Temperament, Anxiety, and Depression: Comparisons Across Five Ethnic Groups of Children

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Extending analyses from a large school-based sample of children and adolescents (N = 1,126; Chorpita, 2002), this study examined anxiety and depression assessment with 5 ethnic groups in Hawaii. Ethnic differences in anxiety and depression symptoms, along with 2 temperamental characteristics—negative affectivity (NA) and positive affectivity (PA)—were examined within the context of the tripartite model of anxiety and depression (Clark & Watson, 1991). Minimal between-group differences in temperamental characteristics were found. Good fit was found for a multisample model relating NA and PA to anxiety and depressive dimensions consistently across all groups. However, significant mean level differences among ethnic groups were found for several specific anxiety dimensions, suggesting that factors outside of the tripartite model explain observed ethnic differences. Further support for the generalizability of the tripartite model was also found.

Although the source and specific nature of ethnic variations in anxiety and mood disorders are not entirely understood, there is a vast body of adult literature discussing cross-cultural differences in the makeup and expression of psychological disorders such as anxiety and depression (e.g., Angel & Thoits, 1987; Kuo, 1984; Marsella, Kinzie, & Gordon, 1973; Okazaki, 1997; Uba, 1994; Yuen, Nahulu, Hishinuma, & Miyamoto, 2000). These cross-cultural differences have implications for the assessment of anxiety and depression in multiethnic children and adolescents. Assessment instruments must address the available data on ethnic group differences in the expression of anxiety and depression and be specific about their validity for use with particular ethnic or cultural groups. This study uses two assessment instruments to examine anxiety and depressive symptoms and their relation to negative affect and positive affect among children and adolescents from five ethnic groups.

Universal Versus Culturally Specific Influences on Anxiety and Depression

One important aspect of understanding the makeup of child and adolescent anxiety and depressive disorders has to do with their relation to temperamental characteristics (Lonigan & Phillips, 2001). It is well known that temperamental factors exert a relatively stable influence across development (Thomas & Chess, 1977). At the same time, the manner in which temperamental characteristics are ultimately expressed at the symptom level may be determined by environmental factors such as culture and socioeconomic class. In the case of anxiety and depression, a number of important factors have been posited as moderators of temperament (Chorpita & Barlow, 1998).

Some insights regarding the influence of culture on the anxiety and depressive disorders can be drawn from the related literature on childhood phobias. Childhood fears and phobias have been studied extensively across a variety of ethnic groups within the United States and internationally (Ollendick, King, & Yule, 1994). Certain "species-relevant" childhood fears involving such things as loud noises, separation from caregivers, and dangerous animals appear to occur with relative developmental consistency across the world (Ollendick, Yang, King, Dong, & Akande, 1996). These types of fears may be categorized as adaptive for species evolution in that they protect children from potential predators. Dong, Xia, Lin, Yang, and Ollendick (1995) argued that whereas most fears of childhood and adolescence are relatively stable within developmental periods and remain consistent in their dominant content across developmental periods, some types of childhood fears may vary depending on the child’s surrounding culture. These authors gave the example of a pattern of higher social-evaluative fears among Chinese 11- to 13-year-olds than either 7- to 10-year-old or 14- to 17-year-old groups. Dong et al. argued that the levels of familial and societal pressure to be successful academically are at
their peak between the ages of 11 and 13 due to the structure of the Chinese education system. This pressure is presumed to account for the higher levels of social-evaluative fears observed in this age group.

Much in the way that evolutionary adaptiveness accounts for some universal features of fears and phobias, it is possible that basic temperamental factors may too be somewhat uniform across different ethnic groups. Similarly, cultural factors that account for differences in elements of childhood fears as noted earlier may exert a parallel influence on the symptoms of anxiety and depression that manifest in different children. Thus, it is hypothesized that there may be both universal and culturally specific influences on the ultimate manifestation of anxiety disorders in children.

Cultural Differences in Anxiety

Although the research literature on cross-cultural differences in child anxiety and depression is somewhat limited, several studies have demonstrated largely similar rates of anxiety disorders overall, with significant ethnic group differences in the rates of specific anxiety disorders such as separation anxiety disorder, posttraumatic stress disorder, and social phobia. These differences are usually explained in relation to specific characteristics of the cultures being studied or to the pressures of ethnic minority status in a predominantly White culture. For example, Last and Perrin (1993) found higher lifetime prevalence of posttraumatic stress disorder among African American versus White children even when controlling for the effects of socioeconomic status. The authors also found a nonsignificant trend suggesting that White children were more likely to report panic disorder, obsessive-compulsive disorder (OCD), and social phobia, whereas African American children were more likely to report simple phobias.

