

# Acculturative Stress, Perfectionism, Years in the United States, and Depression Among Chinese International Students

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The present study examined whether maladaptive perfectionism (i.e., discrepancy between expectations and performance) and length of time in the United States moderated the association between acculturative stress and depression. Data were collected through online surveys from 189 Chinese international students from China and Taiwan attending a midwestern university. Results from a hierarchical regression showed that there were significant main effects of acculturative stress and maladaptive perfectionism on depression, no significant two-way interactions, and a significant three-way interaction, indicating that acculturative stress, maladaptive perfectionism, and length of time in the United States interacted to predict depression. Low maladaptive perfectionism buffered the effect of acculturative stress on depression only for those who had been in the United States for a relatively longer period of time. Implications for counseling and future research directions are discussed.

*Keywords:* acculturative stress, maladaptive perfectionism, depression, Chinese international students, three-way interaction

As the fields of psychology and counseling psychology move toward greater internationalization, international students have come to play a major role in facilitating cross-national collaboration and knowledge exchange between domestic and international cultures (Heppner, 2006). However, the experience of coming to the United States (U.S.) to pursue their academic degrees can be both exciting and challenging for international students (e.g., fulfilling the American dream vs. experiencing acculturative stress). The training institutions and programs that these students attend may also find such internationalization challenging (e.g., expanding diversity vs. lacking knowledge or guidelines to work with

international students). To facilitate the improvement of cross-cultural education in the U.S., researchers have devoted their efforts to conducting studies among this population in order to better understand factors that affect these students' adjustment (e.g., vulnerability to depression) in the U.S. (e.g., Chen, Mallinckrodt, & Mobley, 2002; Constantine, Okazaki, & Utsey, 2004; Kwan, Sadowsky, & Ihle, 1994; Mallinckrodt & Leong, 1992; Swagler & Ellis, 2003; Yeh & Inose, 2003). Moreover, increased knowledge regarding international students' mental health, especially with regard to depression, could enhance both the therapy process and outcome with this population.

In the current study, we focused on Chinese international students to examine the association between acculturative stress and depression as well as to identify which moderators might buffer or strengthen this association. There were some reasons for choosing this population to answer these research questions. First, Chinese international students are among the largest groups of international students on most U.S. college campuses (Institute of International Education, 2006). Second, research has consistently indicated that Asian (including Chinese) international students experience more acculturative stress than European international students because the former may experience more cultural differences than the latter (e.g., Cross, 1995; Kaul, 2001). Therefore, it is important to focus on Chinese international students to understand the association between acculturative stress and depression and to find a factor to reduce the strength of this association. However, research on this specific group is limited. Thus far, very few published studies have examined acculturative stress solely within Chinese international students. For this study, we relied primarily on literature related to

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Taiwanese and Chinese international students as well as to other closely related Asian international student groups (e.g., Korean international students) who might share similar experiences with Chinese international students.

### Acculturative Stress

Depression is often listed as one of the top presenting concerns among international students who seek help from university counseling centers (Nilsson, Berkel, Flores, & Lucas, 2004; Yi, Lin, & Yuko, 2003). For this population, one of the vulnerability factors related to depression is acculturative stress. In general, acculturative stress is defined as a stress reaction in response to life events that are rooted in the experiences of acculturation (Berry, 2005), the psychological difficulties in adapting to a new culture (Smart & Smart, 1995), or psychosocial stressors resulting from unfamiliarity with new customs and social norms (Church, 1982; Lin & Yi, 1997). For Chinese international students, the sources of acculturative stress often include academic pressures, language difficulties, feelings of inferiority, difficulties in adjusting to new food or cultural values, lack of support, perceived discrimination, and homesickness (e.g., Pedersen, 1991; Sandhu & Asrabadi, 1994; Yeh & Inose, 2003).

Chinese international students who experience acculturative stress may be vulnerable to depression. Specifically, when experiencing acculturative stress, they may feel overwhelmed and doubtful of their abilities. Because Asian cultures tend to value emotional self-control (Kim, Atkinson, & Yang, 1999; Kim, Li, & Ng, 2005), these students may believe that they should use their inner resources (e.g., willpower) to resolve their stress or emotional disturbance (e.g., rejection from their American peers). However, some acculturative stressors are related to external factors (e.g., discrimination) and may not always be easily handled by inner sources alone. In these cases, only focusing on internal regulation may not reduce stress. Instead, it is very likely that emotional suppression may make these students vulnerable to depression. Empirically, research has shown that acculturative stress is positively associated with depression among Taiwanese international students (Ying & Han, 2006), Korean international students (Lee, Koeske, & Sales, 2004), and Asian international students (Yang & Clum, 1995).

### Acculturative Stress and Maladaptive Perfectionism

In counseling psychology, we are generally interested in knowing how individual differences (e.g., personality) play a role in mental health concerns. Given the strong association between acculturative stress and depression, it is important to know who is likely to feel more or less vulnerable to depression in the face of acculturative stress among Chinese international students. We hypothesized that maladaptive perfectionism might be a vulnerability factor that strengthens the association between acculturative stress and depression. Maladaptive perfectionism has been operationalized as perceived discrepancy, which indicates the failure to meet one's standards for performance (Slaney, Rice, Mobley, Trippi, & Ashby, 2001).

