

Longitudinal Adjustment Trajectories of International Students and Their Predictors

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Abstract

Despite the increasing number of international students in U.S. universities, the course of adjustment of international students has not been adequately tested and only one study to date has examined multiple trajectories of international students' adjustment. Therefore, the first goal of the current study was to explore multiple trajectories of international student adjustment, using four types of adjustment outcomes (i.e., psychological distress, positive psychological adjustment, acculturative stress, and functional adjustment). The second goal was to identify important predictors of trajectories. A wide range of predictor variables were examined including individual, interpersonal, and contextual factors. Undergraduate and graduate international students who started their first semester at a large Midwestern university participated in this five-wave longitudinal study ($N = 211$) that spanned a period of six months. Multiple trajectories emerged and the trajectories varied across four adjustment outcomes. Contrary to the popular notion, the U-shape adjustment trajectory only emerged for one of four outcomes (psychological distress). Significant predictors of adjustment trajectories included perceived present control over reactions to academic stress, neuroticism, openness, social connectedness with Americans, and self-rated English proficiency. Limitations, implications for practice, and future directions are discussed.

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Longitudinal Adjustment Trajectories of International Students

U.S. universities and colleges welcome a large number of international students every year, most of whom originate from countries where English is not the primary language. In 2010, the top three sending countries were China, India, and South Korea (Institute of International Education, 2010). The number of new international students enrolled has increased by 50% from 2005 to 2011 (Institute of International Education, 2010). International students have become a considerable portion of the student body in U.S. universities. International students bring many benefits – as well as challenges - to U.S. universities. International students increase the cultural richness on campus, promote intercultural communication (Sandhu & Asrabadi, 1994), and bring substantial income to the U.S. (Institute of International Education, 2010). Recently, the challenges U.S. universities face due to the rapid influx of Asian international students have received attention. For example, it can be difficult for admissions offices to evaluate application materials from foreign countries and for instructors to accommodate students who struggle with oral English communications (Bartlett & Fischer, 2011).

International students themselves also face various challenges once they arrive in the U.S. In addition to academic stressors similar to those experienced by American students, they encounter unique stressors such as language difficulty, alienation, and discrimination. Research has shown that international students were less adjusted to college life than were American students (Hechanova-Alampay, Beehr, Christiansen, & Van Horn, 2002) but that they underutilized mental health services on campus (Mori, 2000). Therefore, it is imperative to examine international students' adjustment and its

contributing factors to inform psychological interventions and campus programs for students to improve the quality of their experience.

The aims of the current study were to identify different trajectories of international students' adjustment and predictors of those trajectories. In this paper, I will review the theoretical frameworks developed to understand international students' adjustment, past research on the course of adjustment and its correlates, and the limitations of that research. I will then describe the methods and results of a study conducted to address these limitations.

Hypothesized Courses of Adjustment

A widely known theory of international students' adjustment is the U-curve theory (Lysgaard, 1955; Oberg, 1960). This theory proposes a U-curve shape of adjustment characterized by an initial euphoric state, followed by a period of adjustment difficulty, and eventual recovery. An Internet search led to several university affiliated websites (e.g., study abroad, international student services offices) that describe the U-curve theory of adjustment and suggest that this is what students are likely to experience. Despite its popularity, the U-curve theory has not been adequately tested (see reviews by Black & Mendenhall, 1991, and Church, 1982). Support for the U-curve theory came from early studies that had considerable methodological flaws such as no statistical analyses, reliance on retrospective reports, and poorly defined outcome variables (Black & Mendenhall, 1991). For instance, Lysgaard interviewed 200 Norwegians who previously had studied in the U.S. for varying lengths regarding their satisfaction with their education and social contacts at the time of U.S. residence. Those who had a short stay (6 months or less) and those who lived in the U.S. a longer period (18 months or

more) reported more satisfaction than those who lived in the U.S. more than 6 months but left before 18 months. On this basis, he concluded that the interview results were consistent with the U-curve theory. However, due to their cross-sectional and retrospective nature, they do not directly support it and the statistical analyses were not reported.

More recent studies have provided inconsistent results especially with regard to the initial euphoric stage. For example, Ying and Liese (1990) compared prearrival depressive symptoms to 1 to 2-month postarrival depressive symptoms among Taiwanese international students and found that depressive symptoms increased from pre- to postarrival. This contradicts the initial euphoric stage suggested by the U-curve theory. Studies that have examined postarrival psychological adjustment longitudinally among international students also have not supported the U-curve shape of adjustment (see Table 1). Two of these studies operationalized psychological adjustment solely in terms of depressive symptoms. One study found an inverse U-shape adjustment pattern – depression was highest at 1-month postarrival, decreased at 6-months, and then increased again at 12-months postarrival (Ward & Kennedy, 1996). The other study found that depression was highest at the beginning (24-hours postarrival) and then decreased by 4 months and remained stable (Ward, Okura, Kennedy, & Kojima., 1998). In one study (Hechanova-Alampay et al., 2002), in which psychological adjustment was operationalized as the composite of depressive symptoms and acculturative stress, adjustment followed a U-shape – depression and acculturative stress were low at the beginning of Fall semester, increased 3 months later, then decreased again another 3 months later. However, a comparison group of American students also followed this

trend. The authors concluded that the low adjustment at the 3 months point was an artifact of nearing final exams, rather than providing evidence for the U-curve theory of adjustment.

The most recent study used an analytical method that allows for the examination of multiple trajectories of international students' adjustment (K. Wang et al., 2012). In this study, psychological distress (i.e., depression, anxiety, somatization) was assessed among international students from China and Taiwan over the course of a year. Using group-based trajectory modeling, four trajectory classes were identified. The *consistently distressed* group (10%) reported the highest level of presemester distress with symptoms remaining high over time. The *relieved* group (14%) reported moderate presemester distress that decreased somewhat by the first semester, and then remained the same. The *well-adjusted* group (65%) reported the lowest presemester distress and those levels remained low over time. The *culture shocked* group (11%) reported low presemester distress that increased through the first and second semesters, but then decreased slightly into the third semester. The *culture-shocked* group may provide some evidence for a U-shape adjustment trend, as they appeared to have low presemester distress followed by an increase in distress and then eventual recovery. However, the significance of the linear and quadratic trends were not reported in the article.

Ward and colleagues (e.g., Ward & Kennedy, 1999) took a different approach from the U-curve theory to conceptualize international students' adjustment. Specifically, they proposed the concept of sociocultural adaptation (Searle & Ward, 1990; Ward & Kennedy, 1999; Ward & Searle, 1991) in addition to psychological adjustment. Sociocultural adaptation entails behavioral competence to fit into the new culture, such as

acquiring cultural knowledge and was conceptualized in an intercultural social skills learning framework (Furnham & Bochner, 1986). Psychological adjustment entails the well-being of international students and was conceptualized in terms of the transactional theory of stress and coping (Lazarus & Folkman, 1984). Ward and colleagues expanded the acculturation model that was originally developed for immigrants to describe the adjustment of international students. Acculturation is the adaptation process by which individuals change as a result of intercultural contacts (Berry, 1997), and involves changes in behaviors, beliefs, and values (Berry, Trimble, & Olmedo, 1986). Individuals experience acculturative stress when challenges arise during the process of acculturation (Berry, 2005). Most international students come to the U.S. voluntarily and their residence is relatively short-term compared to immigrants (Berry, Kim, Minde, & Mok, 1987). In this context, functional adaptation may be more relevant than longer-term changes in beliefs and values.

Therefore, Ward and colleagues focused on the importance of functional adaptation among international students (Searle & Ward, 1990; Ward & Kennedy, 1999; Ward & Searle, 1991). In a larger acculturation framework, sociocultural adaptation may be conceptualized as a specific type of acculturation (i.e., behavioral competence). In contrast to the hypothesized U-curve shape of adjustment, in Ward and colleagues' model, sociocultural adaptation is hypothesized to increase over time and then level off. The course of psychological adjustment is hypothesized to vary depending on various factors such as individual characteristics, social support, and coping styles (Ward & Kennedy, 1999).

Five longitudinal studies have examined the course of sociocultural adaptation (see Table 1). The results suggest that international students experience the lowest level of sociocultural adaptation at the beginning of their stay and that it increases over time. Of these, four studies found the increase to happen within 6-months postarrival (Hechanova-Alampay et al., 2002; Kennedy, 1998, reported in Ward & Kennedy, 1999; Ward & Kennedy, 1996; Ward et al., 1998). The other study found that adjustment increased between 3 and 9-months postarrival for a few domains of sociocultural adaptation (academic, unfamiliar climate) and between 9 and 14-months postarrival for the other domains (homesickness, cultural difference, social isolation; Ying, 2005). Although the longitudinal studies are scant, there seems to be a trend that sociocultural adaptation is lowest for international students upon arrival but that it increases fairly quickly, even within several months into their residence in a new culture.

Summary and Limitations of Past Research on International Students' Adjustment

In summary, there are a few limitations of past research on international student adjustment that need to be addressed. First, longitudinal studies that have examined the course of international students' adjustment are scant. No consistent pattern of psychological adjustment has emerged from the existing longitudinal studies, and there has been limited evidence of a U-shape adjustment in the past few decades. There is some longitudinal evidence that international students experience the lowest sociocultural adaptation at the beginning of their sojourn and that it increases even within 6-months postarrival. Only two studies explicitly tested a non-linear course of adjustment (Hechanova-Alampay et al., 2002; K. Wang et al., 2012) despite the suggested non-linear course of adjustment (i.e., U-curve). A few of these studies had small sample sizes (e.g.,

$N = 14$). More longitudinal studies with larger samples are sorely needed and quadratic trends need to be tested.

Second, psychological adjustment was narrowly operationalized as depressive symptoms in most studies. Only one study (K. Wang et al., 2012) used a measure that assessed depression, anxiety, and somatic symptoms. No longitudinal data are available for other indicators of psychological adjustment such as positive psychological adjustment. This is surprising because Adler's (1975) often-cited conceptualization of cross-cultural adjustment includes positive adjustment. Specifically, Adler theorized that the challenges of cross-cultural transitions add richness to one's life experiences, and promote personal growth and eventual re-affirmation of self. The benefits of positive psychological adjustment for decreased risk of mental illness have also been found among a large national sample of U.S. adults (Keyes, 2002). Thus, the definition of adjustment needs to be expanded to include relevant aspects of positive psychological adjustment (i.e., personal growth and self-acceptance).

Finally, all but one of the longitudinal studies described above used group mean comparison of adjustment outcomes across different time points using, for example, repeated measure Analysis of Variance (ANOVA; see Table 1). This method yields a single average trajectory and does not allow researchers to identify subgroups of students who may follow different courses of adjustment. The lack of a consistent pattern of adjustment in past research may be partially explained by heterogeneous adjustment trajectories among international students. For example, K. Wang et al. (2012) used group-based trajectory modeling and identified four distinct trajectories among international

students. More studies that examine multiple trajectories are necessary to understand both the most common adjustment trajectory and less frequent but important trajectories.

Factors that Are Associated with Adjustment Outcomes

Overview

Researchers have examined a multitude of variables that relate to the adjustment of international students. The variables examined as predictors of psychological or sociocultural adjustment can be organized into individual (e.g., English proficiency, length of residence), interpersonal (e.g., social connectedness), and contextual factors (e.g., perceived discrimination). Although acculturation is an often cited predictor of adjustment (Zhang & Goodson, 2011), it conceptually overlaps with some adjustment outcomes (e.g., acculturative stress, sociocultural adaptation) as well as predictor variables (e.g., English proficiency). Therefore, I considered specific components of acculturation (e.g., English proficiency, social connectedness with Americans) rather than global acculturation. I will discuss the association between these variables and both psychological and sociocultural adjustment below, particularly within longitudinal studies, although studies on factors related to international students' adjustment are mostly cross-sectional. For this review, I broadly defined sociocultural adjustment in terms of behavioral or functional competence such as getting used to the local food or adjusting to an unfamiliar educational system. I defined psychological adjustment as psychological and somatic symptoms, positive psychological adjustment (e.g., well-being, satisfaction), and self-reported acculturative stress (as opposed to behaviors involved in adjusting to a new culture).

Predictors of Psychological and Sociocultural Adjustment

Individual Factors.

Demographic variables. Several demographic variables are related to the adjustment of international students. For example, past research has found that region of origin is associated with both psychological and sociocultural adjustment. Specifically, European international students in the U.S. tend to have better sociocultural and psychological adjustment than do students from Asia and Africa (Poyrazli & Kavanaugh, 2006; Yeh & Inose, 2003). The findings regarding gender and age are mixed. Some researchers have found that female international students reported greater psychological difficulty (Dao, D. Lee, & H. L. Chang, 2007; Misra, Crist, & Burant, 2003) whereas others have found no gender difference in psychological adjustment (Yeh & Inose, 2003; Ying & Liese, 1994). Younger international students have reported better psychological adjustment (measured by subjective ratings of adjustment and satisfaction with American life and study; Ying & Liese, 1994) and sociocultural adjustment (Poyrazli, Arbona, Bullinton, & Pisecco, 2001). However, another study found no age difference in acculturative stress (Yeh & Inose, 2003). Given the inconsistent results, more studies are needed to examine the relation between these demographic variables and adjustment outcomes.

Academic factors. Because education is the central purpose of international students' stay in the U.S., it is likely that academic factors are related to their adjustment. In fact, among various acculturative stressors, academic challenges were rated the highest (Ying, 2005). Taiwanese international students who maintained or increased their depression levels from prearrival levels also reported significantly more academic problems postarrival than those who decreased in their depression levels (Ying & Liese,

1991). Finally, in a cross-sectional study, greater academic self-efficacy was related to better sociocultural adaptation (Poyrazli, Arbona, Nora, McPherson, & Piscecco, 2002). Academic factors such as low academic stress and perceived control over reactions to academic stress (Frazier et al., 2011) are likely to predict better adjustment and thus should be assessed when examining international students' adjustment.

