Is Acculturation Unidimensional or Bidimensional? A Head-to-Head Comparison in the Prediction of Personality, Self-Identity, and Adjustment

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The *unidimensional model* of acculturation posits that heritage and mainstream culture identifications have a strong inverse relation, whereas the *bidimensional model* posits that the 2 identifications are independent. The authors compared these models in 3 samples of ethnic Chinese (*ns* = 164, 150, and 204), 1 sample of non-Chinese East Asians (*n* = 70), and one diverse group of acculturating individuals (*n* = 140). Although the unidimensional measure showed a coherent pattern of external correlates, the bidimensional measure revealed independent dimensions corresponding to heritage and mainstream culture identification. These dimensions displayed patterns of noninverse correlations with personality, self-identity, and psychosocial adjustment. The authors conclude that the bidimensional model is a more valid and useful operationalization of acculturation.

The culture in which people live plays an important role in shaping their sense of self. Indeed, one facet of people's self-identity is that they belong to a certain cultural group. Thus, they have a sense of themselves as being, for example, Canadian, American, or Chinese. When an individual moves from one culture to another, many aspects of self-identity are modified to accommodate information about and experiences within the new culture. This process, generally referred to as *acculturation,* involves changes that take place as a result of continuous and direct contact between individuals having different cultural origins (Redfield, Linton, & Herskovits, 1936). Such changes may be observed in a number of different domains, including attitudes, behaviors, values, and sense of cultural identity. At a fundamental level, then, acculturation involves alterations in the individual's sense of self.

An examination of the extant literature on the acculturation process reveals two predominant formulations, which we term the

unidimensional model and the *bidimensional model.* The primary difference between these two approaches resides in how they treat the relation between the culture of birth or upbringing, referred to here as the *heritage culture,* and the predominant cultural environment, or *mainstream culture.* Unidimensional models are based on the implicit assumption that change in cultural identity takes place along a single continuum over the course of time. More specifically, acculturating individuals are seen as being in a process of relinquishing the attitudes, values, and behaviors of their culture of origin while simultaneously adopting those of the new society (Gans, 1979; Gordon, 1964). In contrast, theorists who adopt a bidimensional perspective argue that acculturation can be more completely understood when heritage and mainstream cultural identities are seen as being relatively independent of one another (e.g., Berry, 1997; Ramirez, 1984; Zak, 1973). Thus, individuals may adopt many of the values and behaviors of the mainstream culture without giving up facets of self-identity developed in their culture of origin. Although the relative merits and drawbacks of these two models have been commonly discussed and debated in the acculturation literature, they have never been systematically compared in the same samples. Direct comparison of these two models is therefore the major objective of this article.

The Unidimensional Perspective

The measurement of acculturation takes a step beyond the common practice of simply classifying individuals into different ethnocultural categories (Tweed, Conway, & Ryder, 1999). In the unidimensional approach to acculturation, individuals are placed on a continuum of identities ranging from exclusively heritage culture to exclusively mainstream culture. This perspective was first detailed by Gordon (1964), who developed an assimilation

model in which penetration into the mainstream culture is necessarily accompanied by "the disappearance of the ethnic group as a separate entity and the evaporation of its distinctive values" (Gordon, 1964, p. 81). More recently, some writers have proposed complex unidimensional models that are multifactorial with regard to domain. In other words, different aspects of cultural self-identity may proceed along the acculturation continuum at different rates, with the potential for overexaggeration of mainstream culture elements or even backtracking as a result of ethnic reaffirmation (e.g., Triandis, Kashima, Shimada, & Villareal, 1988).

This conception of acculturation as assimilation has informed much of the research on cultural change. The majority of such studies have used demographic variables, such as generational status, age at immigration, or years lived in the new country, as proxy measures of acculturation, with the underlying assumption being that individuals have more exposure and, consequently, greater adaptation to the mainstream culture with the passage of time. This process is seen as continuing across generations until, eventually, the descendants of immigrants are culturally indistinguishable from the dominant group. Such an approach has proven valuable in examining a number of topics, such as the personality characteristics of different cultural groups. Thus, one discovers, for example, that recent Chinese immigrants to North America have personality profiles that closely resemble those found in Hong Kong, whereas later-generation Chinese have profiles that are similar to those of North Americans, suggesting a predominantly cultural, rather than biological, origin for basic personality (McCrae, Yik, Trapnell, Bond, & Paulhus, 1998).

Although rudimentary demographic indicators are a simple and often useful means of going beyond cultural categories, they fail to account for numerous individual differences and other factors affecting the rate of adaptation to the new culture, such as premigration exposure to the mainstream culture, residence in an ethnic neighborhood, willingness to seek language education, and frequency of contact with individuals from the mainstream culture. To address these shortcomings, a number of researchers have developed self-report instruments designed to assess *psychological acculturation* as an individual-differences measure. In the case of Asian acculturation to North America, the most widely used instrument is the Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA; Suinn, Ahuna, & Khoo, 1992; Suinn, Rickard-Figueroa, Lew, & Vigil, 1987), which presupposes a unidimensional construct that ranges from highly traditional at one pole, through biculturalism at the midpoint of the scale, to highly assimilated at the other pole. Thus, these researchers have elucidated the unidimensional construct by explicitly including biculturalism as the midpoint between heritage culture and mainstream culture identification (Suinn, Khoo, & Ahuna, 1995). The SL-ASIA has been widely used in studies involving Chinese immigrants and has yielded a number of important findings relating to adjustment and mental health (e.g., Davis & Katzman, 1999; Gim, Atkinson, & Whiteley, 1990; Iwamasa & Kooreman, 1995; Lai & Linden, 1993; Paulhus & Duncan, 1998; Tata & Leong, 1994).

The Bidimensional Perspective

In contrast to the unidimensional perspective, several theorists have conceived of acculturation as a process in which both heritage and mainstream cultural identities are free to vary independently (e.g., Berry, 1980; Celano & Tyler, 1990; LaFramboise, Coleman, & Gerton, 1993; Laroche, Kim, Hui, & Joy, 1996; Sayegh & Lasry, 1993; Sanchez & Fernandez, 1993; Zak, 1973). Such models are based on two core assumptions. First, the model presupposes that individuals differ in the extent to which self-identity includes culturally based values, attitudes, and behaviors. Culture may play a large role in the identities of some individuals, whereas others may base their identity more on factors such as occupation or religion. Second, individuals are capable of having multiple cultural identities, each of which may independently vary in strength.

If the assumptions of the bidimensional model are correct, continued use of a unidimensional approach could provide an incomplete, even misleading, picture of acculturation. For example, unidimensional instruments would be unable to distinguish a bicultural individual who strongly identifies with both reference groups from one who does not strongly identify with either group (Mavreas, Bebbington, & Der, 1989; Szapocznik & Kurtines, 1980). Both of these individuals would end up at the midpoint of a unidimensional scale. It seems likely, however, that people who have a well-developed bicultural identity would differ in important ways from those for whom cultural identity is not a particularly salient aspect of their self-schemas. Similarly, if a dependent variable were to be strongly associated with both cultural identities, the two effects would probably cancel each other out and remain invisible to unidimensional instruments. In theoretical terms, the unidimensional perspective fails to consider alternatives to assimilation, such as the emergence of integrated or bicultural identities (Dion & Dion, 1996). Nevertheless, the extent to which these concerns represent serious problems for the unidimensional approach depends, in large part, on the empirically observed relation between heritage and mainstream identities. If the correlation between these identities is strongly negative, the aforementioned problems are not likely to apply. Conversely, if the relationship is orthogonal, the use of a unidimensional model could lead to potentially serious misreadings of acculturation data.

The most widely researched bidimensional approach to acculturation has been John Berry's *acculturation framework*. Berry (1980, 1984; see Berry, 1997, for a review) observed that acculturating individuals are faced with two fundamental questions: "Is it of value to maintain my cultural heritage?" and "Is it of value to maintain relations with other groups?" The responses to these questions guide the individual's adoption of a particular acculturation strategy. Although the Berry framework is based on a bidimensional model, he conceptualized four distinctive "acculturation strategies" based on the quadrants defined by these two dimensions, which are then assessed with separate subscales. *Integration* involves maintaining cultural heritage while endorsing intergroup relations; *assimilation* involves relinquishing cultural heritage and adopting the beliefs and behaviors of the new culture; *separation* involves maintenance of heritage culture without intergroup relations; and *marginalization* involves nonadherence to either old or new culture.

Although this methodology has yielded a number of studies that have enriched understanding of acculturative processes, it has been criticized on a number of conceptual and methodological grounds (e.g., Flannery, 1998; Rudmin, 1996). For example, the theoretically interdependent nature of the scales implies that a high score on one scale should be accompanied by low scores on the other

three. However, reported scale intercorrelations vary wildly and frequently contradict theoretical expectations (e.g., see Berry, Kim, Power, Young, & Bujaki, 1989; Rudmin, 1996).

