Title

Assessing Acculturation Over Time: A Four-Year Prospective Study of Asian American Young Adults

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Methods matter: Theory and analysis in the study of acculturation

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Keywords: acculturation, measurement, smoking initiation, college students, prospective study, growth modeling

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Abstract

Acculturation is commonly defined as a dynamic and multidimensional process in which individuals and groups change over time when coming into contact with another culture. However, there is little research assessing changes in acculturation through prospective study designs. The current study examines stable and dynamic dimensions of acculturation within a 4-year prospective study of 433 Chinese- and Korean-American college students. Growth model analyses revealed differences in change between the stable and dynamic items of acculturation as well as generational differences in acculturation change scores. The findings have implications for further development of acculturation measures and research methodologies.

Keywords: acculturation, measurement, college students, prospective study, hierarchical linear modeling

Methods matter: Theory and analysis in the study of acculturation

Acculturation is commonly defined as a dynamic process in which individuals and groups change over time when coming into contact with another culture. Despite a considerable rise in research on the topic, acculturation has proven to be a challenging construct to elucidate and assess. Research on acculturation is criticized for a host of concerns, such as lack of methodological rigor, weak and variable definitions of acculturation and culture, and inconsistent subscales identified across proposed measures (Castro & Murray, 2009; Hunt, Schneider, & Comer, 2004). Moreover, there have been contradictory findings across studies given the varying instruments and approaches employed.

A key issue largely missing from the research to date is how aspects of acculturation change in the years following migration and across generations. Acculturation is frequently defined as a dynamic process; however, there are few longitudinal examinations of how beliefs, attitudes and behaviors change over time. Instead, research most commonly uses measures of acculturation assessed at baseline to predict cross-sectional or, less commonly, prospective outcomes. Longitudinal data are necessary to test changes in acculturation. While growth modeling and longitudinal designs have been used consistently with other psychological constructs (e.g., personality and developmental research) to examine changes over time, there has been minimal use of these methods in studies of acculturation.

In a literature review only three recent articles were identified which examined acculturation prospectively (Juang & Cookston, 2009; Knight et al., 2009; Miller, Wang, Szalacha, & Sorokin, 2009). Only one of these studies (Miller et al., 2009) directly tested whether there were changes in aspects of acculturation and found varying levels of change for adult immigrant women from the former Soviet Union across different aspects of acculturation (American behavior,

Russian behavior, English language proficiency, and cultural generativity) over a 4-year period. These findings underscore the importance of extending acculturation research and theory to examine changes over the lifespan with implications for impacts on health and wellbeing for those who migrate (Fuligni, 2001).

Like other bodies of research, most acculturation research is plagued by concerns of using "between-person designs to address inherently within-person questions" (Tennen, Affleck, Armeli & Carney, 2000; p. 626). Therefore, greater attention to trajectories of change may be useful for identifying acculturative *processes* and how they are linked to health. This has been a powerful tool in other areas of research, such as examining responses to trauma over time (Bonanno, 2004) and recommended by acculturation researchers as well (Fuligni, 2001).

The current analyses build upon prior studies of acculturation by examining data from a four-year prospective study with Chinese- and Korean-American university students. The years while in university, between the ages of 18 and 22 for the traditional-aged students in this study, are formative, with many young adults experiencing challenges to their identities, behaviors and beliefs. While acknowledging the limitations of using a uni-dimensional measure of acculturation (Marin & Gamboa, 1996), the current analyses examine the importance of examining acculturation over time and have implications for future acculturation research. The study uses growth models to examine changes in acculturation scores within a four-year prospective study.

Method

Sample

A total of 433 participants (209 male, 224 female) completed the current study, including 223 Chinese- and 210 Korean-American university undergraduate students attending a public university in the southwestern United States. Participants (*M* age = 18.2 years, SD = 0.32) reported

primarily being either first- (n = 172) or second-generation (n = 244) of their family in the United States. The majority of participants (n = 305 participants, 70.4%) reported English was not their first language. A previous publication provides additional information on the sample, study design and other measures incorporated in the original study (Myers, Doran, Trinidad, Klonoff & Wall, 2009). The Institutional Review Board at the sponsoring institution approved the study and all participants provided informed consent before being included in the study.