Previous research primarily on White U.S. college students found that maladaptive perfectionism has been consistently associated with depression (e.g., Rice, Leever, Christopher, & Porter,

2006; Slaney et al., 2001). Because those with maladaptive perfectionism tend to equate perfect performance with self-worth, view imperfect performance as a personal failure, and focus on the negative aspects of their performance (Hewitt, Flett, & Ediger, 1996), they are likely to increase their vulnerability to depression. More important, maladaptive perfectionism (e.g., failing to meet one's own performance expectations) has been linked to depression among Taiwanese college students (Wang, Slaney, & Rice, 2007). Thus, we expected that maladaptive perfectionism (i.e., failing to meet one's own performance expectations) to be associated with depression among Chinese international students.

In addition, maladaptive perfectionism is likely to interact with acculturative stress to predict depression for Chinese international students. For example, these students often have expectations of a successful academic performance in the U.S. in order to honor their family back home (Leong & Chou, 1996; Sandhu, 1995). They may perceive social expectations from their family or the importance of academic achievement in Chinese cultural values and feel the pressure to succeed. They may also experience added pressure from the significant costs of attending U.S. schools as international students. In the face of acculturative stressors such as language difficulties, Chinese international students are likely to expect themselves to overcome their language difficulties quickly. However, those with maladaptive perfectionism may view little or slow improvement in their English skills as a personal failure (i.e., negative aspects of performance). This sense of failure can be very distressing and threatening for Chinese international students because they tend to have good academic achievement in their home countries (Pedersen, 1991). Accordingly, we expected that high maladaptive perfectionism (i.e., failing to meet their own performance expectations) is likely to strengthen the association between acculturative stress and depression. Conversely, low maladaptive perfectionism may buffer the association between acculturative stress and depression.

### Acculturative Stress, Maladaptive Perfectionism, and Years in the U.S.: A Three-Way Interaction

Moreover, we speculated that the pattern of acculturative stress and maladaptive perfectionism interaction for those who have been in the U.S. for a short time might be different from the pattern for those who have been in the country longer. For example, during the students' early period in the U.S., it is reasonable to expect that high maladaptive perfectionism (i.e., failure to meet one's own expectations for performance) may enhance the negative effect of acculturative stress on depression. However, low maladaptive perfectionism (i.e., low perception of failure in meeting one's own performance expectations) may or may not immediately buffer the association between acculturative stress and depression in a short period of time. The rationale is that people need a reasonable amount time to become adjusted to a new environment.

For those Chinese international students who have been in the U.S. for a relatively longer period of time, high maladaptive perfectionism may still exacerbate the negative effect of acculturative stress on depression. The possible rationale is that they may set additional expectations for themselves and believe that they should have a better performance than do those who have been in the country for a shorter period. When such students realize that they do not necessarily perform better as a result of having been in

the U.S. longer, they are likely to feel depressed. However, after the students have been in the U.S. for a longer period of time, low maladaptive perfectionism is likely to buffer the negative effect of acculturative stress on depression. The reason may be that those who have been in the U.S. longer and have low maladaptive perfectionism are able to set realistic standards, not view imperfect performance as a personal failure, understand the external factors of acculturative stress, and have knowledge related to the new environment.

One study (Lee et al., 2004) provided an indirect support to our above speculation of a three-way interaction. These researchers explored a three-way interaction of acculturative stress, perceived social support, and acculturation level on psychological distress in a sample of Korean international students. They found that perceived high social support buffered the effect of acculturative stress on psychological distress only when the acculturation level was high (a construct similar to the length of time in the U.S.). Our study was similar to this study in some respects. First, perceived social support and maladaptive perfectionism are both individual difference variables related to psychological adjustment. Second, acculturative level is similar to the length of time that one has been in the U.S.

In conclusion, the main purpose of this study was to directly test how the length of time in the U.S., in combination with maladaptive perfectionism, moderated the effect of acculturative stress on depression among Chinese international students. Specifically, we hypothesized that both acculturative stress and maladaptive perfectionism would associate positively with depression. In addition, we hypothesized that maladaptive perfectionism would moderate the association between acculturative stress and depression. Finally, we explored the association of depression and a three-way interaction among acculturative stress, maladaptive perfectionism, and the length of time in the U.S. On the basis of Lee et al.'s (2004) findings described earlier, we thought that it could be possible for low maladaptive perfectionism to buffer the effect of acculturative stress on depression only for those who have been in the U.S. for a longer period of time. However, it is important to note that this tentative three-way interaction effect was exploratory in nature.

## Method

### Participants

Usable surveys were obtained from 189 Chinese international students from China and Taiwan who responded to an online survey at a large public university in the Midwest. The predominant countries of origin were China ( $n = 135$ ; 71.4%) and Taiwan ( $n = 43$ ; 22.8%; 11 participants did not report their country of origin). Participants consisted of 92 males (49%) and 96 females (51%) with a mean age of 27.97 years ( $SD = 4.65$ ). (One participant failed to report gender data.) Participants reported being in the U.S. for an average of 2.86 years ( $SD = 1.98$ ). Most participants (81%) were graduate students. Almost half of the participants were married (48%), with the other half of the students being either single (38%) or in a dating relationship (10%).

