A Cross-Cultural Investigation of Cognitions and Depressive Symptoms in Adolescents

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Adolescents (N = 2,272) from Hong Kong and the United States provided information regarding their depressive symptoms, cognitions (self-efficacy, negative cognitive errors, and hopelessness), and stressful events between 2 surveys 6 months apart. Depressive symptoms and hopelessness were higher, and self-efficacy and negative cognitive errors were lower in Hong Kong than in the United States. Cognitions were associated with concurrent depressive symptoms and predicted depressive symptoms 6 months later in both cultures. The “reverse” model was also supported with more variance predicted by depressive symptoms to later cognitions than from cognitions to depressive symptoms. There was some support for the hypothesis that self-efficacy is less salient in collective compared with individualistic cultures. These findings extend cognitive theories of depression to a non-Western culture.

Depression is among the leading causes of disability worldwide (World Health Organization, 2001). Some of the most effective treatments for depression are based on cognitive interventions; however, the role that cognitions play in depressive symptoms is little understood outside the West. This study explored the relationship between cognitive patterns and depressive symptoms in a community sample of youths in Hong Kong and the United States. In addition, it examined an emerging question about cognitions’ relationship to depressive symptomatology: Are depressive symptoms predicted by cognitive variables, or are “depressogenic cognitions” a product of depression?

Cognitions have been proposed as universal mediators between events and mood (Beck, Rush, Shaw, & Emery, 1979). Self-efficacy, negative attributions, and hopelessness have each been given importance as concomitants, vulnerability agents, or both in the development of depressive symptoms.

Bandura (1997) has proposed that self-efficacy, or individuals’ beliefs in their ability to manage the challenges they face and achieve the ends important to them, is central to emotional well-being. In community groups, high self-efficacy predicts better social support and indirectly prevents depression as individuals age (Holahan & Holahan, 1987). In nonreferred children, self-efficacy beliefs associate with concurrent self-report of depressed mood and predict mood up to 2 years later (Bandura, Pastorelli, Barbaranelli, & Caprara, 1999).

The tendency to attribute negative events to the self and positive events to external causes (negative cognitive errors) has been considered an important characteristic of depressed individuals. These thought processes have been termed distortions because they take place when there is no objective evidence to support the attributions. Cognitive distortions accompany depressed mood in clinical and nonreferred young people (Tem, Stewart, Skinner, Hughes, & Emslie, 1993). Joiner and Wagner (1995) concluded from their review that attribution style and both depressed mood and diagnosis of depression are clearly correlated. Similarly, hopelessness, reflected in the tendency to attribute negative events to stable and global causes, has been given a central role as a vulnerability agent in cognitive theories of depression (Abramson, Metalsky, & Alloy, 1989). It has been recognized that such theories may also apply to subsyndromal forms of depression in nonclinical samples (Alloy et al., 1999).

Accumulating evidence suggests that the cognitions that have been proposed to underlie depressive symptoms may in fact be a manifestation of depression (Asarnow & Bates, 1988; Cole, Martin, Peeke, Seroczynski, & Hoffman, 1998; Tems et al., 1993). McGrath and Repetti (2002) found that self-reported depressive symptoms predicted future negative views of the self. In contrast, negative self-perceptions were much less effective at predicting changes in depressed mood over time. The two models are in fact not necessarily mutually exclusive. In Beck’s (Beck, Rush, Shaw, & Emery, 1979) paradigm, cognitions and mood affect each other to pull an individual down into the depths of depression. Although

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clinicians know and use the concept of a spiral, effects from cognitions to mood have been far more examined in the empirical literature than have effects from mood to cognitions.

Culture and Depression

Different cultures support their members at different levels, and life stress may thereby be more or less mitigated. Culture may play a role in differences in frequency of disorders in different groups (Tanaka-Matsumi, 2001). The traditional communal emphasis of Chinese culture has been postulated to be protective against factors that increase vulnerability to depression (Chen, 1996; Tseng, Lin, & Yee, 1995). Rapid socioeconomic transformation may be weakening these protective forces (D. Lee, Yip, Chiu, Leung, & Chung, 2001; Parker, Gladstone, & Chee, 2001).

Culture may influence the cognitive predictors of mood. Markus and Kitayama (1991, 1994) have proposed that in individualistic cultures, positive feelings come from a sense of autonomy, personal accomplishment, and agency. In contrast, in collective cultures, positive feelings depend on the sense of connection to others and fulfilling obligations. Extrapolating from the models described previously, in Chinese cultures it would be predicted that a lowered internal sense of personal worth, efficacy, and control may be less salient in the Asian context.

Culture may also play a part in how distress is expressed. Cross-cultural observations suggest that somatic symptoms are more commonly expressed by non-Western (Marsella, Sartorius, Jablensky, & Fenton, 1985) and specifically Chinese groups (Parker et al., 2001), whereas feelings of guilt, self-deprecation, suicidal ideation, and depressed mood are frequently less common compared with Western groups (Marsella et al., 1985). Triandis (1994) has suggested that individualists are more influenced by internal events such as cognitions, whereas communal culture members are more influenced by external regulations and norms. Emphasis on external rather than internal control of events may also reduce the focus on cognitive variables such as hopelessness (Chiles et al., 1989).

