Trajectories of Mental Health and Acculturation Among First Year International Graduate Students From India

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TRAJECTORIES OF MENTAL HEALTH AND ACCULTURATION AMONG FIRST YEAR INTERNATIONAL GRADUATE STUDENTS FROM INDIA

A Dissertation Presented

by

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Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

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A Dissertation Presented

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DEDICATION

To my parents, whose immigrant experience laid the foundation for this study.

To my sister, whose close relationship with several Indian international graduate students inspired my curiosity about their transition

ACKNOWLEDGMENTS

I wish to thank my faculty advisor, Elizabeth A. Harvey, for her invaluable support and guidance throughout my graduate school career. I am grateful to Dr. Harvey for her unwavering mentorship and encouragement during all phases of this research study.

I am also appreciative of the feedback, suggestions and support offered by a number of colleagues and friends during the formulation and implementation of this project.

Finally, I would like to thank the students who participated in this research by openly sharing the challenges, highlights, and reality of their experiences during the first year of their transition to the U.S.

ABSTRACT

TRAJECTORIES OF MENTAL HEALTH AND ACCULTURATION AMONG FIRST YEAR INTERNATIONAL GRADUATE STUDENTS FROM INDIA

SEPTEMBER 2010

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From 2001-2007, students from India have consistently comprised the largest ethnic group of international students on college campuses across the United States (Open Doors: Report on International Educational Exchange, 2007). Despite a number of studies that have researched the mental health of international students in the U.S., none have done so primarily with Indian graduate students. Theoretical and empirical literature regarding the psychological changes and acculturation patterns that international students undergo after their transition do not explore the possibility of multiple pathways of change. The current study identified four separate mental health trajectories for Indian international graduate students during their first year in the U.S. It also found three distinct patterns of acculturation for the Indian culture and four acculturation trajectories for the European American culture. The size of one's adjustment, feelings about transition, gender role attitudes, and availability of out-group support were all significant contributors to the variability among empirically derived mental health trajectories.

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CHAPTER 1

IMMIGRATION, MENTAL HEALTH, AND ACCULTURATION

Introduction

The United States currently opens its doors to more immigrants per year than any other country; in 2006, 12.5% of the U.S. population was foreign-born (U.S. Census Bureau, 2006). Immigrants' reasons for international migration range from seeking economic and educational opportunities that are not as freely available in their home countries to finding refuge from political and religious strife in their local regions, while some are forcibly "conquered, colonized, or enslaved" (Ogbu & Simons, 1998, p. 165). These differences in reasons for migration distinguish voluntary minority groups, refugees, and involuntary immigrants from one another. The current study focused on international students from India who are considered voluntary immigrants because they opted to move to the U.S. for the purposes of obtaining a graduate degree.

Although immigration has the potential to offer positive opportunities, it "severely tests the immigrant's emotional resilience" and can produce "profound psychological distress, even among the best prepared and most motivated and even under the most receptive of circumstances" (Portes & Rumbaut, 2006, p. 169). These emotional difficulties likely vary depending on a number of factors including, but not limited to, one's well-being prior to arrival (Ying & Liese, 1991), acculturative stress encountered during the transition (Abouguendia & Noels, 2001; Mori, 2000; Wang, Ling, Pan, & Shen, 2007), one's strategies for coping with stress (Inman & Yeh, 2007; Yeh, Chang, Arora, Kim, & Xin, 2003), and the size of adjustment the immigrant must make in relation to social and cultural norms in the home country (Yang & Clum, 1994). As the ethnic and racial composition of the United

States continues to diversify, it is important to improve our understanding of immigrants' transitions. The goal of the present study was to examine individual differences in trajectories of mental health and acculturation for Indian international students during the first year of immigration and to identify the particular factors that may distinguish among different types of mental health trajectories. Addressing these questions may inform interventions during critical periods within immigrants' transition.

Indian International Students

The Asian Indian population, which numbers 2.6 million in the U.S., is the third-fastest growing immigrant group in the U.S. (American Community Survey of the U.S. Census Bureau, 2006). Indian international students make up a large subset of the Indian immigrant community, as India has remained the leading country of origin for international students in the U.S. since 2001 (Open Doors: Report on International Educational Exchange, 2007). Most Indian international students have attained a Bachelor's level education in India and seek graduate training in the U.S, which was the case for 75% of new Indian international students in Fall 2007, while the remaining 25% were enrolled in undergraduate or post-doctoral programs. Upon receiving their Master's and/or Doctoral degrees, many Indian graduates continue living in the U.S. and gain employment in a variety of fields, becoming especially prominent as entrepreneurs, engineers, and scientists (Saxenian, 2002).

Because of distinct differences between Indian and Western cultures, it is possible that the adjustment period for Indian immigrants may be more conflicted, or last longer than that of immigrants from Western countries. Indian immigrants generally maintain close ties with their relatives in India, think collectivistically about themselves in relation to others, and show respect and deference to elders in the family (Rastogi, 2007). Additionally, there are

more stereotypical gender roles in Indian culture as compared to the U.S., with an expectation that women should retain traditional values and practices in order to successfully transmit the culture to future generations (Navsaria & Petersen, 2007). Psychological difficulties are regarded as a sign of weakness in India, and the widespread stigma of mental illness within Indian communities is often retained by Indian immigrants in the U.S. (Navsaria & Petersen, 2007). It is important to note that Indians, though emigrating from the same country, showcase incredible diversity in the religions they practice, the cultural values they uphold, and the languages they speak, and may accordingly exhibit trajectories of mental health that are just as variant. The proportion of empirical studies involving Indian immigrants' mental health is imbalanced relative to the increase of this population in the U.S. in recent decades, and few have focused on within-group individual differences. Rather, the literature regarding Indian immigrants primarily focuses on intergenerational family conflict (Baptiste, 2005; Sodowsky & Carey, 1987), parenting attitudes and child-rearing practices (Farver, Xu, Bhadha, Narang & Lieber, 2007; Inman, Howard, Beaumont, & Walker, 2007; Jambunathan & Counselman, 2002), and the role of perceived prejudice and discrimination in immigrants' well-being (Bhatia, 2007; Patel, 2007; Ramasubramanian & Oliver, 2007). I am aware of only one study that has included Indian international students in its examination of mental health and acculturation (Rahman and Rollock, 2004).

In sum, research regarding Indian international students is currently in its nascent stage. Despite the possibility that today's Indian international students may bring with them a greater knowledge of Western culture that serves to prepare them for the transition to U.S. graduate programs, they, like other international students, are also at risk of experiencing difficulties in their psychological and cultural adjustment period. Because Indian

international students come from diverse backgrounds, it is likely that there are multiple patterns of mental health and acculturation during the transition to the U.S. A longitudinal examination of the transition from India to the U.S. among this group is essential for describing these acculturation patterns and understanding how they link with trajectories of mental health. Although there is little research on Indian international students, the literature on acculturation and mental health among immigrants more generally can inform the present study and will be reviewed next.

Acculturation and Mental Health Trajectories Among Immigrants

Acculturation[1] is defined as the process through which cultural exchange occurs between immigrants and their host society (Berry, 2001). In unilinear models of acculturation, it is assumed that as an immigrant adapts to values, attitudes, and behaviors of the host culture, s/he simultaneously sheds parallel elements of the home culture (LaFromboise, 1993). In this theoretical approach, acculturation is considered complete when an immigrant is indistinguishable in values and practices from members of the dominant culture. By contrast, proponents of a bilinear model of acculturation argue that absorbing particular values, attitudes, and behaviors of the receiving society do not preclude the immigrant from retaining an orientation toward his/her culture of origin (Berry, 2001; Cuéllar, Arnold, & Maldonado, 1995; Szapocznik, Kurtines, & Fernandez, 1980).

Researchers broadly use the term "adjustment" to describe changes in immigrants' acculturation process and mental health during their transition to the U.S. Predictors of

[1] It is important to note the distinction between acculturation and ethnic identity, which is a related, but separate construct, and will not be examined in this study. Acculturation is a process undergone by immigrants adapting to and retaining cultural norms and behaviors of a host society, while ethnic identification refers to individuals' attachment to a cultural, national, or ethnic group (Phinney, 2003), and is not limited to immigrants or minorities. Acculturation may be susceptible to change more frequently than ethnic identity since it can occur without significant compromise to one's sense of self. Thus, even during an important transitional period, one year may not be adequate to witness a meaningful change in ethnic identity, and studying the course of acculturation is more appropriate in this case.

mental health have also been examined within immigrant communities in order to refine our understanding of factors that contribute to immigrants' adjustment. Similar efforts of describing international students' transition to the U.S. are reflected in the literature, where acculturation and psychological changes are often coupled together and represented by a U-shaped trajectory of general adjustment (Adler, 1975; Lysgaard, 1955; Oberg, 1960). This pattern was first identified in a cross-sectional study of 200 Norwegian Fulbright scholars in the U.S., which concluded that individuals who had spent between six and 18 months in the U.S. experienced greater adjustment difficulties than those who had been in the U.S for less than six months or longer than 18 months (Lysgaard, 1955). Students who had been in the U.S. for at least 20 months reported the fewest adjustment difficulties of all the groups studied.

Kalervo Oberg's four-stage model of culture shock (1960) roughly maps onto Lysgaard's (1955) findings and suggests a curvilinear relationship between length of time in the U.S. and cultural and psychological adjustment. Oberg termed the initial arrival period the "honeymoon" stage, when immigrants feel excited about participating in a new culture and have not yet experienced challenges substantial enough to override this positive attitude. The "crisis" stage occurs following the "honeymoon," and is characterized by a decline in mental health due to frustration with cultural differences, feelings of isolation and helplessness, and anger/resistance toward the host culture's values and practices. Immigrants then proceed to the "recovery" stage, when they become more aware of cultural rules, are able to participate to a greater degree in their surroundings, and experience a slight improvement in their mental health. The final stage of Oberg's model is called "adjustment,"

which is marked by a further increase in positive affect and ability to negotiate the differences inherent between the home and host cultures.

Adler's five-stage model of culture shock (1975) also follows a trend similar to Oberg's model, with the "contact" phase being one of excitement and discovery. The "disintegration" stage occurs next, during which differences between the home and host culture become more apparent, and individuals may become depressed due to feelings of confusion, loneliness, and/or inadequacy to meet the demands of the new culture. Like Oberg's model, in which individuals experience an improvement in mental health after an initial downward trend, individuals are expected to feel increasingly self-assured, relaxed, and trusting of others in the latter stages of Adler's model, which are successively called "reintegration," "autonomy," and "independence" (Adler, 1975).

Despite popularity for stage models which are characterized by a U-shaped trajectory of adjustment, some researchers have considered them "weak...overgeneralized" (Church, 1982, p. 542), "anecdotal," (Ward, Okura, Kennedy, & Kojima, 1998), and "atheoretical" (Ward, Bochner, & Furnham, 2001, p.80). In contrast to the excitement and euphoria thought to occur upon arrival to a new country, other studies have documented mental health difficulties among a large number of international students much sooner after their transition to the U.S. (Buddington, 2002; Cemalcilar & Falbo, 2008; Jung, Hecht, & Wadsworth, 2007; Rahman & Rollock, 2004; Reynolds & Constantine, 2007; Wei, Heppner, Mallen, Ku, Liao, & Wu, 2007; Yasuda & Duan, 2002; Ye, 2006; Ying & Liese, 1990, 1991). In two studies that followed distinct international student populations in New Zealand, mental health was low soon after arrival and typically improved four to six months after transition, but the authors concluded that subsequent fluctuations in mental health were less predictable and

likely dependent on a number of environmental factors (Ward & Kennedy, 1996; Ward et al., 1998). Two studies have also assessed pre- and post-arrival mood among international students in the U.S., with students reporting a relative decrease in mental health post-arrival (Cemalcilar & Falbo, 2008; Ying & Liese, 1991).

While research concerning international students' mental health has progressed, studies have typically been limited in scope and methodology. Research samples of international students have included both undergraduate and graduate students from a number of different countries (Jung, et al., 2007; Reynolds & Constantine, 2007; Wei, et al., 2002, Yasuda & Duan, 2002). Although these samples allow for a greater degree of variability, they typically do not have the power to conduct within-group analyses, and there is less likelihood of detecting effects which may be masked by differences across heterogeneous subsamples. Furthermore, none of the aforementioned studies have considered the possibility of multiple, distinct trajectories of mental health and acculturation. In addition, a general description of adjustment does not sufficiently distinguish between mental health and acculturation following immigration. Longitudinal studies of international students' mental health and acculturation have the potential to provide a more complete picture of the transition and can allow for the examination of predictors of change in mental health.

Acculturation as a Predictor of Immigrant Mental Health

Acculturation has been extensively studied as a predictor of mental health within a number of immigrant communities around the world, although conclusions are mixed. Shen and Takeuchi (2001) reviewed a number of studies examining the relationship between mental health and acculturation and found that some suggested a positive association (Lam, Pacala & Smith, 1997; Masten, Penland & Nayani, 1994), while others documented an

inverse relationship (Burnam, Telles, Karno, Hough, & Escobar, 1987; Nguyen & Peterson, 1993) between the two variables. A few studies have attempted to examine the relationship between mental health and acculturation by using measures that assess adherence to both the home and host cultures, and have also yielded mixed results. For example, Obasi & Leong (2009) found that individuals of African descent who endorsed an integrationist approach (having high acculturation to both one's ethnocultural group and to the society of a different ethnocultural group) reported greater psychological distress compared to those who favored a traditionalist approach, in which they maintained high acculturation to their own ethnocultural group and low acculturation to the dominant group. In contrast, a study that measured acculturation among Asian Indian adults by asking participants to endorse their views on both their "Americanism" and "Indianism" found that individuals who scored high on both scales experienced the most favorable mental health outcomes (Farver, Bhadha, & Narang, 2002).

Discrepancies in the extant literature regarding the relationship between mental health outcomes and acculturation may be due to variation in sample type, methodology, and the way in which acculturation is operationalized. To the extent that these mixed findings reflect different experiences across different immigrant populations, it is critical to better understand the relation between acculturation and mental health among specific immigrant groups. These mixed findings may also reflect the fact that it is unlikely that there exists a single, optimal strategy of acculturation that is universally related to mental health. Longitudinal research that allows for descriptions of the acculturation process and the individual differences that exist between and within-groups may improve our clarity regarding the association between acculturation and mental health. Therefore, the focus of this study is to

examine different patterns of acculturation, and to explore whether there are associations between mental health and acculturation using a bilinear, multidimensional, and longitudinal method of measuring acculturation.