In another study comparing anxiety and phobias among Hispanic and White children, Ginsburg and Silverman (1996) found that Hispanic children reported more separation anxiety than White children, and Hispanic parents rated their children as more fearful than White parents. Similar to Okazaki (1997), the authors argued that specific aspects of Hispanic cultures influence the specific type of psychopathology manifested by members of that culture. They contend that the higher frequency of separation anxiety among Hispanic children can be explained by the strong value Hispanic cultures tend to place on familial interdependence rather than independence, as may be characteristic of White culture.

Shore and Rapport (1998) found that White children had significantly lower total scores on the Fear Survey Schedule—Revised than Asian American, Filipino, or Native Hawaiian children. The authors also found differences on specific subscales among ethnic groups, including higher anticipatory social fears for Filipinos than other groups and Whites scoring significantly higher than Native Hawaiians and Asians but not Filipinos for fear of danger and death and animal fears. Although there are many possible explanations for these findings, their implication is that ethnicity, or a factor related to ethnic group membership, is associated with reported levels of fear. It is interesting to note that the ethnic minority groups represented report higher levels of fear than majority group members.

Cultural Differences in Depression

The literature on ethnic and cultural differences in depression is similar to the anxiety literature in this area with relatively few studies comparing a wide range of ethnic groups. The overall pattern of depression among ethnic groups is somewhat mixed and appears to be influenced by factors such as recency of immigration and grouping strategy. One large-scale study of sixth to eighth graders from nine ethnic groups found that participants of Mexican descent had higher rates of depression than the other ethnic groups with no other significant ethnic differences (Roberts, Roberts, & Chen, 1997). Other studies report no differences in depression rates across a smaller number of ethnic groups (Costello et al., 1996).

Kuo (1984) found ethnic group differences in depression among members of four Asian ethnic groups. Korean Americans reported the highest rates of depression, followed in order by Filipino Americans, Japanese Americans, and Chinese Americans. At the same time, when analyzed as a single racial group, Asian Americans have prevalence rates for depression that are similar to Whites, suggesting that it is important to group individuals according to their ethnicities rather than their racial group with this population (Kuo, 1984).

Gender Differences in Anxiety and Depression

Gender differences in anxiety appear to follow a general pattern, with girls reporting higher prevalence and intensity of fears and anxiety than boys (e.g., Beidel, Turner, Hamlin, & Morris, 2000; Ollendick & King, 1991; Scherber & Nakamura, 1968). These differences appear to persist across a variety of assessment instruments, including the Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yin, Moffitt, Umemoto, & Francis, 2000), the Revised Fear Survey Schedule for Children (Ollendick, 1983; Shore & Rapport, 1998), the Revised Children’s Manifest Anxiety Scale (Reynolds & Richmond, 1978), and the Center
for Epidemiological Studies Depression Scale (Edman et al., 1998). At the same time, examples of higher rates of specific anxiety disorders for boys than girls can also be found. For example, Chorpita, Yim, et al. (2000) found that boys in their sample reported higher rates of OCD. Interestingly, Treadwell, Flannery-Schroeder, and Kendall (1995) found no gender differences in children’s self-reported anxiety using the Revised Children’s Manifest Anxiety Scale and the State–Trait Anxiety Inventory. They did, however, find that girls reported a greater number of excessive fears than did boys and reported greater fear of certain animals, lizards, worms, loud sirens, and mystery movies.

Similarly, during adolescence, girls tend to report higher rates of depression than boys (Cohen et al., 1993; Lewinson, Hops, Roberts, Seeley, & Andrews, 1993; Makini et al., 1996). Although Casper, Belanoff, and Offer (1996) found that female adolescents reported significantly higher levels of emotional distress, including depression, than boys regardless of race, other studies have found ethnic differences in this gender pattern. For example, significant gender differences in depression were found for postmenarcheal but not premenarcheal adolescent girls as compared with boys among Whites (Hayward, Gotlib, Schraedley, & Litt, 1999). In contrast, no significant gender differences in depression were found for African Americans and Hispanics in the same study.

**Tripartite Model**

The accumulating evidence on specific ethnic differences in anxiety disorders and depression raises the question of how temperament interacts with cultural factors in the expression of these disorders. The tripartite model of emotion (Clark & Watson, 1991; Mineka, Watson, & Clark, 1998) hypothesizes an explanatory link between temperament and anxiety that serves as a useful backdrop to an examination of the role of culture in the expression of temperamental characteristics as anxiety and depression.

