

It is a commonly held notion by anthropologists and psychologists that mood disorders are embedded in Western culture and may not apply as well to people of non-Western cultural backgrounds (e.g., [Kleinman, 1988](#); [Ryder et al., 2008](#)). The *Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (DSM-5; American Psychiatric Association, 2013)* states that “culture provides interpretive frameworks that shape the experience and expression of the symptoms, signs, and behaviors that are criteria for diagnosis” (p. 14). In support of this, past research has demonstrated that participants of Asian background are more likely than participants of European background to express depression in somatic terms ([Yen, Robins, & Lin, 2000](#); [Yeung & Chang, 2002](#)). Examples of somatic symptoms include fatigue, gastrointestinal problems, headache, and pain. There are many descriptions and theoretical discussions of somatization in people of Asian origin ([Kleinman, 1982](#); [Parker, Gladstone, & Chee, 2001](#); [Ryder et al., 2008](#)).

A recent literature review, however, reveals only limited evidence that people of Asian background are more likely than others to report somatic symptoms ([Uebelacker, Strong, Weinstock, & Miller, 2009](#)). On the one hand, some clinical studies suggest that, for example, Chinese American patients are more likely to endorse somatic symptoms than European American patients (e.g., [Huang, Chung, Kroenke, Delucchi, & Spitzer, 2006](#)), and that depressed Malaysian Chinese outpatients are more likely than depressed Australian White outpatients to endorse a somatic symptom as the primary complaint ([Parker, Cheah, & Roy, 2001](#)). However, the findings across studies, especially those using community samples, have not been robust or consistent ([Uebelacker et al., 2009](#)).

International community studies also do not find increased somatization among Asian participants. [Weiss, Tram, Weisz, Rescorla, and Achenbach \(2009\)](#) compared symptoms of depression in Thai and American children and adolescents from a community sample and found that the Thai and American groups endorsed similar levels of somatic (and psychological) symptoms (effect size of the mean contrasts = 0.00, CI [-.05 ~ .05]). When [Kadir and Bifulco \(2010\)](#) examined a community sample of Malaysian women, they found that both somatic and psychological symptoms of depression were expressed by these participants. Although this study was qualitative in nature, it is consistent with other community-based studies (e.g., [Cheng, 1989](#); [Cheung, 1982](#)) that suggest that the high prevalence of somatization in people of Asian background is not likely observed in community samples.

Similarly, Ryder and his research team also suggest that there may be little difference between Asian origin and European origin adults in the presentation of somatic symptoms. They argue that the difference is in people of Asian background endorsing fewer psychological symptoms than people of European background. In their study of outpatients, [Ryder and colleagues \(2008\)](#) found that Chinese participants endorsed a significantly higher level of somatic symptoms than European Canadian participants on two of the three depression measures. The Chinese participants also endorsed a significantly lower level of psychological symptoms than the European Canadian participants on all three depression measures. The effect sizes for psychological symptoms were larger and more consistently significant than the effect sizes for somatic symptoms. Therefore, the authors argued that the “truly distinctive cross-cultural feature” in the expression of depression for people of Asian background may be their reporting of fewer psychological symptoms than people of European background ([Ryder et al., 2008](#)).

Psychologization can be defined as the tendency to express distress in affective or cognitive terms ([Kirmayer, 2001](#)). Examples of psychological symptoms include feelings of worthlessness, irritability, tearfulness, and depressed mood. Thus, based on Ryder and colleagues' findings, it is important that the study of depression examines both somatic and psychological symptoms to assess whether people of Asian origin tend to somatize, people of European origin tend to psychologize, or some combination of the two.

### [The Diagnosticity of Somatic and Psychological Symptoms](#)

One problem with past studies that examine ethnic group differences in symptom frequencies is that it is unclear whether a difference in frequency reflects an ethnic difference in the expression of depression or simply a difference in the degree of depressive symptomatology. For example, in the [Ryder et al. \(2008\)](#) study, it may be that less psychologization among those of Asian background may actually reflect that they have less depressive symptomatology overall and not simply lower levels of psychological symptoms. Thus, it is important that efforts be taken to control for the degree of depressive symptomatology when carrying out these analyses.