Additional Predictors of Immigrants' Mental Health

While geographic relocation is a stressful event, it is likely that there are additional factors beyond the act of immigration and process of acculturation that contribute to changes in one's mental health (Dalgard, Thapa, Hauff, McCubbin, & Syed, 2006). Among international students, coping strategies, social support networks, pre-arrival mood (Ying & Liese, 1991), major life events, and interpersonal and academic problems (Buddington, 2002; Ye, 2006; Ying & Liese, 1991) have been found to be important factors associated with mental health.

Coping styles. Lazarus and Folkman's (1984) model of stress and coping provides one framework for understanding predictors of mental health following immigration. Coping is defined as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p.141). In this model, one's coping response to a stressful event is dependent on 1) the context in which the event occurs, and 2) the individual's appraisal of the event, and may be classified as either an emotion-focused or problem-focused strategy. Emotion-focused coping can range from avoidance of an issue to cognitive reappraisal which allows for a reframing of the stressor in a more positive light. Individuals applying problem-focused coping tend to actively define the problem, analyze the risks and benefits of alternative solutions, and accordingly, choose which solution to implement. Among immigrants, cultural norms of responding to difficulties may play a role

in determining which coping strategy is most appropriate. For example, there is a greater focus on striving for connectedness and social harmony and utilizing social support when encountering a stressor rather than confronting a problem aggressively within collectivistic cultures (Inman & Yeh, 2007).

Both theory and research on coping and psychological outcome indicate better mental health for individuals who practice problem-focused coping and suggest increased psychological distress for those who primarily use emotion-focused or avoidant strategies (Lazarus & Folkman, 1984), but these findings are predominantly based on individualistic orientations. It is possible that other coping strategies absent from dominant models are also associated with good mental health, but few researchers have examined this empirically.

Social support. Social support has been found to buffer life stress (Ye, 2006) and the strength and accessibility of these networks have been shown to be important in maintaining a healthy mental state for immigrants during and after migration. Compared to those from individualistic cultures, immigrants from collectivistic societies may be more interdependent, and may be more reliant on in-group social support as part of their coping response to various stressors (Yeh & Inose, 2002). In one study, Japanese university students endorsed a preference for talking with friends and family in their social groups over seeking institutional support (Yeh, Inose, Kobori & Chang, 2001). It is possible that relating to individuals who come from a similar ethnic or racial background serves as a protective function against declines in mental health, although this has not yet been tested empirically.

Size of Adjustment. The degree of difference between the home and host culture's city environment, gender roles, and academic system may also play a role in predicting international students' mental health during the adjustment period following migration (Ying

& Liese, 1991). Immigrants who have lived in urban environments may be more attuned to expectations in the U.S., having had greater exposure to Western attitudes and behavior through media and word of mouth. Those who relocate to areas in the U.S. that are less urban in comparison to their cities of origin may experience greater declines in mental health because of feelings of isolation and boredom. Significant differences in gender ideology and belief systems from those favored in the U.S. may also predict worse mental health during international students' transition. For example, individuals who have more traditional gender role attitudes may perceive adapting to the more egalitarian attitudes in the U.S. as more challenging. Adjustment to a new educational system has also frequently been a source of stress for many international students (Mori, 2000; Reynolds & Constantine, 2007; Wei et al., 2007). Students who are less familiar with the U.S. academic system are likely to also experience greater mental health difficulties.

Group-Based Trajectory Modeling

In recent years, there have been incredible advances in statistical techniques for examining longitudinal data. Nagin & Tremblay's (2005) group-based trajectory modeling technique is ideal for examining individual differences in trajectories. Once these trajectories are determined, it is possible to 1) estimate the likelihood that any given individual would be a "member" of a particular group, and 2) evaluate predictors of group membership. This method does not assume one standard developmental course for all individuals and allows for the elucidation of individual differences. Utilization of group-based trajectory modeling in the current study may present alternatives to the U-shaped trajectory of adjustment, which has been criticized for its liberal application to all international students.

The Present Study

Despite the large number of Indian international students who matriculate in U.S. universities, little is known about their patterns of mental health and acculturation, the relationship between their mental health and acculturation, and the additional factors that play a role in determining individual differences in mental health soon after their arrival. Based on Indian international students' potential for academic success and professional influence beyond graduation, it is essential to study the psychological challenges that may hamper these individuals' productivity and negatively affect their mental health upon arrival in the United States. Additionally, it is important to recognize the protective factors that allow for the maintenance of positive mental health outcomes. The present study followed a cohort of international Indian students during their first year of graduate school in the United States to address the following questions:

1. How does mental health change over the first year of graduate school and are there distinct trajectories?

It was hypothesized that, on average, Indian international students entering graduate school in the U.S. will show a curvilinear trajectory in mental health, with initially good mental health, followed by an adjustment period of lower mental health, followed by a general recovery in mental health. However, it was expected that individuals would follow different trajectory patterns with some showing consistently high mental health, some consistently low mental health, some demonstrating a curvilinear trajectory, and others showing a steady decline in mental health.

2. How does acculturation change over the first year of graduate school and are there distinct trajectories?

It was predicted that Indian international students entering graduate school in the U.S. would generally possess a high level of acculturation to Indian culture, but that there would be individual differences in their acculturation to the American culture. Specifically, it was predicted that some students would experience gradually increasing acculturation to the American culture, some students would consistently be highly acculturated to the American culture, and that some students would consistently have low acculturation to the American culture. Additionally, it was predicted that Indian international students' acculturation to Indian culture would remain fairly constant throughout the year, and that some may also concurrently experience an increase in acculturation to the American culture.

3. What is the relationship between acculturation and mental health?

It was hypothesized that students who were more acculturated to the American culture would generally possess better mental health at all time points relative to students whose acculturation to the American culture was lower. It was hypothesized that students who had higher acculturation to Indian culture would exhibit better mental health at all time points than students who were less acculturated to the Indian culture since studies have also shown that strong identification with one's ethnic culture is usually linked with positive mental health outcomes. Finally, it was hypothesized that students who reported lower acculturation to the American culture at Time 1 would have relatively worse mental health at the end of the year. It was hypothesized that students with the highest level of Indian acculturation at Time 1 would also exhibit higher mental health over the year.

Although the relationship between acculturation and mental health is not well-defined, there is even less known regarding whether changes in these constructs may be related. Because the longitudinal design of the current study could facilitate an examination of the relationship between changes in mental health and changes in acculturation, I planned to conduct an exploratory analysis and predicted that students whose acculturation to the Indian culture decreased over the year would experience declining mental health. It was also predicted that students with increasing acculturation to the American culture would have improving mental health over time.

4. What are other predictors of mental health trajectories over the first year of graduate school?

Guided by the stress and coping framework outlined in Figure 1, it was predicted that coping styles would be associated with mental health outcomes. Specifically, it was hypothesized that collectivistic coping strategies such as seeking and building relationships with those who have similar experiences and ethnic backgrounds would positively predict mental health. It was also predicted that the coping tactics of self-blame and substance abuse during periods of difficulty would be associated with worsening mental health, while turning to religion may help facilitate an increase in mental health.

Social support was also predicted to be an important predictor of mental health among international students from India. Generally, it was hypothesized that availability and actual use of one's support network would be associated with favorable mental health. In particular, it was predicted that students who perceived there to be greater emotional and practical in-group support from sources such as an Indian students' association, friendships with fellow Indian students, the Indian community in the surrounding region, and relatives or

familial support either in the U.S. or in India would have better mental health throughout the year.

It was predicted that those students who perceived that out-group support was available and accessible to them when needed would generally show fewer declines in mental health over the first year of graduate school. Indian students receiving out-group support from university or graduate school programming, their academic department, and/or particular faculty members may feel more supported and thus have better mental health during their first year of transition.

Finally, it was predicted that students who reported having made a greater adjustment in their transition to the U.S. would experience declining mental health over the first year. In particular, four indicators of the size of the adjustment were examined: 1) students' subjective reports about the size of the adjustment, 2) reports of early academic and financial difficulties, 3) geographic change (urban to rural or rural to urban), and 4) traditional gender role attitudes.

CHAPTER 2

METHOD

Participants

The first time point of this study was completed by 117 Indian international graduate students from 33 universities across the U.S[2]. Of the students who participated in Time 1, 77% were male, and 73% were enrolled in Master's programs, with the majority of students pursuing Engineering (40%) and Computer Science (20%) degrees. The average age of participants at Time 1 was 24.1 years (range = 20.8 to 32 years). For the purposes of this study, only students who competed more than one time point (n = 83) were included in the analyses. Of these participants, 65% were male, 70% were enrolled in Master's programs, and Engineering and Computer Science remained the dominant fields of study (33%; 11%). The average age for this group was 24.3 years at Time 1 (range = 21.2 to 32 years). A majority of these students (83.1%) had never visited the U.S. prior to their arrival in Fall, 2008, while approximately 11% had visited once in the past. One student had previously visited the U.S. twice, and another student had made 3 separate visits to the U.S. before starting graduate school. More than half of the students reported that they had no family members in the U.S., while 36.1% had between 1 and 5 relatives in the U.S. Less than 9% of students had 6 or more relatives in the U.S.

Procedure

I identified and recruited potential participants through electronic list-serves that reached members of Indian student organizations on college campuses nationwide as well as individuals in the Indian community at-large. Participants were also recruited through

[2] The number of respondents at time points 2-5 were as follows: Time 2: n = 77; Time 3: n = 63; Time 4: n = 52; Time 5: n = 57. 44 students participated in all five time points.

postings on social networking websites such as www.facebook.com and www.orkut.com, and on the listserv of the South Asian Psychological Networking Association (SAPNA: www.ourSAPNA.com). A blog advertising the study was posted on the South Asian Journalists Association (SAJA) forum requesting readers to pass on the study link to eligible participants. Additional efforts of recruitment were aimed at consulting companies in India such as *Global Reach*, *Edwise*, and *IMPT consulting services*, all of which counsel students who are planning to apply for graduate education abroad, but there was no response from these agencies. At a local university, Indian international students were invited to participate in the study during an on-campus orientation event where private computer kiosks were made available for them to take the first questionnaire of the study during the event. Inclusion criteria for this study were 1) 1st year international students in graduate programs and 2) had not previously lived in the U.S. for six or more consecutive months.

Students were invited to participate via an online survey on www.surveymonkey.com at five time points during the 2008-2009 academic year[3]. Participants were asked to enter a valid e-mail address at Time 1, which was used to send them links to surveys for Time points 2-5. Students attending universities on a semester schedule were asked to complete surveys 2 weeks after the fall semester began (Time 1), 8 weeks after the fall semester began (Time 2), the 14th week of the fall semester (Time 3), the 2nd week of the spring semester (Time 4) and 8 weeks after the spring semester began (Time 5). Students who were on a trimester schedule were invited to participate during the 1st and 7th week of the first two trimesters, and during the 1st week of the third trimester, which also resulted in five time points. After the start of each time point, participants were reminded by e-mail to complete the survey each week for up to four weeks after the initial survey request had been sent out. During the last reminder,

[3] Data from a sixth time point was not yet available for analyses at the time of this writing.

participants were offered a shortened version of the survey that included only the mental health measure, as this was the primary outcome variable of the study. At the end of each time point, participants were entered into a drawing in which 1 $50 and 5 $25 gift cards to www.amazon.com were given away. For every survey that was completed across all time points, a $0.50 donation was made to the Akshaya Patra Foundation, an India-based charity that aids in feeding schoolchildren across India. As an added incentive, participants were informed that the amount of money donated to the Akshaya Patra Foundation would double if they participated in all five time points of the study (up to $5 per participant).

Measures

All measures for this study were administered in English. The decision to use English versions of the scales rather than using one or more Indian language translations was made based on several reasons. First, English is officially recognized by India as one of its two national languages (Hindi is the other), and is frequently the language Indians use to communicate inter-regionally (Constitution of India: The Official Languages Act, 1963). Next, all international students applying for graduate studies in the U.S. must demonstrate proficiency in the English language based on the Test of English as a Foreign Language (TOEFL), and most universities have a minimum passing score for admission. Among all international graduate students who took the TOEFL in 2007, Indian students demonstrated higher than average English proficiency with a total score of 84 on the Internet-based test (mean = 82) and 566 on the Paper-based test (mean = 548) (ETS, Test score and Data Summary for TOEFL Internet-based and Paper-based Tests: 2007 Data). Finally, participants in Rahman & Rollock's (2004) empirical study of South Asian students' acculturation and mental health also completed all items in English, indicating that the authors agreed that

students' grasp of the English language was sufficient for the purposes of the study. See Table 1 for a listing of measures and respective time points of administration. Some measures were alternated across time points to reduce demands on participants.

Demographic Information. At Time 1, all participants completed a demographic questionnaire indicating their age, gender, field of study, city/region of origin, number and length of visits to the U.S. prior to academic study, and approximate number of family members in the U.S. See Appendix A for a copy of this measure.

Mental Health. Participants' mental health was measured using the Boston x 4 CES-D (Boston short form; Kohout, Berkman, Evans, & Cornoni-Huntley, 1993), a shortened version of the Center for Epidemiological Studies Depression scale (CES-D; Radloff, 1977). This short form has been developed to lessen the burden of the participant/patient in samples for whom completing the entire 20-item CES-D may seem too cumbersome. Using a 4-point scale, participants are asked to respond to 10-items describing symptoms that they may have experienced over the past week. Two items are reverse scored before summing responses. A cut-off score of 10 is used to identify individuals with clinically significant depressive symptoms. The Boston short form, when compared to four other abbreviated versions of the CES-D, had the strongest psychometric properties, with acceptable reliability, sensitivity, and specificity, suggesting that it can serve as a good measure for mental health without sacrificing precision compared to the full CES-D (Grzywacz, Hovey, Seligman, Arcury, & Quandt; 2006). The Boston short form has shown good internal consistency across a number of older adult samples (Kohout et al., 1993) and Mexican immigrant populations (Grzywacz et al., 2006). Grzywacz and colleagues (2006) evaluated the Boston short form using seven distinct groups of Mexican immigrants and found alphas ranging from .71 to .84, with a total

sample alpha of .79. Participants were asked to complete the Boston short form during all time points in this study. See Appendix B for a copy of this measure.