Self-reported symptoms of depression have been found to be higher than reported in the West among nonreferred Chinese high school students (Stewart et al., 1999) and university students (Stewart et al., 1995) in Hong Kong. Studies of the general population in Chinese communities (Chen, 1996; Hwu, Chang, Yeh, Chang, & Yeh, 1996) have indicated that prevalence rates for adult major depressive disorders (MDD) are relatively low compared with the West. In an earlier article, Stewart et al. (2002) examined the prevalence of MDD among adolescents in Hong Kong. In contrast to studies with adults, their findings indicate that current prevalence rates for MDD were similar to those reported in a U.S. community sample. Somatic and cognitive symptoms were compared in Hong Kong and U.S. adolescents matched for age, sex, and depression severity. Some somatic symptoms (particularly those associated with the overlapping, indigenous diagnosis of neurasthenia) were present at higher rates among the depressed Hong Kong youths than reported in the United States. However, cognitive symptoms were equally frequent in the two groups. Our findings are consistent with the literature that indicates that affective and cognitive symptoms, if specifically queried for, are evident among depressed Chinese individuals.

Few studies on cognitive variables and mood in Chinese populations have appeared in the international literature. Anderson (1999) reported that maladaptive attribution styles of taking responsibility for failure but accepting little credit for success explained differences in depressed mood between college student samples in China and the United States. A chance locus of control was associated with emotional distress in patients in remission from nasopharyngeal cancer (Sun & Stewart, 2000) and with children and adolescents with diabetes (Stewart et al., 2000). In an outpatient sample, Cheung and Sun (1999) found that self-efficacy correlated with level of depressive symptoms in outpatient adults with mild psychological symptoms.

Leung and Wong (1998) examined the association between negative cognitive errors and the Youth Self-Report Form in a community sample of Hong Kong adolescents. They found that cognitive errors were associated with internalizing but not externalizing syndromes. Leung and Poon (2001) investigated whether cognitive distortions were specific to emotional and behavioral problems assessed through self-report in a community sample of 12- to 18-year-olds. They found some evidence for problem-specific cognitions in the presence of self-reported anxiety, depression, and aggression.

Hong Kong is not a "typical" Chinese city, but it offers a very specific context within which to examine the relationships between culture and mood disorders. Through much of Asia, rapid social changes have occurred as a result of the urbanization and westernization of the past two decades. Arnett (1999) has predicted that adolescent distress increases in traditional cultures as they modernize, and Hong Kong, the most modernized city in Asia, might reflect the picture that will be prevalent in other Asian cities in the near future.

Thus, there is some evidence that depressive symptoms and their correlates are similar in Hong Kong/Mainland Chinese groups as they are for their counterparts in the West. Furthermore, the association between some cognitive variables and internalizing symptoms has been established in cross-sectional studies. However, they have yet to be examined with cross-cultural reference or longitudinal models. Questions regarding the mutual influence of depression and cognitions have also not been previously examined.

The present study addressed the following questions. First, are the cognitive variables of self-efficacy, negative cognitive errors, and hopelessness associated with depressive symptoms in Hong Kong and in the United States? We hypothesized that cognitive variables would be associated with depressive symptoms in both cultures, consistent with the existing evidence regarding cognitive concomitants of MDD and self-reported depressed mood. However, on the basis of Markus and Kitayama’s (1994) formulations, we predicted that self-efficacy would be associated with depressed mood in the United States more strongly than in Hong Kong. Second, we asked whether data would support a causal model in which cognitive variables predict future depressive symptomatology. Finally, we examined support for the reverse model, whereby levels of depression predict “depressogenic” cognitive variables.

This study adds to the present literature by expanding investigation of cognitive theories to non-Western groups, including cross-cultural comparisons, investigating a nonreferred group that is particularly important in a culture in which help seeking is much less common than in North America, assessing over a longitudinal span, and including several different cognitive variables.
Method

Participants

Hong Kong. The participants were 1,771 students who represent a cross-section of 14- to 18-year-olds from the high school population of Hong Kong. They were sampled from 11 schools in Hong Kong to incorporate three indices of variation in this culture: geographical location, socioeconomic status of the attendees, and range of academic abilities of attendees. Final average participation rate was 80%. All students were ethnic Chinese. Demographic characteristics of both groups are presented in Table 1.

United States. The sample consisted of 501 high school youths, ages 14–18, recruited from urban (one), suburban (two), and rural (four) schools in the Dallas–Fort Worth, Texas area. Informed consent was obtained by signature from parents, with a final average participation rate of 28%. The majority of participants (55%) were Caucasian; 4% described themselves as Asian.

This study was approved by the Institutional Review Board of the University of Texas Southwestern Medical Center and the Ethics Committee of the Faculty of Medicine of the University of Hong Kong.