Language-related factors. Host language proficiency is thought to facilitate social interaction with host nationals, leading to opportunities to learn cultural knowledge and cultivate support networks that, in turn, increase adjustment (Church, 1982; Oberg, 1960). Longitudinal evidence provides some support for the relationship between self-rated English proficiency and later adjustment. Taiwanese international students whose mood deteriorated after they moved to the U.S. had rated their English proficiency significantly lower prior to their sojourn than those whose mood remained stable or improved (Ying & Liese, 1990). Self-rated English proficiency at 2-3 months postarrival predicted better psychological adjustment a year later among the same sample (Ying & Han, 2008). Cross-sectional evidence also suggests a positive relation between subjective ratings of English proficiency and sociocultural adjustment (e.g., C. -C., Wang & Mallinckrodt, 2006).

Although English proficiency seems to be an important correlate of international students' adjustment, the ways it has been measured preclude clear conclusions about which aspects of English proficiency are most related to adjustment. For example, English proficiency has been measured in terms of frequency of English use, comfort in using English, and self-rated overall proficiency (e.g., Constantine, Okazaki, & Utsey, 2004); self-rated proficiency in specific domains such as reading, writing, and listening

comprehension (Ying & Han, 2008); and objective ratings of proficiency such as the Test of English as a Foreign Language (TOEFL; Poyrazli et al., 2001). These differences in measures across studies are important because different measures have different relations with adjustment. For example, one cross-sectional study found that comfort with English use - but not objective English proficiency ratings - was significantly associated with sociocultural adaptation (Swagler & Ellis, 2003). Clear operationalization and more precise measures of language-related factors are necessary for future studies (e.g., separate measures to assess self-rated English proficiency, comfort with English use, and objective English proficiency).

Personality characteristics. Typically in research on international students' adjustment, personality characteristics have been measured concurrently with adjustment outcomes, thus limiting the interpretation of directionality. Across cross-sectional and longitudinal studies, many personality characteristics have been examined but extraversion, openness, and neuroticism seem most promising. In a longitudinal study with Taiwanese international students, prearrival extraversion was negatively associated with depression during the third semester in the U.S. (Ying & Han, 2006). In another study, prearrival openness and emotion regulation were predictive of both psychological and sociocultural postarrival adjustment among Japanese international students (Matsumoto et al., 2003). Emotion regulation refers to the ability to manage and control one's emotions, similar to neuroticism (emotion stability). In a cross-sectional study, neuroticism was positively correlated with acculturative stress among international students in the U.S. (Poyrazli, Thukral, & Duru, 2010). Therefore, extraversion, openness,

and neuroticism should be included in research that examines important predictors of international students' adjustment.

Interpersonal Factors

Relationships with Americans are thought to be particularly important because they enhance cultural skills (Church, 1982). Although the findings are mixed, when they are significant, affiliation with or support from Americans have predicted better adjustment. For example, affiliation with Americans predicted subjective ratings of adjustment and satisfaction with U.S. life and studying, although not depression (Ying & Han, 2006). A study that examined ratios of American to conational friends found better adjustment among those with higher ratios of American friends (Hechanova-Alampay et al., 2002). Likewise, a higher ratio of support from Americans (as compared to conationals or international students) during the first semester (but not second or third semester) predicted a better course of adjustment (K. Wang et al., 2012). Conversely, affiliation with or support from conationals (i.e., other international students from the same country) did not prospectively predict adjustment (Ying & Han, 2006; K. Wang et al., 2012). In other studies, satisfying social relationships were associated with positive sociocultural and psychological adjustment among international students (J. -S., Lee, Koeske, & Sales, 2004; Yeh & Inose, 2003) although the types of satisfying relationship (American, conationals) were not specified in these studies. To summarize, greater affiliation and contact with Americans seem associated with better adjustment. Satisfying relationships are associated with better adjustment but it remains unknown what types of satisfying relationships are most predictive of better adjustment.

Contextual Factors

Research on international students' adjustment has focused more on individual factors than on contextual factors (Zhang & Goodson, 2011). However, the host environment also plays an important role in the experience of international students, such as the attitudes of host nationals (Berry et al., 1987; Zhang & Goodson, 2011). For example, cross-sectional data have indicated that perceived discrimination was related to depression among international students (e.g., E. Jung, Hecht, & Wadsworth, 2007).

The availability of a conational community may also be important. Church (1982) discussed the potential benefit of a conational community such as easing homesickness, providing support, and promoting the maintenance of familiar values and belief systems. However, he also noted that remaining in a conational community minimizes contact with host nationals and thus hinders cultural learning and eventual adaptation. One study examined the effect of ethnic density (defined as the size of a conational community on campus) on international students (Ying & Han, 2008). There was no difference in psychological adjustment between international students in low and high ethnic density universities, although international students in low ethnic density universities reported better English proficiency, more social affiliation with Americans, and less social affiliation with conationals. No studies have examined the relation between these contextual variables and sociocultural (as opposed to psychological) adaptation. Given the potential relation between ethnic density and other important predictors and possibly adjustment outcomes, ethnic density needs to be explored more.

Limitations of Past Predictor Research and Current Study

To summarize, because adjustment changes over time for international students, this process and related factors should be investigated longitudinally. Current research on

predictors is limited by imprecise measures, exclusion of contextual factors, and reliance on cross-sectional designs. Specifically, predictors were often operationalized in ways that did not distinguish overlapping but distinct constructs (e.g., English proficiency and comfort in using English). Lack of attention to contextual factors is problematic because it may promote the expectation that international students should change to fit into the new culture. Indeed, interventions tend to focus on change in international students (e.g., increase English proficiency and cultural knowledge). Finally, because international students' adjustment changes over time, examination of predictors of different courses of adjustment (as opposed to studies that examine cross-sectional correlates of adjustment) are needed.

The current study improved on the existing literature in a number of respects. First, this study modeled multiple longitudinal adjustment trajectories of international students without relying on a single average trajectory by using Group-based Trajectory Modeling (GBTM). Currently, only one study has modeled multiple trajectories of international students' adjustment (K. Wang et al., 2012). However, because only a single adjustment outcome (i.e., psychological distress) was assessed in this study, there are no data regarding multiple trajectories of other types of adjustment. Thus, this study incorporated a broader assessment of psychological adjustment, including four types of adjustment outcomes (i.e., psychological distress, positive psychological adjustment, acculturative stress, and sociocultural adjustment). The assessment of psychological distress was expanded to include anxiety and stress in addition to depression. Positive adjustment was defined as a composite of perceived personal growth and self-acceptance based on Adler's (1975) conceptualization. Acculturative stress was included to assess

psychological adjustment specific to the cross-cultural transition. Sociocultural adaptation was included to assess functional competence in the cross-cultural transition. These four different adjustment outcomes were analyzed separately to allow a better understanding of the course of different types of adjustment.

Third, a broad range of predictor variables was assessed, including individual (i.e., demographic, academic, language-related, personality variables), interpersonal (i.e., social connectedness), and contextual (i.e., perceived discrimination, ethnic density) factors. This study is the first to examine the contextual predictors of multiple adjustment trajectories of international students. This is also the first study to examine predictors of multiple adjustment trajectories, using various types of adjustment outcomes.

Operationalization of the predictor variables was improved by separating conceptually distinct constructs. For instance, objective English proficiency, subjective self-rated proficiency, and comfort in use of English were measured separately. Social relationships with Americans, conationals, and other international students were measured and analyzed separately. Separate measures to assess distinct constructs allows for the identification of specific variables that hinder or help international students' adjustment. Finally, the predictor variables were analyzed with respect to the trajectories rather than adjustment at one time point.

Purpose and Hypotheses

The main purpose of the proposed study was: 1) to identify different adjustment trajectories of international students (e.g., students who always do well vs. students who struggle initially but adjust over time) and 2) to identify factors that predict different

trajectories. Based on existing cross-sectional and longitudinal studies, the following hypotheses regarding adjustment trajectories were proposed.

H1a: Psychological adjustment. There will be no U-curve shape of psychological adjustment. There will be consistently distressed, consistently well adjusted, and initially distressed but recovered groups in terms of psychological adjustment.

H1b: Sociocultural adaptation. There will be multiple trajectories that differ in terms of the degree of sociocultural adaptation at the beginning. Across trajectory groups, sociocultural adaptation will be lowest at the beginning and increase over time across all trajectory groups.

Based on the review of past research, the following hypotheses were identified with respect to the predictors. The relations between demographic factors (i.e., age, gender, race) and adjustment trajectories were explored without specific hypothesis because of the mixed results in past literature. One exception is the region of origin where I expected that European students would fare better than students from other parts of the world. Thus, the hypothesis was specified as:

H2: European students are more likely to be in the favorable adjustment trajectories.

Due to the centrality of education in international students' lives, it was hypothesized that higher academic stress would be related to poorer adjustment trajectories. However, I expected that students would fare better if they had a sense of control over their reactions to academic stress. This aspect of control is called *perceived present control* and is consistently related to better psychological adjustment (e.g., Frazier et al., 2011). Therefore, perceived present control over reactions to academic

stress was hypothesized to predict better adjustment trajectories. I will refer this as “perceived control over academic stress” in this paper.

H3a: Higher academic stress is related to less favorable adjustment trajectories.

H3b: Greater perceived control over academic stress is predictive of favorable adjustment trajectories.

Greater English proficiency was hypothesized to predict favorable adjustment trajectories. This effect was expected to be stronger for subjective ratings of English proficiency and comfort than for objective ratings of English proficiency.

H4a: Greater English proficiency and comfort will predict favorable adjustment trajectories.

H4b: Subjective English proficiency and comfort will be better predictors of adjustment trajectories than objective English proficiency.

Based on past research, I hypothesized that extraversion, openness, and neuroticism would be related to adjustment trajectories as follows.

H5a: Extraversion is expected to be associated with favorable adjustment trajectories.

H5b: Openness is expected to be associated with favorable adjustment trajectories.

H5c: Neuroticism is expected to be associated with less favorable adjustment.

Based on past research, satisfying social relationships are expected to be beneficial to international students’ adjustment and the hypotheses were formulated as follow.

H6a: Satisfying social relationships will be associated with favorable adjustment trajectories.

H6b: This relation is expected to be stronger for social relationships with Americans than with conationals or other international students.

Finally, contextual factors were considered. It is expected that international students will experience more adjustment difficulties if they perceive the host environment as discriminating against them. International students may receive support from conational students that help them transition into the new culture (Church, 1982). However, if remaining in a conational community indeed hinders cultural learning (Church, 1982), high ethnic density may be related to unfavorable sociocultural adaptation. Thus, the hypotheses were specified as below.

H7: Perceived discrimination will predict poorer adjustment trajectories.

H8a: Higher ethnic density is expected to be associated with favorable psychological adjustment trajectories.

H8b: Higher ethnic density is expected to be related to poorer sociocultural adaptation trajectories.

Method

Participants and Procedure

All incoming international undergraduate and graduate students who started their first semester at a large public Midwestern university in Fall 2011 (total $N = 1,250$) were invited to participate. The students were recruited through email solicitations forwarded by the international student services office at the university. The email contained the link to participate in the online study. In addition, the study was announced in introductory psychology courses and advanced English as a Second Language (ESL) courses for degree seeking students. Various student organizations also were contacted and asked to

include the invitation to participate in this study in their newsletters. Students were given options to earn extra Psychology course credits or gift cards to a retail store. The participants who chose gift card options received \$5 each time for their first three survey completions and \$10 each time for the fourth and fifth completions. Two reminders were sent to the students two to four days apart after invitations were sent each time.

Two hundred fifty international students responded to the initial invitation. This was 20% of the incoming undergraduate and graduate international students. The participants were asked to take online surveys a total of 5 times throughout the course of the academic year. Participants completed the first survey (T1) in late September (the first month of the Fall semester). Most (84%) arrived in the U.S. a month or two prior to the beginning of the Fall 2011 semester. The mean elapsed months since T1 completion were: 1.1 months (T2), 2.1 months (T3), 4.2 months (T4), and 6.2 months (T5). The first three surveys were completed in Fall semester 2011 and the second two in Spring semester 2012. Frequent assessment allows a better understanding of the course of adjustment. Because I expected change to occur quickly, more assessments were conducted during the first semester. Participants who completed the first survey received invitations to all subsequent surveys. Some skipped a few surveys and then returned at later times. The number of participants at each time point was: 250 (T1), 195 (T2), 177 (T3), 157 (T4), and 148 (T5). The mean number of surveys completed was 3.7 and the mode was 5 ($n = 129$, 51% of the total participants). One student reportedly grew up in the U.S, and was thus removed from the sample. Only those who completed at least two surveys were retained because multiple assessments allow better estimation of trajectories ($n = 211$ students; 84% of the T1 sample). The mean age of the final sample was 22.6

($SD = 3.6$) at T1. The majority (60%) were graduate students. Most identified as Asian (87%) followed by White (8%), Hispanic/Latino(a) (3%), and Black/African (2%). Roughly half reported growing up in China (47%), followed by India (18%), Korea (7%), and all other countries (28%; each less than 3%). Gender was evenly distributed (52% female, 48% male). Most students reported either average (51%) or above average (46%) socioeconomic backgrounds in their home countries. Differences between completers and noncompleters are presented in the Results section.

The necessary sample size to detect significant growth factors varies based on expected effect size, missing data, and inclusion of covariates (Muthen & Muthen, 2002). The target sample size of approximately 250 or slightly less was determined based on a Monte Carlo study indicating that a sample size of 250 was necessary to detect a medium effect size in a growth model with a predictor and missing data (Muthen & Muthen, 2002). A sample size that is slightly smaller than 250 was expected to be sufficient because this study does not include predictors in the initial growth (trajectory) analyses. Predictors were analyzed separately using multinomial logistic regression.