Design

Data for the current study come from a four-year prospective study of cigarette smoking initiation and progression among undergraduate university students. Data were collected at baseline during students' first year of enrollment at the university and at three subsequent annual time-points between 2001 and 2006.

Measures

Variables included in the current analyses include ethnicity, gender, and generational status. The variable capturing years lived in the U.S. is also included for 1st generation students. In addition, there are four time points of data on the 21-item Suinn-Lew Asian Self Identity Acculturation Scale (SL-ASIA; Suinn, Ahuna, & Khoo, 1992). The scale provides a 5-point Likert scale in which a score of 1 indicates greater identification with Asian culture (e.g., "prefer to speak Asian only") and a score of 5 indicates greater identification with U.S. culture (e.g., "prefer to speak English only"). A score of 3 indicates biculturalism (e.g., "prefer to speak Asian and English about equally well"). In the original validation of the scale, Suinn and colleagues reported high internal reliability for the total scale (α = .91). The internal reliability for the total scale was slightly lower in the current sample (α = .85).

Analyses

Because the focus of the study is to examine changes in acculturation over time, the first step was to examine the 21 items of the SL-ASIA to determine whether or not each item addressed attitudes, beliefs or behaviors that could potentially change over time. For example, generational status and childhood friends (reported in adulthood) represent stable characteristics. However, given the nature of other items such as food and music preferences, one would anticipate they might change over time. Changes in these attitudes, beliefs and behaviors are inherent to the commonly used definition of acculturation. However, one item in the SL-ASIA scale includes aspects that could be either stable or dynamic. Response options for "What contact have you had with Asia?" include options like "raised one year or more in Asia," "lived less than one year in Asia," or "occasional visits to Asia." Some of the response options represent past and therefore stable characteristics whereas other response options (e.g., visits and communications with individuals living in Asia) potentially change over time. Therefore, this item was dropped from subsequent analyses leaving 4 Stable subscale items and 16 Change subscale items based on the authors' classification of the items. Table 1 lists all items categorized under each subscale. The Change subscale had adequate reliability (Cronbach's alpha = 0.832) and the Stable subscale had lower reliability (Cronbach's alpha = .695), likely due to consisting of a smaller subset of items. A Confirmatory Factor Analysis (CFA) conducted using MPLUS (Version 5.1) statistical software supported adequate fit for a two-factor solution (Stable and Change).

[INSERT TABLE 1 HERE]

Next, growth models were tested using PASW (Version 18). There was evidence that the assumptions underlying the analysis were met (Tabachnick & Fidell, 2007). Participants were assessed annually providing 1,583 assessments, with 79.5% of the sample completing all four assessments, 8.3% completing three assessments, 9.7% completing two assessments, and 2.5%

completing one assessment. Given the small number of students reporting higher than 2nd generational status (n = 17), we included only the 1st and 2nd generation students (n = 416) in the generational comparisons. Data are assumed to be *missing at random* (MAR). Therefore, all data available are used in the current analyses using maximum likelihood (ML) estimation, in which ML will efficiently use all available time points to estimate the model (Raudenbush & Bryk, 2002). Using the Change and Stable subscales, growth model analyses were conducted to examine changes in acculturation scores over time. The data were stratified by generational status given we anticipated greater levels of change among first generation students as compared to second-generation students. Therefore, the item assessing generational status was dropped from the Stable subscale, leaving 3 items in that subscale for the growth model analyses. In addition, for first generation students the analyses included the number of years living in the United States as a predictor. This predictor is not applicable to second-generation students who were born in the U.S. Therefore, the second-generation model included only the time predictor to assess changes in each subscale across the four years in university.