Item Response Theory (IRT) provides a statistical approach to examine whether ethnic group differences in depressive symptoms reflect differences in the expression of depression or group differences in the level of the latent construct. IRT provides mathematical expressions of the relationship between participants' responses on an item (in this case, symptoms) and the underlying latent construct (in this case, depressive symptomatology). It accounts for the potentially confounding effect of the degree of depressive symptomatology by assessing whether the association between the item and the latent construct differs depending on race or ethnicity (e.g., Asian or European origin) when both racial or ethnic groups are matched in the degree of depressive symptomatology ([Uebelacker et al., 2009](#)). Although in Classical Test Theory, the trait is based on the total number of items endorsed, in IRT, the latent trait ( $\theta$ ) is estimated based on the participants' responses and the properties of the items ([Yang & Kao, 2014](#)). Theta has a mean of 0 and a *SD* of 1, with an arbitrary range for the latent construct that is measured. Those with a more negative value of theta are thought to have less of the latent construct of depressive symptomatology, and those with a more positive value of theta have more of the construct of depressive symptomatology ([Yang & Kao, 2014](#)). Another advantage of the IRT approach is that it may be a more precise manner of testing whether there are ethnic differences in symptom expression than the traditional frequency approach. For example, with the traditional approach, there may be significant differences between two groups in the frequency of psychological symptoms endorsed, suggesting that the two groups express depression differently; yet the association between a given symptom and the construct of depressive symptomatology may be no different for the two groups. Conversely, there may be no difference in the frequency of psychological symptoms reported for the two groups, suggesting no difference in the expression of the disorder; however, the relationship between a psychological symptom and the construct of depressive symptomatology may be much stronger for one group than another.

In IRT, a mathematical function specifies an item characteristic curve (ICC) that represents the probability of a response on an item varying with the level of the underlying latent construct, in this case depressive symptomatology. The relative position and slope are two important

characteristics of this curve. First, the relative position of the ICC indicates the trait strength of the underlying construct (i.e., severity or difficulty parameter). A curve that is shifted more toward the right indicates that the item is more difficult for that group (compared with the group with a curve that is shifted more toward the left); this group requires more of the latent construct (i.e., depressive symptomatology) than the other group for the same probability of item endorsement. In other words, given an equivalent degree of depressive symptomatology, the group with the curve that is shifted more to the right is less likely to endorse the item. Second, the slope indicates the discriminability of the item (i.e., discrimination parameter). An item with a steeper ICC slope discriminates more effectively between different levels of the underlying construct. Differential item functioning (DIF) is a statistical approach that is used to test the null hypothesis that these item parameters do not differ between two groups.

The use of IRT methodology for analyzing depressive symptoms and testing the somatic hypothesis is an emerging area of research ([Uebelacker et al., 2009](#)). Using IRT and a community sample, [Uebelacker and colleagues \(2009\)](#) tested whether Asian Americans would be more likely to “somatize” than European Americans, given similar degrees of depressive symptomatology. This study utilized the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) dataset, a large, nationally representative epidemiological sample of American adults. Uebelacker and colleagues examined symptoms of depression, including analyses comparing Asian Americans and non-Latino White Americans. For the severity parameter, given similar degrees of depressive symptomatology, Asian American participants were more likely to endorse only suicidal ideation than non-Latino White participants. For the discrimination parameter, only one symptom met criteria for significant DIF; difficulty in concentrating was less discriminating for Asian Americans than for European Americans. Overall, the results failed to find support for the notion that Asian Americans express depression differently than European Americans, even when controlling for degree of depressive symptomatology as carried out by IRT. The study was limited, however, in that their community sample included a relatively small sample of Asian Americans ( $n = 291$ ), compared with the other racial or ethnic groups included in this study ( $n$ s ranged from 468 to 10,958). The study also excluded those who were not fluent in English; thus, the sample likely reflected a more acculturated Asian American sample, thereby reducing the likelihood of finding ethnic differences. Finally, the analyses focused only on seven MDD symptoms in a 2-week episode of depressed mood or anhedonia. Only one other study to date has used IRT to examine DSM symptoms of depression between groups ([Simon & Von Korff, 2006](#)). However, these researchers included depressed primary care participants with and without a comorbid medical condition and did not examine race or ethnicity differences.