Measures

To ensure comprehension of the survey questions among newly-arrived international students, a focus group consisting of four international students and a spouse of an international student discussed the understandability of all items prior to survey administration. The words or expressions that were deemed difficult to understand were modified through discussion. The discussion resulted in several minor changes in wording. For example, “make myself understood” was modified to “make others understand you.” Additionally, at the end of the first two surveys, the participants rated

their comprehension of the survey. The mean comprehension ratings were both 1.4 at T1 and T2 on a scale of 1 to 4, where 1 indicates “no difficulty” and 2 indicates “slight difficulty.”

Outcome measures. Four outcome measures were used to assess different types of adjustment outcomes.

Psychological distress. The 21-item Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995) assesses psychological distress including depression, anxiety, and stress. This measure was chosen because of its ability to assess a broader range of psychological symptoms than depression alone. Items were rated on a 0 (*did not apply to me at all*) to 3 (*very much or most of the time*) scale. Scores on the DASS have been validated with ethnic minority and international university students (Norton, 2007) and both clinical and non-clinical U.S. samples (Antony, Bieling, Cox, Enns, & Swinson, 1998). The alpha coefficients for the DASS-21 subscale scores among ethnic minority university students ranged from .74 to .88, and convergent and divergent validity was demonstrated using other depression, anxiety, and positive/negative affect measures (Norton, 2007). Because the subscales in the current study were highly correlated (r 's = .76 to .81 at T1), total scores were used for analyses. The alpha coefficients of the total scores in this sample ranged from .93 to .96 from T1 to T5.

Positive psychological adjustment. Ryff's Psychological Well-Being Scale (RPWB; Ryff, 1989) was used to assess positive psychological adaptation. The original measure consisted of six subscales that contained 14 items each. Based on Adler's (1975) conceptualization of positive adjustment of international students, the self-acceptance and personal growth scales from the RPWB were selected for this study. To minimize

participant burden, the 7-item subscales (C. D. Ryff, personal communication, August 4, 2011) were used. The Self-Acceptance subscale measures a positive self-view and acceptance of one's own challenges and strengths (e.g., "When I look at the story of my life, I am pleased with how things have turned out"). The Personal Growth subscale measures a sense of growth and self-improvement over time, and openness to new experiences (e.g., "I have the sense that I have developed a lot as a person over time"). Items were rated on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale. The alpha coefficients in previous studies were .83 to .84 for the 7-item Self-Acceptance Scale and .74 to .76 for the 7-item Personal Growth Scale (C. D. Ryff, personal communication, August 4, 2011). The validity of scores on the 14-item Personal Growth and Self-Acceptance scales was demonstrated among college students, using a perceived distress measure (E. C. Chang, 2006). The alpha coefficients of the scores in the current study ranged from .76 to .86 from T1 to T5 for Self-Acceptance, .64 to .74 for Personal Growth, and .79 to .86 for a composite of the two scales. The two scales were moderately correlated (r 's = .49 to .71 from T1 to T5) and thus combined for analyses.

Acculturative Stress. The 15-item Riverside Acculturation Stress Scale (RASI; Benet-Martinez & Haritatos, 2005) was developed to assess five theoretically-derived aspects of acculturative stress: work challenges, language skills, intercultural relations, discrimination, and cultural isolation. The RASI measures broader subjective psychological experiences as well as some functional adaptation. Sample items include "Because of my Asian background, I have to work harder than most Americans", and "I often feel misunderstood or limited in daily situations because of my English skills." The word "Asian" was replaced with "cultural/ethnic" in this study. The items were

developed to be applicable to diverse cultural groups although originally it was developed for Asian Americans. Items were rated on a 1 (*strongly disagree*) to 5 (*strongly agree*) scale. Higher scores represent higher levels of acculturative stress. The internal consistencies of subscale scores have ranged from .72 to .84 in previous studies of Asian Americans (Miller, Kim, & Benet-Martinez, 2011). RASI scores were positively correlated with depression and anxiety among Chinese American college student/scholar and spouses in a previous study (Miller et al., 2011). In the current sample, the total scores were used and the alpha coefficients of the total scores ranged from .82 to .89 from T1 through T5.

Sociocultural Adaptation. The Sociocultural Adaptation Scale (SCAS; Ward & Kennedy, 1999) was developed to assess difficulties that international students encounter primarily in daily behavioral domains in the new environment. The SCAS has 40 items that are rated on a 5-point scale (1 = *no difficulty* to 5 = *extreme difficulty*). Examples of items are “getting used to the pace of life” and “finding your way around.” Higher scores indicate more difficulty. In this study, we eliminated the recently added cognitive domain items because they seem to focus on values and attitudes rather than functional competence, and lack psychometric data. The remaining 33 items were used in this study. The developers have used varying numbers of items and reported alpha coefficients for SCAS scores ranging from .76 to .91 (Ward & Kennedy, 1999). The SCAS was positively correlated with depression, anxiety, and stress among Chinese and Taiwanese international students (C. -C., Wang & Mallinckrodt, 2006). The alpha coefficients for the scores of this sample ranged from .93 to .97 from T1 to T5.

Predictor variables – individual variables. The predictor variables related to individual factors are described below.

Demographic information. Participants answered questions about age, gender, race, relationship status, socioeconomic status, country of origin, degree level, field of study, length of residence in the U.S., prior educational experience in the U.S., prior residence in English speaking countries, and plans after completing education. The demographic questionnaire is included in Appendix A.

Academic factors. Academic stress was measured by three items asking participants to rate how stressed, worried, and helpless they felt regarding their academics on a scale of 1 (*not at all*) to 10 (*a great deal*). In past research with college students, scores on this measure had an alpha coefficient of .84 and were negatively correlated with academic performance (Struthers, Perry, & Menec, 2000). In the current study, alpha coefficients ranged from .83 to .87 from T1 to T5. Perceived control over academic stress was measured by the 8-item present control subscale of the Perceived Control over Stressful Events Scale (Frazier et al., 2011). The word “event” from the original measure was replaced with “academic stress” to specify the academic context. Items were rated on a 1 (*strongly disagree*) to 4 (*strongly agree*) scale. The alpha coefficients for scores on the present control subscale in previous studies of university students ranged from .79 to .86, and present control was positively correlated with hope and general self-efficacy and negatively correlated with distress (Frazier et al., 2011). The alpha coefficients in the current study ranged from .80 to .92 from T1 to T5.

English proficiency. Participants were asked to report subjective and objective English proficiency. The self-rated subjective proficiency questions covered reading,

writing, listening, and speaking skills. Responses were made on a 4-point Likert scale (1 = *low* to 4 = *excellent*). These questions were derived from past research (e.g., Poyrazli & Kavanaugh, 2006; Ying & Han, 2008); however, the word “understanding” was replaced with “listening” in this study to ensure the rating of auditory understanding. Higher scores represent higher proficiency. In a past study, the alpha coefficient was reported to be .76 (Ying & Han, 2008). Subjective English proficiency measured this way was negatively correlated with acculturative stress (Constantine et al., 2004). In the current study, the alpha coefficients ranged from .87 to .92 across time. The Test of English as a Foreign Language (TOEFL) is a standardized English proficiency test that has three components (reading, writing, and oral proficiency). Higher scores indicate higher proficiency. TOEFL served as an objective measure of English proficiency. Most international students are required to surpass a certain score on the TOEFL to enroll in U.S. universities. Higher TOEFL scores represent higher proficiency. The students were asked to report their TOEFL scores.

Communication comfort. The Personal Report of Communication Apprehension Scale (PRCA; McCroskey, 1982) was used to assess comfort with communication both in native language and English. The original PRCA consists of 24 items that ask about comfort in four social situations. In this study, to minimize redundancy, we used two social situations (i.e., group setting, meeting a new person – 6 items each) that are particularly relevant to international students. Participants answered each question twice – once with respect to comfort with English and once with respect to their native language. Sample questions include “I am calm and relaxed while participating in group discussion” and “communicating at meetings usually makes me uncomfortable.”

Responses were made on a 5-point Likert scale (1= *strongly agree* and 5 = *strongly disagree*). Higher scores indicate more comfort. Alpha coefficients were .88 for native language comfort and .91 for English language comfort among Chinese international students using all 24 items (Swagler & Ellis, 2003). The full scale PRCA with English significantly predicted cross-cultural adaptation among Taiwanese international students (Swagler & Ellis, 2003). PRCA with English was positively correlated with PRCA with a native language (Swagler & Ellis, 2003). The alpha coefficients in the current study ranged from .93 to .94 for English from T1 to T5. The alpha coefficient was .91 for native language (measured only at T1).

Personality characteristics. The 44-item Big Five Inventory (BFI; John & Srivastava, 1999) measures five personality factors. The 26 items that measure extraversion, openness, and neuroticism (emotional stability) were used in this study. In a previous study with international students, the average alpha coefficient of all five factors was .83 (Poyrazli et al., 2010). The BFI extraversion and openness were positively correlated with intercultural adjustment potential, whereas neuroticism was negatively correlated with intercultural adjustment potential among college students (Matsumoto et al., 2001). In the current study, the alpha coefficients for scores on the extraversion, openness, and neuroticism subscales were .74, .74, and .76, respectively at T1.

Predictor variables – interpersonal factors. Social connectedness with different sources was examined in this study.

Social connectedness. The Social Connectedness in Mainstream Society (SCMN) and Ethnic Community (SCETH) Scales (Yoon, K. R. Jung, R. M. Lee, & Felix-Mora, 2012) were developed to assess quality of interpersonal relationships with Americans and

a specified ethnic community. Each scale includes 5 items that ask about one's sense of closeness with the specified groups (e.g., "I feel a sense of closeness with U.S. Americans"). Responses were made on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). In this study, participants rated social connectedness with Americans (SCMN), those who speak their own native language (colanguage community; SCCL), and international students who spoke another native language (SCINT) separately. Higher scores indicate more interpersonal closeness. The alpha coefficients of scores of Asian international students in a previous study were .90 for SCMN and .95 for SCETH (Yoon et al., 2012). In the validation study of the SCMN and SCETH, the SCMN was positively correlated with higher levels of acculturation and the SCETH was negatively correlated with acculturation (Yoon et al., 2012). In the current study, the alpha coefficients ranged from .88 to .92 for scores on the SCMN, from .91 to .94 for the SCCL, and from .92 to .96 for the SCINT.

Predictor variables - contextual factors. Two contextual factors were included in this study.

Perceived discrimination. In assessing perceived discrimination, I used the 3-item discrimination subscale of the Riverside Acculturation Stress Scale (RASI; Benet-Martinez & Haritatos, 2005). For this reason, perceived discrimination was analyzed only with respect to the other outcome measures and not the full RASI. The alpha coefficient for scores on this subscale was .84 in a previous study of Asian Americans (Miller et al., 2011). As evidence of validity, perceived discrimination was positively correlated with anxiety and depression among first generation Chinese American college sample (Miller et al., 2011). The alpha coefficients of the scores in this sample ranged from .74 to .81.

Ethnic density. Ethnic density was assessed by a single item. Participants responded to the stem “In my academic environment...” by selecting one of four responses: 1) “Nearly everyone is from my ethnic or racial group”, 2) “Most of the people are from my ethnic or racial group but some are from other groups”, 3) “There is about an equal mix of my ethnic or racial group and other groups”, and 4) “Most of the people are from different ethnic or racial groups”. This assessment was used in a study that examined intergroup attitudes (Phinney, Ferguson, & Tate, 1997) and the responses to this question were associated with intergroup interactions and attitudes. The original item assessed neighborhood diversity. The stem was modified to assess diversity in the academic environment for the current study.

Results

Preparatory Analysis

Selective attrition was assessed by comparing demographic information (i.e., age, gender, race, socioeconomic background), survey comprehension at T1, and the T1 scores on the adjustment measures (i.e., DASS, RPWB, SCAS, RASI) of the participants who completed only the T1 survey to those who completed two or more surveys. None of the variables were significantly different between the two groups, indicating no evidence of selective attrition. The descriptive statistics and correlations among key variables at T1 are provided in Table 2.

Trajectory Analysis

GBTM brief overview. Group-based trajectory modeling (GBTM, also known as latent class growth analysis) allows modeling multiple trajectory classes within a sample based on differing developmental patterns (Nagin & Tremblay, 1999). GBTM assigns

individuals into one of a specified k number of classes based on their intercepts and developmental pattern (e.g., slope). In other words, individuals who follow a similar growth trend are grouped together. It allows researchers to explore relatively distinct developmental patterns rather than modeling a single average trajectory. Therefore, Nagin (2005) recommended that scores on the outcome measures have enough variance in their slopes to warrant estimation of multiple trajectory classes. Others disagree and state that GBTM is useful when there are only significant intercept variances because individuals may follow similar trajectories but differ in their levels of adjustment (B.O. Muthen, personal communication, February 3rd, 2013), or a small minority may have a distinct growth pattern. GBTM assumes no variance in growth factors within a trajectory class. The goal of GBTM is to group together individuals who follow a similar growth trend (Nagin & Odgers, 2010). Thus, GBTM is appropriate when the research questions pertain to understanding group differences in trajectories. Another advantage is that GBTM uses maximum likelihood estimation (MLE) to estimate the parameters (e.g., slopes and intercepts) based on most likely values for missing data and thus is relatively robust to missing data (Nagin & Odgers, 2010). GBTM requires that the time intervals of each assessment be specified, and thus does not assume equal intervals between assessments.