### Instruments

For the purpose of this study, all of the measures below were translated from English to Mandarin Chinese in a three-step pro-

cess (Brislin, 1970, 1980). First, two of the authors, who are bilingual in English and Chinese, discussed and translated these measures from English into Chinese. Different wording by the two authors was thoroughly discussed in consultation with a third bilingual Asian counseling psychologist. Second, back translation from Chinese to English was conducted by a bilingual doctoral student in counseling psychology who was unfamiliar with the original version of these measures and the purpose of this study. Third, a native English speaker who was a doctoral student in counseling psychology compared the original items and the back-translated items to evaluate semantic equivalence and accuracy. The final Chinese version was provided as an alternative to the English version for participants to complete (i.e., both versions were available online).

**Acculturative stress.** We measured acculturative stress using the Acculturative Stress Scale for International Students (ASSIS; Sandhu & Asrabadi, 1994). The ASSIS, a 36-item measure assessing acculturative stress of international students, consists of seven factors: Perceived Discrimination (8 items), Homesickness (4 items), Perceived Hate (5 items), Fear (4 items), Stress Due to Change/Culture Shock (3 items), Guilt (2 items), and Nonspecific Concerns (10 items). Each item is rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A sample item is "People from some ethnic groups show hatred toward me nonverbally." A total score (ranging from 36 to 180) is the sum of all seven factors, with higher scores representing greater acculturative stress. Coefficient alphas for the total score ranged from .92 to .94 (Constantine et al., 2004; Kaul, 2001; Sandhu & Asrabadi, 1994) for international students. In the present study, the alpha coefficient for the total score was .92 (.93 for the English version and .91 for the Chinese version). Construct validity was supported by a negative association with adaptation (Kaul, 2001) and a positive association with depression (Constantine et al., 2004) among international students.

**Maladaptive perfectionism.** Maladaptive perfectionism was measured with the Discrepancy subscale of the Almost Perfect Scale—Revised (APS-R; Slaney et al., 2001). The APS-R is a 23-item self-report measure designed to assess levels of perfectionism. Each item is measured on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The APS-R is made up of three subscales: High Standards, Order, and Discrepancy. Slaney et al. indicated that one could view the Discrepancy subscale as assessing maladaptive perfectionism. In the present study, we only used the Discrepancy subscale because perceived discrepancy is likely to be a risk factor for Chinese international students. The Discrepancy subscale (12 items) measures the degree to which the respondents perceive themselves as failing to meet their personal standards for performance. Some sample items are, "I often feel frustrated because I can't meet my goals," "I often feel disappointment after completing a task because I know I could have done better," or "My performance rarely measures up to my standards." Total scores can range from 7 to 84, with higher scores indicating greater discrepancy. Slaney et al. reported that coefficient alpha was .92 for Discrepancy in American college students, and Wang et al. (2007) reported that coefficient alpha was .88 for Taiwanese college students. The coefficient alpha was .95 (.93 for the English version and .96 for the Chinese version) for Discrepancy in the present sample. The construct validity of the Discrepancy subscale was supported by the positive association with

depression for American college students (Wei, Mallinckrodt, Russell, & Abraham, 2004) and Taiwanese college students (Wang et al., 2007) as well as the negative association with self-esteem for Taiwanese college students (Wang et al., 2007).

**Depression.** Depression was assessed with the Center for Epidemiological Studies—Depression Scale (CES–D; Radloff, 1977). The CES–D is a 20-item self-report scale that was developed to assess current levels of depressive symptoms. Each item is rated on a 4-point Likert scale ranging from 0 (*rarely or none of the time*) to 3 (*most or all of the time*), reflecting the frequency with which participants have experienced the item during the preceding week. A sample item is “I feel depressed.” Total scores can range from 0 to 60. High scores indicate high levels of depressive symptoms. Scores equal to or greater than 16 represent a significant risk for depression (Mulrow et al., 1995). In the current study, the mean score of this sample was 13 (i.e., item  $M = 0.65$ , see Table 1), which is close to the critical cutoff point of 16. Also, about 32.2% of students in this study had scores of 16 or higher on their CES–D. Coefficient alpha was .87 for Taiwanese college students (Wang et al., 2007) and .91 for African, Asian, and Latin American international college students (Constantine et al., 2004). In the present sample, the coefficient alpha was .89 (.89 for English version and .91 for Chinese version). Evidence for the construct validity of the CES–D has been provided by a positive association with scores on the Discrepancy subscale for Taiwanese college students (Wang et al., 2007). Also, the CES–D is positively associated with a higher level of self-concealment and acculturative stress and a lower level of social self-efficacy for African, Asian, and Latin American international college students (Constantine et al., 2004).

### Procedure

A list of Asian international students from Taiwan and China ( $N = 650$ ) was obtained from the registrar’s office at a large state university in the Midwest. An e-mail invitation was sent to each student inviting him or her to participate in the online survey. Participants were told that the purpose of the research was to learn about factors that could help international students to adjust better in the U.S. Also, participants were informed that their completion of the survey indicated their agreement to participate in the present study. A total of 252 participants responded to the online survey (representing a response rate of 39%). Three validity items were

designed to detect any invalid responses. The validity items instructed the participant to respond in a specific manner. For example, the instructions for the validity items read “Please click (1 = *strongly disagree*) for this item,” and the responses were placed within the Discrepancy subscale and the ASSIS scales. Instructions for another validity item read “Please click (1 = *rarely or none of the time [less than 1 day]*) for this item,” and the response was placed within the CES–D scale. We removed a participant’s responses from the data analyses if the participant answered more than one of the three validity items incorrectly. A total of 55 participants were removed from data analyses because of incorrect responses in one or more of these validity items. We also removed 8 participants because they only partially completed the survey. Therefore, a total of 189 completed surveys used for data analyses in this study.