There is also a large body of work using DIF analyses to examine measurement bias (e.g., [Camilli & Shepard, 1994](#); [Embretson & Reise, 2000](#); [Holland & Wainer, 1993](#)), including studies not using IRT but other statistical methods. For depression specifically, work using multiple regression ([Birnholz & Young, 2012](#)) and nonparametric kernel-smoothing techniques ([Santor, Ramsay, & Zuroff, 1994](#)) has examined depressive symptom severity scores and item bias between groups (i.e., female sexuality groups and males and females, respectively); however, these studies did not test for race or ethnicity differences. Another study ([Dere et al., 2013](#)) did examine race or ethnicity differences in depressive symptoms. With a clinical sample, [Dere et al. \(2013\)](#) used the standardized mean difference technique to assess for DIF among Han-

Chinese and European Canadian participants. They found no DIF for typical somatic symptoms but did find DIF for atypical somatic symptoms and for psychological symptoms. Specifically, the Chinese reported higher levels of “suppressed emotions” and “depressed mood,” and European Canadians reported higher levels of atypical somatic symptoms and “hopelessness,” relative to their overall symptom reporting.

### [Overview and Hypotheses](#)

In the present study, we drew on the Collaborative Psychiatric Epidemiology Surveys (CPES), a national psychiatric epidemiology database that includes both Asian Americans and European Americans, to examine the expression of depressive symptoms among Asian Americans and European Americans. The advantage of this database is that it is comprised of nationally representative samples of people residing in the community, whereas many past studies have only used clinical samples. Another advantage is that the CPES applies a broad definition of Asian American reflecting many countries of origin within Asia. In addition, unlike the [Uebelacker et al. \(2009\)](#) study, non-English speaking Asian American respondents were included, suggesting more variance with regard to acculturation.

We applied two statistical approaches. The first was to identify the specific symptoms for which the two groups differed, using  $\chi^2$  analyses. The second approach was to examine whether these differences held, even accounting for degree of depressive symptomatology, using IRT. Although we believe that the IRT approach is the more precise way to test our hypotheses, by including the traditional approach, we were in a position to assess how our findings map on to past research and how they compare with the IRT approach. Accordingly, it allowed us to explore whether the statistical methods lead to similar or different results.

Our first objective was to test whether Asian Americans and European Americans differ with regard to both somatic and psychological symptoms. Although [Ryder et al. \(2008\)](#) found smaller but significant differences in somatic symptoms between Asian and European Canadian outpatients on two out of three measures, other studies using community samples (e.g., [Cheng, 1989](#); [Cheung, 1982](#); [Weiss et al., 2009](#)) did not find a higher prevalence of somatization in people of Asian background. We predicted that Asian Americans and European Americans in this sample would not significantly differ in their levels of somatic symptom endorsement. For psychological symptoms, consistent with previous findings by [Ryder et al. \(2008\)](#), we expected Asian Americans in our sample would endorse lower levels of psychological symptoms than European Americans.

Next, we examined the relationship between the symptom and the latent construct using IRT. For somatic symptoms, we expected that the severity parameters would not be significantly different between the two racial or ethnic groups. In other words, Asian Americans and European Americans would have similar probabilities of endorsing somatic symptoms, given the same degree of depressive symptomatology, and thus, similar severity parameters. On the other hand, for psychological symptoms, we expected that the severity parameter would be greater for Asian Americans than for European Americans. In other words, Asian Americans would have a lower probability of endorsing psychological symptoms than European Americans with the same

degree of depressive symptomatology. For the discrimination parameter, we explored whether somatization or psychologization is differentially related to the construct of depressive symptomatology for Asian Americans or European Americans.

## [Method](#)

### **Participants**

The participants were part of the CPES, specifically the National Latino and Asian American Study (NLAAS) and the National Comorbidity Survey Replication (NCS-R). These studies together create one combined, nationally representative dataset with enough power to examine cultural and ethnic correlates of mental illness.