The tripartite model of emotion posits several factors to account for the relation between anxiety and depression. The three factors as defined by Clark, Watson, and Mineka (1994) are (a) negative affectivity (NA), defined as “temperamental sensitivity to negative stimuli” (p. 104); (b) positive affectivity (PA), defined as “positive emotionality, energy, affiliation, and dominance” (p. 107); and (c) physiological hyperarousal (PH), defined as “heightened physiological (autonomic) arousal, symptoms of which include racing heart, trembling, shortness of breath, dizziness” (p. 108). Two of the factors, NA and PA, are hypothesized to represent risk factors for the development of anxiety and depression (Watson, Clark, & Harkness, 1994). NA is hypothesized to be positively related to both the anxiety and depression, such that being more easily upset by things is related to having higher levels of each disorder. In contrast, PA is hypothesized to be related only to depression, such that having less positive emotionality is related to higher levels of depression. Child and adult research has found accumulating support for this model (e.g., Brown, Chorpita, & Barlow, 1998; Chorpita, Daleiden, Moffitt, Yim, & Unemoto, 2000; Daleiden, Chorpita, & Lu, 2000; Joiner, Catanzaro, & Laurent, 1996; Lonigan, Carey, & Finch, 1994; Watson et al., 1995).

Within the tripartite model, NA and PA are conceptualized as orthogonal temperamental variables that are related to anxiety and depression symptoms (Lonigan & Phillips, 2001). Factor analytic data on the Affect and Arousal Scale (AFARS; Chorpita, Daleiden, et al., 2000) support this hypothesis as NA and PA were found to be orthogonal factors, whereas PH was positively correlated with NA. Although PH has been included in the tripartite model at the same level as NA and PA, Clark et al. (1994) described PH as “less clearly a personality dimension than either NA or PA” (p. xx). As a result, only NA and PA have been included in this study as dimensions of temperament.

NA and PA are hypothesized to be associated with depression and anxiety in unique and predictable ways. In a multiethnic clinical sample of 100 children ages 7 to 17 with anxiety and mood disorders, Chorpita, Plummer, and Moffitt (2000) found NA to be significantly related to depression and six anxiety disorders, including social phobia, separation anxiety, OCD, generalized anxiety disorder (GAD), and panic disorder and agoraphobia (PDA). In the same study, PA was significantly negatively correlated with depression.

There is some evidence suggesting that NA and PA may be relatively unaffected by variations in the surrounding culture. Chorpita, Daleiden, et al. (2000) found no significant differences among six ethnic groups (White, Chinese American, Filipino American, Native Hawaiian, Japanese American, and multiethnic) in NA. The authors did find a significant difference among groups on PA such that Native Hawaiian children scored slightly higher than Japanese American, White, and multiethnic children. However, the effect size of this difference was small, $\eta^2 = 0.019$, making it difficult to draw conclusions about its importance. Similarly, nonsignificant or very small differences in NA and PA were observed among children grouped by grade level and by gender.

Interestingly, although accumulating evidence supports the link between temperamental characteristics and anxiety and depression, the factors that determine whether psychopathology will be expressed and its magnitude are not as well understood. These factors could include gender, age, socioeconomic status, education, immigration status, and a variety of other cultural and environmental factors. Beliefs about appro-
priate familial attachment, the parameters of social interaction, and the timing and nature of social pressures related to achievement are all components of culture that may shape the expression of anxiety and depression.

This Study

This study is an attempt to extend our understanding of the generalizability of temperamental characteristics and their expression at the symptom level across children and adolescents from five ethnic groups in Hawaii. This investigation extends the work done by Chorpita (2002) examining the applicability and fit of the tripartite model across gender and grade level using a subgroup of the same multietnic school sample used in the original 2002 study.

First, we proposed to examine group differences on temperament. Based on the idea that dimensions of temperament are relatively invulnerable to environmental influences, we predicted that no ethnic group differences in mean scores for temperament would be found. Second, we examined group differences in symptoms for five anxiety disorders and depression. This was accomplished in two ways: (a) mean differences in scores on the Revised Child Anxiety and Depression Scale (RCADS) using multivariate analysis of variance (MANOVA) and (b) differences in the percentage of children with clinically elevated scores on the RCADS (defined as T scores > 65). Two predictions about ethnic group variations in anxiety and depression symptoms were made based on observed ethnic group differences in previous studies of two specific types of anxiety: social phobia and separation anxiety.