Results

Mean Differences

Overall, there was a significant difference between first- (M Change = 3.00, SD = 0.43; M Stable = 2.53, SD = 0.75) and second-generation (M Change = 3.32; SD = 0.37; M Stable = 3.52, SD = 0.54) students in their total SL-ASIA Change [F (1, 414) = 64.16, p <.001; η^2= .134] and Stable [F (1, 414) = 243.84, p <.001; η^2= .371] subscales when comparing the year 1 data. The generational differences accounted for significant differences across the two subscales, which further supported the decision to stratify the data by generational status. Comparisons of mean differences also identified differences between Chinese (M Change = 3.23, SD = 0.42; M Stable =

2.77, SD = 0.68) and Korean (M Change = 3.15, SD = 0.43; M Stable = 2.70, SD = 1.7) students on the Change [F (1, 414) = 3.85, p = .050; η^2= .009] but not the Stable subscale [F (1, 414) = 1.34, p = .247; η^2= .003] when comparing the year 1 data. Given the small amount of variance accounted for by nationality (<1%) and the lack of *a priori* hypotheses on ethnic differences in change, nationality was not included in subsequent analyses. Also, there were no gender differences in the Change [F (1, 414) = .066, p= .797; η^2< 0.001] or Stable [F (1, 414) = .145, p= . 704; η^2< 0.001] subscales at the initial assessment. Therefore, subsequent analyses stratified by generational status only. Table 2 provides the mean scores by generation for each of the four years of assessment.

[INSERT TABLE 2 HERE]

Growth Model Analyses

Nested growth models were run sequentially, with comparisons of model fit for each step in the analysis to determine the best fitting model. Models were run first testing the effects of time (linear and quadratic with fixed and random effects each entered separately). Next, additional main effects were entered followed by interaction terms in the final model for first-generation analyses. Based on Chi-squared difference tests, the final models were selected for first- and second-generation students separately.

Second-generation students: Change subscale. In the final model there was no linear or quadratic change over time, (AIC = 4863.388), neither the linear (b = 0.096, 95% CI [-0.006, 0.199], t (225) = 1.847, p = .066) nor quadratic (b = 0.068, 95% CI [-0.110, 0.246], t (232) = 0.758, p = .449) time variables were significant. Participants did vary in their initial level of acculturation, there was significant variance in the intercept (Wald Z = 10.313, p <.001). Although there was no significant overall linear or quadratic slope there was variability associated with both

the linear slope coefficient (Wald Z = 5.684, p <.001), and quadratic slope coefficient (Wald Z = 3.091, p =.001). These significant variances highlight significant individual differences from the overall linear and quadratic slopes.

Second-generation students: Stable subscale. In the final model (AIC = 2723.33), neither the linear slope (*b* = -0.014, 95% CI [-0.041, 0.014], *t* (186) = -0.990, *p* = 0.323) nor quadratic slope (*b* = -0.024, 95% CI [-0.076, 0.029], *t* (231) = -0.893, *p* = 0.373) time variables significantly predicted the Stable subscale. There was significant variance in the intercept (Wald Z =1.913, *p* <.001), linear slope (Wald Z = 2.757, *p* <.01), and quadratic slope (Wald Z = 1.142, *p* = . 254). These significant variances highlight the significant individual variability in initial level of acculturation and in linear but not quadratic slopes

First-generation students: Change subscale. In the final model (AIC = 3463.482), the linear slope (*b* = 0.252, 95% CI [0.138, 0.366], *t* (153) = 4.378, *p* < .001) but not quadratic slope (*b* = -0.165, 95% CI [-0.384, 0.055], *t* (153) = -1.479, *p* = .141) significantly in predicted the Change subscale. There was also a significant effect for how long first-generation students had lived in the U.S. (*b* = 0.831, 95% CI [0.659, 1.002], *t* (175) = 9.547, *p* <.001). The longer first-generation students lived in the U.S. the more they identified with U.S. culture. There was significant variance in the intercept (Wald Z = 24.769, *p* <.001), linear slope (Wald Z = 3.542, *p* <.001), and quadratic slope (Wald Z = 2.227, *p* = .026). Students had different initial levels of acculturation, and the rate at which their acculturation changed also varied significantly.