The Asian American data were selected from the NLAAS, which included participants 18 years and older in the contiguous United States and Hawaii. The NLAAS Asian American sample ( $N = 2,095$ ) included: Chinese ( $n = 600$ ), Filipino ( $n = 508$ ), Vietnamese ( $n = 520$ ), and “other” Asian ( $n = 467$ ) participants. The category other Asian included Bangladeshi, Burmese, Cambodian, Hmong, Indian, Indonesian, Japanese, Korean, Laotian, Malaysian, Mongolian, Myanmar, Pakistani, Singaporean, Sri Lankan, Taiwanese, and Thai participants. Among the Asian Americans, 454 were born in the United States, 1,639 were born outside of the United States, and two did not report their place of birth. Interviews were completed in English, Mandarin, Cantonese, Tagalog, and Vietnamese. The mean age was 41.0 ( $SD = 14.7$ ). Forty-seven percent of the Asian Americans were male, and 53% were female. The response rate for Asian Americans was 69.3%.

As this was a first step to examining ethnicity and culture using IRT and a nationally representative sample, Asian Americans were studied as an entire group, as were European Americans. To only focus on one of the specific ethnic groups (e.g., Chinese Americans) would restrict the focus to that specific group instead of a national sample of Asian origin adults. Moreover, the sample size of a specific group would be limited. In addition, using the entire sample is consistent with other NLAAS studies that examine Asian Americans as one group (e.g., [Gee, Ro, Gavin, & Takeuchi, 2008](#); [Leu et al., 2008](#); [Marques et al., 2011](#); [Takeuchi, Alegria, Jackson, & Williams, 2007](#)). The term “Asian American” is used here because the participants reported national origin in a country located in the continent of Asia and they reported having residence in the United States.

The Asian Americans who received the Depression Module ( $N = 310$ ) included: Chinese ( $n = 100$ ), Filipino ( $n = 61$ ), Vietnamese ( $n = 50$ ), and other Asian ( $n = 99$ ) participants from the countries of origin noted earlier. Among these Asian Americans, 106 were born in the United States, 202 were born outside of the United States, and two did not report their place of birth. The mean age was 38.7 ( $SD = 14.1$ ), and 39% were male.

The European American data were selected from the NCS-R, which included participants 18 years and older in the contiguous United States. The non-Hispanic White sample included 4,180

people with a mean age of 46.5 years ( $SD = 17.8$ ). Forty-six percent of the European Americans were male, and 54% were female. Their response rate was 70.9%.

The European Americans who received the Depression Module included 1,763 participants. Among these European Americans, 1,658 were born in the United States, 38 were born outside of the United States, and 67 did not report their place of birth. The mean age was 44.2 years ( $SD = 15.0$ ), and 36% were male.

## Measures

### Composite International Diagnostic Interview

The Composite International Diagnostic Interview (CIDI, World Health Organization) is a structured diagnostic interview that generates International Classification of Diseases (ICD-10) and *Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV)* diagnoses. It was designed to be used across cultures. Trained, nonclinical interviewers administered the CIDI in person. This study primarily focused on the following sections of the CIDI.

### Screening section

In this section, participants were asked three questions specific to depression. These items consisted of questions asking about times when most of the day, one felt “sad, empty, or depressed,” “very discouraged about how things were going,” or when one “lost interest in most things [he or she] usually [enjoys].” If the participant endorsed at least one of the screening items, they went on to answer the questions in the depression module.

### Depression module

This module consisted of symptoms that mapped on to the *Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition-Text Revision (DSM-IV-TR)* criteria for Major Depressive Disorder. It included nine somatic symptoms (e.g., “Did you have a much larger appetite than usual nearly every day?”) and 23 psychological symptoms (e.g., “Did you feel hopeless about the future nearly every day?”). The depressive symptoms were separated as somatic or psychological based on consensus from past studies (e.g., [Kadir & Bifulco, 2010](#); [Kleinman, 1982](#); [Ryder et al., 2008](#); [Uebelacker et al., 2009](#); [Weiss et al., 2009](#); [Yen et al., 2000](#)) and the face validity of the items.

## Results

### Overview

We first examined the entire sample to see whether there were ethnic group differences in the depression screening items. We then carried out two distinct sets of analyses with those who screened positive for possible depression. These analyses were carried out with this subsample because all of the depressive symptoms were assessed with this group. To examine the rate of

endorsement of specific somatic and psychological symptoms by Asian and European Americans, we conducted  $\chi^2$  analyses to examine specifically where (i.e., in which symptoms) the racial or ethnic group differences may lie. Because of the potentially confounding effect of the degree of depressive symptomatology in evaluating group differences in the expression of depression, our next set of analyses used IRT to examine any potential DIF in somatic and psychological symptoms.