Measures. Measures were administered to all participants on two occasions (unless otherwise noted) separated by 6 months. The following steps were taken to ensure that the psychometric properties of the scales were adequate to assess the construct in the Hong Kong sample (see Stewart & Bond, 2002). Time 1 (T1) responses for all scales were subjected to the following procedures. A confirmatory factor analysis was first conducted separately for each cultural group. The number of factors derived was dictated by the original instrument. For any item to be computed; therefore, there is a variation in the numbers of participants across the analyses.

Depressive symptoms. These symptoms were assessed in Hong Kong by using the Chinese version of the revised Beck Depression Inventory (C-BDI-II; Chinese Behavioral Sciences Society, 2000) and in the United States with the BDI-II (Beck, Steer, & Brown, 1996). The items are identical to those in the BDI-II. The C–BDI-II version used in this study did not include the item on sexual interest because several school principals found it objectionable; this item was also dropped from the U.S. analyses. The previous version of the C–BDI-II has been widely used in many different cultures. Support for validity of the C–BDI-II is offered by the significant correlation (Pearson’s r = .64) between the total score and the short form of the General Health Questionnaire, an instrument that has been validated (P.W.H. Lee, Lam, Ong, Wang, & Kleevens, 1985) as a measure of distress in the Hong Kong population and that has been widely used with various subsectors of the population, including adolescents (e.g., Lam, Stewart, Ho, & the Youth Sexuality Study Task Force, 2001; Stewart et al., 2000). The confirmatory factor analysis showed that all items loaded onto a single factor at greater than or equal to .40 for both cultures. The alphas were .89 and .93 in Hong Kong and the United States, respectively.

Beck et al. (1996) proposed that BDI scores between 14 and 19 were indicative of mild depression, 20–28 of moderate depression, and higher than 28 of severe depression. Frequency distributions for each of these categories are presented in Table 1.

Cognitive variables. Self-efficacy was assessed using a 10-item Generalized Self-Efficacy Scale (Schwarzer, 1992), which has been translated and validated with the Hong Kong population (Cheung & Sun, 1999). All 10 items of this scale loaded at .45 or higher onto a single factor in both cultures. The alphas were .83 and .89 in Hong Kong and the United States, respectively.

Negative cognitive errors were examined with the Children’s Negative Cognitive Errors Questionnaire (Leitenberg, Yost, & Carroll-Wilson, 1986). This scale has previously been used and validated in Hong Kong (Leung & Wong, 1998). In the present study, all 24 items loaded onto a single factor (consistent with Messer & Kempton, 1994) at .40 or higher. The alphas in the Hong Kong and the U.S. samples were .89 and .95, respectively.

Hopelessness was measured using the Hopelessness Scale for Children (Kazdin, Rodgers, & Colbus, 1986), a 17-item true–false scale measuring a child’s negative expectations about the future. A confirmatory factor analysis revealed four factors for the two cultural groups, much as in the original report, with the two largest factors incorporating most of the items. A single score is used by convention for this test, and items incorporated into it for this study were the 11 common items that loaded onto the largest factor for both cultural groups at .35 or greater. The alphas for the Hong Kong and the U.S. samples were .74 for Hong Kong and .82 for the United States.

Stressful events. At Time 2 (T2), all participants were asked whether there had been any major changes, and range in their lives in the previous 6 months since the last survey, and they were also asked to indicate the nature of the change(s). Thirteen percent (n = 224) in Hong Kong and 36% (n = 180) in the United States indicated that there had been a change. In Hong Kong, of those indicating that there had been a change, 71% indicated one category of change, 21% indicated two changes, and 8% said they had three or more changes during the period since the preceding survey. Among adolescents in the United States indicating a change, 70% indicated...
a single change, 19% indicated two changes, and 11% described three or more changes. They were asked about the extent of distress that these changes had caused, on a scale from 1 (not at all) to 4 (a great deal), and responses on this scale were used as a control for intervening life stress when longitudinally assessing cognitive influence on depressive symptoms.

Results

Table 2 presents the means and standard deviations for the variables of the study, separated by culture and sex. A multivariate analysis of variance with culture and sex as variables revealed significant effects for both culture, $F(9, 1623) = 46.14, p < .001$, and sex, $F(9, 1623) = 14.72, p < .001$, and the interaction, $F(9, 1623) = 2.78, p < .01$. Depression and hopelessness were higher in Hong Kong, and depression was higher in girls. The discrepancy between sexes in depression was less in Hong Kong than in the United States. Self-efficacy was lower in Hong Kong and among girls.

Cognitions and Depressive Symptoms: Bivariate and Multivariate Analyses for Concurrent Associations

Bivariate associations among variables are reported separately for each culture in Table 3. In both Hong Kong and the United States, the three cognitive variables were significantly associated with depressive symptoms. Associations were stronger to depressive symptoms in the U.S. sample compared with the Hong Kong sample for self-efficacy ($z$ for difference = 5.49 at $T_1$ and 4.90 at $T_2$; both $ps < .001$), hopelessness ($z$ for difference = 3.80 at $T_1$ and 3.60 at $T_2$; both $ps < .001$), and $T_2$ cognitive errors ($z$ for difference = 2.00 at $T_2$, $p < .05$).