A few researchers, including Berry (e.g., Dona & Berry, 1994), have taken a somewhat different approach by measuring the two dimensions separately. Lasry and Sayegh (1993) asked participants to respond to two questions regarding strength of ethnic identity for heritage culture and mainstream culture. Similarly, Suinn added four experimental items to the SL-ASIA that reflect a bidimensional perspective in two domains, cultural values and interpersonal competencies (R. M. Suinn, personal communication, October 3, 1994). Both of these methods then require dichotomization of the two dimensions to yield the four acculturation strategies, an approach that Berry (1998) has criticized for failing to adequately capture the unique characteristics of the four strategies. On the other hand, if one is more interested in the underlying two dimensions, this method may be the best way to explore some of the core assumptions of the bidimensional model, such as orthogonality. It should also be noted that it is not necessary, or even desirable, to dichotomize these dimensions into high and low acculturation to capture this important new information.

Another reason to posit a bidimensional structure to cultural identity is the growing body of literature on the way in which individuals construe the self in a social context (Markus & Kitayama, 1991; Singelis, 1994; Triandis, 1989). Recent work indicates that the separate measures of the independent and interdependent aspects of the self have an orthogonal relationship (Kashima et al., 1995; Singelis, 1994). Although this work has important conceptual and practical implications, it deals primarily with the self in relation to other people, whereas the study of acculturation typically focuses on the individual's broader attitudinal and behavioral responses to culture in general. Nonetheless, this bidimensional approach to the self provides additional support for the notion that core constructs that vary across cultures may display an independent, rather than an inverse, relationship.

Whereas the unidimensional model provides a parsimonious approach to acculturation, the bidimensional model is broader and potentially more inclusive. The relative advantages of the two models depend in large part on the observed empirical relationship between the heritage and mainstream dimensions of acculturation. We thus argue throughout this article that the utility of the bidimensional model can be established only if the two dimensions (a) can be measured reliably, (b) correlate in expected directions with key third variables (i.e., demonstrate concurrent validity), (c) are orthogonal (or at least are not strongly negatively correlated), and (d) show a distinct pattern of correlations with other variables of interest. Although there has been much debate in the acculturation literature, to date there is no published empirical work directly comparing the unidimensional and bidimensional perspectives. In this article, we report three studies that empirically assessed the two models and directly compared their advantages and limitations. The first study compared these two models in the domain of personality in a Chinese sample; the second study examined the models in the contexts of self-construal and psychosocial adjustment, also in a Chinese sample; and the third study replicated the findings of Study 2 in both Chinese and multiple non-Chinese samples.

Study 1

The goal of Study 1 was to conduct a preliminary investigation of the validity and utility of the bidimensional model and to compare it with the well-established unidimensional model in the context of basic personality traits. An important consideration in this comparison is the degree of association between the heritage and mainstream dimensions of cultural identity. Using items developed by Suinn (personal communication, October 3, 1994), we assessed acculturation on separate heritage identification and mainstream identification subscales. We reasoned that a strong negative correlation between the two subscales would support the unidimensional model and challenge one of the core assumptions of the bidimensional model. On the other hand, if the two subscales were found to be relatively independent, it would still be necessary to demonstrate that each has a coherent set of correlates.

One key set of correlates is basic personality traits. Despite the common perception of personality as stable and unchanging, there is some evidence to suggest that cultural change may be sufficient to cause corresponding changes in personality in the direction of the mainstream culture. McCrae and colleagues (1998) demonstrated that, after migration and over the course of time and generations, personality profiles of Chinese individuals increasingly resembled those of the mainstream culture. Accordingly, in Study 1, we included measures of the Big Five dimensions of personality. The unidimensional model would be favored if the Heritage and Mainstream subscales showed an inverse pattern of correlates with personality, whereas a coherent, independent set of correlates for each subscale would support the bidimensional model. Thus, examining personality correlates provides an important context in which to compare the two models.

Method

Participants

The sample for Study 1 consisted of 109 female and 55 male undergraduate volunteers, ranging in age from 17 to 23 years ($M = 18.40$, $SD = 1.12$), who identified themselves as having Chinese ancestry. There were 97 first-generation and 67 second-generation individuals of Chinese descent within the sample. Following Suinn and colleagues (1987), the first generation was defined as individuals born in a country with a predominantly Chinese culture, whereas individuals classified as second generation were born in a Western, English-speaking country. Participants received a cover letter describing the purpose of the study, assuring confidentiality, and offering extra course credit in exchange for completing the questionnaires.

Measures

Unidimensional measure. The SL-ASIA (Suinn et al., 1987, 1992), a widely used acculturation measure for Asian Americans, was used to assess unidimensional acculturation, or assimilation. The SL-ASIA is a 21-item multiple-choice questionnaire that covers topics such as cultural preferences, ethnic identity, friendship choice, language, history, and attitudes (Suinn et al., 1987). Each item has five possible numbered responses, ranging from low acculturation with high Asian identity (1.00) to high acculturation with low Asian identity (5.00). Midrange items are designed to reflect degrees of biculturalism. The wording of certain items on the SL-ASIA was altered to reflect the Canadian context of this study, specifically, each occurrence of "United States" was changed to "Canada/U.S." The Cronbach alpha coefficient for this sample was .90.

Bidimensional measure. To separately measure heritage and main-stream acculturation, we used two experimental subscales based on items proposed by Suinn (personal communication, October 3, 1994). Each subscale contains two items, one dealing with values and the other dealing with social interactions; items are rated on a 5-point scale. The psycho-metric properties of this bidimensional acculturation measure are reported here as substantive findings.

Big Five Inventory (BFI). The BFI (John, Donahue, & Kentle, 1991) is a 44-item scale designed to measure five primary personality factors: (a) agreeableness, (b) conscientiousness, (c) extraversion, (d) neuroticism, and (e) openness to experience. Many theorists believe that these factors represent the basic underlying dimensions of human personality (e.g., Costa & McCrae, 1992; Goldberg, 1993). Items were rated on a 5-point scale. Cronbach alpha coefficients for this sample were .77, .76, .84, .85, and .82, respectively.

Results

Bidimensional Acculturation

Reliability of the provisional bidimensional measure of accul-turation was assessed via Cronbach alpha coefficients; these coef-ficients were .53 for the Heritage subscale and .37 for the Main-stream subscale. Internal structure, specifically orthogonality, was explored by correlating the two subscale scores, which yielded a subscale intercorrelation (r) of $-.20$ $(p < .02)$. The subscales were largely independent in both the first-generation and second-generation groups $(rs = -.09$ and $-.01$, respectively, $ns)$. How-ever, the low subscale alpha coefficients suggest that one possible explanation for these findings is low reliability. After correction for attenuation, the subscale intercorrelation was $-.44$ $(p < .001)$, with intercorrelations of $-.20$ $(p < .02)$ and $-.02$ (ns), respec-tively, for the first- and second-generation groups.

Finally, concurrent validity was evaluated by comparing the two dimensions with (a) percentage of time lived in North America and (b) the unidimensional acculturation score provided by the SL-ASIA. Percentage of time living in North America was signifi-cantly associated with both the Heritage and Mainstream subscales $(rs = -.27$ and .53, respectively, $ps < .001)$. As in previous studies involving the SL-ASIA, there was a high degree of asso-ciation between this instrument and time lived in North America $(r = .74$, $p < .001)$. Finally, the SL-ASIA was significantly associated with both the Heritage and Mainstream subscales $(rs = -.46$ and .55, respectively, $ps < .001)$.

Personality

Unidimensional acculturation. We examined the association between unidimensional acculturation and personality using five separate single linear regressions, entering the SL-ASIA as the predictor and each of the five factors on the BFI as criteria. Assimilation was significantly associated with higher extraversion and higher openness (see Table 1).

Bidimensional acculturation. We assessed the association be-tween bidimensional acculturation and personality using five sep-arate blocked linear regressions, entering the two acculturation dimensions followed by the interaction term. The Heritage sub-scale was associated with higher conscientiousness and lower neuroticism, whereas the Mainstream subscale was associated with higher scores on conscientiousness, extraversion, and openness, as well as with lower neuroticism. There were no significant inter-actions (see Table 1).

Controlling for Demographics

To assess the extent to which the construct of acculturation explains variance in personality above and beyond demographic variables, we calculated the correlations among the SL-ASIA, Heritage subscale, Mainstream subscale, and personality measures, partialing out percentage of lifetime lived in Canada and genera-tional status. Table 1 shows, in parentheses, the beta coefficients after the removal of shared variance with the demographic indi-cators. For the unidimensional model, both of the previously significant effects were reduced to nonsignificance. Within the bidimensional model, one of the significant effects for the Heritage subscale remained significant, whereas the other was reduced to a trend. For the Mainstream subscale, three significant effects re-mained significant, one was reduced to a trend, and a previously nonsignificant effect became significant.