### **Ethnicity and Degree of Depression**

Across all assessments of depression, Asian Americans reported significantly less depression. First, when the overall sample is considered, a smaller percentage of Asian Americans than European Americans reported any of the depression screening items. For example, 31.9% of Asian Americans endorsed the item “sad/empty/depressed,” whereas half of European Americans (49.9%) endorsed this item ( $p < .001$ , Cramer’s  $V = 0.16$ ; see [Table 1](#)). Second, when considering the screened-in sample (i.e., those who received the full depression module), a smaller percentage of Asian Americans than European Americans reported two of the three depression screening items. For example, 84.2% of Asian Americans endorsed the item “discouraged about life,” whereas 92.0% of European Americans endorsed this item ( $p < .001$ , Cramer’s  $V = 0.10$ ; see [Table 1](#)). There was no significant difference between racial or ethnic groups for the item sad/empty/depressed in the screened-in sample. Last, Asian Americans had lower rates of Major Depressive Disorder than European Americans (Pearson  $\chi^2$ ,  $ps < .001$ ); this was the case for lifetime (Asian Americans: 9.2%; European Americans: 18.0%; Cramer’s  $V = 0.11$ ) and 12-month Major Depressive Disorder (Asian Americans: 4.5%; European Americans: 7.2%; Cramer’s  $V = 0.05$ ).

*Rates of Depression Screening Item Endorsement by Race or Ethnicity (%) for the Overall Sample and for Those Who Screened In to Receive the Depression Module*

### **Ethnicity and Symptom Endorsement**

Asian Americans and European Americans did not differ in the median somatic symptoms endorsed (Asian Americans: 4.00 symptoms, European Americans: 4.00 symptoms;  $\chi^2 = 1.24$ ,  $p = .30$ ). However, Asian Americans were significantly lower in the median psychological symptoms endorsed, when compared with European Americans (Asian Americans: 13.00; European Americans: 14.00;  $\chi^2 = 5.62$ ,  $p = .02$ ). In terms of the specific symptoms,  $\chi^2$  analyses revealed that Asian Americans were significantly lower than European Americans in their endorsement rate for 3 of the 9 somatic symptoms (33%) and 9 of the 23 psychological symptoms (39%). An example of a somatic symptom that was endorsed less by Asian Americans is a larger appetite; 8.2% of the Asian Americans reported having a larger appetite, whereas 14.3% of the European Americans reported having a larger appetite ( $p = .004$ , Cramer’s  $V = 0.06$ ; see [Table 2](#)). An example of a psychological symptom endorsed less by Asian Americans is guilt; only 41.9% of the Asian Americans reported guilt, whereas 50.9% of the European Americans reported this symptom ( $p = .004$ , Cramer’s  $V = 0.06$ ; see [Table 3](#)).

*Rates of Depressive Somatic Symptom Endorsement for Those Who “Screened In” to the*

## *Depression Module by Race or Ethnicity*

### *Rates of Depressive Psychological Symptom Endorsement for Those Who “Screened In” to the Depression Module by Race or Ethnicity*

#### **Item Response Theory**

For the IRT analyses, Mplus Version 6.12 was used, applying a two-parameter model (2PL), which involves estimating a severity and discrimination parameter for each symptom. The 2PL model was preferred over the one-parameter (1PL) model, using Akaike information criterion (AIC) and sample-size adjusted Bayesian information criterion (BIC). Assumptions of unidimensionality of the trait ( $\alpha = .99$ ), local independence of items, and ability to model the response for an item via an item response function were met. Analysis was run containing all of the depressive symptoms (i.e., both somatic and psychological symptoms) in one IRT analysis, but the symptoms are presented in separate somatic and psychological symptom tables for clarity and consistency with our discussion of the results. The item parameters were compared across groups according to [Linacre and Wright \(1986\)](#). Results from these analyses are shown in [Tables 4](#) and [5](#), which list the severity and discrimination parameters for each somatic and psychological depressive symptom across the racial or ethnic group comparisons.