For multivariate regression analyses, the following procedures were followed. The initial analyses combined the two cultures and sexes. Culture, sex, and age were entered as control variables at Step 1, and the predictors were entered at Step 2. These analyses were followed by tests of the interaction terms for each predictor by culture and sex, as well as by three-way interaction terms. All two- and three-way interactions were tested individually, and the appropriate two-way interaction terms included the three-way tests. If any of the interaction terms were significant, the direction of the differences found in the interaction was reported.

Multivariate analyses were conducted to determine the unique relationships of the cognitive variables with depressive symptoms. Concurrent associations were tested at $T_1$. Depressive symptoms were first analyzed categorically, with BDI scores separated into those that indicated minimal or mild depression (BDI score at or below 19) versus moderate or severe depression (BDI above 20), and the categories were then used as the dependent variable in logistic regression analyses. Age and sex were entered as control variables in Step 1. Results from Step 2 are presented in Table 4. Cognitive variables offered unique prediction to depression that was defined categorically. The effect was weakest for self-efficacy and strongest for hopelessness. Culture and sex interactions were not significant, indicating that the strength of the predictors was equal in both cultures and for boys and girls.

Multivariate analyses were then conducted with the continuous depressive symptoms score, entered at Step 2, and also presented in Table 4. Forty-one percent of the variance in $T_1$ depressive symptoms was explained by concurrent cognitive variables, $F(3, 1632) = 390.34, p < .001$; all cognitive variables contributed to the variance in depressive symptoms. Self-efficacy and hopelessness contributed more variance to depressive symptoms in the United States than in Hong Kong. Cognitive errors and hopelessness were stronger predictors for girls than for boys. Because of these interaction effects, the cultures and sexes were separated to determine differences in cognitions’ overlap with depressive symptoms. Cognitive variables added 40% to the variance in $T_1$ depressive symptoms in Hong Kong, $F(3, 1284) = 270.17, p < .001$, and 55% to this variance in the United States, $F(3, 343) = 124.24, p < .001$. When boys and girls were separated, cognitive variables added 33% to the variance for boys.

Table 2
Means, Standard Deviations, and Comparisons on Study Variables at Time 1 ($T_1$) and Time 2 ($T_2$)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Hong Kong ($N = 1,771$)</th>
<th>United States ($N = 501$)</th>
<th>Main and interaction effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boats ($n = 873$)</td>
<td>Girls ($n = 898$)</td>
<td>Boys ($n = 198$)</td>
</tr>
<tr>
<td>$T_1$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>12.50 (9.31)</td>
<td>15.45 (9.99)</td>
<td>9.22 (9.00)</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>2.64 (0.46)</td>
<td>2.53 (0.43)</td>
<td>3.06 (0.60)</td>
</tr>
<tr>
<td>Cognitive errors</td>
<td>2.05 (0.57)</td>
<td>2.12 (0.50)</td>
<td>2.21 (0.85)</td>
</tr>
<tr>
<td>Hopelessness</td>
<td>1.24 (0.21)</td>
<td>1.23 (0.21)</td>
<td>1.14 (0.19)</td>
</tr>
<tr>
<td>$T_2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>12.35 (9.78)</td>
<td>14.56 (10.06)</td>
<td>9.19 (9.32)</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>2.64 (0.49)</td>
<td>2.52 (0.46)</td>
<td>3.09 (0.57)</td>
</tr>
<tr>
<td>Cognitive errors</td>
<td>2.07 (0.63)</td>
<td>2.06 (0.58)</td>
<td>2.05 (0.78)</td>
</tr>
<tr>
<td>Hopelessness</td>
<td>1.24 (0.23)</td>
<td>1.21 (0.23)</td>
<td>1.14 (0.20)</td>
</tr>
<tr>
<td>Stressful events</td>
<td>0.26 (0.80)</td>
<td>0.39 (0.98)</td>
<td>0.67 (1.22)</td>
</tr>
</tbody>
</table>

Note. * Cohen (1988) provided the following guidelines for interpreting $d$: .20 = small-effect size, .50 = medium-effect size, .80 = large-effect size. **$p < .05$. *** $p < .01$. **** $p < .001$. 