Discussion

The first study supported the major tenets of the bidimensional model. Both the heritage and mainstream dimensions of cultural identity correlated in expected directions with key demographic variables. In addition, the two dimensions did not seem to report opposite poles of a single dimension, and they displayed coherent

Table 1

Prediction of Personality From Acculturation Measures in Study 1

| | Unidimensional model | | | Bidimensional model | | | | |
| | SL-ASIA | | | Heritage | | Mainstream | | |
Trait	β	(β)	R^2	β	(β)	β	(β)	R^2
Agreeableness	$-.02$	(.05)	.00	.12	(.08)	.16†	(.23*)	.03
Conscientiousness	$-.05$	$(-.12)$	.00	.20*	(.18*)	.18*	(.17†)	.06
Extraversion	.21**	(.18)	.05	.09	(.08)	.35**	(.33**)	.12
Neuroticism	$-.04$	(.01)	.00	$-.17*$	$(-.15†)$	$-.21**$	$(-.20*)$	.06
Openness	.16*	(.17)	.03	.09	(.09)	.28**	(.29**)	.08

Note. Values in parentheses are beta values after removal of variance shared with demographics. SL-ASIA = Suinn-Lew Asian Self-Identity Acculturation Scale.
† $p < .10$ (marginally significant). * $p < .05$. ** $p < .01$.

patterns of personality correlates. Thus, consistent with the bidimensional perspective, both dimensions of cultural identity appeared to have validity and utility.

Looking specifically at the Big Five dimensions of personality, the Mainstream subscale was associated with lower neuroticism and higher levels of three other factors. In addition, the Heritage subscale also had explanatory power in predicting lower neuroticism and higher conscientiousness. On the other hand, the unidimensional measurement approach was unable to detect the effects involving neuroticism and conscientiousness, possibly because the heritage and mainstream effects canceled each other out. The SL-ASIA was predictive only of extraversion and openness, the two strongest relations found for the bidimensional model, and yielded considerably smaller effect sizes.

Finally, all but one of the effects found for the bidimensional model remained significant after control for proportion of time spent in North America, suggesting that detailed paper-and-pencil measures of psychological acculturation can explain variance above and beyond the demographic characteristics of the sample. There appears, then, to be value in measuring acculturation using this more complex methodology. In contrast, all of the significant effects for the unidimensional model were erased when demographic characteristics were controlled. It should be noted, however, that this finding does not necessarily represent a weakness with the unidimensional approach per se; one possible explanation is that many of the items on the SL-ASIA are saturated with demographic information (Ryder, Paulhus, & Alden, 1998).

Study 2

The purpose of Study 2 was threefold. First, we developed an improved bidimensional measure of acculturation to deal with some of the psychometric limitations of Study 1, particularly the low reliabilities of the bidimensional subscales. Although Study 1 established that the two subscales were not opposing poles of a single dimension, the strength of their association remained unclear, a critical point in comparing the two models. Second, we compared the unidimensional and bidimensional models in another domain of theoretical importance, namely, self-identity across cultures. Finally, we compared the two models in terms of their ability to predict psychosocial adjustment, a domain of applied importance.

Constructing the Vancouver Index of Acculturation (VIA)

Study 1 indicated that the two bidimensional subscales were of questionable reliability. A greater number of items covering a wider range of domains would allow a broader assessment of the construct and possibly yield a more reliable measure of the two dimensions. To this end, we developed the VIA, a self-report instrument that assesses several domains relevant to acculturation, including values, social relationships, and adherence to traditions. The development of an improved bidimensional instrument permitted a more decisive evaluation of the two models.

Self-Identity

One of the most important and widely studied cultural value dimensions is that of individualism–collectivism. As originally operationalized by Hofstede (1980), individualism refers to an emphasis on the individual in society, whereas collectivism involves an emphasis on the in-group (see also Triandis, 1989). Although this construct was originally conceptualized at the level of culture, researchers from the self tradition adapted this work to the level of the individual. Markus and Kitayama (1991) proposed that individuals with an *independent self-construal* see themselves as a bounded and autonomous entity, whereas those with an *interdependent self-construal* perceive themselves as being interconnected with others. According to these writers, individuals from North America and Western Europe tend to have a strong independent self and a weak interdependent self, whereas the reverse is true for those from most other cultures, including Chinese.

Singelis (1994) established that these two aspects of self are empirically orthogonal and suggested that people who have been exposed to both Chinese and Western culture may be particularly likely to have strong independent selves as well as strong interdependent selves. An examination of how these constructs map onto the two models of acculturation may clarify the relative validity of the unidimensional and bidimensional models. Furthermore, because many of the predictions made by these theories involve specific differences between Asian and Western cultures, instruments measuring self-identity can serve as a valuable means of validating the VIA.

Psychosocial Adjustment

Researchers who study cultural transition are particularly interested in the various ways in which individuals may cope, or fail to cope, with the stresses associated with acculturation. The relation between acculturation and psychosocial adjustment is well established in the literature. Berry (1970) introduced the term *acculturative stress* to describe the potentially adverse effects of changing cultures, and this key construct motivated much of the extant research on acculturation. Previous work has demonstrated that ethnic Chinese living in North America suffer from psychological distress to a greater extent that do individuals of European descent (Lorenzo & Adler, 1984; Ryder, Alden, & Paulhus, 1999a), in turn leading to increased burden and distress for their families (Ryder, Bean, & Dion, 2000). However, this effect is almost entirely due to increased psychopathology among the immigrant subgroup, with no differences being found for Chinese individuals born in North American (Ryder et al., 1999a).

In general, the unidimensional paradigm predicts that the effects of acculturative stress should diminish as individuals successfully shed the old and adopt the new culture. However, as Berry (1997) noted, separate consideration of heritage and mainstream culture identification may provide a richer picture of acculturative stress and adjustment. On the basis of a long series of studies using his acculturation framework (Berry et al., 1989; Dona & Berry, 1994; Krishnan & Berry, 1992; Partridge, 1988; Sam, 1994; Sam & Berry, 1995; Zheng & Berry, 1991), Berry concluded that the integration strategy leads to the best mental health outcomes, whereas marginalization leads to the worst outcomes (Berry, 1990, 1997, 1999; Berry, Kim, Minde, & Mok, 1987; Berry & Sam, 1996). Assimilation and separation fall somewhere in between.

Given the relations between acculturation and personality observed in Study 1, one might hypothesize that the differential

mental health outcomes of acculturating individuals may simply reflect preexisting personality traits. For example, the reported advantages for integration may be due to the relation between this acculturation strategy and neuroticism. Less neurotic people may be more likely to choose integration as a strategy and be more able to implement it effectively. Similarly, individuals high in extraversion may be more able to interact comfortably with members of either ethnocultural group, with consequences for both acculturation and adjustment. To deal with these competing explanations, Study 2 controlled for dispositional neuroticism and extraversion when examining the relation between acculturation and psychosocial adjustment.

Method

Participants

The sample for Study 2 consisted of 99 female and 51 male undergraduate volunteers, ranging in age from 18 to 25 years ($M = 19.72$, $SD = 1.14$), who identified themselves as having Chinese ancestry. There were 87 first-generation and 63 second-generation individuals in the sample. Participants received a cover letter describing the purpose of the study, assuring confidentiality, and offering extra course credit in exchange for completing the questionnaires.

Measures

Participants received a questionnaire package containing a wide variety of instruments assessing demographics, personality, self-construal, and psychosocial adjustment. Two of the instruments, the SL-ASIA and the BFI, were used in Study 1 and described earlier. In addition, an expanded two-dimensional acculturation scale was developed, self-identity was used as a validation measure, and psychosocial adjustment was quantified via a number of scales and specific questions. These measures are described subsequently.

Vancouver Index of Acculturation. The version of the VIA used in this study is a 12-item instrument designed to measure the heritage and mainstream dimensions of acculturation (Ryder, Alden, & Paulhus, 1999b). Items were generated in pairs with regard to content area, with one item in each pair referring to Chinese culture and the other item referring to North American culture. Each item was rated on a 5-point scale ranging from *not at all* (1) to *very much so* (5). Examples of items include "I am interested in maintaining or developing Chinese traditions" and "I would be willing to marry a North American person." Thus, higher subscale scores represent higher levels of identification with the culture represented.

The specific content areas covered by four of the item pairs were derived from a set of items provided by J. W. Berry (personal communication, February 10, 1998) to study youth acculturation, whereas the other two pairs were the same as those used in Study 1. Items were written to avoid conceptual dependency, meaning that the semantics of a given item should not imply or necessitate a particular response to its counterpart in the pair. For example, a poorly worded item might read, "I prefer social activities with Chinese people," thereby implying that one does not also prefer such activities with North American people. An improved wording would be "I enjoy social activities with Chinese people," which could conceptually be paired with enjoying, or not enjoying, such activities with North American people.

Self-construal scale (SCS). The SCS (Singelis, 1994) is based on the theoretical writings of Markus and Kitayama (1991) and assesses two dimensions of self-construal: (a) independent self-construal, or the extent to which the self is seen as being a separate and autonomous entity, and (b) interdependent self-construal, or the extent to which the self is seen as being enmeshed within a group. These two dimensions are relatively orthogonal when assessed with the two 12-item subscales of the SCS. Items are rated on a 7-point scale. Cronbach alpha coefficients for this sample were .65 for independent self-construal and .64 for interdependent self-construal.

Beck Depression Inventory (BDI). The BDI (Beck, Ward, Mendelson, & Erbaugh, 1961) is a commonly used 21-item self-report measure of depressive symptoms covering a 2-week period. Each item contains four response options of increasing severity, numbered from zero to three. Overall scores are generated by summing responses. The Cronbach alpha coefficient for this sample was .89.