#### *Differential Item Functioning of DSM-IV Somatic Symptoms of Major Depressive Disorder for Asian and European Americans*

#### *Differential Item Functioning of DSM-IV Psychological Symptoms of Major Depressive Disorder for Asian and European Americans*

For somatic symptoms, only two out of nine somatic symptoms (22.2%) exceeded criteria for statistical significance in DIF for the severity parameter (see [Table 4](#)). For example, Asian Americans were less likely to endorse the somatic symptom “fatigue/loss of energy” than European Americans, given similar degrees of depressive symptomatology. This item’s ICCs are plotted in [Figure 1a](#). The severity parameter is typically examined from the horizontal axis, where the probability of endorsement of the item is 0.5 or 50%. [Figure 1a](#) shows that the curve for Asian Americans is shifted more toward the right. This indicates that this item is more “difficult” for Asian Americans, or requires more of the latent construct (i.e., depressive symptomatology) for the same probability of endorsement as European Americans. Stated another way, given equivalent degrees of depressive symptomatology, Asian Americans tended to be less likely to endorse the item fatigue/loss of energy than European Americans. In addition, one somatic symptom was more discriminating for Asian Americans than European Americans—psychomotor agitation. The item’s ICCs are plotted in [Figure 1b](#). Again, the discrimination parameter refers to the degree to which the item discriminates between participants along the continuum of depressive symptomatology. The steeper slope for Asian Americans than European Americans in [Figure 1b](#) indicates that the item “psychomotor agitation” is more discriminating for Asian Americans than European Americans.



*Figure 1. (a) Illustrative item characteristic curves for the “fatigue/loss of energy” somatic depressive symptom item derived from Asian and European Americans. (b) Illustrative item characteristic curves for the “psychomotor agitation” somatic depressive symptom item derived from Asian and European Americans.*

For the psychological symptoms, an examination of DIF showed that 11 of these items differed across racial or ethnic groups in terms of severity or difficulty, and one item (thoughts about death) differed in terms of discrimination. The 11 of 23 psychological symptoms (47.8%) that exceeded criteria for statistical significance in DIF for the severity parameter are shown in [Table 5](#). As an example, the ICCs for the item “guilt” are plotted in [Figure 2a](#). This shows that given equivalent degrees of depressive symptomatology, Asian Americans are less likely to endorse feelings of guilt than European American respondents. In addition, the discriminability of the item “thought about death” is plotted in [Figure 2b](#), showing a steeper slope (i.e., better discriminability) for Asian Americans than European Americans.

*Figure 2. (a) Illustrative item characteristic curves for the “guilt” psychological depressive symptom item derived from Asian and European Americans. (b) Illustrative item characteristic curves for the “thought about death” psychological depressive symptom item derived from Asian and European Americans.*

## [Discussion](#)

We found that Asian Americans within a national sample of U.S. residents are less likely to present with depressive symptoms and disorders than European Americans. Despite the clear difference in prevalence rates, there were more ethnic similarities in the report of symptoms than differences. There were no differences in nearly two-thirds (62.5%) of the depressive symptoms—6 of the 9 somatic symptoms and 14 of the 23 psychological symptoms. When there were ethnic differences, however, Asian Americans were less likely than European Americans to report both somatic and psychological symptoms. Our hypothesis that Asian Americans would endorse similar levels of somatic symptoms compared with European Americans was not fully supported. For the majority of the somatic symptoms, similar to other studies using community samples, there were no differences between the two groups in level of endorsement. However, for one-third of the somatic symptoms, a lower percentage of Asian Americans than European Americans endorsed these symptoms, which is opposite to what [Ryder et al. \(2008\)](#) found using their clinical Chinese and European Canadian sample and contrary to what would be expected according to the somatization hypothesis. However, our finding is consistent with [Dere et al. \(2013\)](#), who also found larger appetite and hypersomnia to be less common in Han Chinese than European Canadian outpatients in their study. For psychological symptoms, the frequency analysis supports our hypothesis and Ryder’s prior clinical findings that a lower percentage of Asian Americans endorse psychological symptoms than European Americans.