Hong Kong (stronger predictor in girls in the United States compared with mine the nature of the interaction. Hopelessness was a significant were separated into the four sex-by-culture combinations to deter-

Table 3
Intercorrelations of Study Variables at Time 1 (T1) and Time 2 (T2)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 Depressive symptoms</td>
<td>—</td>
<td>—</td>
<td>.49</td>
<td>.54</td>
<td>.61</td>
<td>—</td>
<td>.40</td>
<td>.42</td>
<td>.14</td>
</tr>
<tr>
<td>T1 Self-Efficacy</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>T1 Cognitive errors</td>
<td>.49</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>T1 Hopelessness</td>
<td>.46</td>
<td>.43</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>T2 Depressive symptoms</td>
<td>.69</td>
<td>.38</td>
<td>—</td>
<td>.50</td>
<td>—</td>
<td>—</td>
<td>.52</td>
<td>.56</td>
<td>.20</td>
</tr>
<tr>
<td>T2 Self-Efficacy</td>
<td>.46</td>
<td>.62</td>
<td>.32</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.22</td>
<td>.31</td>
<td>.09</td>
</tr>
<tr>
<td>T2 Cognitive errors</td>
<td>.50</td>
<td>.30</td>
<td>.69</td>
<td>.41</td>
<td>.59</td>
<td>.42</td>
<td>—</td>
<td>.46</td>
<td>.08</td>
</tr>
<tr>
<td>T2 Hopelessness</td>
<td>.52</td>
<td>.32</td>
<td>.34</td>
<td>.54</td>
<td>.67</td>
<td>.52</td>
<td>—</td>
<td>—</td>
<td>.14</td>
</tr>
<tr>
<td>T1 to T2 Stressful events</td>
<td>.27</td>
<td>.06</td>
<td>—</td>
<td>.34</td>
<td>—</td>
<td>—</td>
<td>.12</td>
<td>.15</td>
<td>.22</td>
</tr>
</tbody>
</table>

Note. Hong Kong correlations are above the diagonal; U.S. correlations are below the diagonal. All correlations are significant at p = .001, except **p < .01 and ns, nonsignificant.

Cohen (1988) provides the following effect size guidelines for correlation-based effect sizes: .10 = small-effect size, .30 = medium-effect size, and .50 = large-effect size.

\[ F(3, 776) = 119.48, p < .001, \text{and 51\% for girls, } F(3, 851) = 288.90, p < .001. \]

Hopelessness, culture, and sex showed a significant three-way interaction (\( B = 1.79, SE B = 0.81, \beta = .21, p < .05 \)). The groups were separated into the four sex-by-culture combinations to determine the nature of the interaction. Hopelessness was a significant predictor for all four subgroups. However, it was a significantly stronger predictor in girls in the United States compared with Hong Kong (\( B = 5.45, SE B = 2.62, \beta = .30, p < .05 \), for interaction of culture with hopelessness in girls) and girls compared with boys in the United States (\( B = 5.49, SE B = 1.93, \beta = .40, p < .01 \), for interaction of sex with hopelessness in the United States).

In summary, all three cognitive variables accounted for variance in depressive symptoms among adolescents in both cultures, regardless of whether depressive symptoms were treated as categor- ical or continuous. Self-efficacy was the weakest of the three predictors in both cultures. Self-efficacy contributed less to depressive symptoms in Hong Kong compared with the United States; however, this finding was limited to predicting depression as a continuum and not categorically. In addition, hopelessness also predicted more variance in depressive symptoms in the United States compared with Hong Kong. Two of the three cognitive variables predicted more of the variance in depressive symptoms in girls than in boys, and hopelessness was a stronger predictor for girls, particularly in the United States.

**Longitudinal Prediction**

Prediction from T1 cognitive variables to T2 depression categories was first assessed using logistic regression, controlling at Step 1 for age, culture, sex, T1 depressive symptoms, and stressful events. Results for Step 2 are presented in Table 5. Self-efficacy at T1 did not predict change in level of depressive symptoms at T2. However, both cognitive errors and hopelessness were unique prospective predictors of change in categorization at T2. Culture interacted with cognitive errors, which were more consistent predictors of later depressive symptoms in Hong Kong than in the United States.

Prediction to T2 depressive symptoms as a continuous measure is presented in the second section of Table 5. The variance added by cognitive variables in predicting depressive symptoms 6 months later was significant but small in size (\( \Delta R^2 = .02 \), \( F(3, 1629) = 22.16, p < .001 \)). Cognitive errors and hopelessness at T1 provided unique information regarding changes in depressive symptoms from T1 to T2. Culture and sex by predictor and the three-way interactions were not significant.

**Reciprocal Causality of Cognitive Variables and Depressive Symptoms**

Table 6 shows the comparative effects of models in which single cognitions at T1 predict T2 depressive symptoms and the reverse models, with T1 depressive symptoms predicting T2 cognitive variables. Step 1 controlled for age, culture, sex, and the dependent variable at T1; results in Table 6 present the statistics for Step 2 in which the predictors were added. Each cognitive variable at T1 added small but significant amounts of variance to T2 depressive symptoms. Fs (1, 1634–1637) for change at Step 2 ranged from 8.69 to 48.93, ps < .05.

In the reverse model, all three cognitive variables at T2 were significantly predicted by depressive symptoms at T1, Fs (1, 1633–1638) for change at Step 2 ranged from 48.65 to 244.46, ps < .001. The amount of variance predicted was again very small but always larger that for T2 depressive symptoms predicted from T1 cognitions. Depressive symptoms at T1 contributed more to self-efficacy and cognitive distortions in the United States than in Hong Kong. Depressive symptoms at T1 also contributed more to cognitive distortions among girls than among boys.