As noted above, participants could complete the survey either in English or in Mandarin Chinese. There were 87 participants (46%) who completed the English version and 102 participants (54%) who completed the Mandarin Chinese version. Participants were also informed that they could request a paper-and-pencil survey instead of responding to the online survey. Two participants completed the paper-and-pencil version. After participants completed their survey, they were told they could send a separate e-mail with their contact information (i.e., name and phone number) in order to be entered into a drawing for a \$100, \$50, or \$25 cash prize. Two follow-up reminder e-mails were sent to nonrespondents.

## Results

### Testing Residual Normality Assumption

The normality of the residual scores was first assessed for the regression model. The residual skewness and kurtosis were 0.51 and 1.46, respectively, indicating nonnormality. It implied a failure to meet the assumption of residual normality in the regression analysis. A square-root transformation was computed for the dependent variable of depression (Cohen, Cohen, West, & Aiken, 2003). The transformed depression variable was used in the regression model, resulting in a skewness and kurtosis of residual scores of 0.16 and 0.94, respectively. This indicated a mild nonnormality that satisfied the residual normality assumption in the regression analysis. Thus, the transformed depression variable was used in all the rest of analyses.

Table 1

*Means, Standard Deviations, Ranges, and Correlations Among Acculturative Stress, Maladaptive Perfectionism, Years in the United States (U.S.), and Depression*

Variable	1	2	3	4	5	Mean	SD	Possible range	Sample range
1. Acculturative stress	—	.43***	-.07	.60***	.63***	2.58	0.48	1–5.00	1.03–4.11
2. Maladaptive perfectionism		—	-.09	.53***	.55***	3.47	1.35	1–7.00	1.00–6.50
3. Years in the U.S.			—	-.01	-.02	2.86	1.98	NA	0.17–12.67
4. Depression				—	.97***	0.65	0.44	0–3.00	0–2.30
5. Depression (transformed)					—	3.40	1.21	0–7.75	0–6.78

*Note.*  $N = 186$ – $189$ . Higher scores on acculturative stress, maladaptive perfectionism, and depression indicated a higher level of acculturative stress, maladaptive perfectionism, and depression. Higher scores on years in the U.S. indicated a longer period of time in the U.S. All means, *SDs*, possible ranges, and sample ranges are based on the item-level, not sum of the items.

\*\*\*  $p < .001$ .

### Preliminary Analyses and Descriptive Statistics

Before the main analyses, we first examined whether our sample ( $N = 189$ ) was comparable to the sample of students who had been invited to participate in the current study ( $N = 650$ ) regarding the proportion of nationality and sex. A chi-square test indicated that female (12.9%) and male (11.2%) students from Taiwan were overrepresented in our final sample relative to the proportion of female (6.7%) and male (6.2%) students from Taiwan who had been invited to participate. However, the representation of female and male students from China did not vary significantly from the expected proportion of participants.

Next, we conducted one multivariate of analysis of variance to examine whether the main measures (acculturative stress, maladaptive perfectionism, and depression) varied in regards to sex, marital status, country of origin, and different language versions. In addition, we examined whether there were interaction effects of sex, marital status, country of origin, and different language versions on the main variables. The results indicated that there were neither significant main effects nor interaction effects with one exception: The overall interaction effect of marital status and country of origin was significant. In the follow-up results, only an interaction effect of marital status and country of origin on acculturative stress was significant. Therefore, the results generally indicated that the main variables did not significantly differ on the basis of sex, marital status, country of origin, or different language versions (all  $ps > .05$ ). (It is important to note that women in general are more vulnerable to depression than men [e.g., McGrath, Keita, Strickland, & Russo, 1990]. However, it was not the case in this sample.) Moreover, if the demographic variable was varied on the basis of the dependent variable (i.e., depression), the demographic variables would be used as covariates in regression analyses. However, the depression score did not vary in terms of these demographic variables. None of demographic variables were used as covariates in the later regression analyses.

Means, standard deviations, ranges, and zero-order intercorrelations are presented in Table 1. As the table shows, the associations among acculturative stress, maladaptive perfectionism, and depression were all significantly related ( $ps < .001$ ). Depression and transformed depression were highly correlated ( $r = .97$ ). However, the length of time in the U.S. was not significantly related to acculturative stress, maladaptive perfectionism, transformed depression, or depression (all  $ps > .05$ ).