Social anxiety may be particularly sensitive to ethnic variations because it is so closely linked to cultural expectations, attributions, norms, and values regarding appropriate behavior and interpersonal interaction (see Dong et al., 1995; Okazaki, 1997). We therefore predicted that we would find significant differences between ethnic groups in social phobia scores, with higher average scores and higher rates of clinical elevation being associated with ethnic groups that assign greater negative attributions and shame to violations of norms for interpersonal interaction such as Japanese Americans, Chinese Americans, and Filipino Americans (see Anderson, 1983).

Similarly, separation anxiety may also be more sensitive to ethnic variations than other anxiety disorders or depression because of its reliance on cultural definitions of appropriate familial interactions (see Ginsburg & Silverman, 1996; Uba, 1984). We predicted that ethnic groups that place greater value on maintaining close relationships among family members such as Chinese Americans, Filipino Americans, Native Hawaiians, and Japanese Americans would demonstrate higher scores on separation anxiety and have higher percentages of clinical elevation on this scale than Whites.

Third, we examined group differences in the relation of temperament to anxiety and depression symptoms. This was done in two steps: (a) The overall structure of the model relating NA and PA to depression and anxiety symptoms was tested for uniformity across all groups using multisample structural equation modeling, and (b) the strength of the relations between NA, PA, and the disorders was tested for uniformity across groups using multisample structural equation modeling. Based on previous research supporting the model (e.g., Brown et al., 1998; Chorpita, Plummer, et al., 2000; Clark & Watson, 1991; Joiner et al., 1996; Lonigan et al., 1994), we predicted that there would be no difference in the structure of the model relating NA and PA to anxiety and depression. In terms of predicting ethnic group variations in the strength of relations between NA, PA, and the disorders, there is little research available to guide prediction about the role of culture and its influence on the relation between temperament and anxiety and depression. As a result, this aspect of the study is viewed as exploratory in nature, and no specific predictions were made.

Method

Participants

Participants for this study were drawn from a sample of 1,578 children and adolescents in Grades 3 through 12 on O'ahu Hawaii. Children and adolescents were recruited for this study from 13 public and private high schools. The sample was geographically and economically representative of the general population on O'ahu. The overall response rate among children and families that were asked to participate in the study was 73%.

Children and adolescents representing the five largest ethnic groups (n = 1,155) were included in the sample. The ethnic groups included in the sample were as follows: White (n = 133; 11.5%), Chinese American (n = 138; 11.9%), Filipino (n = 217; 18.8%), Native Hawaiian (n = 204; 17.7%), and Japanese American (n = 463; 40.1%).

The children and adolescents ranged in age from 7 to 18 (M = 12.61, SD = 2.75), with more girls (n = 643; 55.7%) than boys (n = 512; 44.3%) participating. A one-way analysis of variance found significant differences in age among ethnic groups, F(4, 1,150) = 10.55, p < .05. Post hoc analyses using Tukey's honestly significant difference test indicated that the children in the White group were significantly older than the children in the Japanese American and Native Hawaiian groups.
(mean differences = 0.85 and 1.03, respectively; both *p* < .05). Similarly, Filipino American children reported being significantly older than Chinese American, Japanese American, and Native Hawaiian children (mean differences = 0.88, 1.22, and 1.39, respectively; all *ps* < .05).

More than 20 different ethnicities were identified by participants in the study. Twenty percent of the sample reported speaking a language other than English in the home either exclusively or in combination with English. The languages most commonly reported were Pidgin (5.5%), Japanese (4.2%), Chinese (4.1%), Filipino (3.6%), and Hawaiian (1.4%). Twenty-six percent of the sample self-identified as two ethnicities and 33% reported being three or more ethnicities. Participants were grouped according to their self-reported ethnic group of primary identification.

**Instruments**

The instruments included in these analyses were a demographic questionnaire, items from the RCADS (Chorpita, Yim, et al., 2000), and the AFARS (Chorpita, Daleiden, et al., 2000), an empirically derived measure of tripartite dimensions in children. The demographic questionnaire is a self-report measure that asks children to report their age, grade, gender, ethnicities listed by name, ethnic group of primary identification, and languages other than English spoken at home.