The GBTM analyses were conducted as follows using Mplus 6.1 (Muthen & Muthen, 2010). First, I tested the intercept variance of each outcome without constraining the variance to zero to confirm the appropriateness of GBTM analyses (i.e., that there was significant variance in intercepts). Second, I specified single class models holding variance in the intercepts and slopes to zero this time. I added one class at a time until I

found the best fitting models. Both linear only models and linear and quadratic models were tested because the U-curve theory suggested a quadratic trend. Unconditional models (i.e., without covariates) were specified for the model selection process as outlined by Nagin (1999). Third, three fit statistics, existing theories, and the size of the classes were considered in choosing the final models (Nagin & Odger, 2010). With regard to fit statistics, the Bayesian information criterion index (BIC) corrects for the complexity of the models (e.g., adding a quadratic trend). Smaller BICs indicate better fit. Entropy indexes the probability of classification accuracy of each individual in a specified class, with 1.0 indicating the best accuracy. The bootstrapped likelihood ratio test (BLRT) determines the fit of a k class model compared to $k-1$ class model. A significant BLRT suggests better model fit for the k class model. Nagin and Odger (2010) cautioned against overreliance on fit statistics given the data-driven nature of GBTM, arguing that theory and parsimony must be considered in model selection. Following this recommendation, I used a holistic assessment that considered fit statistics, theory, and parsimony. Fourth, the chosen models were tested with and without multivariate outliers¹. Because the removal of outliers did not change the significance of the slopes, the outliers were retained. Finally, the class memberships were saved once the best models for each outcome were selected, and predictors of class membership were tested using multinomial logistic regression. The results are summarized in the following sections.

Model selection. In the initial models (with variances not constrained to zero), all four outcomes had significant variance in intercepts, and RPWB and RASI also had significant variance in slopes; therefore, GBTM was judged to be appropriate. A set of

¹ Multivariate outliers were inspected by Mahalanobis distance and visual inspection of lattice plots.

GBTM analyses was conducted for each adjustment outcome, starting with a single class model and adding one class at a time, as described above.

Psychological distress (DASS). A summary of the fit statistics and smallest class sizes of each model for the DASS are provided in Table 3. The fit statistics improved with more classes. Five class models were disregarded as one of the classes were too small ($n = 1$ for the linear model, $n = 2$ for the quadratic model). The significant BLRTs indicated the added value of the 4-class models compared to the 3-class models. However, one of the classes in the 4-class linear model was too small ($n = 1$). The 4-class quadratic model was chosen, as it had a comparable BIC to the 3-class quadratic model, the same entropy (.90), a significant BLRT as compared to 3-class quadratic model, and all classes contained more than 10 participants. The 4-class quadratic model was preferred over the 3-class linear model despite a slightly larger BIC because it was consistent with the U-curve theory of adjustment and consistent with the previous study that examined the multiple trajectories of psychological distress that found four classes (K. Wang et al., 2012). The trajectories and class sizes are in Figure 1.

The four classes were labeled high-stable distress (6%, $n = 12$), moderate decreasing distress (39%, $n = 82$), low decreasing distress (50%, $n = 105$), and U-curve adjustment (5%, $n = 11$). The high stable group started with the highest level of symptoms (intercept $B = 1.4$, $p < .01$) and maintained the same symptom level over the 6-month period (slope $B = .07$, $p = .53$). The moderate decreasing group started with a moderate level of symptoms (intercept $B = .88$, $p < .01$) that declined over 6 months (slope $B = -.09$, $p < .05$). For these two groups, quadratic trend was not significant. The low decreasing group experienced minimal symptoms (intercept $B = .28$, $p < .01$) that

declined over time (slope $B = -.07, p < .01$) and then increased only slightly (quadratic $B = .01, p < .01$). The U-curve group started with minimal symptoms (intercept $B = .24, p < .01$) but increased in distress over the 4-month period (slope $B = .59, p < .01$). They recovered somewhat at the end of the academic year (quadratic $B = -.08, p < .01$) but symptom levels remained in the moderate range. The high stable in distress groups score was higher than the mean score of .70 from another student sample from this university ($N = 507, SD = .47$; Frazier, 2013).

Positive psychological adjustment (RPWS). A summary of the fit statistics and smallest class sizes of each model for positive psychological adjustment is provided in Table 4 and the trajectories are in Figure 2. The BLRTs were all significant indicating better fit after adding each class. Up to 4-class models were tested because the 3-class model was chosen. The linear models were preferred because the linear and quadratic models yielded similar BICs and entropies. The 3-class model had better entropy but slightly larger BIC as compared to 4-class linear model. There is no guiding theory for positive psychological adjustment trajectories and the fourth class did not add meaningfully interpretable results because the fourth class did not have a distinct slope and differed slightly with respect to the intercept only. Thus, the 3-class linear model was chosen over the 4-class linear model for parsimony. The three classes were named high increasing well-being (41%, $n = 86$), moderate decreasing well-being (42%, $n = 87$), and low decreasing well-being (17%, $n = 36$). The high increasing group showed high levels of self-acceptance and personal growth at the beginning of the first semester (intercept $B = 6.03, p < .01$) that continued to increase over the 6-month period (slope $B = .03, p < .05$). The moderate decreasing group started with moderate levels of self-acceptance and

personal growth (intercept $B = 5.23, p < .01$) and decreased in well-being over time (slope $B = -.07, p < .01$). The low decreasing group started in the neutral range (intercept $B = 4.15, p < .01$) and decreased over time (slope $B = -.05, p < .05$).

Acculturative stress (RASI). The fit statistics and smallest class sizes of each model for RASI are summarized in Table 5 and the trajectories are in Figure 3. The linear models were preferred because they had smaller BICs than the quadratic models and the same entropies. The 3-class linear model was chosen despite a larger BIC than the 4-class linear model. The fourth trajectory did not have a distinct pattern and appeared to have only resulted in a slight change in intercept of each class as compared to 3-class model. The three groups were labeled as high increasing acculturative stress, moderate stable acculturative stress, and low decreasing acculturative stress. The high increasing group (45%, $n = 95$) began the semester in the neutral range in acculturative stress (intercept $B = 3.12, p < .01$) but increased in their acculturative stress over time (slope $B = .02, p < .05$). The moderate stable group (42%, $n = 88$) started in the moderate range (intercept $B = 2.5, p < .01$) and did not change significantly over the 6-month period (slope $B = .01, p = .29$). The smallest group was the low decreasing group (13%, $n = 28$), which experienced the least acculturative stress at the beginning (intercept $B = 1.74, p < .01$) and decreased in acculturative stress over time (slope $B = -.04, p < .05$).

Sociocultural adaptation (SCAS). A summary of the fit statistics and smallest class sizes of each model for sociocultural adaptation is provided in Table 6 and the trajectories are in Figure 4. The linear models were preferred because the fit statistics were similar to the quadratic models. The 3-class linear model was chosen despite a larger BIC as compared to the 4-class linear model because the fourth class did not add

interpretable information. Specifically, the linear trends (i.e., slope significance) were the same for the 3-class and 4-class models (all classes but the highest difficulty group decreased in difficulty). The three classes were labeled as low-decreasing in sociocultural difficulty (50%, $n = 103$), moderate-decreasing in difficulty (43%, $n = 90$), and high-stable difficulty groups (7%, $n = 15$). The low-decreasing group reported the lowest sociocultural difficulty (intercept $B = 1.5$, $p < .01$) and decreased over time (slope $B = -.06$, $p < .01$). The moderate-decreasing group reported slight difficulty initially (intercept $B = 2.1$, $p < .01$) and significantly reduced in sociocultural difficulty over time (slope $B = -.04$, $p < .01$). It is noteworthy that 92% of the students experienced only slight sociocultural difficulty even at the beginning of their first semester. A small portion of students (high stable) reported a higher level of sociocultural difficulty (intercept $B = 2.9$, $p < .01$) and continued to experience the same level of difficulty throughout (slope $B = -.01$, $p = .83$).

Trajectory analyses summary. Overall, the international students appeared to adjust well across all four outcomes even at the beginning of their sojourn. However, the analyses also suggested multiple trajectories in international students' adjustment. The patterns of trajectories differed across the different adjustment outcomes. The U-curve pattern of adjustment only emerged in psychological distress and only a small portion (5%) of students fell into this trajectory class. Across outcomes, the most distressed students were usually the smallest groups and they tended to maintain the same level of difficulties or increase in difficulty over time. The exception was acculturative stress where the smallest group consisted of those who reported the least acculturative stress. Contrary to the general belief that cross-cultural experiences enhance personal growth

and self-acceptance, the majority of students decreased in their sense of personal growth and self-acceptance over time. The students with the most robust sense of self-acceptance and personal growth at the beginning of the first semester increased in self-acceptance and personal growth during the academic year. In summary, there was limited support for the U-curve theory of adjustment and adjustment patterns differed across psychological adjustment outcomes. In terms of sociocultural adjustment, the results generally were consistent with Ward and colleague's conceptualization of decline in sociocultural difficulty, although a small minority maintained the same level of sociocultural difficulty over time.

Predictors of Trajectory Classes

Preparatory analysis. Individual, interpersonal, and contextual factors were analyzed² with respect to the trajectory class memberships of each outcome. The four adjustment outcomes were analyzed separately. Four sets of analyses were conducted using chi-square and ANOVA to identify variables that significantly predicted class membership which would then be used in the multinomial logistic regression analyses. In these preparatory analyses, the trajectory classes served as independent variables and predictor variables as dependent variables. All predictive variables were measured at T1. The individual factors included gender, age, region of origin (Asia, Europe only due to small cell size of other regions), race (Asians, White/Caucasians only due to small cell size of other races), language related factors, personality characteristics, and academic factors (i.e., academic stress, perceived control over academic stress). Removal of other races and regions of origin resulted in slightly smaller sample sizes ($n = 199$ for analysis

² The predictor variables that were discussed in the proposal but did not reach significance will be discussed in Appendix B.

of race, $n = 197$ for regions of origin). For the analysis of race and region only, DASS was removed from analysis because one trajectory did not contain any White/Caucasian or European students. The interpersonal factors were social connectedness with Americans, those whose native language was their own (colanguage), and international students who speak a native language different from their own (international). The contextual factors were perceived discrimination and ethnic density. The levels of ethnic density were grouped into two categories (half or more are from own racial/ethnic groups, most are from racial/ethnic groups different from own) due to small cell counts. Due to the large number of predictor variables, the significance level was adjusted by Bonferroni correction and included in Table 7 ($.05/14\text{tests} = .004$ for ANOVA, $.05/4\text{ tests} = .013$ for Chi-Square). The results of ANOVA and Chi-Square were reported in Table 7.

Individual variables. The individual factors that reached the adjusted significance level for all four outcomes were communication comfort with English, neuroticism, openness, academic stress, and perceived control over academic stress. Communication comfort with native language and extraversion were significant for three of four outcomes. TOEFL, self-rated English proficiency, and race were significant for acculturative stress only. Being White/Caucasian race was associated with more favorable acculturative stress trajectories than being Asian. Region of origin was not significant, contrary to hypotheses, although all European students identified as White/Caucasian race and only a few from other regions identified as White/Caucasian. Perceived control over academic stress showed a larger effect than academic stress. The hypothesis that communication comfort with English would yield larger effects than objective and self-rated English was supported. Having a higher TOEFL score or self-

rated English proficiency was associated with favorable acculturative stress trajectories. Hypothesized relationships between personality characteristics and adjustment trajectories were supported. Neuroticism was associated with unfavorable adjustment trajectories, and extraversion and openness were related to more favorable adjustment trajectories.

Interpersonal and contextual factors. For the interpersonal factors, only social connectedness with Americans reached statistical significance across all four outcomes. The contextual factors (i.e., perceived discrimination, ethnic density) were not significant for any of four outcomes³. The hypothesis that social connectedness would be associated with favorable adjustment trajectories was only partially supported as only social connectedness with Americans was significant. The hypothesis that social connectedness with Americans was more predictive of social connectedness with colanguage individuals and other international students was supported. The results failed to support the hypotheses with respect to perceived discrimination and ethnic density.

Multinomial logistic regression analysis. The variables that reached corrected significance in the preparatory analyses were included in the multinomial regression analyses that examined difference among the identified classes in each adjustment outcome. In this step, trajectory classes served as dependent variables and predictors as independent variables. The number of predictors varied in each outcome. The largest trajectory class in each outcome served as the reference group as they were normative in this sample except positive psychological adjustment that had two similar size largest

³ Perceived discrimination was excluded from the analyses of RASI because it is a subscale of RASI.

groups. When the odds ratio is smaller than 1.0, I rotated the reference group for interpretability and reported the odds ratios in the text.

Psychological distress (DASS). In this model, the low declining distress group was the reference group. The predictors were communication comfort with English, communication comfort with native language, neuroticism, openness, perceived control over academic stress, academic stress, and social connectedness with Americans (see Table 8). Relative to the high stable distress group, the low decreasing distress group had less neuroticism and more perceived control over academic stress. Relative to the moderate decreasing distress group, the low decreasing group had less neuroticism, more perceived control over academic stress, more social connectedness with Americans and more comfort with their native language. Relative to the U-curve group, the low decreasing group had more openness. Communication comfort with English and academic stress failed to predict the trajectory class membership for psychological distress with all variables in the model.

Positive psychological adjustment (RPWB). The results of the multinomial logistic regression analyses for positive psychological adjustment are in Table 9. The high increasing well-being group was chosen as a reference group for convenience because the high increasing and moderate decreasing groups were similar in number. The predictors entered were communication comfort with English, communication comfort with native language, extraversion, neuroticism, openness, perceived control over academic stress, academic stress, and social connectedness with Americans. The only significant predictors of positive psychological adjustment trajectories were perceived control over academic stress and personality. Specifically, moderate decreasing well-

being group had less perceived control over academic stress than the high increasing well-being group. Relative to the high increasing well-being group, the low decreasing group had more neuroticism, less openness, and less perceived control over academic stress. All other predictors were nonsignificant.