First-generation students: Stable subscale. In the final model (AIC = 2108.68) the linear slope (*b* = 0.040, 95% CI [0.008, 0.073], *t* (310) = 2.449, *p* = .015) but not quadratic slope (*b* = -0.070, 95% CI [-0.156, 0.016], *t* (163) = -1.612, *p* = .109) was significant in predicting the Stable subscale. There was a significant effect for how long first-generation students had lived in

the U.S. (b = 0.397, 95% CI [0.352, 0.442], t (177) = 17.427, p <.001). The longer first-generation students lived in the U.S. the greater their acculturation toward U.S. culture. There was significant variance in the intercept (Wald Z = 8.104, p <.001) and quadratic slope (Wald Z = 2.359, p = . 018). The random effects for the linear slope were not tested in the final model as it had not significantly improved model fit in the earlier testing of the model. Models including interactions between the linear and quadratic time variables and years in the U.S. were also tested but did not significantly improve the model.

Discussion

The results from the current study highlight the importance of examining changes in acculturation over time and underscore a theoretically proposed but rarely evaluated notion that acculturation is dynamic. As predicted, first-generation students demonstrated greater changes in acculturation over the four years than second-generation students, with significant change occurring for items on the Change subscale and not the Stable subscale. These findings highlight that there are aspects of acculturation that may be more dynamic and aspects that are more stable over time and that our measures and analytic approaches need to be able to differentiate these unique aspects of acculturation for migrants at all stages of the acculturation process. In addition, there was significant individual variability in both slopes and intercepts, which underscores the importance of examining change prospectively and both within and between person analyses. These findings have both theoretical and practical implications.

The results from this and other studies (Miller et al., 2009) have implications for scale development. Psychometrics and scale development have strong foundations in which more stable items are preferred and/or retained (e.g., test-rest reliability), and therefore items are less likely to detect change. This has been a confounding issue in other areas of research where assessment of

change likely underestimates actual changes (Mroczek & Spiro, 2003). Therefore, current acculturation measures and assessment of change using those measures likely under-estimate real-life changes in cultural attitudes, beliefs, and behaviors. Moreover, our current measures, as demonstrated here, frequently combine both stable and dynamic aspects of acculturation that can confound examinations of change over time. Future studies would benefit from developing scales and items that better differentiate these characteristics and follow participants over time; linking specific acculturative changes, such as dietary habits or attitudes toward smoking, to the health topic at hand.

Adequate conceptualization and measurement of acculturation is important for many reasons, including the appropriate adaptation and effective implementation of health programs. Information on behavioral and cognitive preferences among immigrants can help health programs and providers to better target and tailor messages for their intended audience. It is also essential for examining the effectiveness of evidenced-based programs for implementation with diverse cultural groups across a range of acculturation (Castro, Barrera, & Holleran Steiker, 2010). Moreover, adequate information on how acculturation manifests over time will provide clarity to how quickly health behaviors change following migration in order to identify optimal time periods for intervention.

Limitations

There are several limitations with the current study, including the use of the SL-ASIA measure of acculturation. The measure does not separate identification with Asian and U.S. cultures as independent dimensions as is currently recommended in the acculturation literature. Therefore, it is difficult to ascertain the unique changes in each dimension in the current analyses.

Future studies should use scales that separate cultural identification in order to distinguish differential changes in cultural identification and practices for each culture.

In addition, the years while attending university represent a dynamic time period for many young adults. The current analyses provide some information on change that occurs among two groups of Asian-Americans; however, this may or may not generalize to other groups of immigrants, other settings, or different time-periods over the life course. The first generation participants in this study had lived in the U.S. for most of their lives (*M* years in the U.S. = 10.46, SD = 4.46 and *M* age = 18.1 years). Therefore, less change in some dimensions and potentially greater change in other dimensions would be expected than in more recent immigrants as well as among adult immigrants across the lifespan. Additional studies that examine changes in acculturation over the lifespan among other groups of adult immigrants are needed to better understand the context of acculturation and its processes with diverse groups in diverse settings.