The RCADS is a 47-item self-report instrument designed to measure symptoms associated with *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. [DSM–IV], American Psychiatric Association, 1994) diagnostic criteria for social phobia (9 items), separation anxiety (7 items), PDA (9 items), OCD (6 items), GAD (6 items), and depression (10 items) among children and adolescents. Children are asked to rate how often each item applies to them. Items on the instrument are scored as 0 (*never*), 1 (*sometimes*), 2 (*often*), or 3 (*always*).

Chorpita, Yim, et al. (2000) found significant subscale differences in means among children of different ages and gender. They concluded that the use of *T* scores based on age and gender may be the most appropriate method for using the RCADS as they provide a more specified reference group for comparison. Clinical elevations on the RCADS are defined as having *T* scores of 65 or higher.

The items that make up each subscale were empirically derived. The total scale yields an internally consistent factor structure that corresponds to DSM–IV criteria for anxiety disorders and depression (Chorpita, Yim, et al., 2000). The scale has been administered to children and adolescents Grades 3 through 12 from a wide range of ethnic groups (Chorpita, Yim, et al., 2000). Further support for the scale’s reliability was found through test–retest analyses yielding reliability coefficients between .69 and .82 across subscales in a multiethnic sample ranging in age from 8 to 18 (Chorpita, Yim, et al., 2000). The scale’s validity was also supported in the same study as RCADS subscale scores correlated with scores on related child anxiety and depression measures.

The AFARS is a 27-item self-report instrument designed to measure NA, PA, and PH among children and adolescents. Items are scored using a 4-point scale ranging from 0 (*never true*) to 3 (*always true*). The scale is divided into three subscales corresponding to NA, PA, and PH. There are 8, 10, and 9 items in the NA, PA, and PH subscales, respectively. The total score is not used because its meaning would be unclear theoretically.

In a large multiethnic school-based sample (ages 7 to 18), Chorpita, Daleiden, et al. (2000) reported internal consistency estimates ranging between .77 and .81 for PA, NA, and PH. The scale’s three-factor structure was found to be consistent with the tripartite model of emotion. Consistent with prediction, NA and PA were found to be relatively orthogonal constructs, whereas PH was positively correlated with NA. Only items from the NA and PA scales were used in this study. There were tests for differences by gender, grade level, and ethnicity yielded nonsignificant or minimal differences in scores on each of the three subscales (NA, PA, and PH). See Chorpita, Daleiden, et al. for normative data by grade level and gender.

**Procedure**

Participants were administered the questionnaires in groups at their schools following the acquisition of written parental consent and verbal assent by the child or adolescent. All participants were read a standardized set of instructions, advising participants to read each item and select the answer that seemed most appropriate. The participants were reminded that their responses would be kept confidential and that there were no right or wrong answers. The order of presentation of the RCADS and AFARS was randomly varied.

**Results**

**Ethnic Group Differences in Subscale Scores**

Ethnic group differences in NA and PA were examined using subscale scores on the AFARS. Because of their orthogonal nature, NA and PA were examined separately using analyses of variance across ethnic groups. Bonferroni’s correction was used to address the potential risk of inflating a Type I error, setting the alpha level for this set of univariate analyses at .025.
With respect to temperament, no significant difference was found among ethnic groups in NA score. The analysis of variance did, however, indicate a significant difference in PA items by ethnic group: $F(4, 1119) = 6.26, p < .025$. Post hoc analyses of PA using Tukey’s honestly significant difference test indicated that Native Hawaiians reported significantly more PA than Japanese Americans. Out of a total of 30 possible points, Native Hawaiians scored a mean difference of 1.98 higher than Japanese Americans, $p < .025$.

Ethnic group differences in anxiety and depression were examined using subscale scores on the RCADS. MANOVAs were used to examine whether ethnic group differences existed on any of the subscales while controlling for Type I error. The alpha level for these comparisons was set at $\alpha = .05$. See Table 1 for means and standard deviations.

A multivariate analyses of Anxiety and Depression subscale scores on the RCADS by ethnic group was significant, Pillai’s trace = 0.066, $F(24, 4536) = 3.184$, $p < .05$. The effect size for this MANOVA was $\eta^2 = 0.02$. Following the significant finding of the MANOVA on this set of variables, univariate analyses were performed to determine whether significant differences were found on each of the subscales.

Univariate analyses of ethnic group differences in scores on the six RCADS subscales indicated significant ethnic group differences for separation anxiety items, $F(4, 1147) = 5.58, p < .05$; PDA items, $F(4, 1148) = 5.05, p < .05$; social phobia items, $F(4, 1143) = 4.71, p < .05$; and OCD items, $F(4, 1143) = 5.35, p < .05$ (see Table 1). No significant ethnic group differences were found for depression items and GAD items.