Acculturation. Participants completed the Culture of Origin and European-American sub-scales of the Asian American Multidimensional Acculturation Scale (AAMAS; Gim Chung, Kim, & Abreu, 2004). The AAMAS is a multi-linear measure developed on the principle of orthogonality of cultural dimensions, and yields separate acculturation scores for one's culture of origin (AAMAS-CO), the European American culture, (AAMAS-EA) and a pan-ethnic Asian-American culture (AAMAS-AA)[4]. Because the focus of this study was to understand Indian students' adoption of American customs and their retention of Indian behaviors and knowledge, the cultural dimension measuring identification with a pan-ethnic Asian American culture was not assessed.

The AAMAS has a four-factor structure that consists of cultural identity, language, cultural knowledge, and food consumption. Each sub-scale includes 15 items, and uses a 6-point likert scale that ranges from "not very much" to "very much," with one reverse scored item. The AAMAS has been tested across a number of college student populations of varying Asian descent, and has shown good test-retest reliability over a 2 week period; stability coefficients were .89 for the AAMAS-CO and .78 for the AAMAS-EA. Reliabilities across four administrations of the AAMAS were consistent, with average alpha coefficients for AAMAS-CO and AAMAS-EA .89 and .80 respectively (Gim Chung et al., 2004). The AAMAS-CO and AAMAS-EA subscales were administered at Time 1 to obtain an initial level of acculturation soon after arriving in the U.S., and then subsequently at time points 3

[4] Multi-dimensional measures of acculturation are growing in popularity for their capacity to account for varying proportions of an immigrant's adoption of dominant social and cultural practices and concurrent maintenance of his/her home culture (Chang, Tracey, & Moore, 2005; Gim Chung et al., 2004; Cuéllar et al., 1995; Sandhu & Asrabadi, 1994; Sodowsky & Plake, 1991).

and 5. See Appendix C for this measure.

Coping Style. Participants were administered four subscales of the Collectivistic Coping Scale (CCS; Yeh et al., 2003) and a shortened version of the brief COPE (Carver, 1997) during Times 2 and 4 to assess their coping style after identifying a specific problem/stressor that they had encountered in the preceding month[5]. Instructions for both coping measures are similar to one another and were therefore condensed into one set of directions to ensure that students were referring to the same problem they reported when answering both the CCS and the brief COPE items.

The 20-items comprising the Social Activity, Intracultural Coping, Relational Universality, and Fatalism subscales of the CCS were administered in order to assess coping strategies that may be especially relevant for Indian students but may not easily be captured by the brief COPE. The CCS has been used with a large number of subjects and across a wide range of ethnic groups and ages, consistently demonstrating good reliabilities. Alphas for each of the above subscales are .90, .94, .91, and .80, respectively. See Appendix D for a copy of this measure.

The brief COPE was developed primarily to reduce redundancy in items and to facilitate faster administration of the original 60-item COPE (Carver, Scheier, & Weintraub, 1989) in applied settings, and has shown acceptable internal consistency (overall ά = .68). The brief version consists of 2 items for each of 14 subscales, most of which contain items from corresponding subscales in the original COPE. Items in the brief COPE that closely resembled items in the CCS were eliminated for the purposes of shortening the survey. The resulting questionnaire included a total of five items comprised of the Self-Blame, Religion,

[5] There were 28 respondents at Time 2 for whom the CCS and brief COPE were not applicable because they reported that they had not experienced any problems or difficulties in the previous month.

and Substance Abuse subscales. A copy of this measure can be seen in Appendix E. Only data from Time 2 were used in order to determine whether coping styles identified early on could predict mental health trajectories, changes in mental health over the academic year, and mental health at Time 5.

Social Support. Students completed a social support scale developed specifically for this study that assessed the availability and type of support received at Times 2 and 4. First, students were asked to indicate which of 10 potential sources of support were available to them. Six of the support sources on this list were in-group support such as family members, Indian friends, and Indian student organizations, and the remaining four sources described out-group support that included faculty/departmental support and non-Indian friends. Students were also given the opportunity to select "other" and specify additional sources of support that were not listed. The number of support sources identified were summed separately to obtain counts for both in-group and out-group support. Next, participants were asked to indicate how much practical and emotional support they received from each source using a 4-point likert scale that ranged from "not at all" to "very much." Practical and emotional support received was calculated by averaging the amount reported for each source of support. Alphas for emotional and practical support received were .59 and .51, respectively. The initial administration of the social support scale was at Time 2 for the purposes of allowing students time to develop and utilize the sources of support that were on the measure. Only data from Time 2 were used in the present analyses to determine whether social support early in the academic year could predict mental health groups, changes in mental health over all time points in the study and at Time 5. See Appendix F for a copy of this measure.

Size of Adjustment. Overall adjustment to the U.S. was assessed by asking students to use a 4-point likert scale to answer a.) the degree of adjustment they made since moving to the U.S., and b.) how they felt about their ability to adjust to life in the U.S. Higher scores indicated that the size of adjustment students made in the U.S. was small, and that they felt positive about their ability to adjust. Because these constructs were measured with only one item, it was not possible to calculate reliability at any given time point. However, I examined the intercorrelations of each item across the five time points by calculating Cronbach's alpha, which yielded a measure of the average split half correlation among the five data points for each item. Cronbach's alpha for the first item was .61 and for the second item was .66 for the second item across all five time points.

Academic and financial concerns were measured by averaging five items that addressed challenges with language, finances, and the overall academic system, and this scale had very good internal consistency (α = .90). This questionnaire was administered at each time point; only Time 1 data were used as predictors of mental health trajectories, changes in mental health over the academic year, and mental health at Time 5. See Appendix G for this measure.

On the demographic questionnaire, participants were asked to indicate whether they were living in a rural or an urban environment in India. Students' university cities/towns were assigned urban or non-urban status using the U.S. Census Bureau's definition of urbanized areas (2002). The discrepancy between the students' report of their Indian city's environment and his/her university's location was coded as a dichotomous variable which used to determine whether this difference could predict mental health group trajectories.

The Social Roles Questionnaire (SRQ; Baber & Tucker, 2006) was used to assess attitudes about gender roles during Times 1, 3, and 5. This scale was recently developed by editing language from other commonly used measures such as the Attitudes Toward Women scale (AWS; Spence, Helmreich & Stapp, 1973) the Attitudes Toward Marital and Childrearing Roles Scale (AMCR; Hoffman & Kloska, 1995), and the Attitudes About Roles for Children Scale (Antill, Cotton, Russell, & Goodnow, 1996). The SRQ goes beyond dichotomous approaches of thinking about social roles and allows for the identification of attitudes toward roles that may transcend gender. During the scale's development, the authors tested a 52-item measure with two separate samples and subsequently refined the measure using principal components analysis with varimax rotation after aggregating results from both samples. This resulted in a brief, 13-item questionnaire with two factors: Gender Transcendent and Gender-Linked. The Gender Transcendent scale includes items reflecting attitudes of individuals who do not believe that roles and tasks should be solely based on one's gender, while the Gender-Linked subscale contains items that suggest that specific social roles and behaviors are appropriate for either men or women, but not for both. The Gender Transcendent scale consists of 5 items and has an internal consistency of .65; the Gender-Linked subscale makes up the remaining 8 items and has an alpha coefficient of .75. Participants respond to items based on a percentage scale in 10% increments, where 0% = strongly disagree and 100% = strongly agree, and all five items of the Gender Transcendent scale are reverse coded. Higher scores reveal more traditional attitudes. For both subscales, men and women responded significantly differently, with women reporting a higher level of gender transcendence and men being more likely to associate certain roles to a gender (Baber & Tucker, 2006). In the present study, data from Time 1 were used to test whether gender

ideology distinguished mental health group trajectories, and/or was a significant predictor of changes in mental health, and mental health at Time 5. See Appendix H for a copy of this scale.

CHAPTER 3

RESULTS

Analytic Plan

To address the first two questions, semi-parametric modeling (Nagin, 1999) was used to identify group-based trajectories of mental health and acculturation. The PROC TRAJ program in SAS was used to identify commonly occurring mental health and acculturation trajectories from the empirically derived data. This is the recommended program for estimating the probability of each individual's group membership, and best fit models were chosen using the Bayesian Information Criterion (BIC; Nagin, 1999). The semi-parametric modeling method utilizes a polynomial function to estimate the relationship between the variable in question and the specific time point. This general function takes the form

$$y^{j*}_{it} = \beta^{j}_{0} + \beta^{j}_{1}(time)_{it} + \beta^{j}_{2}(time^{2})_{it} + \varepsilon$$

where y^{j*}_{it} is a latent variable that measures the level of the construct for participant *i* at time *t* given membership in-group *j*. The coefficients of the model varied across groups and ultimately determined the shape of each trajectory. Individuals with at least two data points were included in these analyses.

To address the third question, the relationship between mental health and acculturation was examined four different ways. First, simple correlations were conducted between mental health scores at each time point and both acculturation subscales at times 1, 3, and 5. Next, a chi-square test was conducted between each mental health group and each acculturation group to ascertain whether there was significant overlap between these groups. Third, one-way ANOVAs were conducted with mental health group as a between subjects

factor and with both acculturation subscales as dependent variables, to determine whether acculturation at Time 1 predicted type of mental health trajectory. Finally, HLM was used to determine whether changes in acculturation were related to changes in mental health and whether changes in acculturation predicted Time 5 mental health. In the first set of Level 1 models, acculturation scores were regressed on each time point, resulting in the equation: $Y_{ij} = \beta_{0j} + \beta_{1j}*(TIME) + r_{ij}$, where Y is the acculturation score for the individual *i* at time point *j*, and the parameter *r* yields the residual value for each individual. An unconditional model was then fit for Level 2, and yielded a residual file containing the variable "ecintrcp," which is the coefficient denoting the acculturation slope, or change in acculturation across time points 1, 3, and 5. Positive slopes indicated a general increase in acculturation while negative scores indicated a decrease in acculturation for each subscale. Once these change scores were obtained, a new HLM model was fit for each acculturation subscale to determine the relationship between changes in acculturation and changes in mental health. In this second Level 1 model, CES-D[6] scores were regressed on time point (coded -4, -3, -2, -1, 0, so that the intercept β_{0j} represented an estimation of each individual's CES-D score at the final time point in this study), resulting in the equation $Y_{ij} = \beta_{0j} + \beta_{1j}*(TIME) + r_{ij}$, where Y is the CES-D score for the individual *i* at time point *j*, and the parameter *r* yields the residual value for each individual. In the Level 2 model, the parameter estimates from the second Level 1 model were used as outcomes, and the acculturation slope obtained from the first Level 1 model was added to explain variability in CES-D scores. The Level 2 equations for this question were thus:

$$\beta_0 = \gamma_0 + \gamma_{01} *(\text{acculturation slope}) + \mu_0$$

[6] From here onwards, the mental health measure is called the 'CES-D' for brevity, but still refers to the 10-item Boston short form.

$\beta_1 = \gamma_{10} + \gamma_{11}$ *(acculturation slope) + μ_1

where β_0 represented CES-D score at Time 5, and β_1 represented the change in CES-D scores over times 1-5. A significant *p* value for γ_{01} indicated that changes in acculturation to Indian culture and/or European American culture were predictive of mental health at Time 5, whereas a significant *p* value for γ_{11} determined that changes in acculturation to Indian culture and/or European American culture were associated with changes in mental health across time points 1-5.

In order to address the fourth question examining additional predictors of mental health trajectories, two approaches were used. First, one-way ANOVAs were conducted comparing individuals who were classified in different mental health trajectory groups. Significant ANOVAs were followed up with Tukey HSD tests to compare each pair of groups. Second, HLM was used to predict changes in mental health over time and to predict mental health levels at Time 5. The Level 1 model was created by regressing CES-D scores on time point (coded -4, -3, -2, -1, 0, so that the intercept β_{0j} represented an estimation of each individual's CES-D score at the final time point in this study) and yielded the equation $Y_{ij} = \beta_{0j} + \beta_{1j}$*(TIME) + r_{ij}, where Y is the CES-D score for the individual *i* at time point *j*, and the parameter *r* yields the residual value for each individual. Level 1 model parameter estimates were used as outcomes in the Level 2 models, and additional predictors were added to explain variability in Time 5 CES-D scores and CES-D scores over times 1-5. The general equations for Level 2 models were:

$\beta_0 = \gamma_0 + \gamma_{01}$ *(PREDICTOR) + μ_0

$\beta_1 = \gamma_{10} + \gamma_{11}$ *(PREDICTOR) + μ_1

Descriptive Statistics

Descriptive data for the main variables of interest in this study are shown in Table 2. Intercorrelations between CES-D scores and AAMAS subscales are shown in Table 3. CES-D scores across times 1-5 were generally correlated with each other, although CES-D scores at Time 1 were only significantly associated with scores at Time 3 (r = .37, p <.01). CES-D scores for Times 2, 3, 4, and 5 were all correlated with each other at the p < .01 level (rs = .51 - .72) with the exception of the correlation between Times 2 and 4, which was significant at the .05 level (r = .30). Acculturation subscale scores at Times 1, 3, and 5 were also correlated with each other. For the AAMAS-CO subscale, correlations ranged from .70 to .77 (all ps < .01). AAMAS-EA score correlations for Times 1, 3, and 5 ranged from .44 to .73 (all ps < .01).

Intercorrelations among additional predictor variables are shown in Table 4. Generally, it appeared that variables within the same subscale were significantly correlated with one another, but there were few significant correlations across different measures. For example, the four subscales of the CCS that were used for this study were all significantly related with the exception of Intracultural Coping and Fatalism. Additionally, the Gender-Linked and Gender Transcendent subscales of the SRQ were significantly correlated, and the amount of adjustment that one reported between the U.S. and India was also significantly related to the feelings one expressed toward his/her ability to adjust at the first time point. The greater the amount of academic and financial concern at Time 2, the less support one reported receiving at Time 2[7]. There was a low but significant positive correlation (r =.37) between the Gender-Linked subscale and CCS-Fatalism subscale, indicating that those who

[7] Practical and emotional support were combined into one predictor variable because they were so highly correlated with each other (r = .83).

held more traditional beliefs about gender also tended to view their problems as beyond their control to change, and vice versa.