To rule out the possibility of an artifact of less depressive symptomatology among Asian Americans compared with European Americans, we carried out IRT analyses. As mentioned, an advantage of the IRT approach over the typical frequency approach is that it accounts for the

potentially confounding effect of degree of depressive symptomatology, and it may be a more precise manner of testing whether there are ethnic differences in symptom expression. With the IRT analyses, we found very similar results to the frequency analyses. There were more ethnic similarities than differences for both somatic symptoms (7 of 9 severity parameters; 8 of 9 discrimination parameters) and psychological symptoms (12 of 23 severity parameters; 22 of 23 discrimination parameters). However, when there were ethnic differences, relative to European Americans, Asian Americans were less likely to endorse specific somatic and psychological symptoms, given similar degrees of depressive symptomatology. The IRT analyses suggested some true differences in the expression of depression, but largely in the severity parameter for these symptoms. Asian Americans were less likely to endorse two somatic symptoms and 11 psychological symptoms. This may reflect differences in the relevance of these items across ethnic groups, particularly with psychological symptoms.

Overall, it can be seen that the ethnic differences are largely the same using both the frequency and IRT approaches. The  $\chi^2$  and IRT analyses yielded significant differences across ethnic groups for both somatic and psychological symptoms, such that when there were differences, Asian Americans were less likely to endorse both somatic and psychological symptoms than European Americans. The IRT findings indicate that Asian Americans' lower rates of some somatic and psychological symptoms are not an artifact of different degrees of symptomatology among Asian Americans compared with European Americans. Together, these findings challenge the view that persons of Asian origin somatize their depression.

New neural evidence supports our findings that when there are differences between Asian Americans and European Americans, Asian Americans are less likely to endorse specific somatic and psychological symptoms. [Immordino-Yang, Yang, and Damasio \(2014\)](#) provide physiological and imaging data that suggest that Chinese and East Asian American participants use somatosensory information significantly less than non-Asian Americans in the expression of emotion. This is consistent with Chinese Confucian principles, which emphasize settling the body to be better able to tune in to the social context ([Markus & Kitayama, 1991](#)). In contrast, it may be a more "mainstream American" strategy to use bodily information to aid in the assessment of one's emotions. It is possible then that Asian Americans are less likely to endorse some somatic and psychological symptoms, because for Asian Americans they are not as interrelated and used in conjunction to assess emotional state. In contrast, [Immordino-Yang, Yang, and Damasio \(2014\)](#) suggest that European Americans may use somatic words to describe psychological states. Thus, it is not surprising that in our sample, Asian Americans are less likely to endorse somatic symptoms of Major Depression than European Americans, opposite of the somatization hypothesis.

The study by [Immordino-Yang et al. \(2014\)](#), however, does not explain the difference seen between clinical and community samples. Past studies using clinical samples (e.g., [Huang et al., 2006](#); [Parker et al., 2001](#); [Ryder et al., 2008](#)) have found greater somatization in Asian origin than European origin patients. In contrast, our community study, along with [Uebelacker et al. \(2009\)](#) and [Weiss et al. \(2009\)](#), found no difference in somatization between Asian origin and European origin groups. An interesting area for future research is to better understand why we tend to see a pattern of somatization of depression in Asian origin clinical samples but not community samples. One possibility is that in Chinese societies there is less tolerance for

disclosing one's illness outside the family (e.g., [Lin, Tardiff, Donetz, & Goresky, 1978](#)). To reduce the "burden of stigma", Asian origin persons who seek professional help may tend to present their distress in somatic symptoms rather than in psychological symptoms, as somatic symptoms are less stigmatized ([Goldberg & Bridges, 1988](#)). Certainly, there is a body of evidence that suggests that mental illness is stigmatized, at least in Chinese societies (e.g., [Chan & Parker, 2004](#); [Chung & Wong, 2004](#)). In contrast, in community samples, there is more heterogeneity—those who do not have psychiatric illness, participants who have kept illness to themselves or within the family, and some who have sought help outside the family. Therefore, compared with a clinical sample where 100% of the participants have revealed a potentially stigmatized illness identity outside the family, there may be less of a need to emphasize somatic symptoms of depression. As stated in [Ryder et al. \(2008\)](#), "[s]omatization allows psychologically distressed individuals to inhabit the sick role in their societies without bearing the burden of stigma ([Goldberg & Bridges, 1988](#))" (p. 302). Thus, it is possible that the pattern of greater somatization in Asian origin participants represents a help-seeking bias in clinical samples. The source of the sample is a potentially important moderator for future studies to examine.