Acculturative stress (RASI). The results of multinomial logistic regression analyses for acculturative stress are listed in Table 10. The reference group is the high increasing acculturative stress group. The predictors entered were race (Asian vs. White/Caucasian), TOEFL, self-rated English proficiency, communication comfort with English, extraversion, neuroticism, openness, perceived control over academic stress, academic stress, and social connectedness with Americans. Relative to the high increasing acculturative stress group, the low decreasing group had higher self-rated English proficiency, less neuroticism, and more perceived control over academic stress. The moderate stable acculturative stress group felt more connected with Americans than the high increasing group. There were no group differences in race, TOEFL scores, communication comfort with English, extraversion, openness, and academic stress.

Sociocultural adaptation (SCAS). The results of multinomial logistic regression analyses for sociocultural adaptation are listed in Table 11. The reference group was the low decreasing adaptation group. The entered predictors were communication comfort with English, communication comfort with native language, extraversion, neuroticism, openness, perceived control over academic stress, and social connectedness with Americans. No group differences were found in any of these predictors although when the reference group was rotated, the moderate decreasing group had higher openness than

high stable group. The largely non-significant results could be due to a small size of the high stable group ($n = 15$).

Predictor analyses summary. The preparatory predictor analyses identified many significant predictors and provided some insights about the relative importance of various predictors with respect to adjustment trajectories. However, when the effect of other predictors were controlled in multinomial regression analyses, only perceived control over academic stress and neuroticism emerged as significant predictor across all outcomes except sociocultural adaptation. Openness reached significance in predicting trajectories of two adjustment outcomes (i.e., negative and positive psychological adjustment). Openness was the only predictor that distinguished the low decreasing psychological distress group from the U-shape group. Social connectedness with Americans was significant in predicting psychological distress and acculturative stress trajectories. The direction of this finding was as expected (better adjusted group reports more connectedness); however, the most distressed group did not differ from the least distressed group, perhaps due to the small class size in high distress group. Variables related to English proficiency predicted psychological distress and acculturative stress.

Discussion

This study explored the adjustment trajectories of international students and their predictors, using four separate adjustment outcomes. For psychological adjustment, it was expected that there would be consistently distressed, consistently well adjusted, and initially distressed but recovered groups. I did not expect that U-curve adjustment trajectory to emerge. For sociocultural adaptation, I expected that most students would increase in adaptation over time. The second goal of the study was to identify the

predictors of those adjustment trajectories. Various individual, interpersonal, and contextual factors were expected to predict adjustment trajectories.

Psychological Distress

The U-curve shape of adjustment emerged only in terms of psychological distress and with a very small number of students. This finding suggests that the U-curve shape of adjustment is not normative among international students. Most students experienced the greatest psychological symptoms at the beginning, with symptoms declining over the 6-month period, disconfirming the euphoric stage proposed by the U-curve adjustment model (Lysgaard, 1955; Oberg 1960). High stable, moderate decreasing, and low decreasing trajectories emerged, with the group that had low distress levels being the most common. This finding is consistent with a previous study that identified consistently distressed, consistently well adjusted, recovered, and culture shock groups (K. Wang et al., 2012). Similar to K. Wang's study, the low decreasing group was the largest in the current study but they decreased in distress over time (versus being consistently low in distress in K. Wang's study). The culture shock group could not be identified in this study due to the lack of prearrival data to test decrease in postarrival adjustment relative to prearrival adjustment.

Positive Psychological Adjustment

Somewhat unexpectedly, the majority of the students decreased slightly in positive psychological adjustment (i.e., self-acceptance and personal growth) over the 6 month period. High increasing and moderate decreasing groups were similar in numbers though the moderate decreasing group was slightly larger. This could be because the many challenges encountered in the cross-cultural transition (e.g., studying in a non-

native language, navigating in a new educational system) may temporarily lower self-confidence. Only those with the most robust sense of self may still increase their self-acceptance and personal growth in the face of challenges and successful adjustment in the new culture. This finding contradicts the assumption (Adler, 1975) that cross-cultural experiences enhance personal growth and self-acceptance at least during the first two semesters. The finding also indicates that positive psychological adjustment takes unique courses separate from psychological distress.

Acculturative Stress

Acculturative stress measured psychological in addition to functional adjustment related to cross-cultural transition. Acculturative stress was an exception in that the largest group was the most distressed. This suggests that experiencing a certain level of acculturative stress is normative and does not necessarily indicate psychopathology. Roughly half of the students increased in acculturative stress over time and another big portion maintained the same level of acculturative stress. This may be due to the process of acculturation where individuals' beliefs and values change slowly, whereas behavioral competence increases relatively quickly (Berry, 2005). International students may need to have a certain depth of cultural contact to experience acculturative stress. For instance, value differences may become salient only after international students develop meaningful social contacts with Americans. Therefore, acculturative stress may be experienced after individuals get enough exposure to the new culture, unlike psychological distress which was most pronounced at the beginning of the sojourn.

Sociocultural Adaptation

Sociocultural adaptation was lowest initially and then increased among most students. This is consistent with Ward and colleagues proposition (e.g., Searle & Ward, 1990; Ward & Kennedy, 1999; Ward & Searle, 1991) that behavioral competence improves as international students learn the necessary skills to function in American culture. Most students (92%) reported minimal sociocultural difficulty that decreased over time. As theorized regarding the acculturation process, behavioral competence is perhaps easier to acquire within a relatively short period than adjustment in existing values and beliefs (Berry, 2005). The findings pertaining to acculturative stress and sociocultural adjustment support Berry's proposed process of acculturation where behavioral change (i.e., sociocultural adaptation) occurs with ease and psychological change (i.e., values, beliefs) spans a longer time period.

Univariate Predictors of Adjustment Trajectories

In the univariate analyses, with respect to predictor factors, only individual and interpersonal factors were significant, and contextual factors (i.e., perceived discrimination and ethnic density) failed to predict adjustment trajectories. Only one individual demographic factor (race) was significant, and this finding was limited to acculturative stress. Specifically, Asian students were overrepresented in the higher acculturative stress trajectories relative to students with White/Caucasian backgrounds. This is consistent with previous research that found European students fare better than students from other regions (Poyrazli & Kavanaugh, 2006; Yeh & Inose, 2003). There are a number of factors that may have contributed to this finding such as differences in comfort with English use, cultural dissimilarity, and social connectedness with Americans.

Perceived control over academic stress was a significant predictor of all four adjustment outcomes and the effect was larger than academic stress. This result is consistent with research that perceived control is related to better adaptation to stressors more generally (Frazier et al., 2011, 2012). This could be because one's perceived control over reaction to academic stress gives a sense of relief from inevitable academic stress. Frazier et al. (2011) described that perceived present control involves self-efficacy in one's ability to cope with challenges. International students who have confidence in their ability to cope with academic challenges may be less prone to psychological distress, and more likely to maintain well-being and adapt quickly to their role as a university student in an unfamiliar educational system. The large effect of perceived control over academic stress relative to other predictors also confirms that academics are central to international students' lives and sense of control in this domain is particularly beneficial.

Among the language related variables, communication comfort with English was the only factor that consistently predicted better adjustment across all four adjustment outcomes. The effect was larger than communication comfort with native language. This indicates the importance of affective experience of language use, rather than objective or subjective ratings of English proficiency. This is consistent with a previous study that found that communication comfort with English, but not TOEFL scores, significantly predicted adjustment among Taiwanese students (Swagler & Ellis, 2003).

Personality characteristics were also significant. Neuroticism and openness were particularly important and consistently significant across all outcomes. As predicted, neuroticism was related to unfavorable adjustment trajectories, and openness was related to favorable adjustment trajectories. Extraversion was significant among all but

psychological distress. Lower openness and higher neuroticism were related to negative psychological and functional adjustment in previous studies (e.g., Matsumoto et al., 2001). The current results are consistent with the previous findings and also provided support that these two characteristics are related to positive psychological adjustment and acculturative stress in addition to psychological distress and functional adaptation. In addition to neuroticism and openness, extraversion also relates to positive psychological adjustment, lower acculturative stress, and better sociocultural adaptation. Higher prearrival extraversion was also associated with lower postarrival depression among Chinese and Taiwanese students (Ying & Han, 2006). Thus, extraversion may be another personality characteristic that enhances cross-cultural adaptation.

Multivariate Predictors of Adjustment Trajectories

After controlling for other predictors, only a few factors remained significant. Perceived control over academic stress was the most significant predictor of most adjustment outcomes, after controlling for academic stress, personality characteristics, comfort with English/native language, and social connectedness with Americans. This finding confirmed the international students' commitment to education and highlighted the importance of feeling confident in managing emotional reactions to academic stress.

Communication comfort with English was the most important among all the language factors. However, the significance of communication comfort with English diminished once all other predictors were controlled. After controlling for other predictors, only one language factor (i.e., self-rated English proficiency) emerged as a significant predictor and only with respect to acculturative stress. These findings are somewhat surprising given the long standing belief that English is key to successful

adaptation of international students (Church, 1982; Swagler & Ellis, 2003). Perhaps, language-related variables mostly exert their effects through other factors. For instance, students who lack confidence in English may struggle with their academics and this may lead to frustration and disappointment.

Neuroticism was related to all types of psychological adjustment, including acculturative stress, after controlling for other variables. Neuroticism may be a risk factor that predisposes the students to psychological distress but not poor functional adaptation in the cross-cultural transition. Openness predicted negative and positive psychological adjustment and was the only predictor that differentiated the U-shape adjustment and low decreasing psychological distress groups. Specifically, the low decreasing distress group was higher in openness relative to the U-shape group. This is interesting because both groups started with minimal distress but the course diverged as the semester progressed. One can infer that initial favorable adjustment may be short lived if individuals are unable to welcome challenges that ensue in the cross-cultural transition. Extraversion did not predict any adjustment outcomes after controlling for other variables. This was unexpected but perhaps an ability to regulate one's emotions and willingness to change and adopt new ways are more important traits in cross-cultural adaptation. All three personality characteristics failed to predict sociocultural adaptation perhaps because it may be easier to achieve and less affected by individual characteristics.

Among the social factors, social connectedness with Americans was the only significant predictor of psychological distress and acculturative stress trajectories. Social connectedness with colanguage individuals and other international students were not significant for any of the adjustment outcomes. International students may particularly

feel comfortable living in a new environment when they feel welcomed and included by Americans (Ying & Han, 2006). However, the least adjusted groups differed from the moderately adjusted group but not from the most adjusted with respect to social connectedness with Americans. This may be due to the small size in the most distressed groups.

Finally, although the contextual factors failed to predict adjustment trajectories, it is premature to dismiss the potential impact of perceived discrimination and ethnic density. Perceived discrimination was correlated with all adjustment outcomes at T1 in expected directions though this was not the case with adjustment trajectories. Perhaps these contextual factors have more complex relations with adjustment than were assessed in this study. For instance, those who feel discriminated against but succeed academically may be able to maintain sense of well-being despite the hardship. Low ethnic density may indirectly affect adjustment through increasing opportunity to interact with Americans and subsequent cultural learning. However, low ethnic density may also contribute to isolation if the students do not feel connected to Americans. In addition, one item measure might not have been sufficient to accurately measure ethnic density.

Contribution to Existing Research

This study made a significant contribution to existing research in several respects. First, this study used GBTM which allowed the analyses of multiple adjustment trajectories. The results suggested that the U-shape adjustment trajectory is rare and only a very small portion of students fell into this trajectory class. Second, this is the first study that examined multiple adjustment trajectories of international students with diverse adjustment outcomes. To my knowledge, there is only one study that examined

multiple trajectories of international students' adjustment (K. Wang et al., 2012). The previous study modeled only psychological distress and trajectories of other types of adjustment remained unexamined. The current study examined a broader range of adjustment measures and suggested that the shapes of adjustment vary across different types of adjustment. For example, the international students increased or maintained their levels of acculturative stress, whereas most decreased in sociocultural difficulty over the 6-month period. Third, separate measures of overlapping but distinct constructs shed light on the most important predictors of trajectories. For example, perceived control over academic stress was by far the most important, even after controlling for academic stress. Taken together, the current study made a significant contribution to the existing literature in illuminating the trajectories of international students' adjustment and important predictors.

Limitations and Future Research

There were several limitations that should be noted. First, this study did not assess prearrival adjustment. The lack of prearrival data did not permit a test of the culture shock trajectory that emerged in the previous study with psychological distress (K. Wang et al., 2012). Second, the study was conducted in a Midwestern university where international student enrollment has rapidly increased and was approximately 10% of overall enrollment in Fall 2011. The experience of international students may be different in universities that have fewer or more international students. Third, the international students in this study had various ethnic backgrounds though most originated from East Asian countries. Because they represented multiple countries, it may be an oversimplification to group them together based on their international student status.

Future longitudinal research should use methods that identify multiple trajectories using diverse outcome measures. Research on trajectories of positive psychological adjustment is particularly lacking and future research should include positive adjustment outcomes as well as symptom focused measures. Although this study illuminated the importance of several predictors, I did not examine the pathway through which these predictors affect adjustment trajectories or moderating variables that buffer or enhance the effect of predictors. Future studies should test mediators and moderators in addition to predictors.

