and family support, which in turn are associated with lower risk of depressive and anxiety disorders. The findings concerning higher social standing among U.S.-born women are consistent with previous findings that successive generations of immigrants tend to have higher levels of social mobility and human capital, which are generally protective against mental disorders (Adler et al., 2000; Park & Myers, 2010). However, the findings concerning greater perceived family support among U.S.-born women compared to immigrants was not aligned with our predictions. The direction of difference for family support was the opposite of that found for family cohesion, which was higher among immigrant groups as predicted. Rather than feelings of closeness, our family support scale assesses frequent, proximal contact and reliance on immediate and extended family members. Research suggests that U.S.-born generations tend to enjoy more proximity to multi-generational extended family support networks than immigrant generations, who are more likely to leave behind extended family support in their country of origin (Glick, 1999). As such, it is important to differentiate the aspects of family climate that may favor or disfavor distinct generations of immi-

grant groups. When social mobility and family support protective factors were examined in the regression analyses, they produced suppression effects, which lent some credence to the notion that the immigrant advantage in mental health can be viewed as paradoxical because U.S.-born women are at greater risk for lifetime anxiety and depressive diagnoses, despite experiencing some more favorable conditions than immigrant women.

Thus, U.S.-born Asian American women are at greater risk of exposure to certain chronic stressors (e.g., discrimination, family conflict, less family cohesion) while also benefitting more from some protective factors (e.g., higher perceived status and family support) compared to immigrant Asian women. We examined whether nativity differences in depression and anxiety disorders could be explained by the risk and protective factors when considered together. It appeared that the net effect of the risk factors explained the nativity differences in lifetime disorder. The heightened stress that U.S.-born Asian American women experienced in family climate and perceived discrimination explained the elevated risk for disorder, even after accounting for suppression effects. It is also notable that the protective factors were no longer significantly associated with depressive or anxiety disorders after controlling for the effect of stressors. This might suggest that any mental health advantage conferred to U.S.-born women by perceived social standing and family support are outweighed by exposure to risk factors.

Our findings did not support the differential reactivity hypothesis as an explanation for nativity differences in risk of anxiety and depression. U.S.-born Asian American women did not appear more reactive to stress than immigrant Asian women. Contrary to the notion of immigrant hardiness, subgroup analyses revealed more consistent significant associations between the four risk factors under consideration (i.e., family conflict, cultural conflict, low family cohesion, and perceived discrimination) and lifetime disorder risk, particularly among later life immigrant women. It is possible that immigrant women may in some respects be more susceptible to these types of stress given their relatively low social standing in the community. Individuals from low status groups tend to report greater impact of stressful events in their lives than individuals from higher status groups (Grzywacz, Almeida, Neupert, & Ettner, 2004). However, it is also possible that our reliance on self-report data presents a potentially weak test of the immigrant hardiness hypothesis, as respondents were asked to report on their stress context. Psychological hardiness among Asian American immigrants may manifest in a higher threshold for perceiving events and conditions as stressful and reporting them as such in the interview. Future studies should therefore incorporate methodologies that better separate objective circumstances and events from respondents' appraisals of stress to better evaluate potential group differences in stress reactivity. This could be better accomplished with experimental methods and objective threat stress interview procedures.

There are additional limitations of the study that should be considered in interpreting our results. First, the study pertained to Asian American women, so results may not be generalizable to other ethnic minority and immigrant women or Asian American men. Nevertheless, these nativity disparities in depression and anxiety were not previously shown among Asian American men (Takeuchi et al., 2007). This may be due to the fact that women tend to manifest distress through internalizing symptoms (as evi-

denced by higher prevalence rates for depression and anxiety disorders), whereas men tend to manifest distress with more externalizing presentations (e.g., Kessler, Chiu, Demler, & Walters, 2005). Indeed, there is some evidence to suggest that U.S.-born Asian American men exhibit higher prevalence of substance use disorders compared to their immigrant Asian counterparts (Takeuchi et al., 2007). As such, there are opportunities to examine explanations of nativity-based disparities in psychiatric disorders most likely to be revealed among ethnic minority men versus women.

Second, the NLAAS and other major psychiatric epidemiologic surveys yield cross-sectional analyses. We assessed exposure to risk and protective factors and their relation to the lifetime occurrence of psychiatric disorder. This precludes conclusions concerning the directionality of the associations examined. Taking the reverse causality argument through its conclusion, our mediation analyses may be interpreted to suggest that generational differences in depression and anxiety may explain group differences in perceptions of discrimination, family conflict and cohesion. However, as applied to the suppression analyses, reverse causality interpretations are less plausible. Elevated rates of depression and anxiety would be unlikely to result in more favorable appraisals of social status among U.S.-born women compared to immigrants. Prospective data are needed to clarify the directionality of these relationships.

Third, this study relied on self-reports of stressors, protective factors, and mental health problems. We have already discussed this limitation in providing a test of group differences in stress reactivity. Self-report measures of stress represent abstracted estimates of the frequency of events coupled with an appraisal of those events as significant and distressing. The measurement of experiences of discrimination and unfair treatment are particularly subject to frame of reference effects. Future research should capitalize on real-time event sampling, experimental and laboratory manipulations, and objective measures of health status to examine the role of risk and protective factors in explaining nativity based disparities in mental health.

Despite these limitations, the study focused on a large nationally representative sample of Asian American women, and shed new light on how we might best understand nativity differences in psychiatric disorders by examining differential exposure to risk and protective factors in U.S.-born versus immigrant groups. In particular, subjecting psychiatric epidemiologic data to mediation and suppression analyses presents a novel approach to examining the so-called immigrant paradox. Our findings suggest that increased rates of depression and anxiety among later generation Asian American women are explicable based on differential experiences of psychosocial stress in the domains of family and discrimination reported by women.

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