Brief Symptom Inventory (BSI). The BSI (Derogatis, 1993) is a 53-item self-report measure of general psychological functioning and symptomatology. Three indexes can be generated from the BSI; two of these indexes are conceptually and statistically independent, and thus both were used in the present study. The Positive Symptom Total (BSI-PST) represents the number of symptoms identified as being present, whereas the Positive Symptoms Distress Index (BSI-PSDI) is based on the mean indicated distress for present symptoms. Items are rated on a 4-point scale ranging from zero to three, in which zero represents absence of the symptom and higher scores represent presence of the symptom at increasing levels of severity. The Cronbach alpha coefficient for this sample was .95.

Other adjustment questions. Additional questions tapped specific domains of *health maladjustment* (e.g., "How many colds or flus have you had in the past 6 months?"), *social maladjustment* (e.g., "How many friends can you depend on for help?"), and *academic maladjustment* (e.g., "What is your GPA?"). Each question was rated on a 10-point scale, higher scores representing more adjustment problems in each domain.

Results

Bidimensional Acculturation

Reliability of the VIA was assessed by means of Cronbach alpha coefficients and mean interitem correlations. Internal consistency (alpha) coefficients were .79 for the six-item Heritage subscale (mean interitem $r = .40$) and .75 for the six-item Mainstream subscale (mean interitem $r = .34$). Internal structure, specifically orthogonality, was assessed by calculating the subscale intercorrelation. This analysis demonstrated that the two dimensions of acculturation were orthogonal in the overall sample ($r = .09$, ns), as well as in both first- and second-generation groups ($rs = .09$ and .15, respectively, ns). It should be noted that the mean interitem correlations reported here are similar to the alpha coefficients reported for the two-item scales in Study 1, suggesting that the main advantage of the VIA is not better items but wider coverage of the culture domain.

We evaluated concurrent validity by comparing the two dimensions with (a) percentage of time lived in a Western, English-speaking country, (b) percentage of time educated in a Western, English-speaking country, (c) the unidimensional acculturation score provided by the SL-ASIA, and (d) a single-item validity check measuring current cultural identification in a unidimensional fashion. The percentages of time lived in and educated in the West were significantly associated with the Mainstream subscale ($rs = .47$ and .41, respectively, $ps < .001$). Significant associations were found between the SL-ASIA and the Heritage and Mainstream subscales ($rs = -.30$ and .54, respectively, $ps < .001$), and the same was true for the single-item identity measure ($rs = -.34$ and .44, respectively, $ps < .001$).

Factorial validity was established by means of principal-components analysis with promax rotation ($\kappa = 4$). Two components were extracted, in keeping both with a priori theoretical

Table 2
Prediction of Self-Identity From Acculturation Measures in Study 2

| | Unidimensional model | | | Bidimensional model | | | | |
| | SL-ASIA | | | Heritage | | Mainstream | | |
SCS self-identity	β	(β)	R^2	β	(β)	β	(β)	R^2
Independent	.24**	(.17)	.06	.06	(.06)	.40**	(.37**)	.17
Interdependent	−.05	(−.18)	.00	.33**	(.34**)	−.02	(−.05)	.11

Note. Values in parentheses are beta values after removal of variance shared with demographics. SL-ASIA = Suinn-Lew Asian Self-Identity Acculturation Scale; SCS = Self-Construal Scale.
** $p < .01$.

expectations and with a substantial break observed on the scree plot. The first component contained the heritage identity items and explained 30% of the variance, whereas the second component contained the mainstream identity items and explained 21%. All items had primary loadings of greater than .40 on the expected component, and the two components were close to orthogonal ($r = .15$).

Self-Identity

Unidimensional acculturation. The associations between unidimensional acculturation and self-identity were examined with linear regression. Assimilation was positively associated with an independent self-identity (see Table 2).

Bidimensional acculturation. We assessed the association between bidimensional acculturation and self-identity using blocked linear regression, entering main effects in the first block and the interaction term in the second block. The Heritage subscale was significantly associated with a stronger interdependent self-identity, whereas the Mainstream subscale predicted a stronger independent self-identity (see Table 2).

Adjustment

Because the six indexes of adjustment are conceptually related and thought to be measuring the same underlying construct, a multivariate general linear model (GLM) was used for all analyses involving these variables. This procedure facilitated the examination of overall multivariate effects and helped to control Type I error. The six adjustment measures—BDI, BSI-PST, BSI-PSDI, health maladjustment, social maladjustment, and academic maladjustment—were entered as dependent variables, and the dimension or dimensions of acculturation were entered as independent dimensional predictors. Interaction terms were also entered into the model but were dropped if they did not attain significance.

Unidimensional acculturation. On the whole, assimilation was significantly associated with adjustment, $F(6, 139) = 4.82$, $p < .001$, Wilks's $\lambda = .83$, $\eta^2 = .17$. Specifically, higher assimilation significantly predicted lower levels of depression, reported symptoms, symptom distress, and social maladjustment (see top panel of Table 3).

To control for the potential effects of neuroticism and extraversion, we ran a similar GLM with the two personality traits as covariates. Although neuroticism was significantly associated with adjustment, $F(6, 137) = 11.25$, $p < .001$, Wilks's $\lambda = .67$, $\eta^2 =$

.33, the inclusion of this variable did not erase the effects of acculturation. However, the multivariate effect for assimilation was reduced to a trend, $F(6, 137) = 1.95$, $p < .08$, Wilks's $\lambda = .92$, $\eta^2 = .08$. Higher assimilation significantly predicted lower depression, fewer reported symptoms, and lower symptom distress (see bottom panel of Table 3).

Bidimensional acculturation. For the bidimensional model, only the Mainstream subscale showed a significant multivariate effect with adjustment, $F(6, 138) = 5.78$, $p < .001$, Wilks's $\lambda = .83$, $\eta^2 = .20$. This dimension was a statistically significant univariate predictor of lower levels of depression, reported symptoms, symptom distress, social maladjustment, and academic maladjustment (see top panel of Table 3).

As with the unidimensional analyses, a similar GLM was run with neuroticism and extraversion as covariates. Although neuroticism was significantly associated with adjustment, $F(6, 136) = 11.29$, $p < .001$, Wilks's $\lambda = .67$, $\eta^2 = .33$, the inclusion of this variable did not erase the effects of acculturation. Again, only the Mainstream subscale had a significant overall effect, $F(6, 136) = 2.73$, $p < .05$, Wilks's $\lambda = .89$, $\eta^2 = .11$. This dimension was a statistically significant univariate predictor of lower levels of depression, reported symptoms, symptom distress, social maladjustment, and academic maladjustment (see bottom panel of Table 3).

Controlling for Demographics

As in Study 1, we calculated the correlations among the SL-ASIA, the Heritage subscale, the Mainstream subscale, and the criterion variables of interest, partialing out percentage of time lived in Canada and generational status. Tables 2 and 3 show, in parentheses, the beta coefficients after the removal of shared variance with the demographic indicators. For the unidimensional model, two of the five significant effects remained significant, and three were no longer significant. Within the bidimensional model, the two significant effects for the Heritage subscale remained significant. For the Mainstream subscale, five of the six significant effects remained significant at $p < .05$, and one was reduced to a trend at $p < .10$ (see Table 2 and top panel of Table 3).

Discussion

Once again, the results supported a bidimensional approach to acculturation. The two dimensions of cultural identity proved to be

Table 3

Prediction of Psychosocial Adjustment From Acculturation Measures in Study 2

| | Unidimensional model | | | Bidimensional model | | | | | |
| | SL-ASIA | | | VIA Heritage | | | VIA Mainstream | | |
Variable	β	(β)	η^2	β	(β)	η^2	β	(β)	η^2
			Without	covariates					
Depression	-.27**	(-.19)	.09	-.01	(-.03)	.00	-.26**	(-.18*)	.09
Reported symptoms	-.34**	(-.32*)	.12	.09	(.08)	.01	-.36**	(-.30**)	.13
Symptom distress	-.34**	(-.33*)	.12	.18*	(.17*)	.03	-.32**	(-.24*)	.11
Health maladjustment	-.06	(.05)	.01	-.06	(-.06)	.01	-.08	(-.05)	.01
Social maladjustment	-.19**	(-.13)	.06	-.01	(-.02)	.00	-.24**	(-.20**)	.10
Academic maladjustment	-.15†	(-.16)	.03	-.02	(-.02)	.00	-.17*	(-.14†)	.03
			Controlling for extraversion	and neuroticism					
Depression	-.14*		.03	-.09		.01	-.14*		.03
Reported symptoms	-.18*		.04	.01		.00	-.21**		.06
Symptom distress	-.17*		.04	.09		.01	-.17*		.04
Health maladjustment	-.04		.00	-.08		.01	-.07		.01
Social maladjustment	-.10		.02	-.04		.00	-.15*		.04
Academic maladjustment	-.12		.02	-.03		.00	-.17*		.02

Note. Values in parentheses are beta values after removal of variance shared with demographics. SL-ASIA = Suinn-Lew Asian Self-Identity Acculturation Scale; VIA = Vancouver Index of Acculturation.
† $p < .10$ (marginally significant). * $p < .05$. ** $p < .01$.

independent and distinctive in their correlates with measures of self-construal and adjustment. The results also suggested that the VIA is a promising instrument for measurement of the two cultural identity constructs.