Counseling Implications

This study provided useful information to university administration and counseling centers. First and most importantly, the results highlighted the resilience of international students who are mostly well-adjusted. Second, the results normalized the difficulty experienced at the beginning of the sojourn. The U-curve theory of adjustment is appealing but it is rare. It may be misleading to inform incoming international students of the U-curve theory. This can create false expectations that they should be excited and satisfied with their U.S. lives at the beginning of sojourn and may stigmatize those who initially struggle to transition. Third, the adjustment trajectory cannot be reduced to a single shape. The shapes of adjustment trajectories vary across different types of adjustment outcomes. Interventions pertaining to behavioral competence are likely to be most helpful at the early stage of the sojourn. In the second semester, it may be more helpful to focus on acculturative stress that stems from conflicts in value and belief systems. Fourth, interventions that help increase perceived control over academic stress may be particularly helpful, and have been shown to be effective in general college

student samples (Hintz, 2013). International students come to the U.S. for education and perceived lack of control in this domain can be extremely difficult. Academic failure brings serious consequences to international students such as losing their student visa and getting their educational pursuits disrupted. However, it is encouraging to find that perceived control over academic stress was more important than academic stress itself because one's reactions can be malleable. The interventions may address academic success skills in U.S. higher education and help international students develop effective coping skills.

Conclusion

The first goal of this study was exploring multiple trajectories of international students' adjustment using four adjustment outcomes (i.e., psychological distress, positive psychological adjustment, acculturative stress, and sociocultural adaptation). The adjustment trajectories varied across different types of adjustment outcomes. The U-shape trajectory was very small and only emerged with psychological distress, suggesting that this trajectory is not normative. The most distressed or least adjusted groups were usually the smallest with the exception of acculturative stress.

The second goal was identifying the important predictors of adjustment trajectories of each outcome. Perceived control over reactions to academic stress was by far the most important predictor of all four types of adjustment outcomes. Neuroticism and openness were promising characteristics that hinder or enhance international students' adjustment. The language-related factors were not predictive of adjustment outcomes after controlling for other variables except self-rated English predicting favorable acculturative stress trajectories. Social connectedness with Americans was the only social

factor that was predictive of favorable adjustment trajectories. Contextual factors (perceived discrimination, ethnic density) failed to predict adjustment.

The use of multiple trajectory analyses in this population has just begun, and more studies are needed to determine trajectories of various types of adjustment outcomes and important predictors. Completing one's education in a foreign country is a long process, and it is more useful to identify predictors of the course of adjustment than adjustment at a single time point. This study illuminated heterogeneous adjustment trajectories among international students that vary across different types of adjustment outcomes. The wide range of predictors that were included in the study provided valuable information regarding what factors are most relevant to international students' adjustment.

Table 1

Longitudinal studies that assessed adjustment outcomes repeatedly

Authors	Sample nationality & size	Time frame (postarrival)	Time points	Adjustment measures	Analytic methods	Findings related to course of adjustment
1 Hechanova-Alampay et al. (2002)	Majority Asian students, $n = 106$ (T1) & Americans $n = 188$	6 months	T1 = beginning of first semester, T2 = 3 months after, T3 = 6 months after T1	1. Adjustment scale (measured general condition, interaction with host nationals, academic adjustment; Black & Stephens, 1989), 2. For strain: CES-D Depression Scale (Radloff, 1977), the Cultural Adaptation Pain Scale (Sandhu et al., 1996) that measured stress related to adapting to a new environment	ANCOVA	1. Both American and international students increased their adjustment over time. The majority of variance in adjustment was explained by a linear trend. 2. Both American and international students showed the inverse U-curve of strain. Time accounted for only 3% of variance in strains. This was explained by a quadratic trend.
2 Kennedy (1998) cited in Ward & Kennedy, 1999	Singaporean students in various countries, $N = 108$	6 months	T1 = 1 month prearrival, T2 = 1 month postarrival, T3 = 6 months postarrival	Sociocultural Adaptation Scale (Ward & Kennedy, 1999)	t-test	1. Less sociocultural difficulty was experienced prearrival. 2. Sociocultural difficulty decreased between 1 month and 6 months postarrival.
3 K. Wang, et al. (2012)	Chinese and Taiwanese students, $N = 507$	12-15 months	T1 = before the beginning of the first semester, T2 = 1 months into the first semester, T3 = 5 months after T2, T4 = 12 months after T2	Brief Symptom Inventory-18 (Derogatis, 2000)	Group-based trajectory modeling	1. Four trajectory classes were identified: consistently distressed (10%), relieved (14%), culture shocked (11%), well-adjusted (65%).

4	Ward & Kennedy (1996)	Malaysian & Singaporean students, <i>N</i> = 14	12 months	T1 = within 1 month postarrival, T2 = 6 months postarrival, T3 = 12 months postarrival	Sociocultural Adaptation Scale (Ward & Kennedy, 1999); Zung Self-rating Depression Scale (ZSDS; Zung, 1965)	ANOVA	1. Sociocultural difficulty decreased between T1 & T2. 2. Depression scores were highest at T1, significantly decreased at T2, and increased again at T3.
5	Ward et al., (1998)	Japanese students, <i>N</i> = 35	12 months	T1 = within 24hr postarrival; T2 = 4 months, T3 = 6 months, T4 = 12 months postarrival	Sociocultural Adaptation Scale (Ward & Kennedy, 1999); Zung Self-rated Depression Scale (Zung, 1965)	ANOVA	1. Both depression and sociocultural difficulty were highest at T1 and decreased significantly at T2 and remained stable.
6	Ying (2005)	Taiwanese students, <i>N</i> = 97	26 months	T1 = prearrival, T2 = 2-3 months postarrival, T3 = 9 months postarrival, T4 = 14 months postarrival, T5 = 21 months, T6 = 26 months postarrival	Migration-Acculturative Stress Scale (MASS) ⁴ , Center for Epidemiologic Studies - Depression Scale (CES-D)	Repeated MANOVA	1. All 5 domains of acculturative stress dropped significantly either between T2 and T3 (academic, unfamiliar climate) or between T3 and T4 (homesickness, cultural difference, social isolation). 2. No results were reported regarding depression.

⁴ The author constructed outcome measure that appears to measure functional adaptation similar to sociocultural adaptation.

Table 2
T1 variables correlations

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Psychological distress	.56	.44	--									
2. Positive psychological adjustment	5.43	.84	-.47**	--								
3. Acculturative stress	2.7	.60	.42**	-.30**	--							
4. Sociocultural adaptation	2.05	.54	.60**	-.36**	.51**	--						
5. Academic stress	5.88	2.14	.39**	-.33**	.32**	.33**	--					
6. Perceived control over academic stress	3.06	.51	-.59**	.54**	-.34**	-.41**	-.48**	--				
7. TOEFL	97.49	12.07	-.14	.24**	-.17*	-.17*	-.12	.15*	--			
8. Self-rated English proficiency	2.92	.73	-.04	.27**	-.30**	-.31**	-.20**	.16*	.54**	--		
9. Comfort with English use	3.42	.82	-.32**	.41**	-.41**	-.51**	-.34**	.37**	.33**	.42**	--	
10. Comfort with a native language use	3.84	.72	-.25**	.30**	-.05	-.30**	-.18*	.33**	-.01	-.04	.44**	--
11. Neuroticism	2.73	.62	.48**	-.43**	.32**	.32**	.39**	-.44**	-.04	-.06	-.35**	-.23**
12. Extraversion	3.32	.61	-.23**	.40**	-.24**	-.35**	-.14*	.28**	.24**	.30**	.42**	.25**
13. Openness	3.51	.51	-.21**	.39**	-.20**	-.21**	-.18**	.37**	.19*	.18**	.29**	.28**
14. SCMN	4.19	1.24	-.35**	.33**	-.39**	-.43**	-.15*	.27**	.18*	.27**	.41**	.07
15. SCCL	5.38	1.27	-.08	-.01	.14*	.09	0	.05	-.12	-.17*	-.18**	.22**
16. SCINT	4.65	1.24	-.04	.14	.00	-.14	-.02	.11	.09	.11	.08	.19**
17. Perceived discrimination	2.35	.87	.37**	-.19**	.66**	.30**	.10	-.19**	.07	.02	-.14*	-.03
18. Ethnic density	3.29	.90	-.13	.10	.11	-.10	-.11	.12	.06	.00	.10	.08

Table 2 cont'd

	11	12	13	14	15	16	17	18
11. Neuroticism	--							
12. Extraversion	-.33**	--						
13. Openness	-.25**	.33**	--					
14. SCMN	-.20**	.25**	.24**	--				
15. SCCL	.02	-.07	-.01	-.07	--			
16. SCINT	-.05	.23**	.12	.24**	.23**	--		
17. Perceived discrimination	.12	-.08	-.12	-.29**	-.02	.13	--	
18. Ethnic density	-.07	.11	.01	-.06	-.03	.07	.11	--

Note. $N = 211$. TOEFL = Test of English as a Foreign Language; SCMN = social connectedness with Americans; SCCL = social connectedness with colanguage individuals; SCINT = social connectedness with other international students. * $p < .05$, ** $p < .01$.

Table 3

Fit Statistics for depression, anxiety, and stress

	1-class		2-class		3-class		4-class	
	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic
BIC	1233.2	1238.2	945.0	954.6	811.08	822.5	807.5	822.5
Entropy	NA	NA	.81	.81	.90	.90	.92	.90
BLRT	NA	NA	299.3	305	154.9	153.5	19.6	21.3
BLRT <i>p</i>	NA	NA	< .001	< .001	< .001	< .001	< .001	.013
Smallest class	210	210	84	83	13	13	1	11

Note. Preferred model is highlighted in bold. BIC = Bayesian Information Criterion; BLRT = bootstrap likelihood ratio test

Table 4

Fit Statistics for positive psychological adjustment

	1-class		2-class		3-class		4-class	
	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic
BIC	2440.6	2445.2	2065.6	2073.9	1973.2	1982.2	1947.4	1961.0
Entropy	NA	NA	.83	.83	.82	.82	.77	.77
BLRT	NA	NA	391.1	392.7	108.4	113.1	41.8	42.6
BLRT <i>p</i>	NA	NA	< .001	< .001	< .001	< .001	< .001	< .001
Smallest class	209	209	86	86	36	34	32	33

Note. Preferred model is highlighted in bold. BIC = Bayesian Information Criterion; BLRT = bootstrap likelihood ration test

Table 5

Fit Statistics for acculturative stress

	1-class		2-class		3-class		4-class	
	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic
BIC	1758.7	1763.0	1366.3	1371.8	1204.1	1216.0	1149.2	1163.2
Entropy	NA	NA	.86	.86	.84	.84	.85	.85
BLRT	NA	NA	408.5	412.7	178.3	177.2	70.9	74.2
BLRT <i>p</i>	NA	NA	< .001	< .001	< .001	< .001	< .001	< .001
Smallest class	211	211	52	53	28	28	20	20

Note. Preferred model is highlighted in bold. BIC = Bayesian Information Criterion; BLRT = bootstrap likelihood ration test

Table 6

Fit Statistics for sociocultural adaptation

	1-class		2-class		3-class		4-class	
	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic
BIC	1469.8	1462.9	1145.6	1133.4	1004.8	990.13	944.4	921.6
Entropy	NA	NA	.82	.82	.87	.88	.86	.87
BLRT	NA	NA	340.2	350.8	156.8	164.6	76.4	89.9
BLRT <i>p</i>	NA	NA	< .001	< .001	< .001	< .001	< .001	< .001
smallest class	208	208	70	69	15	15	11	11

Note. Preferred model is highlighted in bold. BIC = Bayesian Information Criterion; BLRT = bootstrap likelihood ration test

Table 7

ANOVA for Predictor Selection

	DASS 4-class quadratic model		RPWB 3-class linear model		RASI 3-class linear model		SCA 3-class linear model	
	F	p-value	F	p-value	F	p-value	F	p-value
Age	.98	.406	2.06	.130	2.47	.087	.08	.919
Stress	9.20*	< .001	11.54*	< .001	7.32*	.001	4.51	.012
Control	24.86*	< .001	32.97*	< .001	20.00*	< .001	14.11*	< .001
TOEFL	2.49	.620	3.09	.048	7.79*	.001	4.43	.013
Eng prof	.43	.732	4.62	.011	14.04*	< .001	4.68	.010
CCEN	7.27*	< .001	15.83*	< .001	15.48*	< .001	14.55*	< .001
CCNL	6.93*	< .001	7.33*	.001	1.73	.180	8.31*	< .001
EX	3.54	.016	8.17*	< .001	6.91*	.001	8.40*	< .001
NR	18.00*	< .001	17.67*	< .001	10.07*	< .001	10.38*	< .001
OP	6.87*	< .001	13.70*	< .001	8.18*	< .001	7.57*	.001
SCMN	9.24*	< .001	7.70*	.001	22.34*	< .001	8.94*	< .001
SCCL	1.71	.165	.28	.754	.83	.439	4.68	.005
SCINT	3.18	.025	.35	.709	1.99	.140	3.81	.024
Disc	3.91	.010	3.58	.030	NA	NA	1	.361

Note. Stress = academic stress; control = perceived control over academic stress; TOEFL = Test of English as a Foreign Language; Eng prof = self-rated English proficiency; CCEN = communication comfort with English; CCNL = communication comfort with a native language; EX = extraversion; NR = neuroticism; OP = openness; SCMN = social connectedness with Americans; SCCL = social connectedness with colanguage individuals; SCINT = social connectedness with other international students; disc = perceived discrimination. Adjusted significance level (.05/14), $p < .004$

Chi-Square for Predictor Selection

	DASS 4-class quadratic model		RPWB 3-class linear model		RASI 3-class linear model		SCA 3-class linear model	
	F	p-value	F	p-value	F	p-value	F	p-value
Gender	1.26	.740	.60	.742	5.96	.051	4.38	.112
Region of origin	2.98	.040	2.53	.283	7.85	.020	.16	.922
Race	2.58	.471	2.92	.233	10.24*	.006	.07	.968
Ethnic density	5.51	.138	2.97	.227	.85	.654	6.27	.044

Note. Adjusted significance level (.05/4), $p < .013$

Table 8

Multinomial logistic regressions predicting psychological distress trajectories

	U-curve adjustment					High stable					Moderate decreasing				
	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio
Intercept	-.03	4.67	.00	1.00		9.79	5.00	3.83	.05		4.79	2.69	3.17	.08	
Stress	.04	.19	.06	.81	1.05	-.13	.21	.41	.52	.9	.13	.11	1.40	.24	1.1
Control	-.17	.89	.03	.85	.8	-	1.05	9.99	< .01	.0**	-1.49	.51	8.56	< .01	.2**
					(1.2)	3.33				(27.9)					(4.4)
CCEN	.66	.61	1.18	.28	1.9	.12	.61	.04	.85	1.1	.34	.30	1.32	.25	1.4
CCNL	.42	.65	.41	.52	1.5	-.57	.62	.84	.36	.6	-.64	.30	4.46	.04	.5*
										(1.8)					(1.9)
Neuroticism	-.01	.74	.00	1.00	1.0	2.35	.81	8.48	< .01	10.5**	1.35	.40	11.58	< .01	3.8**
Openness	-1.84	.85	4.65	.03	.2*	-	.92	2.03	.16	.27	-.38	.43	0.78	.38	.7
					(6.3)	1.31				(3.7)					(1.5)
SCMN	.08	.33	.06	.80	1.09	-.58	.39	2.17	.14	.6	-.56	.18	9.45	< .01	.6**
										(1.8)					(1.8)

Note. The reference category is the low decreasing group. Stress = academic stress; control = perceived control over academic stress; CCEN = communication comfort with English; CCNL = communication comfort with a native language; SCMN = social connectedness with Americans. * $p < .05$, ** $p < .01$. OR in parenthesis is reversed OR estimated by rotating the reference group.