There were significant three-way interactions for the T1 depressive symptoms effect on self-efficacy (\( B = 0.01, SE B = 0.00, \beta = .50, p < .01 \)) and cognitive distortions (\( B = 0.01, SE B = 0.00, \beta = .37, p < .05 \)). Although depressive symptoms at T1 predicted more variance in self-efficacy in U.S. boys than in Hong Kong boys, there were no cultural differences in prediction for girls and no sex differences within either culture. Depressive symptoms predicted more variance in cognitive errors in U.S. girls compared with Hong Kong girls; boys did not differ by culture. More variance was predicted for cognitive distortions among girls compared with boys within the United States, but this sex difference was not present in Hong Kong.
### Table 4
**Multivariate Regression of Depression Category and Continuum at Time 1 on Concurrent Cognitive Variables**

<table>
<thead>
<tr>
<th>Dependent variable and predictor&lt;sup&gt;4&lt;/sup&gt;</th>
<th>Total&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Culture&lt;sup&gt;6&lt;/sup&gt;</th>
<th>Sex&lt;sup&gt;6&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR (CI)</td>
<td>Hong Kong</td>
<td>United States</td>
</tr>
<tr>
<td>Depressed/Nondepressed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>0.67 (0.52–0.87)&lt;sup&gt;*&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive errors</td>
<td>2.42 (1.99–2.95)&lt;sup&gt;***&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hopelessness</td>
<td>111.38 (60.29–205.74)&lt;sup&gt;***&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>−1.76 .42 −.08&lt;sup&gt;***&lt;/sup&gt;</td>
<td>−1.03 .49 −.05&lt;sup&gt;*&lt;/sup&gt;</td>
<td>−3.29 .81 −.17&lt;sup&gt;***&lt;/sup&gt;</td>
</tr>
<tr>
<td>Cognitive errors</td>
<td>4.45 .32 .30&lt;sup&gt;***&lt;/sup&gt;</td>
<td>18.00 1.11 .40&lt;sup&gt;***&lt;/sup&gt;</td>
<td>24.00 2.29 .45&lt;sup&gt;***&lt;/sup&gt;</td>
</tr>
<tr>
<td>Hopelessness</td>
<td>19.46 1.00 .42&lt;sup&gt;***&lt;/sup&gt;</td>
<td>16.42 1.45 38&lt;sup&gt;***&lt;/sup&gt;</td>
<td>22.15 1.34 .47&lt;sup&gt;***&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

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

<sup>4</sup> Age, culture, and sex were entered in a prior step (Step 1). Separate values for the two cultures are reported if any of the Culture × Predictor interaction terms, tested individually at Step 3, was significant: B, SE B, β for Culture × Self-Efficacy and for Culture × Hopelessness are −2.61, .83, −.38<sup>**</sup> and 5.94, 2.16, .31<sup>**</sup>, respectively. Separate values for boys and girls are reported if any of the Sex × Predictor interaction terms, tested individually at Step 3, was significant: B, SE B, β for Sex × Cognitive errors and for Sex × Hopelessness are 2.20, .57, .34<sup>***</sup> and 5.97, 1.72, .41<sup>**</sup>, respectively. Depressed/Nondepressed prediction to categories of depressed (Beck Depression Inventory—II [BDI–II] score ≥ 19) versus nondepressed (BDI–II score ≤ 19) mood. Prediction to depressed symptoms as a continuous variable.

* p < .05. ** p < .01. *** p < .001.
Thus, these data supported the model in which cognitions influence depressive symptoms, as well as the reverse model in which depressive symptoms influence changes in cognitions. Effects were small in both directions, but the reverse model accounted for more variance than the cognitions to depression model.

**Discussion**

Consistent with previous findings, depressive symptoms were reported at higher rates among Hong Kong youths than in the United States and among girls than boys. Hopelessness was also higher among Hong Kong youths, though self-efficacy and cognitive distortions were lower. Self-efficacy, negative cognitive errors, and hopelessness generally showed similar patterns of association to concurrent depressive symptoms in Hong Kong and in the United States, though these associations were generally weaker in Hong Kong than in the United States. They were also weaker among boys compared with girls. Longitudinal predictions after controlling for baseline symptoms from cognitions to depression were not significant across sex and culture, but longitudinal predictions from depressive symptoms to cognitions were significant across sex and culture.