### Main Analyses

A hierarchical regression was used in the analyses. Aiken and West (1991) and Frazer, Tix, and Barron (2004) suggested centering or standardizing the predictor and moderator before the interaction term was computed in order to reduce multicollinearity among these variables. We chose to standardize these variables since Frazer et al. (2004) suggested that standardization makes plotting the interaction effect easier. The two-way interaction terms were created through the multiplication of acculturative stress, maladaptive perfectionism, or years in the U.S. (i.e., Acculturative Stress  $\times$  Maladaptive Perfectionism, Acculturative Stress  $\times$  Years in the U.S., and Maladaptive Perfectionism  $\times$  Years in the U.S.). Similarly, a three-way interaction term was created through the multiplication of acculturative stress, maladap-

tive perfectionism, and years in the U.S. (i.e., Acculturative Stress  $\times$  Maladaptive Perfectionism  $\times$  Years in the U.S.). In the hierarchical regression, acculturative stress, maladaptive perfectionism, and years in the U.S. were entered as a block in the first step of the regression. The three two-way interaction terms (i.e., Acculturative Stress  $\times$  Maladaptive Perfectionism, Acculturative Stress  $\times$  Years in the U.S., and Maladaptive Perfectionism  $\times$  Years in the U.S.) were then entered as a block in the second step of the regression. Finally, a three-way interaction term (i.e., Acculturative Stress  $\times$  Maladaptive Perfectionism  $\times$  Years in the U.S.) was entered as a block in the third step of the regression (see Table 2). According to Baron and Kenny (1986), evidence for the interaction effect is present when the regression coefficient for the interaction term (e.g., Acculturative Stress  $\times$  Maladaptive Perfectionism) predicting the dependent variable (depression) is significant. This analysis allowed us to examine the direct associations of acculturative stress, maladaptive perfectionism, and years in the U.S. with depression and, subsequently, the interaction effects in predicting depression over and above the direct associations.

Results indicated that acculturative stress, maladaptive perfectionism, and years in the U.S. accounted for 49% of the variance in depression,  $F(3, 182) = 57.46, p < .001$  (see Table 2). Acculturative stress ( $\beta = .35, sr^2 = .10, p < .001$ ) and maladaptive perfectionism ( $\beta = .48, sr^2 = .18, p < .001$ ) were found to significantly predict depression. However, years in the U.S. failed to predict depression ( $\beta = .05, sr^2 = .003, p = .33$ ; see Table 2). In Step 2, the overall two-way interactions did not significantly add additional variance to depression over and beyond the first-order effects,  $\Delta R^2 = .01, \Delta F(3, 179) = 0.98, p = .40$ . None of the two-way interactions was found to be statistically significant (see Table 2). However, in Step 3, a three-way interaction significantly added incremental variance in depression over and beyond the first-order effects and two-way interaction effects,  $\Delta R^2 = .02, \Delta F(1, 178) = 6.35, p < .05$ . According to Cohen (1992), an  $R^2$  value of .02 indicates a small effect size. The regression coefficient for the interaction of acculturative stress, maladaptive perfectionism, and years in the U.S. was significant in predicting depression,  $\beta = .15, sr^2 = .02, p < .05$ . Although the coefficient for the interaction term seemed small, Cohen et al. (2003, p. 297) indicated that the effect size for interactions in psychological and social science research tends to be small (i.e., squared semipartial or partial correlations of .01–.05 or so).

In order to aid in the interpretation of the three-way interaction, we further tested the significant levels for simple interactions and then each of the simple slopes (see Cohen et al., 2003, pp. 290–291 for a discussion). Cohen et al. suggested breaking down the three-way interaction to a more interpretable form by testing the significance of the simple interaction. The simple interaction tests the significance of two-way interaction between two predictors (e.g., acculturative stress and maladaptive perfectionism) at different values or levels of the third predictor (e.g., the shorter vs. longer period of time in the U.S.).

Thus, we tested the significance of simple interaction (Acculturative Stress  $\times$  Maladaptive Perfectionism) among those who have been in the U.S. for a shorter period of time (see Panel A in Figure 1). The result indicated that there was no significant simple interaction ( $p = .10$ ). Specifically, the estimated simple slopes at low maladaptive perfectionism ( $b = .67$ ) and at high maladaptive perfectionism ( $b = .35$ ) were not significantly different from each

Table 2  
*A Hierarchical Multiple Regression Analysis Predicting Depression From Acculturative Stress, Maladaptive Perfectionism, Years in the United States (U.S.), and Their Interactions*

Variable	B	SE B	$\beta$
Step 1			
Acculturative stress	.43	0.07	.35***
Maladaptive perfectionism	.57	0.07	.48***
Years in the U.S.	.06	0.07	.05
Step 2			
Acculturative stress	.44	0.07	.36***
Maladaptive perfectionism	.57	0.07	.48***
Years in the U.S.	.05	0.07	.05
Acculturative Stress $\times$ Maladaptive Perfectionism	.03	0.06	.03
Acculturative Stress $\times$ Years in the U.S.	-.10	0.08	-.07
Maladaptive Perfectionism $\times$ Years in the U.S.	-.03	0.07	-.02
Step 3			
Acculturative stress	.45	0.07	.37***
Maladaptive perfectionism	.58	0.07	.48***
Years in the U.S.	-.01	0.07	-.04
Acculturative Stress $\times$ Maladaptive Perfectionism	.01	0.06	.01
Acculturative Stress $\times$ Years in the U.S.	-.06	0.08	-.04
Maladaptive Perfectionism $\times$ Years in the U.S.	-.00	0.06	-.00
Acculturative Stress $\times$ Maladaptive Perfectionism $\times$ Years in the U.S.	.17	0.07	.15*

Note.  $N = 186$ .  $R^2 = .49$ ,  $p < .001$  for Step 1;  $\Delta R^2 = .01$ ,  $p > .05$  for Step 2;  $\Delta R^2 = .02$ ,  $p < .05$  for Step 3.  
 \*  $p < .05$ . \*\*\*  $p < .001$ .

other (see Panel A in Figure 1) even though the magnitudes of these sample two slopes looked different in the current sample. The values of the simple slopes in the population were likely to be similar to each other. Moreover, we followed Aiken and West's (1991) suggestion using one standard deviation below and one above the mean to plot the variables and to test the statistical significance for each of the simple slopes. The results indicated that there was significantly positive association between acculturative stress and depression for both high and low maladaptive perfectionism (i.e., significant simple slopes, see Panel A in Figure 1).