Attrition. Seventy-one percent of participants who responded at Time 1 continued for at least one additional time point in the study. Attrition after Time 1 can be attributed to difficulty maintaining contact with some participants because they had supplied an invalid e-mail address, which was the only way that participants were notified of subsequent surveys. Three participants specifically requested to drop out of the study due to time constraints. The students who participated only at Time 1 and those who participated in two or more time points did not differ significantly on any of the predictor variables that were measured at Time 1 with the exception of their gender ideology. Participants who dropped out after Time 1 tended to endorse more traditional gender roles for men and women ($p < .05$) than those who stayed in the study after Time 1.

Mental Health and Acculturation

1. How Does Mental Health Change Over the First Year of Graduate School and are There Individual Differences in These Trajectories?

Linear and quadratic models with 2-groups, 3-groups, and 4-groups each were fit using the mental health data to determine which of the six groups yielded the best fit. A 4-group linear model (Table 5 and Figure 2) had the lowest BIC value (-983.62), and appeared to be the optimal fit for describing the number and pattern of mental health trajectories in this sample. The first group ("CONSISTENTLY GOOD"; $n = 22$) started out with the lowest CES-D scores and generally remained stable across time points 1 through 5. Group 2, ("IMPROVING"; $n = 46$) experienced a gradual, linear improvement in mental health by Time 5 ($p = .01$), while group 3 ("WORSE"; $n = 14$) demonstrated a linear worsening of

symptoms (p <.01). Group 4 (“INCONSISTENT”; n = 1) only contained one person whose mental health considerably fluctuated throughout the year. This person reported very poor mental health at Time 1, which gradually worsened through the third time point, improved by Time 4, and was slightly worse at Time 5; linear change for this group was not significant, likely because mental health shifted so often during the year.

2. How Does Acculturation Change Over the First Year of Graduate School and are There Individual Differences in These Trajectories?

Acculturation trajectories for the Culture of Origin (AAMAS-CO) and European-American (AAMAS-EA) subscales of the AAMAS were obtained using the same PROC TRAJ procedure. A 3-group linear model was chosen for the AAMAS-CO subscale (Table 5 and Figure 3). This model had the best BIC value (-142.92) of all six models tested with the AAMAS-CO data. Group 1 (“LOW”; n = 3) reported the lowest level of acculturation to Indian culture among the three groups at Time 1. Group 2 (“MID”; n = 25) started the academic year higher on acculturation to Indian culture than Group 1, but lower than Group 3 (“HIGH”; n = 33), which had the largest number of participants. The three groups of the AAMAS-CO subscale did not show significant linear changes in their trajectories over time points 1, 3 and 5.

The linear model used for describing the trajectories of the AAMAS-EA scores over Times 1, 3, and 5 identified four distinct groups (Table 5 and Figure 4). The BIC value for this model is -144.55. Although the 3-group linear model had a better BIC value, the 4-group linear model captured a fourth trajectory of European American acculturation levels worthy of description. Group 1 (“DECREASING”; n = 4) started out with the third highest AAMAS-EA score and showed a significant linear reduction in acculturation to the U.S. culture over

time points 1, 3, and 5 (p = .001). Group 2 ("INCREASING"; n = 23) exhibited a significantly linear increase in its acculturation to American culture (p = .01). Group 3 ("LOW"; n = 28) started at the lowest level of acculturation to the U.S. and remained relatively stable over time points 1, 3, and 5. The fourth group ("HIGH"; n = 9) began higher than all groups with respect to American acculturation, and remained high over time.

3. What is the Relationship Between Mental Health and Acculturation?

Intercorrelations of CES-D scores and both acculturation subscales are shown in Table 4. Higher acculturation to the European American culture at Time 1 was associated with better mental health at Time 1 ($p < .05$), and the same association was significant at Time 3 ($p < .05$). Higher acculturation to the Indian culture at Time 5 was associated with better mental health at times 4 and 5 (ps < .05).

Chi-square analyses examining the relation between mental health group membership and acculturation group membership were not statistically significant (both ps > 0.30), indicating that there was no overlap between membership in these groups. One-way ANOVAs conducted with mental health groups as a between subjects factor and acculturation scores as dependent variables suggested that there were no significant differences between mental health groups on acculturation at Time 1. HLM analyses indicated that the relation between changes in acculturation and mental health at Time 5 was not significant for either of the two acculturation subscales, nor were changes in acculturation found to be significantly associated with changes in mental health across the five time points (ps > .05).

Other Predictors of Mental Health

4. What Are Other Predictors of Mental Health Trajectories Over the First Year of Graduate School?

Once individuals were assigned group membership based on the PROC TRAJ method, predictors of the CONSISTENTLY GOOD, IMPROVING and WORSE mental health trajectories were tested using one-way ANOVAs[8]. Mean group differences for all predictor variables are shown in Table 6. Tukey HSD tests were conducted to examine pairwise differences among the three groups. The amount of out-group support available varied significantly across mental health trajectory groups, F (2, 71) = 3.41, p <.05), with participants in the CONSISTENTLY GOOD group reporting significantly greater availability of out-group support than those in the WORSE group ($p < .05$). Those in the CONSISTENTLY GOOD group also felt more positive than the IMPROVING group about their ability to adjust ($p < .05$). There were significant differences in gender ideology across groups; the CONSISTENTLY GOOD group endorsed fewer gender transcendent opinions than the IMPROVING group ($p < .05$), and the WORSE group was significantly more traditional than the CONSISTENTLY GOOD group with respect to gender roles at Time 1 ($p < .05$). There were significant differences across groups in individuals' reports of the size of adjustment required at Time 1 (F (2, 78) = 5.23, $p < .01$) as well as in individuals' perceptions of their ability to adjust in the U.S. at Time 1 (F (2, 78) = 6.79, $p < .01$). Participants in the CONSISTENTLY GOOD group reported that transitioning to the U.S. was a smaller adjustment ($p < .05$) than both the IMPROVING and WORSE groups, with the WORSE group reporting the largest adjustment.

[8] Because there was only one participant in the "INCONSISTENT" group, this trajectory was not included in analyses that compared mean group differences for predictors of mental health.

HLM analyses were conducted next to understand which variables significantly predicted mental health at Time 5 and changes in mental health over time; see Table 7 for model parameters. Results indicated that the coping tactic of self-blame, the availability of in-group support, out-group support, amount of support received, and gender ideology were all significant predictors of mental health at Time 5. The amount of concern felt regarding academic performance and finances approached significance as a predictor of mental health at Time 5. None of the variables significantly predicted overall change in mental health, although gender ideology and the way one felt about his/her transition to the U.S. both approached significance.

The Role of Gender

Each research question was re-analyzed using gender as a moderator in order to explore whether there were significant gender differences in a) mental health trajectories; b) acculturation trajectories; c) the relationship between acculturation and mental health; and/or d) additional predictors of mental health. A chi-square test between mental health group trajectories and gender demonstrated that there were significant differences across the three mental health groups (χ^2= 7.13; $p < .05$). Specifically, there were more men than women in the WORSE group, (χ^2 = 10.29; $p < .01$) relative to the CONSISTENTLY GOOD and IMPROVING groups. A chi-square test between acculturation group trajectories and gender revealed that were no significant differences for either acculturation to Indian culture (χ^2 = 1.66; $p = .44$) or acculturation to European American culture (χ^2 = 4.33; $p = .23$).

For additional analyses involving gender as a moderator, a more conservative alpha of .01 was used to identify significant interactions because 1) gender analyses were exploratory/post hoc and 2) to reduce the likelihood of Type 1 error due to the large number

of interactions being tested in regressions, 2 way-ANOVAs, and HLM models. To understand whether there were differences in the relationship between mental health and acculturation between men and women, CES-D scores were regressed on acculturation score, gender, and a gender by acculturation score interaction at each time point of measurement; gender was coded as "0" for men and "1" for women. Gender significantly moderated the relation between Time 1 European American acculturation and Time 4 mental health (β = 9.13, *SE* = 2.87, $p < .01$).This significant finding was followed up by examining correlations between acculturation and CES-D score separately for men and women. Lower acculturation to European American culture at Time 1 was associated with better mental health at Time 4 for women ($r = .58$, $p < .05$) but not for men. Next, three-way chi-square tests conducted using CES-D groups, acculturation groups for each subscale, and gender were run to determine if gender moderated the overlap between these groups; neither test was significant (*p*s > .67).

Gender and mental health trajectory groups were entered as factors in a two-way ANOVA to determine whether differences in Time 1 acculturation across mental health trajectory groups varied as a function of gender. The interaction between gender and mental health trajectory was not significant for either acculturation to Indian culture or European American culture at Time 1 (*p*s >.06). Next, HLM was used to explore whether gender moderated the relationship between Time 1 acculturation and mental health at Time 5 and/or changes in mental health across time. The HLM models for each acculturation subscale were created by entering acculturation score at Time 1, gender, and a gender by acculturation score product term as Level 2 predictors; see Table 8 for interaction coefficient parameters. For those interaction coefficients that were significant, separate HLM models were run for men

and women to aid in interpreting the results. The interaction term for European American acculturation at Time 1 and gender significantly predicted Time 5 mental health (β = 6.70, *SE* = $p < .01$), with higher acculturation to the European American culture at Time 1 predicting better mental health at Time 5 for men ($p < .05$), but not for women.

Finally, gender was entered as a moderator in an HLM model to explore whether changes in acculturation were associated with mental health at Time 5 or with changes in mental health over Times 1-5. Model parameters are shown in Table 8; none of these analyses were significant. In order to address whether additional variables of mental health trajectories varied as a function of gender, two-way ANOVAs were run with gender and mental health trajectories as factors for each predictor. No significant gender by mental health trajectory interactions were found (*p*s >.15). Each variable, gender, and the variable by gender product term were then entered into an HLM model to determine if gender moderated the relationship between each variable and mental health at Time 5 and/or mental health across the five time points. All interaction coefficients are presented in Table 8. Gender significantly moderated the relationship between gender transcendent ideology and mental health at Time 5 (β = -0.45, *SE* = 0.13, $p < .01$) such that more traditional gender ideology predicted worse mental health at Time 5 for men (β = 0.43, *SE* = 0.11, $p < .01$), but not for women.

CHAPTER 4

DISCUSSION

This study examined the trajectories of mental health and acculturation among Indian international graduate students over their first academic year in the U.S. and sought to identify predictors of mental health during this transition. Findings support the notion that Indian students do not follow one single trajectory of mental health or acculturation. Moreover, a number of factors, including availability of out-group support, the size of adjustment, feelings about the transition, and gender role attitudes, accounted for individual differences in mental health trajectories.

Mental Health Trajectories

Unlike early theoretical models of international students' adjustment which broadly describe mental health following migration with a U-shaped curve (Adler, 1975; Lysgaard, 1955; Oberg, 1960), the present study identified substantial variation in trajectories of mental health. The largest group of students in the current study did experience improving mental health over time, as is characteristic of the U-shaped trajectory, though students were not followed long enough to determine whether their mental health trajectories would ultimately decline again. Roughly one-fourth of students reported good mental health upon arrival and maintained good mental health throughout the year, and 17% of students showed worsening mental health over the first year, similar to the results described in Ward et al.'s findings (1996, 1998). Interestingly, there were more men than women in the group that experienced a decline in mental health during the transition. It is possible that Indian men are confronted with greater difficulties adjusting to an environment in which gender roles are not as pronounced as they are in India, whereas the lack of these boundaries may be more

welcomed by Indian women. Indian men may also face greater pressure than Indian women to succeed academically, be financially secure, and may feel less inclined to use relational coping strategies and/or reach out for support when in distress, all factors that may contribute to a decrease in mental health over time.

Acculturation Trajectories

The present study also found distinct trajectories of acculturation to Indian culture and to American culture. With respect to Indian culture, all three groups began at different baseline levels of acculturation and maintained these levels over time. The largest proportion of students (54%) reported having consistently high levels of acculturation to Indian culture. Of the four trajectories for acculturation to American culture, 46% of students reported consistently low levels throughout the year and 13 % reported consistently high levels throughout the year. Approximately one-third of students began with moderate levels of acculturation to American culture, and steadily increased over the academic year, while 7% reported the highest levels of acculturation initially, and decreased over time. These findings support bilinear theories of acculturation, in which individuals can simultaneously endorse differing levels of acculturation toward their culture of origin and the host culture (Berry, 2001; Szapocznik et al., 1980). These data also found greater variability in American acculturation trajectories than in Indian acculturation trajectories, suggesting that acculturation to the host culture may be more susceptible to change than acculturation to one's culture of origin during the initial transition period. The results corroborate Cemalcilar and Falbo's (2008) findings in which international graduate students maintained their identification to their home culture while experiencing an increase in their identification to the U.S. culture. The distinct trajectories that emerged from the current study underscore the

importance of recognizing individual differences in patterns of mental health and acculturation. Assuming that all individuals follow a similar pathway masks the variability of developmental courses within a group.

The Relationship Between Acculturation and Mental Health

As expected, there was little evidence supporting a definitive relationship between acculturation and mental health in this study. Generally, neither acculturation trajectories nor initial acculturation levels were associated with mental health trajectories or with better mental health outcomes, suggesting that there are likely multiple acculturation strategies that are associated with good mental health. Although acculturation was not generally predictive of later mental health, there was some weak evidence supporting concurrent relations between acculturation and mental health at some time points. In particular, at Time 1 and 3, higher acculturation to the American culture at Time 1 was associated with better mental health and higher acculturation to the Indian culture at Time 5 was associated with better mental health at Times 4 and 5. Students with higher acculturation to the American culture in the initial months after arrival may have experienced less of a culture "shock" (Oberg, 1960) due to greater familiarity with the English language, food, popular culture, and social norms in the U.S., and thus were probably more likely to feel happier in their first few months of transition. Higher acculturation to the Indian culture at the end of the study may have had implications for better mental health at Time 5 due to students feeling more grounded, content, and perhaps closer to their core sense of self.

There was only minimal indication that the relation between acculturation and mental health varied as a function of gender. Higher levels of American acculturation at arrival were predictive of worse mental health for men at the end of the study, and higher levels of

American acculturation at arrival were related to better mental health for women at the fourth time point. The fourth time point of the study took place just after the winter break, which for many students, was a time when they returned home to India, or spent a significant amount of time with Indian friends and/or extended family in the U.S. for the first time after arrival. While a higher level of acculturation to the American culture in the beginning of the year may have facilitated a smoother transition or greater sense of belonging to the U.S. during their first semester, it may have resulted in greater conflict for women soon after the winter break. For example, being home in India during the holidays may have highlighted the contrast between American values and traditionally Indian values. Women who had positively viewed their higher American acculturation in the beginning of the year may have been cautioned of the consequences of becoming "too Americanized" by friends or family members in India, and have returned to the U.S. feeling less accepted by their support networks at home. This may have resulted in lower confidence regarding their ability to maintain and pass on traditional customs and practices of the Indian culture in the future.