Analyses with the VIA indicated that the two subscales were reliable, and virtually orthogonal, in both immigrant and second-generation samples. In addition, strong and coherent associations were observed between the Mainstream subscale and variables indicative of exposure to the new culture. For example, individuals who had received a greater proportion of their education in Canada or the United States were more likely to score highly on the Mainstream subscale. In contrast, the relative absence of associations between the Heritage subscale and these same indicators suggests that this dimension may be capturing a distinct and relatively unexplored aspect of acculturation.

The two dimensions of acculturation were predictive of self-identity in ways that were, for the most part, theoretically expected. An interdependent self-identity was associated with the heritage dimension, whereas an independent self-identity was associated with the mainstream dimension. Thus, as expected, a high score on both forms of self-identity was associated with having a strong bicultural identity. Note that the bidimensional model provided considerably more information than did the unidimensional model.

The results of Study 2 also indicated that the two dimensions of acculturation displayed different patterns of association with psychosocial adjustment. Whereas the mainstream component yielded significant effects in the direction of greater adjustment, the heritage component showed no such association. Although the latter dimension did have a positive relationship with symptom distress, this result should be interpreted cautiously because of the nonsignificant multivariate effect. Overall, these findings appear to con-

tradict Ward and Rana-Deuba (1999), who found that the heritage-culture dimension predicted greater adjustment (specifically, less depression). In their study, however, participants were Western embassy officials and international aid workers on temporary assignment to various Third World cultures. This group might be expected to show different patterns of acculturation and adjustment than Asian immigrants making a permanent transition to North America. Our findings are more in keeping with Sanchez and Fernandez (1993) and Nguyen, Messé, and Stollak (1999), who found that the mainstream dimension was positively related to better psychosocial adjustment in Hispanic Americans and Vietnamese immigrants to the United States, respectively. However, it should be noted that the latter authors also reported some negative effects for the heritage dimension.

In strictly numerical terms, the mainstream component of the bidimensional model had approximately the same amount of predictive power for psychosocial adjustment as did the unidimensional model. However, it is important to note that the results from the unidimensional measure lend themselves to two other interpretations: (a) Acquiring a new identity leads to greater adjustment, and (b) losing the old identity leads to greater adjustment. In contrast to the predictions of the unidimensional model, a bidimensional approach clearly indicates that the first alternative provides the best fit to our findings. Note also that this association remained, albeit somewhat weakened, when we controlled for neuroticism and extraversion, suggesting that the association of acculturation with adjustment is not simply an artifact of preexisting personality factors. Finally, as in Study 1, shared variance with demographics did not account for all of the observed associations between bidimensional acculturation and the criterion variables.

Study 3

Study 3 had two objectives. The first was to replicate the findings of Study 2 in a broader cross section of acculturating individuals. To this end, we modified the VIA so that it would be appropriate for a wider range of ethnocultural groups and collected information from members of several such groups. Our second objective was to extend our assessment of adjustment to incorporate interpersonal aspects of acculturation. Here, we were interested in interpersonal difficulties that might arise in some individuals attempting to negotiate multiple cultural contexts.

Refining the Vancouver Index of Acculturation

One of the practical limitations of the VIA, as used in Study 2, was that the heritage culture items referred specifically to Chinese culture. As a means of increasing the utility of the instrument for culturally heterogeneous samples, the 12 items were rewritten so that the items referred to "heritage culture" more generally. A new instructional set was written to clarify the definition of this term. In an effort to more fully capture the construct of acculturation, several new items were written to measure domains not covered by the version of the instrument used in Study 2. This process resulted in an overall pool of 15 domains, with 1 heritage-identity and 1 mainstream-identity item written for each domain.

The revised instrument was then administered to the present sample, which was randomly split into two subsamples. Using a combination of reliability analysis and principal-components factor analysis, we performed an iterative procedure involving one half of the sample. Five item pairs were removed because either one or both members of the pair lowered the scale reliability or did not load cleanly onto a single principal component. The remaining 20 items were then validated on the second half of the sample, resulting in close convergence between the two samples (see Ryder et al., 1999b, for details). This process yielded a refined version of the VIA (see Appendix).

Interpersonal Adjustment

Most of the extant research on acculturation and psychosocial adaptation has examined emotional adjustment as reflected in symptoms of anxiety and depression. However, there are several, more focused domains of adjustment that may be germane to the study of acculturation. One of these domains, interpersonal adjustment, involves consideration of an individual's ability to socialize and interact with others comfortably. Acculturating individuals may be in the position of learning a new language and a new system of social norms, or they may be continually forced to negotiate between two different sets of cultural expectations. Either way, one might expect such individuals to experience unique interpersonal difficulties as part of the acculturation process.

Our primary focus in the interpersonal domain was the acculturating individual's overall sense of comfort or discomfort in social interactions. We addressed this question using several measures designed to assess a wide range of interpersonal problems, including but not limited to social anxiety. In an effort to broaden the interpersonal issues under consideration, we included an instrument constructed in an East Asian culture (Kleinknecht, Dinnel, & Kleinknecht, 1997; Takahashi, 1989). Because social anxiety in particular and interper-

sonal dysfunction more generally are influenced by personality characteristics, it was especially important to replicate the finding in Study 2 that acculturation–adjustment relationships play a role above and beyond such dispositional factors. Again, neuroticism and extraversion were of particular interest, especially given the central role of these two factors in shyness and other social difficulties (Paulhus & Trapnell, 1998).

Finally, we were interested in domain-specific effects of interpersonal adjustment. Thus, we considered difficulties encountered with heritage and mainstream individuals separately. We predicted that individuals with a strong mainstream identity would find it easier to interact with North Americans but would not necessarily be better adjusted when interacting with other individuals from the heritage culture. Similarly, we wished to investigate whether maintenance of the heritage culture would yield specific interpersonal benefits with those from the heritage culture and, specifically, members of the individual's own family.

Method

Participants

Three different undergraduate samples, namely individuals of Chinese, non-Chinese East Asian, and non-English-speaking (excluding Chinese and East Asian) descent, took part in Study 3. The Chinese sample contained 140 female and 64 male undergraduate volunteers, ranging in age from 18 to 25 years ($M = 19.82$, $SD = 1.28$), who identified Chinese as their heritage culture. There were 125 first-generation and 79 second-generation individuals of Chinese descent within the sample. The East Asian sample consisted of 54 female and 16 male undergraduates ranging in age from 18 to 30 years ($M = 19.97$, $SD = 1.79$); this sample comprised 36 first-generation and 34 second-generation individuals. These individuals identified other East and South East Asian cultures, such as Japanese, Korean, and Vietnamese, as their heritage culture. Finally, the non-English-speaking, or "miscellaneous," sample was composed of first- and second-generation individuals who identified a non-English-speaking and non–East Asian culture as their heritage culture (e.g., East Indian, Italian, or Arabic). This group consisted of 100 female and 40 male undergraduates ranging in age from 17 to 37 years ($M = 20.20$, $SD = 2.34$); included were 22 first-generation and 118 second-generation individuals. All participants received a cover letter describing the purpose of the study, assuring confidentiality, and offering extra course credit in exchange for completing the questionnaires.

Measures

Participants received a questionnaire package containing a wide variety of instruments assessing demographics, self-construal, and psychosocial adjustment. The SL-ASIA and BFI, used in Study 1, along with the SCS, used in Study 2, were described earlier. Note that the SL-ASIA was not used with the miscellaneous sample, because its item content was not appropriate for this group. Several new measures, designed to broaden the measurement of self-identity and to operationalize psychosocial adjustment in an interpersonal fashion, are described subsequently.

Aspects of Identity Scale (AIS). The AIS (Cheek, Tropp, & Chen, 1994) is a 34-item self-report measure that assesses the relative importance that individuals place on personal (e.g., "My emotions and feelings"), social (e.g., "My popularity with other people"), and collective (e.g., "Being part of the many generations of my family") aspects of identity when constructing their self-definition. For the purposes of this study, only the personal and collective subscales were used; it is notable that the collective identity subscale was originally developed to assess collectivist features suggested by European social identity theory (e.g., Tajfel &

Turner, 1986). Cronbach alpha coefficients for the overall sample were .79 for the personal subscale and .64 for the collective subscale.

Inventory of Interpersonal Problems–Circumplex Version (IIP-C). The IIP-C (Alden, Wiggins, & Pincus, 1991) is a 64-item self-report measure of tendencies to experience specific interpersonal difficulties. Each item contains four response options representing increasing symptom severity. Although a host of scoring options are available for the IIP-C, we relied on the mean severity of reported problems, useful as an overall index of interpersonal dysfunction, for the purposes of this study. The Cronbach alpha coefficient for the overall sample was .94.

Social Avoidance and Distress Scale (SAD). The SAD (Watson & Friend, 1969) is a 28-item self-report measure of social discomfort and preference for being alone. Each item is scored on a true–false scale, with *true* representing more social anxiety for 14 of the items and *false* indicating more social anxiety for the other 14 items. The Cronbach alpha coefficient for the overall sample was .91.