### Table 5
**Multivariate Prediction of Depression at Time 2 (T2) by Time 1 (T1) Cognitive Variables**

<table>
<thead>
<tr>
<th>Dependent variable and predictor</th>
<th>Total (N = 2,272)</th>
<th>Culture*</th>
<th>Hong Kong</th>
<th>United States</th>
<th>OR (CI)</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depressed/Nondepressed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>0.76 (0.56–1.03)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive errors</td>
<td>1.62 (1.29–2.02)**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hopelessness</td>
<td>8.63 (4.30–17.31)**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.90 (1.44–2.49)**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR (CI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.18 (0.74–1.68)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>.66</td>
<td>.44</td>
<td>.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive errors</td>
<td>1.41</td>
<td>.35</td>
<td>.09***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hopelessness</td>
<td>6.47</td>
<td>1.17</td>
<td>.13***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. OR = odds ratio; CI = confidence interval. *Separate values for the two cultures are reported if any of the Culture × Predictor interaction terms, tested individually at Step 3, was significant: B, SE B, β for Culture × Cognitive errors are −.44, .22, 3.95*, respectively. **Age, culture, sex, and stressful events between T1 and T2 were entered in a prior step (Step 1) as control variables. ***Prediction to categories of depressed (Beck Depression Inventory—II [BDI–II] score ≥ 19) versus nondepressed (BDI–II score ≤ 19) mood. **For change at Step 2 from Step 1. *p < .05. **p < .01. ***p < .001.

Thus, these data supported the model in which cognitions influence depressive symptoms, as well as the reverse model in which depressive symptoms influence changes in cognitions. Effects were small in both directions, but the reverse model accounted for more variance than the cognitions to depression model.

### Table 6
**Reciprocal Causality of Cognitive Variables and Depressive Symptoms**

<table>
<thead>
<tr>
<th>Dependent variable and predictor</th>
<th>Total (N = 2,272)</th>
<th>Culture*</th>
<th>Hong Kong</th>
<th>United States</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2 Depressive symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1 Self-Efficacy</td>
<td>−1.31</td>
<td>.44</td>
<td>−.06**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1 Cognitive errors</td>
<td>1.90</td>
<td>.35</td>
<td>.12***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1 Hopelessness</td>
<td>8.01</td>
<td>1.15</td>
<td>.17***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 Self-Efficacy</td>
<td>−.01</td>
<td>.00</td>
<td>−.15***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 Depressive symptoms</td>
<td>−.01</td>
<td>.00</td>
<td>−.15***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 Cognitive errors</td>
<td>.01</td>
<td>.00</td>
<td>.19***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 Hopelessness</td>
<td>.01</td>
<td>.39</td>
<td>.30***</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. T1 = Time 1; T2 = Time 2. *Separate values for the two cultures are reported if any of the Culture × Predictor interaction terms, tested individually at the Step 3, was significant: B, SE B, β for Culture × Depressive symptoms to predict self-efficacy are −.01, .00, −.15, p < .05, respectively; for Culture × Depressive symptoms to predict cognitive errors are .01, .00, .20, p < .01, respectively. **Separate values for boys and girls are reported if any of the Sex × Predictor interaction terms, tested individually at Step 3, was significant: B, SE B, β for Sex × Depressive symptoms to predict cognitive errors are .01, .00, .22, p < .01. ***Age, culture, sex, and T1 level of dependent variable were entered in the prior step (Step 1) as control variables. For change at Step 2 from Step 1. *p < .05. **p < .01. ***p < .001.
sion were significant but weak. The reverse prediction of cogni-
tions from \( T_1 \) depressive symptoms was stronger for both cultures. In cultural comparisons, the reverse model predicted more vari-
ance in the United States compared with Hong Kong.

We hypothesized that self-efficacy would be a less important 
variable in influencing mood in Hong Kong than in the United 
States. Although self-efficacy did contribute less variance to de-
pressive symptoms in Hong Kong than in the United States, 
cognitions in general tended to be weaker predictors of depression 
among Hong Kong youths. There were other indicators, however, 
as to the lesser salience of self-efficacy among Hong Kong youths.

Self-efficacy was lower among Hong Kong youths. It is of interest 
that even though depression was higher among Hong Kong youths, 
controlling for self-efficacy did not eliminate these differences. 
Self-efficacy may be lower in cultures where individuals expect to 
rely on others and individual autonomy and agency are less valued 
because they are not effective as protective mechanisms in collect-
cive cultures.

Autonomy and relationships in various paradigms (e.g., Kagit-
cibasi, 1996) are seen as balancing forces and complementary 
needs, with variation among individuals (and between men and 
women, see Cross & Madson, 1997) as to the extent to which one 
or the other of these is more important. Communal cultures em-
phasize relationships. The individual is seen as existing as part of 
a matrix of relationships. Possibly risk and protective forces may 
relate more closely to the quality of the individual’s relationships 
than to assessments of one’s own ability to manage challenge and 
achieve goals. Diener and Diener (1995) examined contribu-
tors to subjective well-being in 31 nations and found that self-esteem 
correlated more strongly with life satisfaction in individualistic 
compared with collectivist societies. Kwan, Bond, and Singelis 
(1997) have shown that greater variance in life satisfaction among 
Hong Kong denizens is explained by their assessment of the 
harmony in their most important relationships than is explained by 
their self-esteem. In contrast, in the West, self-esteem explains a 
larger proportion of life satisfaction. This relative balance may also 
be manifest in mood and pathology.

The finding of typically weaker associations among cognitions and 
mood in Hong Kong compared with the United States is also 
consistent with cross-cultural hypotheses regarding attention to 
inner states. Triandis (1994) has suggested that an important dif-
ference between cultures is the degree to which they are guided by 
internal phenomena such as beliefs and attitudes. Hong Kong 
Youths, consistent with their cultural script, may be less attendant 
to their cognitions.