For men, it is understandable that higher American acculturation at the beginning of the year was predictive of better mental health at the end of the study; it is likely that adapting to the cultural behaviors and practices of the U.S. allowed men to feel a greater sense of mastery within social and academic domains, and those who acquired these practices earlier felt more confident and pleased with their progress later in the year. Furthermore, men may have encountered less pressure than women from Indian friends and relatives to resist acculturating to the American culture due to the notion that men are viewed as primary earners in Indian households, and greater financial success would follow from a firm grasp of the educational and professional spheres in the U.S. Although there were not many gender

differences in the relation between acculturation and mental health, the few differences that were found point to the need for future studies to better understand how the immigration process may differ for men and women, especially for individuals who immigrate from cultures that have strongly defined social roles for men and women.

Coping Strategies and Mental Health

None of the coping strategies assessed in this study accounted for individual differences in mental health trajectories; however, there was some evidence that higher use of self-blame to cope with difficulties at Time 2 was predictive of poorer mental health outcome at Time 5. It is possible that for problems related to cultural and academic adjustment, blaming oneself results in decreased motivation to actively resolve the issue, and may ultimately cause one to feel worse about one's situation. Additionally, using self-blame to address difficulties in the social domain might also lead to negative self-perceptions over time.

In contrast to self-blame, other strategies such as using religion or substances to cope with problems early in the year may have been helpful in the short-term, but the effects may not have been long lasting. Furthermore, while students from collectivistic cultures may be more prone to use strategies such as participating in various social activities, seeking validation and support from other members of their ethnic community, and thinking fatalistically (Yeh, 2003), it is likely that Indian students in this sample used a combination of these styles to cope with difficulties. For example, some students may have sought support from other members of the Indian community by voicing their concerns while engaging in social activities together. Students who reached out to senior-level Indian graduate students in attempt to learn how they addressed similar problems during their first year may have been

consoled through fatalism (i.e., “some things are just out of your control”), leading first-year students to internalize this style as a way to accept some of the difficulties they experienced. Some of these coping combinations may have helped to promote mental health, while others may have made students feel worse, and it is likely that none of the collectivistic coping styles was solely responsible for promoting good mental health over the long run. Finally, it is also possible that there are other coping strategies that do distinguish between mental health patterns and/or predict mental health outcomes that were not assessed in this study.

Social Support and Mental Health

Consistent with findings on immigration and psychological well-being, social support was an important contributor to students’ mental health in this study (Jasinskaja-Lahti & Liebkind, 2007; Ward, et al., 1998; Yang & Clum, 1995), distinguishing mental health trajectory groups and predicting Time 5 mental health. The amount of out-group support that students perceived to be available to them differentiated those who consistently had good mental health from those who experienced worsening mental health over time. For those who had good mental health at arrival, a perception of high out-group support in the beginning of the year may have served to buffer difficulties experienced later in the year. Students who identified greater sources of out-group support likely felt more welcomed by non-Indian peers, faculty members, and other organizations on campus, which may have resulted in favorable feelings about their transition that persisted throughout the year. The availability of in-group support did not predict variability in mental health patterns. In-group support did not distinguish mental health trajectories in this study, perhaps due to the similar perception across all groups that members of the Indian community would always be available when needed; in fact, mean levels of in-group support were higher than mean levels of out-group

support. Thus, it is understandable that it was only the availability of out-group support, which some students may have thought to be less reliable than in-group support, which differentiated patterns of mental health among the students in this sample.

Although it did not distinguish mental health trajectory groups, in-group support was an important contributor to mental health at the end of year as was out-group support and signaled better mental health among Indian international students. The fact that in-group support predicted outcome but did not predict trajectories of mental health suggests that individuals with in-group support may have already been experiencing better mental health at the beginning of the year. The amount of support received did not distinguish mental health trajectories and seemed to matter less than the perception that support was available; this is consistent with studies that have found a positive correlation between perceived social support and mental health (Cadzow & Servoss, 2009; Murphy & Mahalingam, 2004).

Gender Roles and Mental Health

Initial attitudes about gender ideology played a significant role in discriminating among mental health trajectory groups. Students who maintained good mental health from arrival onwards endorsed more flexible gender roles initially than those whose mental health was poor at arrival but ultimately improved. The group of students who gradually improved also exhibited fewer traditional attitudes about gender than the group whose mental health declined over time. In addition to discriminating among trajectory groups, gender ideology at the beginning of the year also predicted mental health outcomes at the end of the year differently for men and women. Attitudes toward gender roles in India are generally more conservative than those in the U.S., even if this is a subtle distinction in urban regions of India. For students who arrived in the U.S. with stereotypical ideas about activities and

abilities that are characteristic of men and women, it may have been surprising, and at times overwhelming, to experience the incongruity between their beliefs about gender and the values and attitudes expressed in the U.S. Having a more flexible stance at arrival seemed to maintain and/or improve students' mental health, since this perspective likely allowed students to incorporate themselves into social and academic arenas with greater ease. By contrast, students who retained more traditional gender ideology may have felt greater strain when confronted with fluid gender role boundaries and consequently, experienced worsening mental health due to difficulties reconciling gender role differences between the U.S and India. The fact that gender ideology may have more strongly predicted mental health outcomes for men than for women may be because Indian women coming to the U.S. may have arrived with more liberal gender ideology than Indian men, and did not experience as much gender role conflict as a result. It is possible that a less conservative stance on gender roles among Indian women in this sample played a key role in encouraging them to leave India for attaining a graduate degree at an age when many women in India are typically pressured to finish school and focus on married life.

Size of Adjustment

Consistent with other studies (Rahman & Rollock, 2004; Ying & Liese, 1991), the degree of adjustment students must make upon their initial arrival in the U.S. as well as the perception of their ability to make this adjustment appears to play a role in one's mental health trajectory. In the present study, students who had consistently good mental health needed to make the fewest changes in order to adapt to life in the U.S. compared with those who had poor mental health and gradually improved, and those who had poor mental health and continued to decline over the year. The initial arrival period following immigration is

usually the time when the greatest adjustments have to be made; if students did not perceive having to make large adjustments then, it is likely that they did not need to make many more as the year progressed, and thus were able to maintain good mental health throughout the year. Students who identified the highest number of changes at the beginning of the year ultimately had declining mental health over the year perhaps because the initial adjustment period set a negative tone to the remainder of the year, or because there were many changes that were difficult to address thoroughly during the length of the study. For students whose mental health was poor to begin with but ultimately improved over time, the degree of difference between the U.S. and India may have reduced over time as they became more adept at managing or reconciling these differences. Students whose mental health was consistently good over the year also had more positive feelings about adjusting than the group who had poor mental health on arrival and gradually improved. It is not surprising that having less confidence in the beginning of the year would result in concurrent distress. More interesting is the fact that feeling ill-equipped to handle the changes initially did not seem to have a lasting effect.

The size of adjustment that one had to make from living in an urban environment to a non-urban area did not play a key role in predicting mental health groups. Although a few students commented on life being "boring" or "lonely" at times, perhaps the academic lifestyle and rigor of their program left little room for students to feel the discrepancies of the city environment, if they exist. For those who have felt that differences between their locations in India and the U.S. were challenging, they may have learned to cope with these changes through a number of ways. First, they may acknowledge that they are primarily in the city for educational purposes; second, that this move is likely temporary; and third, that

this change gives them an opportunity to experience a lifestyle that they otherwise would not have sought on their own. Students' concerns about academics and finances soon after arrival also did not vary significantly between the three groups. It is possible that these concerns did not necessarily dictate group membership because students may have had a range of responses to address their concerns; thus, two individuals with the same level of concern may have been categorized in different mental health trajectories for this reason. Additionally, there may have been other differentiating concerns that were not captured by this measure.

Predicting Individual Differences in Change

Although a number of factors distinguished different trajectory groups and predicted mental health toward the end of the academic year, none significantly predicted individual differences in changes in mental health over the course of the year. The failure of these factors to predict changes over time may be due to the fact that "change" has a different meaning depending on the initial level of mental health. In particular, stable mental health would be positive if one starts the year with good mental health, whereas stable mental health would be a negative outcome for individuals who began the year with poor mental health. Thus, separating change from the initial level of symptoms may make it difficult to see and interpret effects of predictor variables over time.

Study Implications

The results of this study have several implications for host academic institutions in the U.S., as well as for international students applying for admission to U.S. graduate programs. First, it is essential to recognize that transition to the U.S. brings with it changes in nearly every facet of life, many of which may have a significant impact on students' mental health. Incoming students and faculty members who acknowledge that the transition period

may be characterized by lifestyle, social, and academic adjustments, may be more accepting of the challenges that accompany these changes. Additionally, it is important for incoming students and faculty members to know that not all students experience difficulties or declining mental health during the transition; in fact, most students tend to have consistently good mental health or experience improving health over the course of the initial transition. Second, international students vary in their degree of acculturation to their countries of origin; thus it is inappropriate to assume that all international students from the same country will share the same values, beliefs, and practices. Furthermore, international students acculturate to the host culture differently, and a particular pattern for one student may not be the optimal strategy for another.

Third, the significant role of social support in promoting mental health throughout the year is an important message to relay to universities and faculty members. Faculty advisors and other departmental staff who are made aware of the specific challenges faced by international students within the first several months of arrival may improve their connections to students by encouraging students to voice their academic concerns and by responding sensitively to the differences inherent in the educational systems of the U.S. and students' home countries. Students may benefit from more culturally attuned faculty mentorship that addresses the transitional demands of being an international student. The value of in-group support is also recognized in this study, and may be an indication that universities should provide additional assistance to cultural student associations, which are largely responsible for successfully disseminating practical information to incoming students. These organizations also provide a welcoming forum in which students can affirm their

cultural identities, form lasting friendships, and gain emotional support during their transition, and throughout the course of their graduate school experience.

Fourth, navigating new or different gender roles may be especially challenging for some students and may differ based on gender. With institutional and/or departmental support in connecting incoming students to current students, Indian students who have undergone the same transition in prior years could provide incoming students with information regarding expectations in the U.S., which may facilitate a smoother arrival period, and ultimately, better mental health outcomes for new students.

Limitations and Directions for Future Research

Although this study provides a new perspective for understanding mental health patterns and predictors among international graduate students, it is not without limitations. Due to the focus on Indian international students' mental health, caution should be taken if applying the findings to other international student groups or to non-student Indian immigrants. Additionally, it is essential to remember that the majority of Indian international students in this study had positive mental health outcomes during their first six months of study in the U.S. While the findings suggest that there is a group of students who may experience hardship and worsening of mental health over time, it is important to avoid overpathologizing these students. Furthermore, the current study only captured students' mental health trajectories during their first six months in the U.S., and additional research that follows students over the remainder of their transition period is needed. This study did not examine students' attitudes toward seeking help for psychological difficulties, and it is unclear whether the optimal intervention for Indian international students in distress is through a mental health professional or university counseling center. Thus, care should be

taken when intervening, as standards for coping with difficulties may be different than norms in the U.S.

Although this was a longitudinal study, the direction of causality is still unclear for the relationship between the significant predictors and mental health trajectories. For example, it is likely that needing to make few changes and feeling positive about being one's ability to adjust may have contributed to the maintenance of good mental health. However, having good mental health initially may have buffered students' reactions to the size of adjustment and given them the confidence to feel that any changes they needed to make were within their reach. Although it is somewhat unlikely, it is also possible that students who felt worse over time perceived there to be inadequate out-group support because they were less motivated to seek it or had the perception that they were disliked or alienated by others.

The strategy of online recruitment and administration of surveys increased sampling bias, although efforts were taken to reach a wide and diverse number of students across the country. The issue of attrition, although an inherent characteristic of longitudinal designs, raises the concern that the conclusions drawn in this study differ from those that would have been drawn with a 100% participant retention rate. Analyses between students who continued past the first time point and those who dropped out after Time 1 yielded no significant differences between the groups on any of the predictor variables with the exception of gender ideology, which lessens the concern of attrition's influence on the results. Another issue involves the small sample size, which resulted in relatively small mental health trajectory groups, making further analyses more difficult to conduct. A bigger sample would increase power, and additional data should be gathered in order to form more robust conclusions in the future. Although the author attempted to choose measures that were culturally applicable

to an international sample, students may have had difficulties in understanding some items. As always, self-reports of sensitive topics such as mental health and difficulties experienced are subject to interpretation and dependent on participants' discretion and comfort level.

Despite these limitations, this study offers some promising findings and opportunities for increased research in this area. Extended study of Indian international students prior to their arrival and after their first transitional year in the U.S. can lead to a more comprehensive understanding of the course of mental health and acculturation trajectories. Examination of acculturation patterns beyond six months in the U.S. may help illuminate specific changes in attitudes and behavior since the acculturation process takes time and likely differs across domains (Berry, Phinney, Sam, & Vedder, 2006; Gim Chung et al., 2004). Future studies may consider including international students of other ethnicities and nationalities and undergraduate students to enable between-group comparisons. As the U.S. continues to enroll large numbers of international students, it is crucial to focus efforts on understanding the factors which foster a successful psychological and cultural transition from the beginning of their transition, throughout the course of their stay, be it temporary or permanent

APPENDIX A

DEMOGRAPHIC INFORMATION

Directions: The following questions ask about you and your family/place of origin. Please answer as accurately and completely as you can.