Revised Shyness Scale (RSS). The RSS (Cheek, 1983) is a six-item self-report measure of shyness. Each item is rated on a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7); one of the six items is reverse coded. For the purposes of this study, the scale was administered twice, once specifying shyness with individuals from the heritage culture and once specifying individuals from the mainstream Western culture (i.e., North Americans). Overall shyness was calculated by taking the mean of all 12 items. The Cronbach alpha coefficient for the overall sample was .78; coefficients were also acceptable for both the provisional Heritage and Mainstream subscales (.79 and .88, respectively).

Taijin Kyofusho Scale (TKSS). The TKSS (Kleinknecht et al., 1997) is a 31-item scale designed to measure *taijin kyofusho*, a Japanese interpersonal construct similar to social anxiety. The items were based on earlier work by Takahashi (1989), who identified a set of questions that effectively discriminated taijin kyofusho patients from nonpatients in Japan. These items reflect a morbid fear of embarrassing or offending others by such acts as blushing, emitting offensive body odors, or staring inappropriately. Taijin kyofusho is viewed as arising from *Shinkeishitsu,* or nervous temperament, as proposed by Shoma Morita (e.g., Morita, 1928/1998), and reflects an obsession with the thought of offending others and thereby bringing shame upon one's social or familial group. Each item is rated on a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7). The Cronbach alpha coefficient for the overall sample was .93.

Results

Psychometric Properties of the VIA

As in Study 2, reliability of the VIA was assessed by means of Cronbach alpha coefficients and mean interitem correlations. The

Heritage dimension was highly internally consistent in the Chinese, East Asian, and miscellaneous samples (αs = .91, .92, and .91, respectively) and had high mean interitem correlations (rs = .52, .53, and .51). Similarly, the Mainstream dimension yielded high Cronbach alpha coefficients and mean interitem correlations in the Chinese, East Asian, and miscellaneous samples (αs = .89, .85, and .87, rs = .45, .38, and .44, respectively). Internal structure, specifically orthogonality, was again assessed by correlating the two dimensions of acculturation as measured by the VIA. Small negative intercorrelations were found for the Chinese, East Asian, and miscellaneous samples (rs = −.18, −.13, and −.01, $p < .01$, ns, and ns, respectively). Collapsed across ethnicity, the overall intercorrelations were −.19 ($p < .01$) for first-generation participants and .06 (ns) for second-generation participants.

Concurrent validity was evaluated by comparing the two dimensions with (a) percentage of time lived in a Western, English-speaking country; (b) percentage of time educated in a Western, English-speaking country; (c) generational status; (d) a single item asking respondents about whether they planned to return to their country of origin (sojourner status); (e) status of English as a first or second language; (f) a single-item validity check measuring Western identification in a unidimensional fashion; and (g) mean SL-ASIA score. For all three samples, both the Heritage and Mainstream subscales yielded significant correlations with these concurrent validity indicators (see Table 4). The one exception was the relation between the Heritage subscale and Western identification in the East Asian sample, which was a nonsignificant trend.

Finally, factorial validity was established by means of principal-components analysis with promax rotation (κ = 4) performed separately on four groups: two Chinese, one East Asian, and one miscellaneous. The two Chinese subsamples were generated by randomly dividing the overall Chinese sample into two groups of equal size. For all four samples, two components were extracted, in keeping both with a priori theoretical expectations and with a substantial break observed on each of the scree plots. As in Study 2, the first component contained the Heritage identity items, and the second component contained the Mainstream identity items. Component loadings on the pattern matrix, percentage of variance explained, and component intercorrelations are displayed in Table 5, with remarkable similarity across samples.

Table 4
Concurrent Validity of the Vancouver Index of Acculturation (VIA) in Three Samples: Study 3

	Chinese		East Asian		Miscellaneous	
Variable	VIA-H	VIA-M	VIA-H	VIA-M	VIA-H	VIA-M
Percentage of time lived in West	−.30**	.57**	−.24*	.43**	−.25**	.31**
Percentage of time educated in West	−.29**	.54**	−.32*	.39**	−.17*	.40**
Generational status	−.30**	.42**	−.27*	.32**	−.16*	.35**
Anticipates remaining in West	−.37**	.39**	−.27*	.56**	−.29**	.23**
English first language	−.39**	.54**	−.32*	.39**	−.30**	.25**
Western identification	−.39**	.26**	−.23†	.29*	−.25**	.33**
SL-ASIA mean score	−.57**	.60**	−.60**	.51**		

Note. VIA-H = VIA Heritage dimension; VIA-M = VIA Mainstream dimension; SL-ASIA = Suinn-Lew Asian Self-Identity Acculturation Scale.
†$p < .10$. *$p < .05$. **$p < .01$.

Table 5

Principal-Components Analysis of the Vancouver Index of Acculturation in Four Samples: Study 3

Item domain	Chinese Group 1		Chinese Group 2		East Asian		Miscellaneous Group 1	
	1	2	1	2	1	2	1	2
Heritage item								
1. Traditions	.76		.69		.69		.72	
3. Marriage	.76		.78		.77		.55	
5. Social activities	.86		.81		.83		.76	
7. Comfortable	.78		.79		.70		.66	
9. Entertainment	.73		.67		.76		.72	
11. Behavior	.74		.72		.72		.79	
13. Practices	.74		.76		.81		.86	
15. Values	.71		.82		.75		.81	
17. Humor	.69		.70		.74		.77	
19. Friends	.83		.75		.83		.83	
Mainstream item								
2. Traditions		.70		.59		.48		.80
4. Marriage		.70		.60		.65	−.33	.46
6. Social activities		.82		.78		.71		.76
8. Comfortable		.88		.80		.73		.70
10. Entertainment		.76		.71		.63		.73
12. Behavior		.68		.72		.77		.81
14. Practices		.69		.65		.75		.74
16. Values		.71		.62		.77		.79
18. Humor		.73		.67		.56		.63
20. Friends		.79		.67	.30	.55	.37	.58
% variance explained	34.90	24.36	30.56	23.28	31.12	21.80	29.95	25.58
Component intercorrelation	−.19		−.11		−.11		.02	

Note. All loadings above .30 are displayed, with significant loadings being those above .40. 1 = first principal component; 2 = second principal component.

Self-Identity

As a means of broadening the measurement of self-identity, scores from the SCS (Singelis, 1994; see Study 2) and the AIS were standardized and combined to form aggregate scores. In keeping with the definitions of the various self constructs, the independent self from the SCS and the personal self from the AIS were combined and termed *independent self-identity*. Similarly, the interdependent self and the collective self were combined and termed *interdependent self-identity*. Previous research has demonstrated that these instruments measure related, but not redundant, constructs in a multicultural sample (Wink, 1997). In this study, Cronbach alpha coefficients for the overall sample were .80 for the combined measure of independent self-identity and .78 for the combined measure of interdependent self-identity.

Unidimensional acculturation. We examined the association between unidimensional acculturation and self-identity using linear regression. In the Chinese sample, assimilation was negatively associated with an interdependent self-identity and positively associated with an independent self-identity (see Table 6). However, this effect was not found in the East Asian sample, possibly as a result of the smaller sample size.

Bidimensional acculturation. We assessed the association between bidimensional acculturation and self-identity using blocked linear regression, entering main effects in the first block and the interaction term in the second block. Similar to Study 2, the

Heritage subscale was significantly associated with a stronger interdependent self-identity in the Chinese, East Asian, and miscellaneous samples, whereas the Mainstream subscale predicted a stronger independent self-identity in all three samples. In the miscellaneous sample, the Heritage subscale was also significantly associated with a stronger independent self-identity, possibly reflecting the heterogeneous nature of this group (see Table 6).

Psychosocial Adjustment

Because the four indexes of interpersonal adjustment are conceptually related and thought to be measuring the same underlying construct, a multivariate GLM was used for all analyses involving these variables. The four interpersonal adjustment measures, the IIP-C, SAD, RSS, and TKS, were entered as dependent variables, and the dimension or dimensions of acculturation were entered as independent dimensions predictors. Interaction terms were also entered into the model but were dropped if they did not attain significance. Unidimensional effects were calculated only for the Chinese and East Asian samples, because the SL-ASIA was inappropriate for use with the miscellaneous sample; bidimensional effects were analyzed for all three samples.

Unidimensional acculturation. For the Chinese sample, assimilation had a significant multivariate relation with adjustment, $F(4, 194) = 7.85$, $p < .001$, Wilks's $\lambda = .86$, $\eta^2 = .14$. Specifically, high assimilation scores significantly predicted low scores on

Table 6

Prediction of Self-Identity From Acculturation Measures in Study 3

| | Unidimensional model | | | Bidimensional model | | | | |
| | SL-ASIA | | | VIA Heritage | | VIA Mainstream | | |
Self-identity	β	(β)	R^2	β	(β)	β	(β)	R^2
				Chinese sample				
Independent	.30**	(.45**)	.09	-.07	(-.07)	.39**	(.39**)	.17
Interdependent	-.20**	(-.31*)	.04	.26**	(.24**)	.07	(.14)	.07
				East Asian sample				
Independent	.20	(.24)	.04	-.11	(-.11)	.26**	(.27**)	.09
Interdependent	-.18	(-.35*)	.03	.35**	(.34**)	.08	(.03)	.12
				Miscellaneous sample				
Independent				.18*	(.20*)	.25**	(.25**)	.09
Interdependent				.41**	(.41**)	-.01	(-.02)	.17

Note. Values in parentheses are beta values after removal of variance shared with demographics. SL-ASIA = Suinn-Lew Asian Self-Identity Acculturation Scale; VIA = Vancouver Index of Acculturation.
* $p < .05$. ** $p < .01$.

interpersonal problems, social anxiety, shyness, and taijin kyofusho (see top panel of Table 7). A similar, albeit nonsignificant, multivariate effect was found for the East Asian sample, $F(4, 65) = 2.30, p < .09$, Wilks's $\lambda = .88$, $\eta^2 = .12$ (see middle panel of Table 7).