Next, we examined the significance of the simple interaction (i.e., Acculturative Stress  $\times$  Maladaptive Perfectionism) for those who have been in the U.S. for a longer period of time (see Panel B in Figure 1). The result showed that there was a significant simple interaction ( $p = .03$ ). Specifically, the simple slope at high maladaptive perfectionism ( $b = .58$ ) was significantly steeper than that at low maladaptive perfectionism ( $b = .21$ ). As can be observed in Panel B in Figure 1, these two slopes are not parallel to each other. Using the above procedure for testing the significance of the simple slopes, we found that the simple slope was significant at high maladaptive perfectionism ( $b = .58$ ,  $p < .001$ ) but not significant at low maladaptive perfectionism among those who had been in the U.S. longer ( $b = .21$ ,  $p > .05$ , see Panel B in Figure 1). Taken together, it appears that high maladaptive perfectionism significantly enhanced the association between acculturative stress and depression, whereas low maladaptive perfectionism buffered this association among those who had been in the U.S. for a longer period of time.

#### Post Hoc Analyses

In order to have a more complete analysis of the three-way interaction, we tested a different set of simple interactions (i.e., Acculturative Stress  $\times$  Length of Time in the U.S.) at different

levels (i.e., high vs. low) of maladaptive perfectionism. At high maladaptive perfectionism, there was no significant simple interaction ( $p = .33$ ). This implies that the simple slope for those who have been in the U.S. for a shorter period of time ( $b = .35$ ,  $p < .05$ ) was not significantly different from that for those who have been in the U.S. for a longer period of time ( $b = .58$ ,  $p < .001$ ; see the top two dashed lines on Panels A and B in Figure 1). However, at low maladaptive perfectionism, there was a significant simple interaction ( $p = .02$ ). Specifically, the simple slope for those who had been in the U.S. for a short time ( $b = .67$ ,  $p < .001$ ) was significantly steeper than that for those who had been in the U.S. longer ( $b = .21$ ,  $p > .05$ ; see the solid lines on Panels A and B in Figure 1). In conclusion, the effect of high maladaptive perfectionism for those who had been in the U.S. for a short time ( $b = .35$ ) was as strong as the effect for those who had been in the U.S. longer ( $b = .58$ ). In contrast, low maladaptive perfectionism played a buffering effect for those who had been in the U.S. longer ( $b = .21$ ) but had the opposite effect (accelerating) for those who had been in the U.S. for a shorter period ( $b = .67$ ).

#### Discussion

The main purpose of the present study was to test the three-way interaction of acculturative stress, maladaptive perfectionism, and the length of time in the U.S. in predicting depression among Chinese international students. We first expected a positive association between acculturative stress and depression. Our findings supported this hypothesis, even after we controlled for maladaptive perfectionism and the length of time in the U.S. This result was parallel to previous results showing that acculturative stress was positively associated with depression in Taiwanese international students (Ying & Han, 2006) and other Asian international students (Constantine et al., 2004; Lee et al., 2004; Sandhu & Asrabadi, 1998; Yang & Clum, 1995). We suspect this finding may