1. Gender: Male / Female

2. Date of birth (mm/dd/yyyy): ____/_____/_____

3. Marital status: Please select the option that is most accurate for you:

   Single/ In a relationship/ Engaged/ Married/ Separated/ Divorced/ Widowed

4. Number of children: 0 / 1 / 2 / 3 / 3+

5. What is your city of origin in India? _____

6. My city of origin in India would be considered to be in a(n): rural area / urban area

7. My mother tongue is... (please choose the language you feel most comfortable speaking)

   Bengali / Dogri / Gujarati / Hindi / Kannada / Kashmiri / Konkani / Malayalam / Marathi/ Nepali / Oriya / Punjabi / Sindhi / Tamil / Telugu / Urdu / Other

   Please specify if "other:"_____

8. In addition to my mother tongue, I also speak the following languages:_____

9. TOEFL score: _____

10. The highest educational degree your father has is....

    Did not finish high school / Completed high school / Technical or vocational certificate / Bachelor's degree / Master's degree / Doctorate or professional degree

11. The highest educational degree your mother has is...

    Did not finish high school / Completed high school / Technical or vocational certificate / Bachelor's degree / Master's degree / Doctorate or professional degree

12. What, if any, is your religious affiliation? Select all that apply.

    Buddhist / Christian / Hindu / Jain / Jewish / Muslim / Sikh / Zoroastrian / None

    Other (please specify): _____

13. I have about _____ family members who live in the U.S.

    0 / 1-5 / 6-10 / 11-15 / 16-20 / 21+

14. I have previously made _____ separate visits to the U.S.

    0 / 1 / 2 / 3 / 4 / 5 / 6 or more

15. If you have previously visited the U.S., please list the approximate dates of each stay below (e.g., May 2000 – June 2000) : _____

16. What is the name of your university/college in the U.S.? Please specify your particular location if your university has multiple campuses (e.g., University of California *Los Angeles)*: _____

17. What is your major field of study at your U.S. university/college?

    Architecture / Biology / Business / Chemistry / Computer Science / Education / Engineering / English / Fine Arts / Law / Mathematics / Medicine / Natural Resources Philosophy / Physics / Psychology / Public Administration / Public Health / Sociology / Other

    Please specify if "Other:" _____

18. What degree are you pursuing at your U.S. university/college?

    M.A. / M.S. / M.P.H. / M.B.A. / M.F.A. / Ph.D. / J.D. / M.D. / Other

    Please specify if "Other:" _____

APPENDIX B

BOSTON X 4 SHORT VERSION OF CES-D

Directions*:* The 10 items below refer to how you have felt and behaved **during the last week**. Please rate each item according to the following scale:

0 = Rarely or none of the time (<1 day)

1 = Some or a little of the time (1-2 days)

2 = Occasionally or a moderate amount of the time (3-4 days)

3 = Most or all of the time (5-7 days)

Item

1. I felt depressed

2. I felt that everything I did was an effort.

3. My sleep was restless.

4. I was happy.

5. I felt lonely

6. People were unfriendly.

7. I enjoyed life.

8. I felt sad.

9. I felt that people dislike me.

10. I could not get “going.”

Note: Items 4 and 7 are reverse coded.

APPENDIX C

ASIAN AMERICAN MULTIDIMENSIONAL ACCULTURATION SCALE

Directions: Please answer the following questions keeping in mind a.) your culture of origin (Indian), and b.) European American culture. Use the following scale to rate your answers:

1 2 3 4 5 6

Not very much Very much

1. How much do you feel you have in common with people from...

2. How much do you interact and associate with people from...

3. How much do you identify with...

4. How much would you like to interact and associate with people from...

5. How proud are you to be a part of ...

6. How negative do you feel about people from..

7. How well do you speak the language of...

8. How well do you understand the language of...

9. How well do you read and write in the language of ...

10. How often do you listen to music or look at movies and magazines from...

11. How knowledgeable are you about the culture and traditions of...

12. How knowledgeable are you about the history of...

13. How much do you actually practice the traditions and keep the holidays...

14. How often do you actually eat the food of...

15. How much do you like the food of...

Note: Item 6 is reverse coded.

APPENDIX D

COLLECTIVISTIC COPING SCALE-MODIFIED

Directions*:* Think of a problem you have encountered **in the last month** that has impacted you. In a few words, please describe the problem or concern that was distressful or troubling to you in the space provided below.

Problem:_____

If you have really not experienced ANY problems (even minor) in the past month, check below:

□ I have had any problems at all in the past month. (If checked, skip CCS and Brief COPE items)

We all use a variety of ways to manage our problems. The following items are some ways that you may have been managing/coping with the problem you just described.

Indicate how often you used the following strategies to manage your problem using a scale of 1-7, where 1 = Not used a lot, and 7 = Used a great deal

1	2	3	4	5	6	7
Not used a lot		Used a little		Used Moderately		Used a great deal

1. Sought out a member of my racial/cultural group
2. Spent more time doing activities with my friend(s)
3. Talked with a member of my racial/cultural group
4. Sought advice from someone who had a similar experience
5. Tried to find people who could feel connected to my struggle
6. Shared my feelings or concerns with a member of my racial/cultural group
7. Found comfort in being with people with shared experiences

8. Participated in activities that made me feel less alone in the world
9. Think problems tend to solve themselves
10. Spent time with people who could personally relate to my problem
11. Tried to be understood by a member of my own racial/cultural group
12. Tried to convince myself that this problem is part of a larger lesson
13. Believed that there was a hidden meaning behind this problem
14. Tried to remember that things happen for a reason
15. Engaged in an activity with my friend(s)
16. Asked advice from a member of my racial/cultural group
17. Felt that my problems would balance out in the long run
18. Attended a social event with my friend(s)
19. Interacted more with my friend(s)
20. Tried to spend time with people who had experienced similar problems

APPENDIX E

SELECTED ITEMS OF THE BRIEF COPE INVENTORY

Directions: Use the following scale to answer whether you have used the following strategies to manage/cope with the problem you just described above.

1 = I haven't been doing this at all

2 = I've been doing this a little bit

3 = I've been doing this a medium amount

4 = I've been doing this a lot

1.* I've been praying or meditating

2. † I've been criticizing myself.

3. ◦ I've been using alcohol or other drugs to help me get through it.

4.* I've been trying to find comfort in my religion or spiritual beliefs.

5. † I've been blaming myself for things that happened.

Note: *Religion subscale; † Self-Blame subscale, ◦Substance Abuse subscale

APPENDIX F

SOCIAL SUPPORT QUESTIONNAIRE

Our family, friends, and acquaintances do many things for us, from helping in practical ways, as well as providing emotional and moral support when we are in times of need. Some examples of practical support may be lending you their car, helping you find your way around campus, or financially contributing to your education. Some examples of emotional or moral support are calling or stopping by to see how you are doing, and/or listening to issues that may be bothering you or giving you difficulty.

In the questions below, we are interested in learning two things:

1. Do you feel the following sources of support are available to you?

Source of support	Available	Not available
Family in India		
Friends in India		
Relatives in the U.S.		
Local Indian community (outside of college campus)		
Indian friends on campus		
Non-Indian international students on campus		
American students on campus		
Formal Indian student organization on campus		
Other student organizations on campus		
Faculty or departmental support		
Other (please specify): _____		

2. Of those sources of support that are available, how much practical and/or emotional support do you believe you have actually received from each of the following in the last month?

1 = Not at all 2 = A little 3 = A good amount 4 = Very much

Use N/A (not applicable) for unavailable sources

Source of support	Practical support	Emotional support
Family in India		
Friends in India		
Relatives in the U.S.		
Local Indian community (outside of college campus)		
Indian friends on campus		
Non-Indian international students on campus		
American students on campus		
Formal Indian student organization on campus		
Other student organizations on campus		
Faculty or departmental support		
Other (please specify): _____		

APPENDIX G

SOCIAL ROLES QUESTIONNAIRE

Directions*:* Please indicate the degree to which you agree or disagree with the following statements, using the scale below:

0-10% 11-20% 21-30% 31-40% 41-50% 51-60% 61-70% 71-80% 81-90% 91-100%

strongly disagree *strongly agree*

1.* The freedom that children are given should be determined by their age and maturity level and not by their sex.

2.† Some types of work are just not appropriate for women.

3. † A father's major responsibility is to provide financially for his children.

4.* Tasks around the house should not be assigned by sex.

5. † Only some types of work are appropriate for both men and women; for example, it is silly for a woman to do construction and for a man to do sewing.

6. † Mothers should make most decisions about how children are brought up.

7. † Men are more sexual than women.

8.* People can be both aggressive and nurturing regardless of sex.

9. † For many important jobs, it is better to choose men instead of women.

10.* People should be treated the same regardless of their sex.

11. † Girls need to be protected and watched over more than boys.

12. † Mothers should work only if necessary.

13. † We should stop thinking about whether people are male or female and focus on other characteristics.

* Gender Transcendent subscale; all items are reverse coded. †Gender-Linked subscale.

APPENDIX H

OVERALL ADJUSTMENT AND ACADEMIC/FINANCIAL CONCERNS QUESTIONNAIRE

Directions: The first year of graduate school in the U.S. may be accompanied with financial or academic challenges that you may or may not have anticipated. Please answer the following questions based on how you feel about these areas at this time:

1. At this point in time, how much of an adjustment have you had to make from your life in India to your life in the U.S.?

1 = Very large; life is extremely different here in the U.S. than it was at home

2 = Large; many things are different, and I have made several changes in my lifestyle

3 = Moderate; some things are different, and I have made a few changes in my lifestyle

4 = Very small; things are generally the same as they were back home.

Please comment on specific aspects that have been different, if you wish: _____

2. At this point in time, how do you feel about your ability to adjust to life in the U.S.?

1 = Very bad; I am not able to adjust to the changes here and I could use a lot of help.

2 = Somewhat bad; most things have been challenging, and I am having a hard time adjusting.

3 = Somewhat good; I have had some difficulties, but have managed most of the changes fine.

4 = Very good; I have not had any major problems so far.

Please comment on specific aspects that have been difficult or easy, if you wish: _____

Use the following scale to answer the next five questions:

1	2	3	4	5
Not at all		Neutral		Very much

Currently, how concerned are you about...

1. your finances?

2. understanding others' English (faculty/peers)?

3. communicating in English with faculty or with other students in class?

4. being evaluated for your performance (projects, papers, and/or exams)?

5. being able to adjust to the academic system in the U.S.?

Table 1

Measure Administration by Time Point

Measure	Time Point				
	1	2	3	4	5
Demographic information (18 items)	✓				
Boston x 4 CES-D (10 items)	✓	✓	✓	✓	✓
AAMAS (30 items)	✓		✓		✓
Overall adjustment and academic/financial concerns (7 items)	✓	✓	✓	✓	✓
SRQ (13 items)	✓		✓		✓
Social Support (20 items)		✓		✓	
CCS (20 items)		✓		✓	
Brief COPE (5 items)		✓		✓	
Total number of items	78	62	60	62	60

Table 2

Descriptive Data for Mental Health, Acculturation, and Predictor Variables for Entire Sample

Variable	Time 1	Time 2	Time 3	Time 4	Time 5
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
CES-D	7.31 (5.40)	7.73 (4.96)	7.37 (5.17)	7.19 (4.90)	6.47 (5.44)
	n = 83	*n* = 77	*n* = 63	*n* = 52	*n* = 57
AAMAS-CO	4.92 (0.59)	N/A	4.98 (0.61)	N/A	4.90 (0.64)
	n = 80		*n* = 56		*n* = 51
AAMAS-EA	3.74 (0.54)	N/A	3.88 (0.64)	N/A	3.82 (0.68)
	n = 80		*n* = 56		*n* = 51
CCS - Social activity		3.91 (1.62)			
		n = 41			
CCS - Intracultural		3.31 (1.74)			
coping		*n* = 41			
CCS - Relational		3.28 (1.58)			
universality		*n* = 41			
CCS - Fatalism		3.76 (1.45)			
		n = 41			
Brief COPE –		1.95 (0.84)			
Religion		*n* = 41			

Table continues

Table 2 continued

Variable	Time 1	Time 2	Time 3	Time 4	Time 5
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Brief COPE –		1.77 (0.86)			
Self- Blame		*n* = 41			
Brief COPE –		1.07 (0.35)			
Substance abuse		*n* = 41			
Available in-group		4.47 (1.23)			
support		*n* = 73			
Available out-group		2.47 (1.29)			
support		*n* = 73			
Received support		2.49 (0.58)			
		n = 66			
SRQ – transcendent[9]	8.50 (8.94)				
	n = 76				
SRQ – linked[10]	29.67 (16.12)				
	n = 76				
Adjustment amount[11]	2.69 (0.81)				
	n = 80				

Table continues

[9] Higher scores indicate more traditional gender ideology
[10] Higher scores indicate more traditional gender ideology
[11] Higher scores indicate a smaller discrepancy between life in India and in the U.S.

Table 2 continued

Variable	Time 1	Time 2	Time 3	Time 4	Time 5
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Adjustment feelings[12]	3.34 (0.66)				
	n = 80				
Acad/fin concerns[13]	2.64 (0.78)				
	n = 80				

[12] Higher scores indicate more positive feelings about adjusting to life in the U.S.
[13] Higher scores indicate greater academic and financial concern

Table 3

Intercorrelations Between Mental Health and Acculturation for Times 1-5

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) T1 CES-D	1	.17	.37**	.21	.22	.03	-.09	-.01	-.29*	-.14	-.07
		n = 76	*n* = 62	*n* = 52	*n* = 57	*n* = 79	*n* = 56	*n* = 50	*n* = 79	*n* = 56	*n* = 50
(2) T2 CES-D		1	.72**	.29*	.55**	-.01	-.16	-.21	-.18	-.12	-.02
			n = 59	*n* = 49	*n* = 53	*n* = 73	*n* = 53	*n* = 47	*n* = 73	*n* = 53	*n* = 47
(3) T3 CES-D			1	.51**	.52	.15	-.09	-.16	-.18	-.34**	-.24
				n = 48	*n* = 52	*n* = 60	*n* = 56	*n* = 46	*n* = 60	*n* = 56	*n* = 46
(4) T4 CES-D				1	.48	.03	-.03	-.35*	.11	-.02	-.06
					n = 49	*n* = 51	*n* = 47	*n* = 43	*n* = 51	*n* = 47	*n* = 43
(5) T5 CES-D					1	-.05	-.09	-.33*	-.17	-.08	-.25
						n = 55	*n* = 49	*n* = 50	*n* = 55	*n* = 49	*n* = 50

Table continues

Table 3 continued

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(6) T1 AAMAS-CO						1	.70**	.73**	.06	-.08	-.04
							n = 55	*n* = 49	*n* = 79	*n* = 55	*n* = 49
(7) T3 AAMAS-CO							1	.77**	.11	.21	.07
								n = 43	*n* = 55	*n* = 56	*n* = 43
(8) T5 AAMAS-CO								1	-.04	-.04	.01
									n = 49	*n* = 43	*n* = 50
(9) T1 AAMAS-EA									1	.51**	.44**
										n = 55	*n* = 49
(10) T3 AAMAS-EA										1	.73**
											n = 43
(11) T5 AAMAS-EA											1
											n = 51

Note. T = Time point; AAMAS-CO = Acculturation to Culture of Origin; AAMAS-EA = Acculturation to European American culture.