Bidimensional acculturation. For the Chinese sample, only the Mainstream dimension had a significant multivariate relation with

adjustment, $F(4, 191) = 7.08, p < .001$, Wilks's $\lambda = .87$, $\eta^2 = .13$. High scores on this dimension significantly predicted lower levels of interpersonal problems, social anxiety, shyness, and taijin kyofusho (see top panel of Table 7). Within the East Asian sample, the Mainstream subscale also had the sole significant multivariate relation with adjustment, $F(4, 63) = 2.50, p < .05$, Wilks's $\lambda = .86$, $\eta^2 = .14$, with higher scores on this subscale predicting lower

Table 7

Prediction of Interpersonal Adjustment From Acculturation Measures in Study 3

| | Unidimensional model | | | Bidimensional model | | | | | |
| | SL-ASIA | | | VIA Heritage | | | VIA Mainstream | | |
Variable	β	(β)	η^2	β	(β)	η^2	β	(β)	η^2
				Chinese sample					
Interpersonal problems	-.29**	(-.26*)	.08	-.03	(-.05)	.00	-.30**	(-.21*)	.09
Social anxiety	-.24**	(-.21†)	.06	.07	(-.01)	.00	-.26**	(-.20*)	.06
Shyness	-.32**	(-.40**)	.11	.15*	(.15*)	.03	-.28**	(-.25**)	.08
Taijin kyofusho	-.21**	(-.27*)	.05	.03	(.02)	.00	-.18*	(-.14)	.03
				East Asian sample					
Interpersonal problems	-.12	(-.33†)	.02	-.07	(-.05)	.01	-.16	(-.23†)	.03
Social anxiety	-.03	(.19)	.00	-.17	(-.21)	.03	-.29*	(-.26*)	.08
Shyness	-.27*	(-.16)	.08	-.09	(-.15)	.01	-.33**	(-.27*)	.11
Taijin kyofusho	.02	(-.06)	.00	-.09	(-.09)	.01	-.08	(-.10)	.01
				Miscellaneous sample					
Interpersonal problems				-.09	(-.06)	.00	-.07	(-.12)	.01
Social anxiety				-.03	(-.03)	.01	-.26**	(-.28**)	.07
Shyness				.02	(.02)	.01	-.21*	(-.24**)	.04
Taijin kyofusho				-.09	(-.08)	.00	-.15†	(-.18*)	.02

Note. Values in parentheses are beta values after removal of variance shared with demographics. SL-ASIA = Suinn-Lew Asian Self-Identity Acculturation Scale; VIA = Vancouver Index of Acculturation.
† $p < .10$ (marginally significant). * $p < .05$. ** $p < .01$.

social anxiety and shyness (see middle panel of Table 7). Finally, only the Mainstream subscale significantly predicted adjustment in the miscellaneous sample, $F(4, 133) = 2.66, p < .04$, Wilks's $\lambda = .93$, $\eta^2 = .07$. Specifically, high scores on this dimension of acculturation predicted lower social anxiety, shyness, and taijin kyofusho (see bottom panel of Table 7).

Acculturation, Adjustment, and Personality in the Chinese Sample

A subset of the Chinese participants in this study ($n = 120$) were administered the BFI as part of a separate study. To investigate the issue of personality as a potential moderating variable, as discussed in Study 2, we reran the analyses just reported while controlling for neuroticism and extraversion.

Unidimensional acculturation. For the unidimensional model, neuroticism had a significant multivariate relation with adjustment, $F(4, 109) = 4.21, p < .001$, Wilks's $\lambda = .87$, $\eta^2 = .13$, as did extraversion, $F(4, 109) = 7.97, p < .001$, Wilks's $\lambda = .77$, $\eta^2 = .23$. Nevertheless, assimilation continued to have a significant multivariate relation with adjustment, $F(4, 109) = 6.19, p < .001$, Wilks's $\lambda = .82$, $\eta^2 = .18$. Specifically, high assimilation scores significantly predicted low scores on interpersonal problems, social anxiety, and shyness ($\beta s = -.23, -.20$, and $-.34, ps < .02$, .02, and .001, respectively).

Bidimensional acculturation. For the bidimensional model, neuroticism had a significant multivariate relation with adjustment, $F(4, 106) = 4.69, p < .01$, Wilks's $\lambda = .85$, $\eta^2 = .15$; as did extraversion, $F(4, 106) = 6.65, p < .001$, Wilks's $\lambda = .80$, $\eta^2 = .20$. Despite these effects, the multivariate relation between the Mainstream subscale and adjustment remained significant, $F(4, 106) = 4.71, p < .01$, Wilks's $\lambda = .85$, $\eta^2 = .15$. Specifically, higher scores on this subscale significantly predicted low scores on interpersonal problems, social anxiety, and shyness ($\beta s = -.30, -.17$, and $-.21, ps < .001$, .03, and .01, respectively).

Controlling for Demographics

As in Studies 1 and 2, we calculated the correlations among the SL-ASIA, the Heritage subscale, the Mainstream subscale, and the criterion variables of interest, partialing out percentage of time lived in Canada and generational status. Tables 6 and 7 show the beta coefficients, in parentheses, after the removal of shared variance with the demographic indicators. For the unidimensional model, across the Chinese and East Asian samples, 5 of the 7 significant effects remained significant, 1 was reduced to a trend, and 1 was no longer significant. Within the bidimensional model, across all samples, the 4 significant effects for the Heritage subscale remained significant. For the Mainstream subscale, 10 of the 11 significant effects remained significant, 1 was eliminated, and 1 previously nonsignificant effect became significant.

Specific Interpersonal Effects

The relation between acculturation and culturally specific shyness was examined by correlating the SL-ASIA and the two VIA subscales with the Heritage and Mainstream subscales generated for the RSS. For the unidimensional model, assimilation predicted less shyness among Westerners in both Chinese and East Asian

samples ($rs = -.42$ and $-.37, ps < .001$ and .01, respectively). Within the bidimensional model, the Heritage dimension predicted more shyness among Westerners, but only in the Chinese sample ($r = .29, p < .001$). Meanwhile, the Mainstream subscale predicted less shyness among Westerners in the Chinese, East Asian, and miscellaneous samples ($rs = -.39, -.33$, and $-.22, ps < .001$, .01, and .01, respectively).

The relation between acculturation and family life satisfaction was examined by correlating the SL-ASIA and the two VIA subscales with a single item asking respondents to rate their satisfaction with their family life on a 7-point scale. For the unidimensional model, assimilation did not have a significant relation with family life satisfaction. Within the bidimensional model, the Heritage subscale predicted greater family life satisfaction in the Chinese and miscellaneous samples ($rs = .20$ and .20, $ps < .01$ and .03, respectively), and a similar trend was obtained in the East Asian sample ($r = .22, p < .08$).

Discussion

As in Studies 1 and 2, the results supported a bidimensional approach to acculturation. The two dimensions of cultural identity had only a modest negative correlation across three separate samples, and this association appeared to disappear after the first generation (see also Tsai, 1998). Furthermore, the two dimensions were distinctive in their correlates with measures of self-construal and adjustment, replicating the core findings of Study 2 while expanding them to other ethnocultural groups. Finally, the results suggest increased confidence in the utility of the VIA for measuring the bidimensional model of acculturation in individuals from various ethnic backgrounds.

Analyses with the VIA again demonstrated that the two subscales were reliable and exhibited an interrelationship that approximated the predictions of the bidimensional model much more than those of the unidimensional model. Strong correlations were observed between the Mainstream subscale and a wide array of variables indicative of exposure to the new culture, as in Study 2. Unlike Study 2, the Heritage dimension also consistently displayed a coherent pattern of correlates with these same demographics, albeit with smaller effect sizes. One possible explanation for this improvement is that the refinements made to the VIA in Study 3 improved the convergent validity of the Heritage culture construct. Nevertheless, the story is, for the most part, the same: The Mainstream dimension appears to be more closely linked to demographic variables than does the Heritage dimension, a finding that would appear to match the ethnographic reality of the acculturating participants. Whereas individuals in the three samples varied widely in terms of exposure to mainstream culture, all of the participants had either been raised (i.e., spent their formative years) in the heritage culture or been raised by parents who were mostly socialized within that culture. Thus, acquisition of a new culture would likely be dependent on extent of exposure, but maintenance of an older culture may be better predicted by other factors, such as upbringing or extent of postmigration contact with individuals of the same ethnic heritage.