Tukey’s honestly significant difference test was used for all post hoc analyses of ethnic group differences in subscale scores. For separation anxiety (27 possible points), Native Hawaiians scored significantly higher than Filipino Americans (mean difference = 0.83, $p < .05$), Japanese Americans (mean difference = 0.91, $p < .05$), and Whites (mean difference = 1.49, $p < .05$). Native Hawaiians also scored significantly higher on post hoc tests of PDA items (27 possible points) than both Japanese Americans (mean difference = 1.07, $p < .05$) and Whites (mean difference = 1.45, $p < .05$). Filipino Americans also scored significantly higher on PDA than Japanese Americans (mean difference = 0.89, $p < .05$) and Whites (mean difference = 1.28, $p < .05$).

Chinese Americans scored significantly higher for social phobia (27 possible points) than Native Hawaiians (mean difference = 1.56, $p < .05$) and Whites (mean difference = 1.91, $p < .05$). Filipino Americans also scored significantly higher than Whites (mean difference = 1.51, $p < .05$) for social phobia.

For OCD items (18 possible points), both Native Hawaiian and Filipino Americans scored significantly higher than Japanese Americans (mean difference = 0.88, $p < .05$, and mean difference = 0.91, $p < .05$, respectively). Native Hawaiians and Filipino Americans also scored higher than Whites for OCD (mean difference = 1.29, $p < .05$, and mean difference = 1.32, $p < .05$, respectively, out of 18 possible points).

**Clinically Elevated Subgroups**

Figure 1 shows the percentage of each ethnic group with clinically elevated scores on each of the six subscales of the RCADS. Although the percentage elevations on both the depression and GAD subscales were relatively similar across ethnic groups, elevation rates were more variable on the other anxiety subscales. Chinese American and Japanese American groups had relatively similar percentages of clinical elevations across domains. Native Hawaiian and Filipino Americans, although both more variable, were also somewhat consistent in their pattern of elevations.

For each scale, a chi-square test was performed to test for independence of clinical elevation by ethnicity. A significant chi-square would mean there was a relation between ethnicity and clinical elevation on a particular scale. The scores for each ethnic group were split into individuals scoring in the normal range and those scoring in the clinically elevated range ($T$ score of 65 or higher). A chi-square analysis of PDA was significant, $\chi^2(4) = 13.81, p < .05$. Similarly, a chi-square analysis of separation anxiety was also found to be significant, $\chi^2(4) = 11.42, p < .05$. These finding suggest that ethnicity is related to clinical elevation on PDA and separation anxiety. Visual inspection of these subscales suggests that Native Hawaiian and Filipino Americans had higher percentages of clinical elevations than Chinese American, Japanese American, and Whites on both PDA and separation anxiety (Figure 1). Chi-square analyses of the proportion of clinical elevations by ethnic group were not significant for depression, GAD, OCD, and social phobia.

**Multisample Solutions**

Individual items on the RCADS and AFARS were combined into groups and summed in the same manner described in Chorpita (2002) to create a model in which each variable has three indicators. The reasoning behind this strategy was to (a) improve the distributional properties of each indicator and (b) minimize the contribution of measurement effects to model fit. Thus, fit statistics were meant to reflect primarily the fit of the relations among the latent variables in the model.

For structural equation models, LISREL 8.12a was used to examine the covariance among variables. Several fit indexes were used to evaluate the overall fit the model. Similar to Chorpita (2002) the Goodness-of-Fit Index (Jöreskog & Sörbom, 1996), the comparative fit index (CFI; Bentler, 1990), the root mean squared error
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<td>1,148</td>
<td>5.53</td>
<td>3.49</td>
<td>1,148</td>
<td>4.70</td>
<td>3.86</td>
<td>1,153</td>
<td>7.74</td>
<td>3.77</td>
</tr>
</tbody>
</table>

Note: * = significant main effect of ethnic group on subscale score at \( \alpha = .05 \); ** = significant main effect of ethnic group on subscale score at \( \alpha = .025 \). PA = positive affectivity; NA = negative affectivity; SAD = separation anxiety disorder; SP = social phobia; OCD = obsessive compulsive disorder; PDA = panic disorder and agoraphobia; GAD = generalized anxiety disorder; DEP = depression.
of approximation (RMSEA; Steiger, 1990), and the standardized root mean square residual (SRMSW) were used to determine good model fit. For all tests, a maximum likelihood algorithm was used to determine model fit.