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

Table 4

Intercorrelations Among Predictor Variables

	Predictor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
T1 AAMAS	(1) CO	1	.06	.27	.38*	.24	.14	.17	-.14	-.05	.19	-.05	.12	-.05	.19	.04	.11	-.02
	n =	79	79	41	41	41	41	41	41	75	69	69	64	75	75	79	79	79
	(2) EA		1	-.07	-.14	-.02	-.13	.19	-.32*	-.06	-.15	.18	.44**	-.12	-.19	.18	.25*	-.23*
	n =		79	41	41	41	41	41	41	41	69	69	69	75	75	79	79	79
T2 CCS	(3) Socact			1	.40**	.60**	.34*	-.06	-.15	.19	.07	-.10	.01	.05	.15	-.10	.08	.15
	n =				41	41	41	41	41	41	41	41	39	41	41	41	41	41
	(4) Intcul				1	.58**	.29	.14	.04	.06	-.10	-.04	.22	-.15	-.05	.13	.11	-.11
	n =				41	41	41	41	41	41	41	41	39	41	41	41	41	41
	(5) Reluni					1	.43**	.08	.06	.16	.03	.08	.05	-.05	.11	.25	.12	.16
	n =					41	41	41	41	41	41	41	39	41	41	41	41	41
	(6) Fatal						1	.21	-.18	.02	.16	.13	.03	.25	.37*	.05	-.04	.19
	n =						41	41	41	41	41	41	39	41	41	41	41	41
T2 Brief COPE	(7) Relig							1	.27	-.25	.03	.04	.09	.08	.10	.00	.09	.08
	n =							41	41	41	41	41	39	41	41	41	41	41

Table continues

Table 4 continued

	Predictor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
T2 Brief COPE	(8) Self-blame								1	.14	-.17	-.21	-.25	-.06	.06	.17	.10	.24
	n =								41	41	41	41	39	41	41	41	41	41
	(9)SubAb									1	-.23	-.05	-.18	.05	-.09	.30	.12	.11
	n =									41	41	41	39	41	41	41	41	41
T2 Social Support	(10)Ingrpsup										1	.15	.25*	.05	.22	.17	.13	.01
	n =										72	72	66	67	67	69	69	69
	(11)Otgrpsup											1	.27	-.06	-.13	.16	.15	-.06
	n =											72	66	67	67	69	69	69
	(12) Recsup												1	-.15	-.13	.04	.18	-.30*
	n =												66	62	62	64	64	64
T1 SRQ	(13)Gentrans													1	.23*	.14	-.15	-.02
	n =													75	75	75	75	75
	(14) Genlink														1	.07	.14	.14
	n =														75	75	75	75
T1 Adjsize	(15) Adjamnt															1	.42**	-.16
	n =															79	79	79

Table continues

Table 4 continues

Predictor		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
T1 Size of Adjustment	(15) Adjamnt															1	.42**	-.16
	n =															79	79	79
	(16) Adjfeel																1	-.15
	n =																79	79
	(17) Acad/ fincon																	1
	n =																	79

Note. CO = Culture of Origin; EA = European American; Socact = Social Activity; Intcul = Intracultural Coping; Reluni = Relational Universality; Fatal = Fatalism; Relig = Religion; SubAb = Substance Abuse; Ingrpsup = In-group support; Otgrpsup = Out-group support; Recsup = Received support; Gentrans = Gender Transcendent; Genlink = Gender-Linked; Adjamnt = Adjustment Amount; Adjfeel = Feelings about Adjustment; Acad/fincon = Academic and financial concerns

† $p < .10$, * $p < .05$, ** $p < .01$

Table 5

Mental Health and Acculturation Group Trajectory Parameters

Variable, group (G), and description	Intercept	Slope	*p*-value	*n*
CES-D G1 “CONSISTENTLY GOOD”	3.42	-0.09	0.78	22
CES-D G2 IMPROVING”	9.53	-0.68	0.01	46
CES-D G3 “WORSE”	7.55	1.48	0.001	14
CES-D G4 “INCONSISTENT”	22.67	2.0	0.47	1
ACC-CO G1 “LOW”	3.45	0.05	0.57	3
ACC-CO G2 “MID”	4.63	-0.02	0.56	25
ACC-CO G3 “HIGH”	5.32	0..02	0.44	33
ACC-EA G1 “DECREASING”	3.86	-0.31	0.001	4
ACC-EA G2 “INCREASING”	3.78	0.09	0.01	21
ACC-EA G3 “LOW”	3.53	-0.002	0.94	28
ACC-EA G4 “HIGH”	4.56	0.06	0.28	8

Table 6

Mean Scores of Time 1 and Time 2 Predictors of Mental Health Group Trajectories

Predictor	Subscale	CG	IMP	WORSE	*F*	Cohen's *d*		
		M (SD)	*M (SD)*	*M (SD)*		CG vs IMP	CG vs WORSE	IMP vs WORSE
T1 AAMAS	CO	4.99 (0.61)	4.94 (0.62)	4.93 (0.42)	0.08	0.08	0.11	0.02
		n = 21	*n* = 44	*n* = 14				
	EA	3.98 (0.64)	3.66 (0.49)	3.66 (0.47)	2.87†	0.56	0.57	0.00
		n = 21	*n* = 44	*n* = 14				
T2 CCS	Social	4.10 (1.51)	3.77 (1.89)	4.11 (1.00)	0.21	0.19	-0.01	-0.22
	activity	*n* = 6	*n* = 24	*n* = 11				
	Intracultural	4.40 (1.34)	3.27 (1.74)	4.11 (1.00)	1.69	0.73	0.25	-0.59
	coping	*n* = 6	*n* = 24	*n* = 11				
	Relational	3.70 (1.04)	3.06 (1.70)	3.91 (1.60)	0.57	0.45	-0.16	-0.51
	universality	*n* = 6	*n* = 24	*n* = 11				

Table continues

Table 6 continued

Predictor	Subscale	CG	IMP	WORSE	*F*	Cohen's *d*		
		M (SD)	*M (SD)*	*M (SD)*		CG vs IMP	CG vs WORSE	IMP vs WORSE
T2 CCS	Fatalism	3.83 (2.02)	3.62 (1.52)	4.04 (0.97)	0.31	0.11	-0.13	-0.33
		n = 6	*n* = 24	*n* = 11				
T2 COPE	Religion	2.17 (0.41)	1.88 (1.00)	2.00 (0.63)	0.30	0.38	0.32	-0.24
		n = 6	*n* = 24	*n* = 11				
	Self-blame	1.17 (0.26)	1.75 (0.85)	2.14 (0.95)	2.69†	-0.92	-1.39	-0.43
		n = 6	*n* = 24	*n* = 11				
	Substance	1.00 (0.00)	1.13 (0.45)	1.00 (0.00)	0.64	-0.41	0.00	0.41
	abuse	*n* = 6	*n* = 24	*n* = 11				
T2 Social	In-group	4.74 (1.15)	4.59 (1.19)	4.07 (0.73)	1.60	0.13	0.70	0.53
Support	support	*n* = 19	*n* = 39	*n* = 14				

Table continues

Table 6 continued

Predictor	Subscale	CG	IMP	WORSE	*F*	Cohen's *d*		
		M (SD)	*M (SD)*	*M (SD)*		CG vs IMP	CG vs WORSE	IMP vs WORSE
T2 Social	Out-group	2.89 (1.10)	2.56 (1.31)	1.79 (1.12)	3.41*	0.27	0.99*	0.63
Support	support	*n* = 19	*n* = 39	*n* = 14				
	Received	2.77 (0.65)	2.43 (0.56)	2.30 (0.41)	2.87†	0.56	0.86	0.26
	Support	*n* = 17	*n* = 28	*n* = 11				
T1 SRQ	Gender	4.33 (5.17)	9.27 (8.29)	9.62 (6.98)	3.56*	-0.72*	-0.86	-0.05
	transcendent	*n* = 21	*n* = 41	*n* = 13				
	Gender	23.67 (14.33)	29.05 (13.88)	37.46 (17.30)	3.57*	-0.38	-0.87*	-0.54
	linked	*n* = 21	*n* = 41	*n* = 13				
T1 Size of	Adjustment	3.14 (0.66)	2.55 (0.79)	2.43 (0.85)	5.23**	0.81*	0.93*	0.15
Adjustment	amount	*n* = 21	*n* = 44	*n* = 14				
	Adjustment	3.76 (0.44)	3.18 (0.66)	3.29 (0.61)	6.79**	1.03*	0.88†	-0.17
	feelings	*n* = 21	*n* = 44	*n* = 14				

Table continues

Table 6 continued

Predictor	Subscale	CG *M (SD)*	IMP *M (SD)*	WORSE *M (SD)*	*F*	Cohen's *d* CG vs IMP	Cohen's *d* CG vs WORSE	Cohen's *d* IMP vs WORSE
T1 Size of Adjustment	Academic/ financial concerns	2.39 (0.89) *n* = 21	2.67 (0.68) *n* = 44	2.80 (0.76) *n* = 14	1.49	-0.35	-0.50	-0.18
	City type adjustment	-	-	-	χ^2 = 0.70	-	-	-

Note. CG = CONSISTENTLY GOOD; IMP = IMPROVING

†p<.10, * p < .05, ** p < .01

Table 7

Predictors of Mental Health at Time 5 and of Changes in Mental Health Over Time Points 1-5: HLM Model

Predictor (Time measured)	Coefficient predicting Time 5 CES-D *b (SE)*	Coefficient predicting CES-D slope *b (SE)*
T1 AAMAS – CO	-0.06 (1.14)	-0.02 (0.31)
T1AAMAS – EA	-1.88 (1.32)	0.18 (0.36)
Times 1-5 AAMAS – CO slope	-1.08 (1.45)	-0.16 (0.43)
Times 1-5 AAMAS – EA slope	-2.13 (1.74)	0.06 (0.43)
T2 CCS – Social activity	0.34 (0.42)	0.14 (0.14)
T2 CCS - Intracultural coping	-0.47 (0.53)	-0.02 (0.16)
T2 CCS – Relational universality	0.46 (0.57)	0.19 (0.17)
T2 CCS – Fatalism	0.70 (0.56)	0.21 (0.17)
T2 Brief COPE – Religion	0.69 (0.77)	0.28 (0.25)
T2 Brief COPE – Self-blame	2.65* (1.02)	0.39 (0.31)

Table continues

Table 7 continued

Predictor (Time measured)	Coefficient predicting Time 5 CES-D *b (SE)*	Coefficient predicting CES-D slope *b (SE)*
T2 Brief COPE – Substance abuse	-0.26 (2.85)	-0.46 (0.85)
T2 Available in-group support	-1.66* (0.70)	-0.03 (0.83)
T2 Available out-group support	-1.72** (0.63)	-0.29 (0.18)
T2 Received support	-3.45* (1.16)	-0.23 (0.33)
T1 SRQ-transcendent	0.15** (0.05)	0.02† (0.01)
T1 SRQ – linked	0.30* (0.12)	0.05† (0.03)
T1 Adjustment amount	-0.85 (0.86)	0.35 (0.29)
T1 Adjustment feelings	-1.35 (1.26)	0.53† (0.28)
T1 Academic/financial concerns	2.09† (0.86)	0.09 (0.24)

†p<.10, * p < .05, ** p < .01

Table 8

HLM Model Parameters for Gender x Predictor Interaction Coefficients for Mental Health at Time 5 and for Changes in Mental Health Over Time Points 1-5

Predictor	Interaction coefficient predicting Time 5 CES-D *b (SE)*	Interaction coefficient predicting CES-D slope *b (SE)*
T1 AAMAS – CO x Gender	3.47 (1.76)†	0.78 (0.47)†
T1 AAMAS – EA x Gender	6.70 (2.37)**	1.29 (0.55)†
T1-T5 AAMAS – CO slope x Gender	4.83 (2.48)†	1.65 (0.78)*
T1-T5 AAMAS – EA slope x Gender	7.32 (2.98)*	1.92 (0.76)*
T2 CCS – Social activity x Gender	-0.20 (0.85)	0.02 (0.24)
T2 CCS – Intracultural coping x Gender	0.06 (1.01)	0.05 (0.24)
T2 CCS – Relational universality x Gender	0.07 (0.97)	0.20 (0.29)
T2 CCS – Fatalism x Gender	-0.99 (0.93)	-0.15 (0.26)
T2 Brief COPE – Religion x Gender	-2.64† (1.50)	-0.22 (0.63)

Table continues

Table 8 continued

Predictor	Interaction coefficient predicting Time 5 CES-D *b (SE)*	Interaction coefficient predicting CES-D slope *b (SE)*
T2 Brief COPE – Substance abuse x Gender[14]	N/A	N/A
T2 Brief COPE – Self-blame x Gender	-3.31 (1.59)*	-0.58 (0.44)
T2 Availability of in-group support x Gender	2.11 (1.17)†	0.48 (0.33)†
T2 Availability of out-group support x Gender	1.46 (1.07)	0.32 (0.34)
T2 Received support x Gender	2.80 (2.55)	0.35 (0.74)
T1 SRQ – transcendent x Gender	-0.45 (0.13)**	-0.06 (0.04)
T1 SRQ – linked x Gender	-0.19 (0.10) †	-0.02 (0.03)
T1 Adjustment amount x Gender	3.67 (1.47)*	1.20 (0.50)*
T1 Adjustment feelings x Gender	4.22 (1.85)*	1.07 (0.43)*
T1 Academic/financial concerns x Gender	0.38 (1.81)	-0.28 (0.56)

†p<.10, * p < .05, ** p < .01

[14] There is only item in the substance abuse scale, and there was limited variability in the responses. An HLM model including gender as a moderator was unable to be estimated due to possible collinearity among predictors. Upon further examination, it was found that all women who answered the item answered it with the same response of "I haven't been doing this at all." Due to the collinearity between gender and item response, this HLM analysis was considered invalid and was not pursued further.