The two dimensions of acculturation were again associated with self-identity in theoretically expected ways in all three samples. Specifically, the Heritage dimension was related to a stronger interdependent self-identity but, in the Chinese and East Asian

samples, was unrelated to the independent self-identity. In contrast, the Mainstream dimension was related to a stronger independent self-identity and was unrelated to the interdependent self-identity in all three samples. Interestingly, the Heritage dimension did, in fact, predict a stronger independent, as well as interdependent, self-identity in the miscellaneous sample. One possible explanation of this finding is that the present heterogeneous sample included many individuals whose heritage culture is Northern or Western European, regions that tend to be individualistic in orientation (Hofstede, 1980). Thus, they would be expected to possess a strong independent self (Markus & Kitayama, 1991).

Finally, the results of Study 3 suggest that the relation between acculturation and adjustment is robust, replicating in three ethnoculturally diverse samples and across a new domain of psychosocial functioning. Again, the mainstream component of the bidimensional model yielded significant effects in the direction of greater adjustment, whereas the heritage component showed no such association. Although there was a significant relation between the latter dimension and increased shyness among the Chinese, attributable primarily to shyness among Westerners, this result should be interpreted cautiously in light of the nonsignificant multivariate effect. Overall, these findings remained despite control for neuroticism and extraversion in the Chinese group and for demographics in all three samples. This enhances the claim made in Study 2 that the acculturation–adjustment relation is not due simply to the effects of preexisting personality. Given the relations between acculturation and adjustment observed in these and other studies, it may be useful for future research to consider the implications of acculturation for psychotherapy with ethnic minority groups (e.g., Alden, 2000). Similarly, the multiple domains of adjustment, including emotional, interpersonal, sociocultural (Searle & Ward, 1990), and economic (Aycan & Berry, 1996), should be considered by researchers focusing on questions relating acculturation to adjustment.

This study also revealed a benefit for retaining one's heritage cultural identity, namely enhanced family life satisfaction. In contrast, the unidimensional model, at least as operationalized by the SL-ASIA, was unable to detect this effect. It should be noted that, as in Study 2, the effect sizes yielded by the unidimensional and bidimensional models were similar, but the bidimensional model provided a richer picture of the data by demonstrating that heritage culture maintenance is not harmful. Strictly speaking, the unidimensional model would have predicted a negative relation between the heritage dimension and adjustment.

General Discussion

Our objective was to compare the unidimensional and bidimensional models of acculturation in the contexts of personality, self-identity, and adjustment. The results of our studies demonstrate that the bidimensional model constitutes a broader and more valid framework for understanding acculturation. Although the unidimensional model has the advantage of parsimony (Flannery, 1998), we believe that it offers an incomplete and often misleading rendering of the acculturation process. Our perspective in this regard is thus consistent both with Berry's arguments for two underlying dimensions of acculturation and with Suinn's expansion of the SL-ASIA to include bidimensional items.

Earlier in this article, we outlined four criteria necessary to conclude that the bidimensional model is superior to the unidimensional model. All of these criteria were met. The two dimensions (a) could be reliably measured, (b) showed concurrent and factorial validity, (c) were independent, and (d) showed distinctive and noninverse patterns of correlations with external variables of interest. With the exception of the measurement reliability criterion in Study 1, all criteria were met in all five samples studied. Furthermore, the effect sizes yielded by the bidimensional model were equal to, and often greater than, those of the unidimensional model for most of the criterion variables studied. In contrast, two of the main predictions of the unidimensional model, namely that two separately measured dimensions would be (a) highly negatively correlated and (b) inversely related to other variables, received little support. Finally, the unidimensional model was unable to detect effects for which the separately measured dimensions actually had the same direction of effect with the dependent variable.

Of special interest was the relation between the two models of acculturation and basic demographics. After all, the utility of psychological measures of acculturation rests on their ability to capture information not inherent in simple demographic markers. Our results demonstrate that the psychological construct of acculturation can incorporate important information above and beyond demographic variables. Demographics, although simple and concrete, do not tell the whole story.

Finally, the results of our research suggest that the VIA is an effective instrument for assessing the bidimensional model in ethnic Chinese, with promising early evidence that it may serve the same function for a host of ethnic groups. One of the important advantages of this instrument is its brevity. Although bidimensional measurement has been criticized for its greater length and complexity (Flannery, 1998), the VIA demonstrates that the bidimensional model can be reliably measured in several different ethnic groups with 10 pairs of straightforward items tapping core aspects of cultural identity. Indeed, the bidimensional measures used in this study were consistently shorter than the unidimensional measure. In terms of simplicity, the method used in the VIA may have the advantage of clarity over both unidimensional and four-strategy measures. Both of the latter approaches contain a large number of items that directly refer to both cultural groups, whereas each item on the VIA is limited to a single concept.

There are several directions for future research that stem from the findings of this study. It will be important to test the generalizability of bidimensional measurement, beyond students and beyond immigrants to North America. The use of university students in the present studies yielded several advantages, including English competence, easy access to large samples, and numerous third variable controls, but at the expense of representativeness. As in other domains, replication of this study's key findings in diverse samples will be invaluable. A related consideration is the extent to which responses might be affected by the language in which the questionnaire is written (McCrae et al., 1998).

Of particular importance would be a comparison of groups of individuals who are acculturating under different circumstances (i.e., refugees, children of immigrants, sojourners, etc.) and of the attitudes toward cultural minorities held by the majority population (Berry, 1997; Ward & Kennedy, 1992). Some of these contexts may reveal utility for the unidimensional model under certain

circumstances (Flannery, 1998). It should be noted, however, that such utility for the unidimensional model could be demonstrated with the bidimensional approach by revealing strong negative correlations between the two dimensions. In contrast, unidimensional measures are incapable of detecting such advantages.

We began this article with the proposition that acculturation involves changes in self-identity resulting from the need to accommodate an old and a new culture, changes that can lead to fundamental alterations in the individual's sense of self. We then demonstrated empirically that people exposed to two cultures, either through birth or through heritage, can incorporate, to varying degrees, two coexisting cultural self-identities. Furthermore, it does not seem to be the case that the old cultural identity necessarily diminishes while the new one grows; rather, the two identities can vary independently. In short, a bidimensional conception, with independent heritage and mainstream dimensions of culture, appears to be far richer and more functional than the traditional unidimensional approach.

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Appendix

Vancouver Index of Acculturation

Please answer each question as carefully as possible by circling *one* of the numbers to the right of each question to indicate your degree of agreement or disagreement.

Many of these questions will refer to your *heritage culture,* meaning the culture that has influenced you most (other than North American culture). It may be the culture of your birth, the culture in which you have been raised, or another culture that forms part of your background. If there are several such cultures, pick the one that has influenced you *most* (e.g., Irish, Chinese, Mexican, Black). If you do not feel that you have been influenced by any other culture, please try to identify a culture that may have had an impact on previous generations of your family.

Please write your *heritage culture* in the space provided._____

Use the following key to help guide your answers:

Strongly Disagree 1	2	Disagree 3	4	Neutral/ Depends 5	6	Agree 7	8	Strongly Agree 9

	Rating
1. I often participate in my *heritage cultural* traditions.	1 2 3 4 5 6 7 8 9
2. I often participate in mainstream North American cultural traditions.	1 2 3 4 5 6 7 8 9
3. I would be willing to marry a person from my *heritage culture.*	1 2 3 4 5 6 7 8 9
4. I would be willing to marry a North American person.	1 2 3 4 5 6 7 8 9
5. I enjoy social activities with people from the same *heritage culture* as myself.	1 2 3 4 5 6 7 8 9
6. I enjoy social activities with typical North American people.	1 2 3 4 5 6 7 8 9
7. I am comfortable working with people of the same *heritage culture* as myself.	1 2 3 4 5 6 7 8 9
8. I am comfortable working with typical North American people.	1 2 3 4 5 6 7 8 9
9. I enjoy entertainment (e.g., movies, music) from my *heritage culture.*	1 2 3 4 5 6 7 8 9
10. I enjoy North American entertainment (e.g., movies, music).	1 2 3 4 5 6 7 8 9
11. I often behave in ways that are typical of my *heritage culture.*	1 2 3 4 5 6 7 8 9
12. I often behave in ways that are 'typically North American.'	1 2 3 4 5 6 7 8 9
13. It is important for me to maintain or develop the practices of my *heritage culture.*	1 2 3 4 5 6 7 8 9
14. It is important for me to maintain or develop North American cultural practices.	1 2 3 4 5 6 7 8 9
15. I believe in the values of my *heritage culture.*	1 2 3 4 5 6 7 8 9
16. I believe in mainstream North American values.	1 2 3 4 5 6 7 8 9
17. I enjoy the jokes and humor of my *heritage culture.*	1 2 3 4 5 6 7 8 9
18. I enjoy typical North American jokes and humor.	1 2 3 4 5 6 7 8 9
19. I am interested in having friends from my *heritage culture.*	1 2 3 4 5 6 7 8 9
20. I am interested in having North American friends.	1 2 3 4 5 6 7 8 9

Note. The *heritage subscore* is the mean of the odd-numbered items, whereas the *mainstream subscore* is the mean of the even-numbered items. Researchers studying acculturation in other mainstream contexts may wish to change "North American" to another descriptor such as "American" in the United States or "British" in Great Britain. Copyright 1999 by Andrew G. Ryder, Lynn E. Alden, and Delroy L. Paulhus.