Future Directions

Acculturation is a complex and challenging construct to assess. The focus here is on the importance of incorporating more research designs that allow us to look at within and between person changes. The field would benefit from increased use of longitudinal and experience sampling methods to examine how the dynamic process of acculturation unfolds over time and in real-time experiences. These approaches provide the opportunity to examine individual differences in intra-individual change to better address questions that have been assessed largely through cross-sectional data thus far. Other areas of research have laid a meaningful framework of methods and measures for acculturation researchers to follow.

Another important area for examination involves what items are to be included in acculturation measures. When using an acculturation measure in cross-sectional research, the

subscales that are more stable (e.g., generational status) may be more appropriate to include if hypothesized to relate to the study outcomes of interest. However, as demonstrated here, some items and subscales change over time and with exposure to the new culture. This leaves to question whether these items should be included in acculturation scales or if acculturation should be measured in two ways: one approach and set of items for cross-sectional research and another for longitudinal. If the goal of acculturation research is to capture changes over time as a function of interacting with the mainstream culture, then current acculturation measures may need to be reconstituted to include only items that we would expect to change when coming in contact with a new culture.

The current study assessed changes over a four-year period, which coincided with their time in university, an anticipated dynamic developmental period for young adults. However, it remains to be seen whether there are other developmental periods following migration that are expected to be more or less dynamic, for certain groups, in regard to specific dimensions of acculturation that might provide better indications or points of intervention for key health outcomes. Longitudinal and dynamic approaches that incorporate measures that allow us to answer the aforementioned questions are essential for advancing our understanding of acculturation.

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Table 1. SL-ASIA items classified under the Change and Stable subscales*

Change Subscale (α = .832[#])

1. What language can you speak?
2. What language do you prefer?
3. How do you identify yourself?
4. Which identification does (did) your mother use?
5. Which identification does (did) your father use?
8. Whom do you now associate with in the community?
9. If you could pick, whom would you prefer to associate with in the community?
10. What is your music preference?
11. What is your movie preference?
15. What is your food preference at home?
16. What is your food preference at restaurants?
17. Do you read only Asian/English language [better than/only]?
18. Do you write only Asian/English language [better than/only]?
19. If you consider yourself a member of the Asian group (whatever term you prefer), how much pride do you have in this group?
20. How would you rate yourself [Very Asian to Very Westernized]?
21. Do you participate in Asian occasions, holidays, traditions, etc.?

Stable Subscale (α = .695[#])

6. What was the ethnic origin of the friends and peers you had, as a child up to age 6?
7. What was the ethnic origin of the friends and peers you had, as a child from 6 to 18?
12. What generation are you?
13. Where were you raised?

*5-point Likert scale: 1 = greater identification with Asian culture (e.g.,“prefer to speak Asian only”) to 5 = greater identification with U.S. culture (e.g., “prefer to speak English only”). A score of 3 indicates biculturalism (e.g.,“prefer to speak Asian and English about equally well”).

Cronbach’s alpha (α) were calculated using Year 1 data only

Note. Item 14, “What contact have you had with Asia?” was dropped given response options included answers that may or may not change over time.

Table 2. Mean Change and Stable Subscale scores over the 4 years of assessment				
Change Subscale**				
	Year 1	Year 2	Year 3	Year 4
Total Change subscale	3.18 (0.43)	3.21 (0.40)	3.24 (0.39)	3.26 (0.39)
1st Generation	3.00 (0.43)	3.06 (0.43)	3.11 (0.40)	3.06 (0.40)
2nd Generation	3.32 (0.37)	3.32 (0.34)	3.33 (0.36)	3.36 (0.34)
Stable Subscale**				
Total Stable Subscale	3.11 (0.80)	3.14 (0.80)	3.18 (0.79)	3.12 (0.78)
1st Generation	2.53 (0.75)	2.62 (0.83)	2.68 (0.82)	2.64 (0.88)
2nd Generation	3.52 (0.54)	3.52 (0.51)	3.52 (0.54)	3.48 (0.56)
**Significant difference between 1st and 2nd generation scores on the Change and Stable subscales, $p < .001$.				