Our findings add to the literature in important ways. First, although past literature has emphasized potential differences in the expression of depression, these results reveal greater similarities between community samples of Asian and European Americans in the expression of both somatic and psychological symptoms of depression. Second, the IRT analyses suggest that there truly are some differences in the expression of depression, but largely in the severity parameter for somatic and psychological symptoms. Compared with European Americans with a similar degree of depressive symptomatology, Asian Americans in a community sample are less likely to report some somatic and psychological symptoms, and they require more depressive symptomatology to report these symptoms. These findings differ from the IRT analysis of [Uebelacker and colleagues \(2009\)](#) who found only one ethnic difference for the severity parameter and one ethnic difference for the discrimination parameter. We place more confidence in the findings of the current study given the large sample size and given that the sample likely represents more sociocultural variability in the expression of depression, because those who did not speak English fluently were included in the present study but not in the [Uebelacker et al. \(2009\)](#) study. Another contribution of this study is that prior research indicating less psychologization in Asian Americans compared with European Americans was based largely on clinical populations. The current study provides complementary evidence using a nationally representative, community sample of noninstitutionalized populations. This is one of a few studies using a nationally representative community sample of Asian and European Americans that examines both somatic and psychological symptoms. Moreover, with the exception of [Uebelacker et al. \(2009\)](#) and [Dere et al. \(2013\)](#), the prior clinical and community studies (e.g., [Weiss et al., 2009](#)) only carried out frequency (i.e., classical test theory) analyses and did not include DIF analyses, which take into account degree of depressive symptomatology.

The findings also have potential clinical implications. Keeping in mind this pattern of less somatization and psychologization in Asian Americans may assist clinicians in the detection and assessment of depression. Although the DSM is heavily weighted toward psychological symptoms (i.e., more than 50% of the DSM criteria are psychologically minded), it may be important to consider that it may take an Asian American who has more depressive symptomatology to endorse some specific psychological symptoms than a European American

client. These findings also challenge the notion that Asian Americans, at least in a community sample, somatize their depression. Being cognizant of these patterns has the potential to assist clinicians in better detecting depression in Asian Americans who are experiencing the disorder.

### **Limitations and Future Directions**

Because of the nature of the survey, this dataset did not allow us to examine depressive symptoms in the entire sample, as only those who passed the screening items received the depression module. Thus, these results may only apply to those who are already more elevated in depressive symptoms and not a true community sample. It will be important to replicate these findings in future studies, using both an entire community and clinical sample.

Second, there may be important subgroup differences, within the broad ethnic categories. For example, some research suggests that Korean female participants report more somatic symptoms than Japanese female participants, but that somatic symptoms account for less variance in Beck Depression Inventory scores for the Korean participants than for the Japanese participants ([Arnault & Kim, 2008](#)). Our intent was not to apply a broad brush in examining Asian Americans and European Americans as two groups, but the current project was an initial study on ethnic differences, and thus, we did not examine subgroup differences within Asian Americans and within European Americans. There might be variability within these two groups, because of nationality, acculturation, language, country of birth, gender, age, and so forth. These would be interesting and important areas of future research, especially as the neural data begin to show some of these differences.

Another limitation is that we only used depressive symptoms defined by the *DSM-IV*. This may be a narrow lens by which to identify depression in our two ethnic groups, and thus, it may contribute to the detection of few group differences. It may be that group differences in the expression of depression would be more easily identified if culture-specific manifestations of depression were included in the assessment.

### **Conclusions**

Although the somatization hypothesis has been popular in past theory and research of symptom expression in racial and ethnic minority groups, more recent studies, particularly those using community samples, do not support this hypothesis. For the majority of both somatic and psychological symptoms of depression in Asian and European Americans, there were no differences in level of endorsement. Where there were differences, we found less somatization in Asian Americans than in European Americans, contrary to the somatization hypothesis. In addition, similar to [Ryder et al. \(2008\)](#), when there were differences, we found less psychologization in Asian Americans than in European Americans. These results were supported by IRT analyses as well, which suggest that the observed ethnic differences are not an artifact of less depressive symptomatology among Asian Americans compared with European Americans. Thus, the presumed cultural differences in the expression of depression, especially the notion that Asian Americans tend to present depression in somatic terms, receive little support in a nationally representative community sample of Asian Americans and European Americans.