Higher levels of depressive symptoms in Hong Kong and in 
girls compared with boys in both cultures are consistent with the 
past literature (e.g., Stewart et al., 1995; Stewart et al., 1999). An 
opposite pattern has been proposed for externalizing pathology. 
Arnett (1999) has noted the significantly lower levels of risk 
behaviors demonstrated by youths in non-Western cultures. In our 
own studies, we have noted that behaviors such as tobacco use and 
adolescent sexual activity are significantly lower among Hong 
Kong youths than reported in the West (Lam et al., 2001). We 
propose that consistent with socialization patterns for young Chi-
nese children that emphasize self-control, obedience, and respect 
for authority (Ho, 1986), internalizing syndromes and symptoms 
may be more congruent with cultural forces. Thus, the cultural 
dynamics may decrease vulnerability to acting out but increase it 
for depressive mood.

The weak direct relationships between self-efficacy and depres-
sive symptoms in both cultures can be attributed to variables that 
terface between self-efficacy and depressive symptoms. Band-
dura (1997) has suggested that self-efficacy results in behaviors 
and other cognitions, which then lead to desired goals. By includ-
ing cognitive errors and hopelessness in the multivariate models, 
the common variance would be removed, diminishing the observed 
relationship between self-efficacy and depressive symptoms. Nev-
evertheless, self-efficacy is a theoretically and practically important 
variable; it has become an important target in health psychology 
research and intervention because it offers an accessible locus for 
intervention.

The model that cognitions influence depressive symptoms and 
the reverse model both received some support. Support for both 
models is consistent with classical concepts of cognition and mood. 
The “negative spiral,” whereby cognitions and mood (sometimes with the involvement of behaviors) pull an individual 
prone to depression further into severity, is well recognized in 
the clinical literature. Such a spiral is supported by our findings 
and reinforces the importance of a multimodal approach to the treat-
ment of clinical depression, whereby both the neurobiological 
deficits (that presumably precede cognitive manifestations) and 
their supporting cognitions are targeted for change.

Effect sizes in both cultures were quite small in the longitudinal 
analyses. Our test of longitudinal influence was rigorous; we 
controlled for the (considerable) overlap of symptoms and cogni-
tions at baseline. In the absence of active efforts to change cog-
nitions or symptoms, cognitive patterns and mood may remain 
stable. As a result, persistent influence of predictors on the out-
comes would be partialed out. Alternatively, the time frame may 
be too long for examination of such effects. Intervening changes 
may mask the cumulative effects of the predictors on the outcomes.

We did not examine clinically depressed youths. Nevertheless, 
we concur with the opinion of Bandura and colleagues (1999) that 
depressive symptoms are a valid target of investigation in their 
own right. Depressive tendencies are associated with MDDs (Blatt, 
D’Afflitto, & Quinlan, 1976; Hirshfeld & Cross, 1982), and young 
people who manifest persistent depressive symptoms frequently go 
on to develop clinical depression or other disorders in adulthood 
(Kandel & Davies, 1986; Kovacs, Feinberg, Crouse-Novak, Paul-
aukas, & Finkelstein, 1984; Strober & Carlson, 1982). Indeed, 
there is a growing body of evidence (e.g., Lewinsohn, Solomon, 
Seeley, & Zeiss, 2000), including some evidence from a subgroup 
of this sample (Stewart et al., 2002), that young people who report 
high levels of depressive symptoms, but who do not meet all 
symptom criteria for MDD, appear to be virtually indistinguishable 
in terms of impairment from those whose symptoms do cross the 
diagnostic threshold for MDD.

Cognitive models were developed for clinical populations, and 
like other investigators we have attempted to extend them to 
nonclinical samples. Our findings that cognitive errors and hope-
lessness do predict concurrently and prospectively the categoriza-
tion of severity of symptoms offer preliminary evidence to support 
cognitive theory with clinical samples in Hong Kong.

Our survey methodology allowed the inclusion of a larger 
sample than more comprehensive face-to-face interviews would
yield. However, surveys miss the richness of interview data that can enhance researchers’ understanding of the phenomenon of depression in this culture. Our measures of self-efficacy were general rather than domain specific and were brief. Our data could be analyzed using more powerful methods such as structural equation modeling. We used entirely “imported” instruments, and some of the weaker findings in Hong Kong compared with the United States may well be because of differential instrument sensitivity to the key features of the construct assessed. Future studies should replicate our findings with broader age groups, including clinical samples, using indigenously developed measures, semistructured interviews, and data from informants. The role of stressors and cognitions that is specific to the quality of relationships should be investigated to assess hypotheses derived from cross-cultural frameworks regarding relative salience of relationships compared with agency in collective cultures.

Our study examined theories of cognition and mood among adolescents in a non-Western culture and in the United States. The findings on the whole are remarkably similar and support a universal theory of the bidirectional associations between cognitions and well-being.

References


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