Table 9.

Multinomial logistic regressions predicting positive psychological adjustment trajectories

Predictors	Moderate decreasing					Low decreasing				
	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio
Intercept	6.41	2.66	5.80	.02		11.32	3.59	9.92	< .01	
Stress	.09	.10	.70	.40	1.1	.00	.14	.00	1.00	1.0
Control	-1.68	.49	11.86	< .01	0.2** (5.4)	-2.09	.65	10.26	< .01	.1** (8.1)
CCEN	-.06	.29	.05	.83	.9 (1.1)	-.62	.41	2.27	.13	.5 (1.9)
CCNL	-.05	.29	.03	.87	1.0	-.07	.42	.03	.86	.9 (1.1)
Extraversion	-.06	.34	.03	.86	.9 (1.1)	-.35	.49	.50	.48	.7 (1.4)
Neuroticism	.51	.36	2.05	.15	1.7	1.12	.51	4.80	.03	3.1*
Openness	-.77	.41	3.41	.07	.5 (2.2)	-1.41	.60	5.61	.02	.2* (4.1)
SCMN	.09	.16	.29	.59	1.1	-.16	.24	.46	.50	.9 (1.2)

Note. The reference group is the high increasing group. Stress = academic stress; control = perceived control over academic stress; CCEN = communication comfort with English; CCNL = communication comfort with a native language; SCMN = social connectedness with Americans. OR in parenthesis is reversed OR estimated by rotating the reference group. * $p < .05$ (2-tailed), ** $p < .01$ (2-tailed)

Table 10
Multinomial logistic regressions predicting acculturative stress trajectories

Predictors	Low decrease					Moderate stable				
	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio
Intercept	-22.47	6.56	11.74	< .01		-2.88	3.10	.86	.35	
Race (White, Asian)	1.01	1.43	.50	.48	2.7	-.35	.97	.13	.72	.7 (1.4)
Stress	.16	.21	.60	.44	1.2	-.05	.12	.23	.63	.9 (1.1)
Control	4.56	1.38	10.99	< .01	95.5**	-.49	.49	.97	.32	.6 (1.6)
TOEFL	.03	.04	.58	.45	1.0	.01	.02	.24	.62	1.0
Eng prof	1.69	.76	4.97	.03	5.4*	.34	.33	1.03	.31	1.4
CCEN	-.47	.52	.82	.36	.6 (1.6)	-.05	.31	.03	.87	.9 (1.1)
Extraversion	.67	.70	.92	.34	2.0	.12	.39	.10	.75	1.1
Neuroticism	-2.11	.81	6.76	< .01	.1** (8.3)	-.43	.40	1.14	.29	.7 (1.5)
Openness	-.52	.81	.42	.52	.6 (1.7)	.24	.42	.34	.56	1.3
SCMN	.53	.34	2.50	.11	1.7	.82	.20	17.18	< .01	2.3**

Note. The reference category is the high increase in stress group. Stress = academic stress; control = perceived control over academic stress; TOEFL = Test of English as a Foreign Language; Eng prof = self-rated English proficiency; CCEN = communication comfort with English; SCMN = social connectedness with Americans. OR in parenthesis is reversed OR estimated by rotating the reference group. * $p < .05$ (2-tailed), ** $p < .01$ (2-tailed)

Table 11
Multinomial logistic regressions predicting sociocultural adaptation trajectories

Predictors	High stable					Moderate decreasing				
	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio
Intercept	12.72	4.37	8.47	< .01		3.63	2.15	2.85	.09	
Control	-1.42	.82	3.01	.08	.2 (4.1)	-.64	.38	2.73	.10	.5 (1.9)
CCEN	.08	.59	.02	.89	1.1	-.46	.26	3.18	.08	.6 (1.6)
CCNL	-.88	.55	2.56	.11	.4 (2.4)	-.22	.26	.73	.39	.8 (1.3)
Extraversion	-1.04	.72	2.08	.15	.4 (2.8)	-.10	.32	.10	.75	.9 (1.1)
Neuroticism	1.11	.67	2.71	.10	3.0	.52	.31	2.84	.09	1.7
Openness	-1.61	.88	3.31	.07	.2 (5.0)	.13	.37	.13	.72	1.1
SCMN	-.58	.35	2.76	1.0	.6 (1.8)	-.21	.15	2.08	.15	.8 (1.2)

Note. The reference category is the low decreasing group. Control = perceived control over academic stress; CCEN = communication comfort with English; CCNL = communication comfort with a native language; SCMN = social connectedness with Americans. OR in parenthesis is reversed OR estimated by rotating the reference group. * $p < .05$ (2-tailed), ** $p < .01$ (2-tailed)

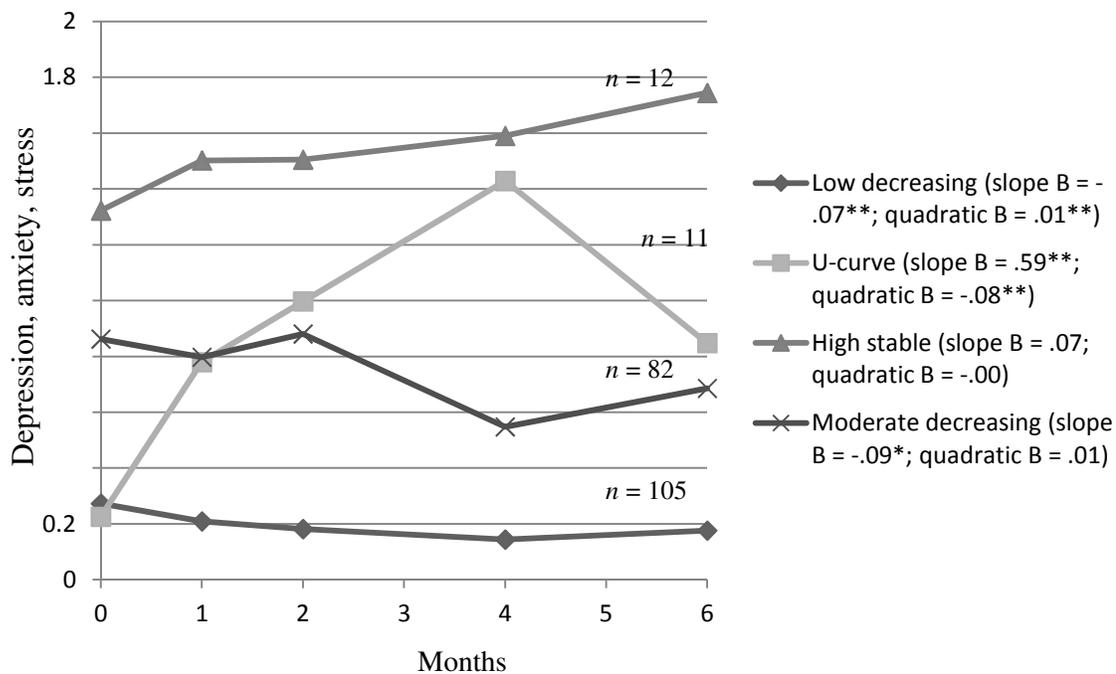


Figure 1. The course of psychological distress of four trajectory classes over 6 months period.

* $p < .05$, ** $p < .01$

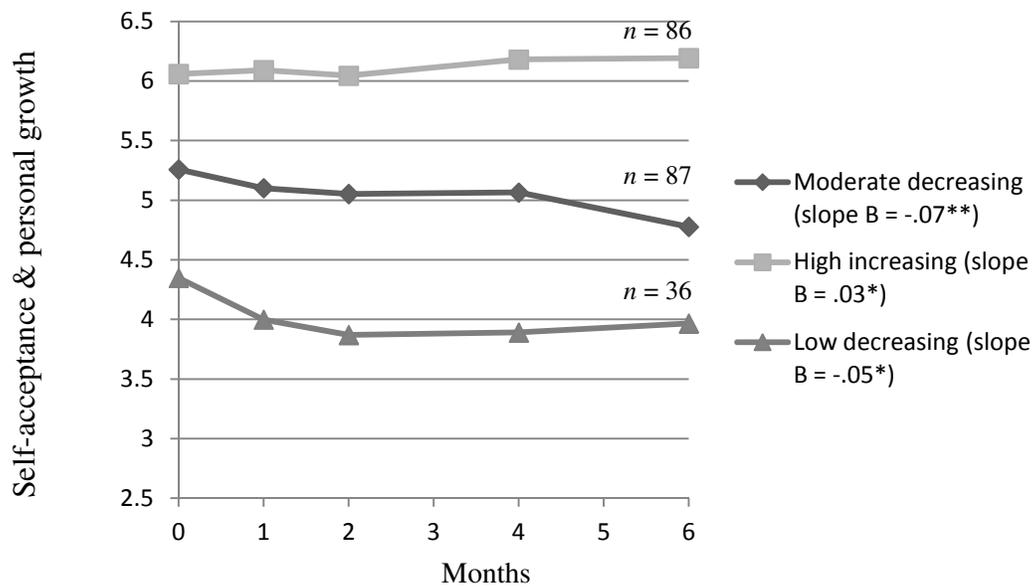


Figure 2. The course of positive psychological adjustment of three trajectory classes over 6 months period. * $p < .05$, ** $p < .01$

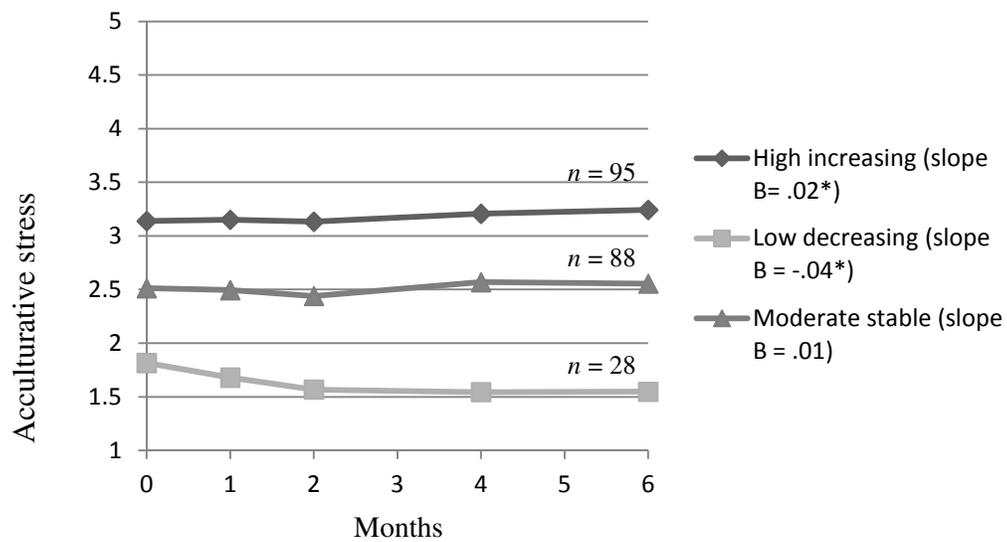


Figure 3. The course of acculturative stress of three trajectory classes over 6 months period.