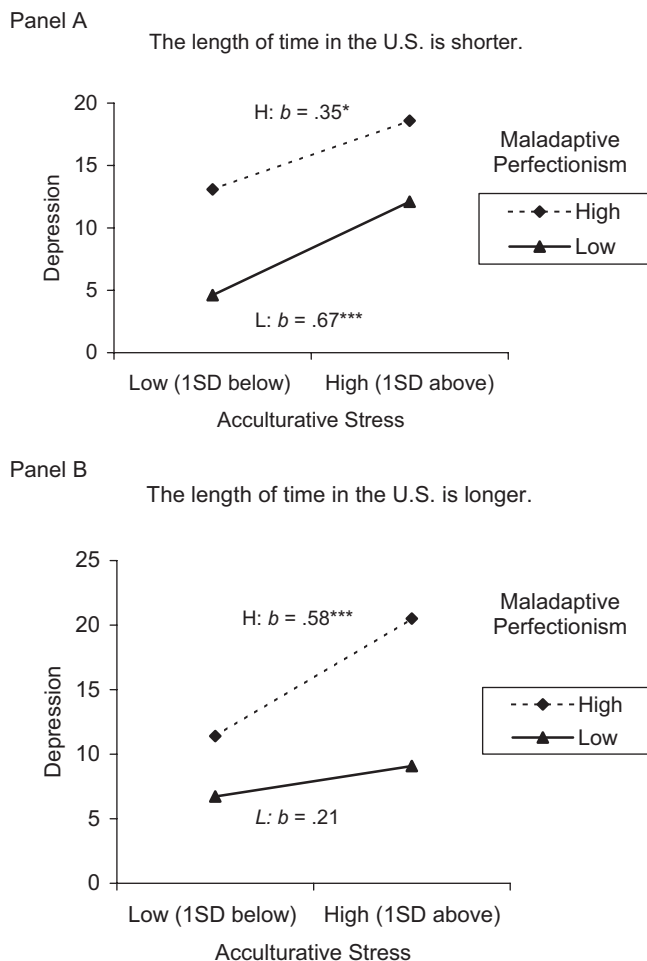


Figure 1. Relationships between acculturative stress and depression at low (L) and high (H) levels of maladaptive perfectionism in Chinese/Taiwanese students who had lived in the United States for a short period of time (Panel A) versus those who had lived in the country for a longer period of time (Panel B). \*  $p < .05$ . \*\*\*  $p < .001$ .

be related to some of the barriers previously discussed for Chinese international students when coping with acculturative stress. For example, when Chinese international graduate students experience acculturative stress, the possibility of losing face and embarrassment may prevent them from sharing their experiences with their peers because these experiences may imply personal failures. Also, they may refrain from talking about their experiences with their friends or family back home because they often do not want to burden others with their problems (Heppner et al., 2006). Because of these considerations, they may keep these upsetting emotions to themselves, which may make them vulnerable to depression.

Second, we expected maladaptive perfectionism to be positively related to depression. Overall, the result from this study supported this positive association, even after we controlled for acculturative stress and the length of time in the U.S. This result was not only consistent with findings of previous studies (Rice et al., 2006; Slaney et al., 2001; Wang et al., 2007) but also extends this line of research to Chinese international students. There are several possible reasons for this association. Perhaps most Chinese interna-

tional students have had outstanding performances in their home countries (Pedersen, 1991), and thus when they come to the U.S., they expect that they will still do quite well in school. Unfortunately, faced with a different language, new environment, and new cultural norms, they may quickly experience difficulties in maintaining the same academic performance as before. Those with maladaptive perfectionism may tend to view these difficulties as personal failure and focus on the negative aspects of their performance, which increases their vulnerability to depression (Hewitt et al., 1996).

More important, our significant three-way interaction suggests that there is additional complexity in understanding Chinese international students besides the main effects we have described. Specifically, among those who had been in the U.S. for a short period of time, the association between acculturative stress and depression was significant when maladaptive perfectionism was both high and low (see Panel A in Figure 1). The effect of high maladaptive perfectionism was as strong as the effect at low maladaptive perfectionism. Perhaps, students who have been in the U.S. for a shorter period and who have high maladaptive perfectionism might interpret various acculturative stressors (e.g., language problems) as resulting from personal failures or imperfect performance and then blame themselves. Perhaps, those who have been in the U.S. for a shorter period and who have low maladaptive perfectionism may set up seemingly realistic expectations for their performance, but these realistic expectations (e.g., improving English proficiency is a slow process) may not be sufficient to meet the demands of reality (e.g., a need to improve English as soon as possible) to function well in everyday life in the U.S.

In addition, for those students who had been living in the U.S. for a longer period of time, high maladaptive perfectionism still appeared to exacerbate the negative impact of acculturative stress on depression (see the dashed line on Panel B in Figure 1). Perhaps, these students expected that they should have higher achievement than before or do better than those who had been in the U.S. for a shorter period of time. Thus, being in the U.S. for a longer time can become an added pressure (e.g., additional expectations from self or others) for those with high maladaptive perfectionism. Moreover, from the post hoc analyses, we know that the effect of high maladaptive perfectionism among students who had been here longer ( $b = .58$ ) was as strong as that among those who had been in the U.S. a short time ( $b = .35$ , see the dashed lines on Panels A and B in Figure 1). Thus, we need to be cautious not to assume that those who have been in the U.S. longer and have high maladaptive perfectionism will be better off than those who have been in the country for a shorter time and who have high maladaptive perfectionism (or vice versa).

Conversely, as expected, low levels of maladaptive perfectionism buffered the negative impact of acculturative stress on depression (see the solid line on Panel B in Figure 1) until the later years in the U.S. Perhaps, for Chinese international students, being in the U.S. longer and having low maladaptive perfectionism allow them to become aware of the fact that acculturative stress is a common experience, understand the external factors of acculturative stress, and gain knowledge about the new environment. These factors in turn may reduce the likelihood of overreacting to acculturative stress. In addition, it is interesting to note that the result from the post hoc analyses (see the solid lines on Panels A and B in Figure 1) indicated that low maladaptive perfectionism played a buffering

effect in the later years in the U.S. However, as mentioned earlier, in students in whom maladaptive perfectionism was low, there was a significant association between acculturative stress and depression during the early years in the U.S. Thus, those with low maladaptive perfectionism would not be free from the negative effect of acculturative stress on depression in the early years in the U.S. In reality, we can expect that a reasonable amount of time is needed for any transitional adjustment period in those moving from one culture to another culture.