Multisample analysis was used to test whether the structure of the full unrestricted model fit equally well across the five ethnic groups (see Table 2). This solution yielded a Goodness-of-Fit Index of 0.92, an RMSEA of 0.022 (test of close fit [RMSEA < 0.05], $p = 1.00$), a CFI of 0.94, and an SRMSR of 0.053, suggesting that an equivalent structure across groups fit the data well. The chi-square for this solution was 1,782.73 with 1,150 df ($p < .0001$).

Next, a second model was tested using the same structure (see Figure 2) but with all paths constrained to be equal across ethnic groups. The fit of this model was compared with the full unrestricted model. The difference in chi-square between this fully constrained model and the full model was statistically significant ($\chi^2$ difference = 448, $df = 280$, $p < .01$), suggesting that some parameters within the model differed across ethnic groups.

Finally, a third model was tested using the same structure but with all paths between the two temperamental variables and the six disorders constrained to be equal across ethnic groups. No significant increase in chi-square was found when the model was compared with the full unrestricted model, suggesting that the five ethnic groups did not differ significantly in the strength of the relations between NA and PA and the six disorders. As a result, no further models using the same structure that constrained specific paths between temperamental and symptom level variables were tested. The path coefficients in this final model (Figure 2) were: 0.30 (NA to separation anxiety), 0.50 (NA to social phobia), 0.57 (NA to OCD), 0.49 (NA to PDA), 0.56 (NA to GAD), 0.60 (NA to depression), and −0.35 (PA to depression). No paths were estimated between PA and the Anxiety subscales.

**Discussion**

These findings support three hypotheses regarding temperament and anxiety and mood disorders. First, a MANOVA confirmed that there were no ethnic group differences in average score for NA, PA also appeared to be relatively consistent across ethnic groups, with one exception: Native Hawaiian children and adolescents reported significantly higher PA scores than Japanese American children and adolescents. This is an interesting finding given that low PA tends to be associated with greater depression and yet no ethnic group differences in depression were found.

Second, with respect to ethnic group differences in symptoms of anxiety and mood disorders, ethnic variations in specific anxiety disorders were found. Significant differences in mean score between two or more ethnic groups were found for all of the anxiety disorders scales with the exception of GAD. Native Hawaiians scored significantly higher than Filipino Americans, Japanese Americans, and Whites for separation anxiety. Although this is somewhat consistent with our prediction that Native Hawaiians would score significantly higher than Whites due to their greater emphasis on familial closeness, the same pattern was not observed for Japanese Americans or Chinese Americans. Moreover, the same pattern was also not found for Filipino Americans in terms of average score but was found for both Native Hawaiians and Filipino Americans, with higher percentages of their samples scoring
Table 2. Effects of Model Constraints Across Ethnic Groups in a Multisample Analysis

<table>
<thead>
<tr>
<th>Parameters</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$p$</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>None (full model)</td>
<td>1,782.73</td>
<td>1150</td>
<td>0.00</td>
<td>446.41</td>
<td>280</td>
<td>0.0000</td>
</tr>
<tr>
<td>All paths constrained</td>
<td>2,229.14</td>
<td>1430</td>
<td>0.00</td>
<td>88.92</td>
<td>64</td>
<td>0.0313</td>
</tr>
<tr>
<td>All paths from latent variables to indicators (i.e., factor loadings)</td>
<td>1,871.65</td>
<td>1214</td>
<td>0.00</td>
<td>29.76</td>
<td>28</td>
<td>0.3402</td>
</tr>
<tr>
<td>All paths from NA and PA to disorders</td>
<td>1,812.49</td>
<td>1178</td>
<td>0.00</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Note: NA = negative affectivity; PA = positive affectivity.

Figure 2. NA, PA, anxiety, and depression: the final model and path coefficients.

in the clinical range for separation anxiety than the other ethnic groups.

Consistent with our hypothesis, Chinese Americans reported significantly more social anxiety than did Native Hawaiians and Whites. Chinese Americans also had the highest percentage of their sample scoring in the clinical range for social anxiety, although the difference was not statistically significant in chi-square analysis. These findings support the notion that cultural groups that assign greater shame to norm violations will have members that show higher levels of social anxiety. Additionally, Filipino Americans reported significantly higher levels of social anxiety than Whites. Contrary to our hypotheses, Japanese American children and adolescents did not report significantly higher levels of social anxiety than other groups.