* $p < .05$, ** $p < .01$

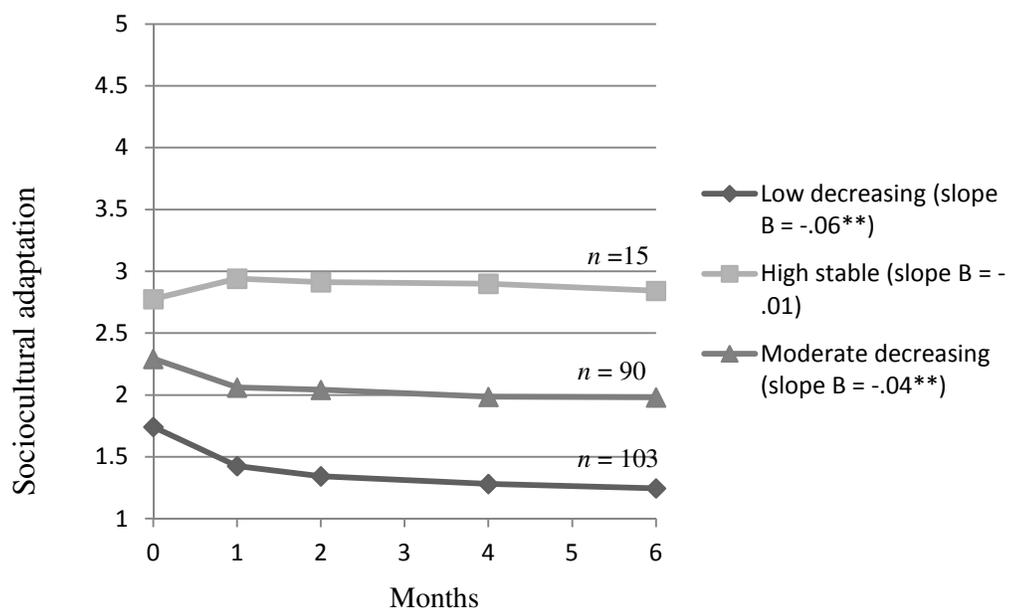


Figure 4. The course of sociocultural adaptation of four trajectory classes over 6 months period. Note that the higher score indicates a greater sociocultural difficulty. * $p < .05$, ** $p < .01$

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Appendix A

What gender are you?

- Male
- Female
- Other:

How old are you?

What part of the world are you from?

- Asia
- Europe
- South/Central America
- Middle East
- Africa
- North America
- Oceania
- Caribbean
- Other

What country were you born in?

What country(countries) did you grow up in?

What religion are you affiliated with?

- Christianity
- Islam
- Buddhism
- I am not affiliated with any religion.
- Other

What race/ethnicity do you identify with?

- Asian
- White/Caucasian
- Hispanic/Latino/a
- Arab/Middle Eastern
- Black/African
- Native American
- Multiracial
- Other

If you are multiracial, please specify.

What degree are you seeking?

- I am an undergraduate student.

- I am a graduate student.
- Other

If you are an undergraduate student, are you...

- Freshman
- Sophomore
- Junior
- Senior

If you are a graduate student, are you...

- Doctoral student
- Master student
- Other

What college are you enrolled in?

- Allied health programs
- Biological science
- Continuing education
- Dentistry
- Design
- Education & human development
- Extension
- Food, agricultural, & natural resource sciences
- Law school
- Liberal arts
- Management
- Medical school
- Nursing
- Pharmacy
- Public affairs
- Public health
- Science & engineering
- Veterinary medicine
- Other

What is your major or intended major?

When do you expect to graduate?

- Fall 2011 - I expect to finish by the end of this semester.
- Spring 2012 or summer 2012
- Fall 2012 or later

When did you arrive in the US? ____ (mm/yyyy)

Have you lived in the US or other English speaking countries before you came to the University of Minnesota?

- Yes
- No

If you answered "yes" to the above question, how old were you at the time?

If you answered "yes" to the above question, how long have you lived in the US or other English speaking countries?

Before you came to the University of Minnesota, did you enroll in school or educational programs in the US or other English speaking countries?

- Yes
- No

If you answered "yes" to the above question, what type of educational program was it? (e.g., ESL, high school exchange program). Please list all.

If you answered "yes" to the above question, how long were you enrolled in the program? (e.g., 6 months)

What is your relationship status?

- I am currently not in a romantic relationship. I don't have a romantic partner.
- I am in a romantic relationship. My partner lives with me or lives in this area.
- I am in a romantic relationship. My partner lives in another part of the US.
- I am in a romantic relationship. My partner lives outside of the US.
- I am married. My partner lives with me.
- I am married. My partner lives separately in the US.
- I am married. My partner lives outside of the US.

Do you have children?

- No
- Yes, my child (children) live(s) with me.
- Yes, my child (children) do(es) NOT live with me.

How would you describe your family's socioeconomic background while you were growing up?

- Above average for where I lived.
- Average for where I lived.
- Below average for where I lived.

What is your current plan after completion of your education in the US?

- I want to go back to my country of origin.
- I hope to remain in the US permanently.
- I hope to remain in the US for some time.

- I want to move to a country other than the US or my country of origin.
- I am uncertain/undecided.
- Other

If you want to go back to your country of origin, when do you want to?

- immediately after I complete my education.
- after I finish a year of post graduate work experience (OPT).
- a few to several years after graduation.
- eventually but I don't know when.

Appendix B

In this appendix, I have included the relevant variables and analyses that were discussed in the proposal meeting.

Additional English Proficiency Variables

Hypothesis 1a: The discrepancy between perceived required English proficiency in one's field of study and own rating of proficiency is related to adjustment trajectories. Specifically, larger perceived gaps between the required and self-rating of English proficiency would be associated with poorer adjustment trajectories.

Perceived required English proficiency in one's field of study was measured by items that asked the participants to estimate the level of English proficiency that is required in their field of study. The participants estimated proficiency in speaking, listening, and writing separately. The responses are low, average, good, and excellent. Discrepancy scores were calculated by subtracting self-rated English proficiency scores from the estimated required English proficiency scores. Higher discrepancy scores indicate that students perceive their English proficiency to be poor relative to perceived required proficiency in their field of study. ANOVA was performed to test this hypothesis. Discrepancy scores served as the dependent variable and trajectory classes as independent variables. Discrepancy scores were significantly related to adjustment trajectories of acculturative stress. Specifically, relative to low decreasing group, high increasing and moderate increasing in acculturative stress groups reported more perceived discrepancy between required English proficiency and their own English proficiency. The results are in Table 1.

Hypothesis 1b: Objective oral proficiency is associated with better adjustment trajectories. Objective oral proficiency was assessed by participants' self-reported score on Speak section TOEFL. The sample size was smaller due to missing speak scores (i.e., $n = 168$ to 171 across adjustment outcomes). The results were analyzed by ANOVA. TOEFL speak scores served as the dependent variable and trajectory classes as independent variables. TOEFL speak was significantly associated with both acculturative stress and sociocultural adjustment trajectories but not psychological distress and positive psychological adjustment. Specifically, relative to low decreasing in acculturative stress group, high increasing group reported lower TOEFL speak scores. Similarly, relative to low decreasing in sociocultural adaptation group, high stable group reported lower TOEFL speak scores. Thus, hypotheses 1a and 1b were partially supported. The results are in Table 1.

Hypothesis 1c: Stronger foreign accents are associated with poorer adjustment trajectories. The degree of foreign accents was measured by one item "*How much of a foreign accent do you feel you have when you speak English?*". The responses were: no accent, slight accent, some accent, moderate accent, and strong accent. Please note that there is a question in the Acculturative Stress Scale that asks the feelings related to a foreign accent ("*It bothers me that I have a foreign accent when I speak English*"). Chi-square was performed to examine the relationship between the degree of foreign accents and adjustment trajectories. The participants were grouped into three foreign accent categories (no to slight accent, some accent, moderate to strong accent) to deal with small cell counts. Chi-square analysis was not performed to DASS adjustment trajectories due to small size of the U-curve adjustment and high stable groups that

resulted in too many small cells. The degree of foreign accent was not significantly related to any adjustment trajectories, thus hypothesis 1c was not supported. The results are in Table 2.

Table 1

ANOVA	DASS 4-class quadratic model		RPWB 3-class linear model		RASI 3-class linear model		SCA 3-class linear model	
	<i>F</i>	<i>p</i> -value	<i>F</i>	<i>p</i> -value	<i>F</i>	<i>p</i> -value	<i>F</i>	<i>p</i> -value
Discrepancy TOEFL speak	.04	.991	1.13	.325	6.76*	.001	2.24	.109
	1.98	.119	1.44	.239	4.62*	.011	5.43*	.005

Note. Adjusted significance level (.05/2), $p < .025$

Table 2

Chi-Square	DASS 4-class quadratic model		RPWB 3-class linear model		RASI 3-class linear model		SCA 3-class linear model	
	<i>F</i>	<i>p</i> -value	<i>F</i>	<i>p</i> -value	<i>F</i>	<i>p</i> -value	<i>F</i>	<i>p</i> -value
Accent	NA	NA	2.35	.67	5.37	.25	2.99	.56

Note. Significance level, $p < .05$

Next, perceived discrepancy between required and self-rated English proficiency, and TOEFL speak scores were added to the multinomial logistic regression analysis of acculturative stress trajectories. The significance level was adjusted and is noted in Table 2. Including these two variables resulted in change in the significance in self-rated English proficiency. Specifically, self-rated English proficiency was no longer predictive of acculturative stress trajectory classes. Neuroticism, perceived control over academic stress, and social connectedness with Americans remained significant.

Table 2

Multinomial logistic regressions predicting acculturative stress trajectories

Predictors	Low decreasing					Moderate stable				
	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio

Intercept	-24.15	7.42	10.59	< .01		-4.73	3.18	2.21	.14	
TOEFL	.07	.07	1.10	.29	1.07	.00	.03	.01	.92	1.00
Speak	-.04	.19	.05	.83	.96	.09	.09	1.00	.32	1.10
Eng prof	1.40	.97	2.09	.15	4.04	.33	.44	.57	.45	1.39
Discrepancy	.16	.57	.08	.78	1.17	.28	.34	.67	.41	1.32
CCEN	-.34	.55	.37	.54	.71	.00	.30	.00	1.00	1.00
Extraversion	.78	.67	1.36	.24	2.18	.14	.38	.14	.71	1.15
Neuroticism	-2.05	.79	6.70	.01	0.13*	-.38	.40	.93	.34	.68
Openness	-.14	.80	.03	.87	.87	.45	.42	1.13	.29	1.56
Stress	.23	.22	1.09	.30	1.26	-.07	.11	.35	.56	.93
Control	3.74	1.24	9.04	< .01	42.01**	-.63	.48	1.74	.19	.53
SCMN	.62	.35	3.13	.08	1.86	.73	.19	13.99	< .01	2.07**
Race (White, Asian)	.18	1.33	.02	.89	1.19	.27	.74	.14	.71	1.31

Note. The reference category is the high increase in stress group. TOEFL = Test of English as a Foreign Language; Speak = TOEFL Speak; Eng prof = self-rated English proficiency; discrepancy = English proficiency discrepancy; CCEN = communication comfort with English; Stress = academic stress; control = perceived control over academic stress; SCMN = social connectedness with Americans. Significance level, $p < .05^*$, $p < .01^{**}$

TOEFL speak scores were added to the multinomial logistic regression analysis of sociocultural adaptation trajectories. Adding TOEFL speak scores resulted in a change in significance of communication comfort with a native language. Specifically, the low decreasing group had significantly higher comfort with a native language.

Table 3
Multinomial logistic regressions predicting sociocultural adaptation trajectories

Predictors	High stable					Moderate decreasing				
	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio	<i>B</i>	SE	Wald	<i>p</i>	Odds ratio
Intercept	15.63	5.20	9.03	<.01		4.55	2.51	3.29	.07	
Speak	-.19	.10	3.32	.07	.83	-.09	.06	2.45	.12	.91
CCEN	.40	.66	.36	.55	1.49	-.22	.29	.60	.44	.80
CCNL	-1.15	.59	3.85	.05	.32*	-.33	.28	1.36	.24	.72
Extraversion	-1.23	.84	2.13	.15	.29	-.12	.35	.11	.74	.89
Neuroticism	1.20	.73	2.67	.10	3.32	.76	.35	4.58	.03	2.13
Openness	-1.83	1.00	3.36	.07	.16	.03	.40	.01	.94	1.03
Control	-.79	.82	.94	.33	.45	-.39	.41	.92	.34	.68

SCMN	-.42	.41	1.04	.31	0.66	-.28	.17	2.56	.11	.76
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The reference category is the low decreasing in difficulty group. Speak = TOEFL Speak; CCEN = communication comfort with English; control = perceived control over academic stress; SCMN = social connectedness with Americans. Significance level, $p < .05^*$, $p < .01^{**}$

Additional Demographic Variables

I did exploratory analyses of additional demographic variables – religion, SES, degree level (undergraduate, graduate), field of study, length of residence in the US, prior educational experience in the US (“*Yes/No*”), prior residence in English speaking countries (“*Yes/No*”), plan after completion of education, and relationship status. All analyses were done by Chi-square test. The results are in Table 4. Because of the small cell counts, religion was excluded from the analyses. Many variables were excluded from the DASS analyses due to small cells. Responses to some variables were combined as follows to deal with small cell counts. SES was categorized to two categories (above average, average or lower than average). Field of study was grouped into 4 categories (science/engineering/medical, liberal arts, agriculture/veterinary, law/management). Length of residence in the U.S. was categorized into two groups (6 months or less, 7 months or longer). Plan after completion of education was grouped into two groups (leave the U.S. immediately, remain in the U.S. for some time). Relationship status was combined into two (in a relationship, not in a relationship). The results are in Table 4. None of the variables reached the corrected significance ($.05/8$, $p < .006$). Thus, these variables were not included in the main analyses.

Table 4

	DASS 4-class quadratic model		RPWB 3-class linear model		RASI 3-class linear model		SCA 3-class linear model	
	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>
SES	3.23	.357	.63	.729	.30	.86	4.64	.097
Degree level	1.24	.745	4.29	.117	3.98	.137	.65	.723
Field of study	NA	NA	3.92	.688	12.18	.058	4.30	.637
Length of residence	NA	NA	.79	.674	2.09	.353	1.71	.426
Prior education in the U.S.	NA	NA	.88	.643	2.35	.309	6.16	.046
Prior residence in English speaking country	NA	NA	.66	.72	.25	.884	7.77	.021
Plan after graduation	NA	NA	1.70	.428	.63	.729	.32	.852
Relationship status	NA	NA	2.41	.30	2.34	.310	6.16	.046

Note. Adjusted significance level (.05/8), $p < .006$