Figure 1: Indian International Students' Determinants of Mental Health

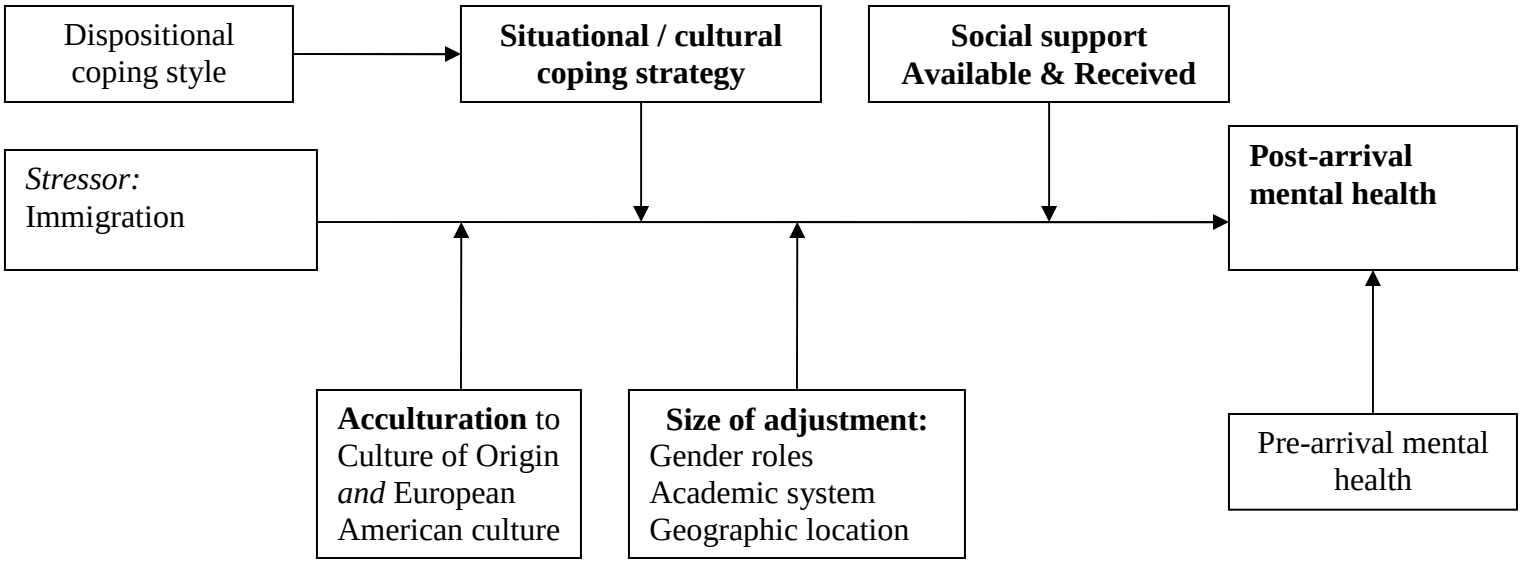


Figure 2: Mental Health Group Trajectories

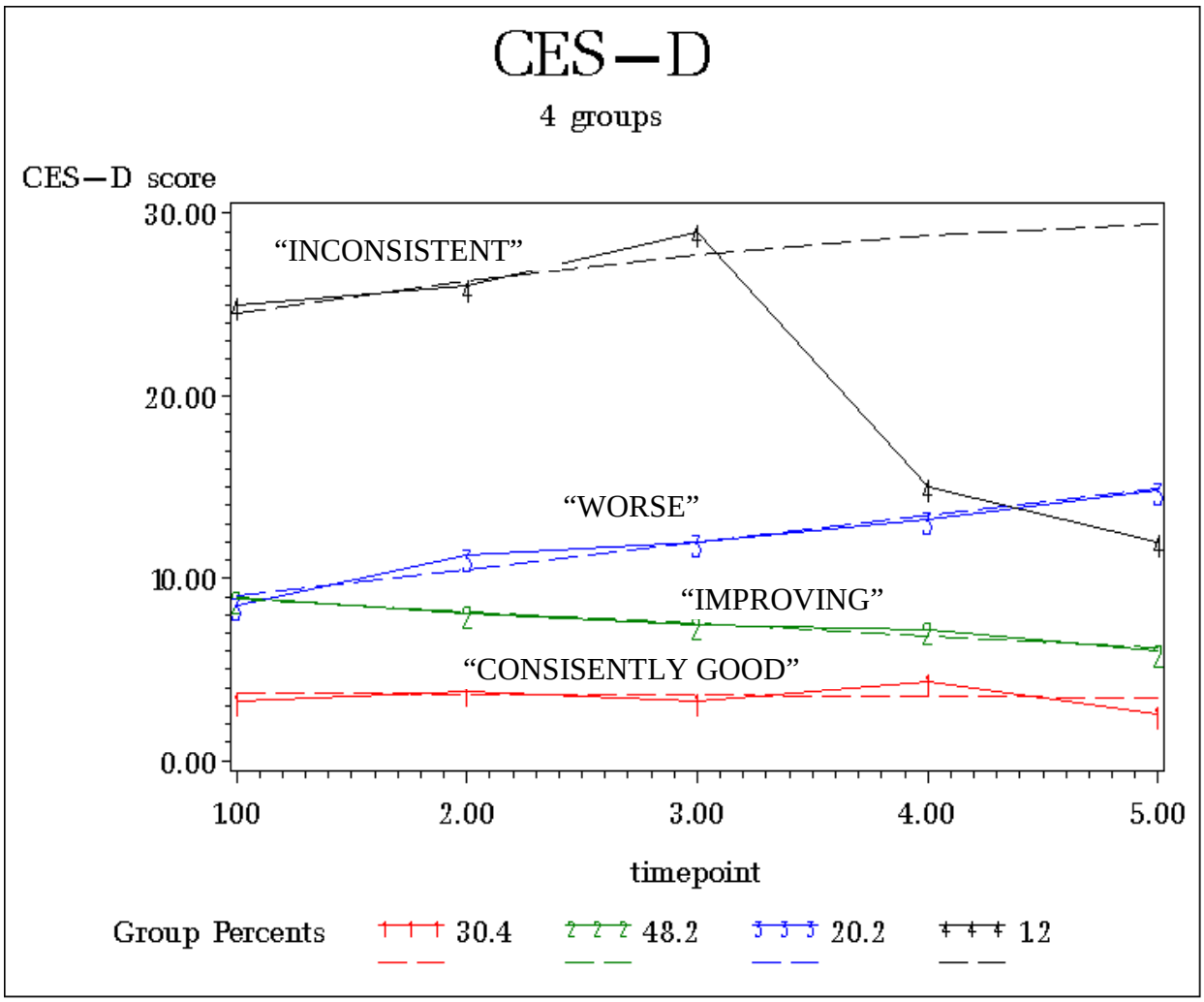


Figure 3: Acculturation: Culture of Origin-group Trajectories

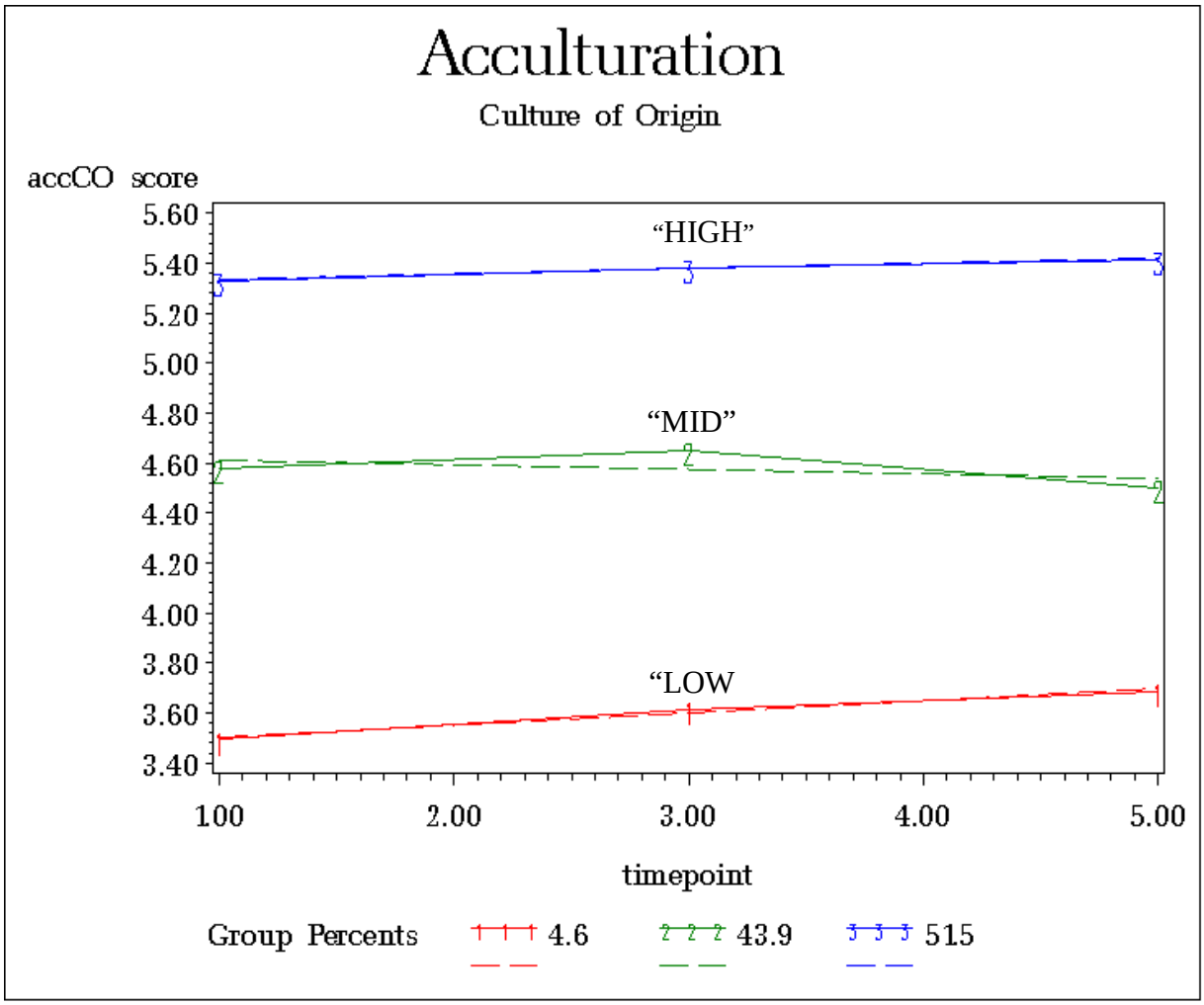
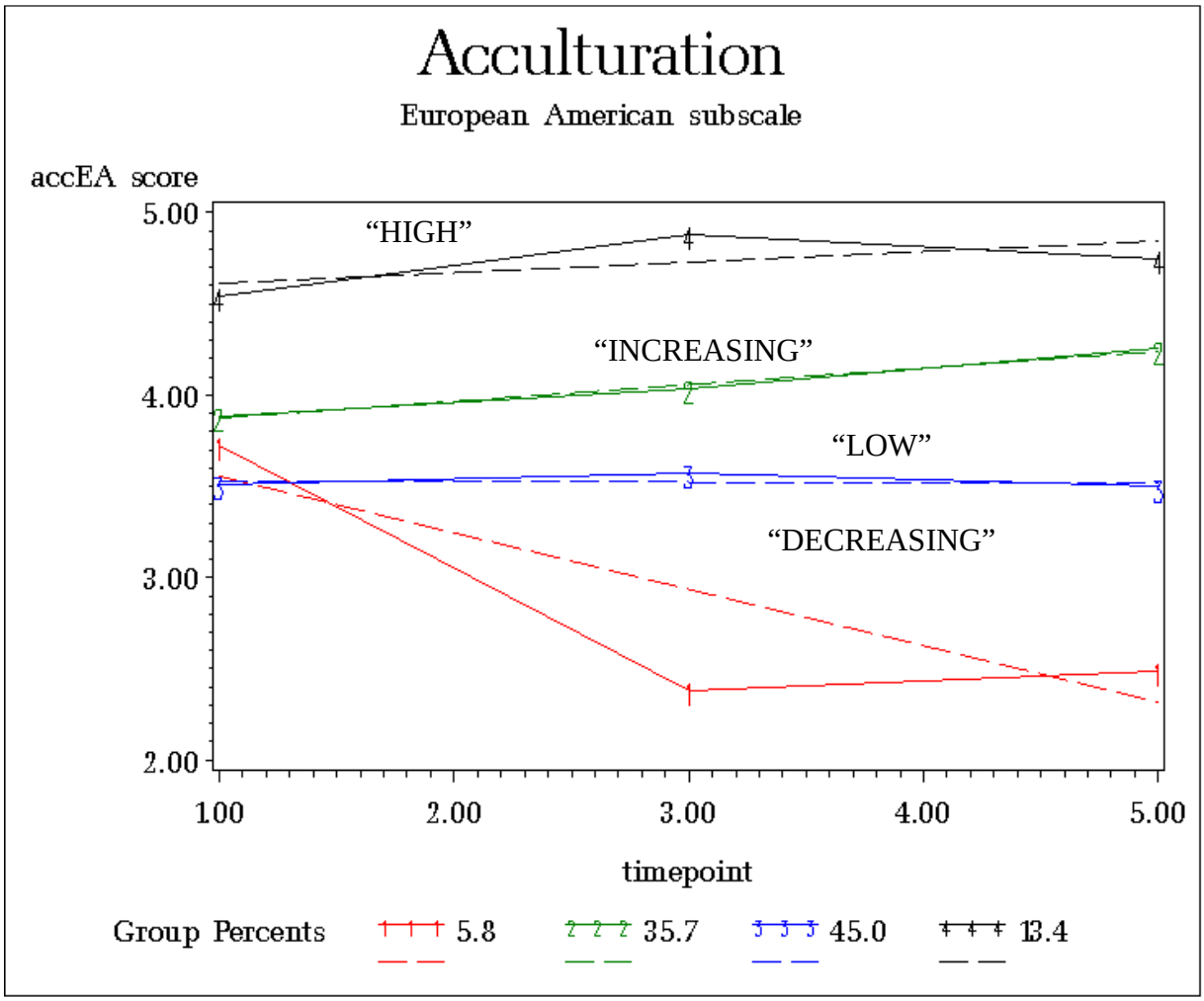


Figure 4: Acculturation: European-American Group Trajectories



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