An overall pattern emerged in which Native Hawaiian and Filipino American children and adolescents tended to score at the same level or higher than Japanese Americans, Chinese Americans, and Whites across five of six indicators of anxiety and depression. Only the Social Phobia subscale performed differently, with Chinese Americans scoring higher than Native Hawaiians and Filipino Americans.

No significant ethnic group differences were found for either depression or GAD both in terms of average score or percentage of clinical elevation. This finding is not entirely surprising given that both of these disorders are hypothesized to be most strongly related to NA (Brown et al., 1998), on which we also found no differences.

Third, as expected, temperament was related to anxiety and depression symptoms such that high NA was associated with greater anxiety and both high NA and lower PA were associated with greater depression. Consistent with our hypothesis, no ethnic group variations in the strength of the relation between NA and the anxiety disorders were found. Multisample analyses suggested that NA is related to anxiety and depression in universally consistent manner across the five ethnic groups sampled. What this suggests is that, although there are variations between ethnic groups in terms of the level or severity of anxiety, there are no differences in the proportion of variance in that level that is explained by NA. These observed ethnic group differences must therefore be explained by factors associated with ethnic or cultural group membership that are unrelated to and do not interact with temperament, such as cultural group norms for interaction.

An important limitation to this study is that ethnic group membership is just one way to measure culture. Although there is often an overlap between ethnicity and culture, belonging to an ethnic group does not necessarily determine one’s cultural affiliation. In this study, participants were grouped according to self-identified ethnic group of primary identification. Using ethnic group of primary affiliation to represent culture can conceal
distinctions that can be made among individuals identifying with each group, such as level of acculturation. Findings from this study suggest that there are factors associated with ethnic group membership that influence level of anxiety above and beyond that expected when dimensions of temperament such as NA and PA are taken into account. Language spoken at home, generation status, level of acculturation and ethnic identity, immigration status, the cultural groups present in each participant's community, and the number of ethnicities individuals have may be examples of these factors associated with ethnic group membership that were not examined in this study. As a result, we can only speculate as to which factors associated with ethnicity may be important predictors of level of anxiety.

Failure to find significant differences among ethnic groups in the severity and intensity of disorders or in the strength of the relation between NA and anxiety symptoms may be an artifact of the way that culture has been operationalized here rather than an indication that culture does not play a role in the expression of anxiety and depression symptoms. At the same time, culture is often a complex and difficult construct to measure and incorporate into assessment in a meaningful way. Future research in this area should focus on further specifying particular aspects of culture that influence the expression of anxiety and depression symptoms among children and adolescents and developing ways to measure them.

It does appear, however, that despite these concerns this manner of grouping individuals revealed an important aspect of anxiety and depression such that ethnic group membership is in some cases associated with level of anxiety but not depression among children and adolescents from five ethnic groups. Future research should focus on further specifying these factors or characteristics associated with ethnic or cultural membership that are linked for some groups to higher levels of specific types of anxiety.

In addition, this study uses single-informant, self-report methodology exclusively, precluding any opportunity to use multiple informants to establish the validity of the information being provided. An important goal of future research is to incorporate multiple measurement strategies into the assessment of anxiety and depression. Moreover, future research will need to incorporate the full tripartite model, including PH, to determine its utility as a means of assessing and describing anxiety and mood disorders.

The findings from this study also contribute to the accumulation of literature on the tripartite model and speak to its generalizability across five ethnic groups in Hawaii. Because the majority of child studies of the tripartite model have been conducted on mostly White samples (e.g., Chorpita, Albano, & Barlow, 1998; Joiner & Lonigan, 2000), this study broadens our understanding of the tripartite model and its relevance to a wider range of children and adolescents. A major finding of this study is that across these five ethnic groups, NA contributes strongly to symptoms of anxiety and depressive disorders and can be considered a risk factor for the development of these types of disorders. This is an important focus of future research in that we have identified NA as a useful starting point for assessing risk for developing anxiety and depressive disorders across five ethnic groups. Future attempts to design assessment instruments in this area can therefore focus on explaining the variance left over after NA has been accounted for. Cultural group norms for appropriate social behavior and family closeness along with the extent to which an individual child identifies with his or her cultural group may be important factors to assess among children and adolescents from these ethnic groups. Assessing these factors can enable a clinician to understand their behavior within a cultural framework that may have a different definition of what is normal and appropriate behavior so that more effective treatment can be provided.

References


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