### *Future Research Directions*

There are several future research directions to continue in this line of research. First, since problem-solving appraisal or other coping constructs have moderated the stress–depression relationship (see Heppner, Witty, & Dixon, 2004), future researchers might consider adding a problem-solving appraisal or an Asian-based coping scale (e.g., Collectivistic Coping Scale; Heppner et al., 2006) to their studies to determine the utility of such an instrument for predicting depression in a sample of international students. Second, future studies might explore whether Asian cultural values serve as a moderator between acculturative stress and depression. As we know, one of the Asian cultural values is to honor their family through academic achievement (Kim et al., 1999, 2005). Chinese international graduate students may expect themselves to reach the same or higher level of achievement as they do in their home countries. In order to maintain the image of outstanding performance, they may choose to keep their difficulties or emotional problems to themselves, a strategy that increases their vulnerability to depression in the face of acculturative stress. Finally, even though we attempted to discuss perfectionism in the cultural context of Chinese international students' experiences (e.g., maintaining excellent academic performance to honor their family), more research is needed to directly examine cultural variables in the study. For example, the components of acculturation (e.g., social–cultural adaptation, enculturation; see Kim & Abreu, 2001) may serve as moderators in studying the effect of acculturative stress on depression.

### *Limitations*

There are a number of limitations in the present study. First, a response rate of 39% to the online survey could be considered low. However, there is often a lower response rate from participants in Web-based surveys (e.g., 22% response rate; Sills & Song, 2002) compared with the response rate from participants who receive course credits. Also, this study's sample may be biased because it only represents students who are interested in this topic or who are willing to participate. Second, we found a high percentage of unusable surveys (55 of 252, 22%) after examining the three validity items. The reasons may be related to ambiguity in the direction of the validity items or to fatigue, annoyance, and frustration resulting from completing a long survey or just a mistake made at a specific moment in responding to the survey. Conversely, because of the validity items, we are confident that the data we used for the data analyses are accurate and contain less error.<sup>1</sup> Third, the present results are limited to Chinese international students at one large state university in the Midwest. However, Asian or other international students often share similar

experiences. So, the present results might also generalize to Asian or other international students with maladaptive perfectionism (i.e., not meeting one's standards or expectations for performance), but additional research is needed. Fourth, all measures are self-report, which may inflate the bivariate associations between variables because of shared variance. However, self-report bias or shared variance between predictors (e.g., acculturative stress and maladaptive perfectionism) is less likely a concern in regression analysis because the shared variance among the independent variables is actually controlled in prediction of the dependent variable. Fifth, 80% of the participants in this study were graduate students, which limits the generalizability of the study's results to undergraduate students. Finally, we used a single subscale to represent the construct of maladaptive perfectionism in the present study; other researchers may want to test the generalizability of our findings with other perfectionism scales and subscales.

### *Clinical Implications*

If the results are confirmed by future studies, our findings have several clinical implications for working with Chinese, other Asian, or perhaps other international students. First, it may be important to increase international students' awareness of how acculturative stress, maladaptive perfectionism, and the interaction of these variables are related to their depression at different time points of their stay in the U.S.. In particular, clinicians helping such students to find strategies to decrease their acculturative stress and maladaptive perfectionism should take into consideration the length of time the students have been in the U.S. Recall that the buffering effect of low maladaptive perfectionism was observed only for those who had been in the U.S. for a longer period, not for those who had been in the U.S. for a short time. Thus, we do not assume that those students who have been in the U.S. a short time and have low maladaptive perfectionism will not be at risk for depression when acculturative stress is high. In the same vein, the effect of high maladaptive perfectionism on the association between acculturative stress and depression for those who have been in the U.S. for a shorter period is as strong as that for those who have been in the U.S. longer. Therefore, we do not assume that those who have been in the U.S. longer but have high maladaptive perfectionism will be free of depression when acculturative stress is elevated. It is also important to educate instructors, student service staff, and clinicians about the importance of

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<sup>1</sup> In conducting regression analyses for the invalid datasets, we found that the standard errors for unstandardized regression coefficient (i.e., *b* weight) increased when the number of incorrect answers increased. This result provided us a piece of evidence for the validity of invalid items because the standard error for *b* increased when the number of incorrect answers increased. Therefore, it would not have been prudent to include all the participants who answered several of the validity questions incorrectly. We decided to include participants who correctly answered two out of three validity items in the analyses. The results indicated a significant three-way interaction. However, the invalid data set ( $N = 55$  with more than one validity item answered incorrectly) indicated a nonsignificant three-way interaction, a finding that is different from the results with the valid data set. This analysis provides us an additional piece of evidence that the invalid data set in the current study might distort the associations among variables.

multicultural training to increase their awareness of the associations among the variables found in this study.

Next, Chinese international students often do not actively seek counseling and psychological help. They may be reluctant to discuss personal problems because of cultural stigmas or may not be aware of the availability of psychological services (Pedersen, 1991). Thus, student service professionals can conduct culturally sensitive outreach programs to let the students know of available resources to normalize their experiences (e.g., a panel of international students or alumni to share their adjustment stories). Being successful in academics and in one's future career are two important goals for international students studying in the U.S. Conducting discussion groups to improve academic performance or providing culturally sensitive career services may be two culturally appropriate strategies to attract students to interact with and obtain assistance from trained professionals (see Lee, Lin, Fuhrman, Heppner, & Heppner, 2006). Finally, we also suggest that pairing newly arrived international students with Americans peers (e.g., serving as an English conversation partner or English tutor) can facilitate the international students' transition and lessen their acculturative stress. Indeed, Westwood and Barker (1990) found that pairing international students with American students enhanced the academic performance of the international students.

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