Measuring Acculturation and Enculturation among Chinese Canadian Older Adults*

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RÉSUMÉ

Il est important de déterminer l'adaptation culturelle; cependant, la plupart des mesures d'acculturation sont unidimensionnelles, avec peu de données psychométriques pour les immigrants plus âgés. Cette étude a évalué une mesure bi-dimensionnelle, l'indice d'acculturation Vancouver (IAV; Ryder, Alden, et Paulhus, 2000), parmi 149 patients (âge moyen = 73,92 années) Canadiens d'origine chinoise. Les cohérences internes étaient 0,84 et 0,83 pour les sous-échelles du grand public et du patrimoine, respectivement, et ils étaient orthogonal. La validité convergente et discriminante ont été démontrées par des corrélations entre les sous-échelles prévues IAV et l'âge à l'immigration, les années au Canada, la maîtrise de l'anglais, la croyance dans la culture chinoise et l'échelle de valeurs (CCCV; Lai et Chau, 2007). Le VIA a représenté beaucoup plus de la variance dans la capacité de la langue de la BCCV, au-dessus et au-delà des procurations d'acculturation. L'analyse factorielle exploratoire reproduit la structure à deux facteurs signalés par Ryder et al. (2000). Une analyse factorielle confirmatoire a indiqué un ajustement médiocre. Cette étude prend en charge un modèle bi-dimensionnel d'adaptation culturelle entre Canadiens chinois plus âgés.

ABSTRACT

Cultural adaptation is important to assess; however, most acculturation measures are unidimensional with little psychometric data for older immigrants. This study assessed a bidimensional measure, the Vancouver Index of Acculturation (VIA; Ryder, Alden, & Paulhus, 2000), among 149 (mean age: 73.92 years) Chinese Canadians. Internal consistencies were .84 and .83 for the Mainstream and Heritage subscales respectively, and they were orthogonal. Convergent and discriminant validity were demonstrated by predicted correlations between the VIA subscales and age at immigration, years in Canada, English fluency, and the Belief in Chinese Culture and Values Scale (BCCV; Lai & Chau, 2007). The VIA accounted for significantly more variance in language ability than the BCCV, above and beyond acculturation proxies. Exploratory factor analysis replicated the two-factor structure reported by Ryder et al. (2000). A confirmatory factor analysis indicated poor fit. This study supports a bidimensional model of cultural adaptation among older Chinese Canadians.

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Many countries have experienced high rates of immigration from Asian countries. For example, by 2017 it is estimated that 19 per cent to 23 per cent of Canada's population will be a visible minority, and approximately one-half of these will be of either South Asian or Chinese descent (Statistics Canada, 2005). The immigrant population is older than the non-immigrant population, with about 19 per cent of all immigrants aged 65 and

older, compared to 11 per cent of non-immigrants (Statistics Canada, 2008). According to the most recent data available, approximately 10 per cent of Chinese Canadians were over the age of 65, and 22 per cent were aged 45 to 64 (Statistics Canada, 2001). This proportion will grow substantially in the coming years. Unfortunately, research with older immigrants is sparse, and there are few research paradigms and models to guide practice (Hinrichsen, 2006; McDonald, 2011).

Cultural adaptation is an important variable to assess in research with older immigrants because it has clear implications for well-being and access to services. For example, older persons from minority backgrounds are at greater risk for mental health problems and are less likely to utilize mental health services (Sorkin, Pham, & Ngo-Metzger, 2009). There are multiple pathways and barriers to help-seeking including immigration background (e.g., refugees), acculturation and enculturation, racism and discrimination, socioeconomic status, stigma, and attitudes/beliefs that are unique to specific groups (Hwang, Myers, Abe-Kim, & Ting, 2008).

Cultural attitudes and beliefs have a direct impact on people's explanatory models of illness, affecting the way illness is understood and how remedies are sought (Kleinman, 1980). Complementary and alternative medicine approaches are primary treatment methods among Chinese older adults due to holistic views of health that encompass mind, body, and spirit (Lai & Surood, 2009). Data from the 2003 Canadian Community Health Survey indicated that Chinese Canadians were 1.5 times more likely to have consulted an alternative health care provider (e.g., acupuncture, massage therapy, herbalists) compared to non-Chinese Canadians (Roth & Kobayashi, 2008). Furthermore, cultural attitudes such as the perceived shame associated with accessing Western mental health services and the preservation of *face*, a social and internalized sanction for enforcing moral standards, may influence mental health treatment decisions (Kung, 2004; Yang, Phelan, & Link, 2008). Research has associated adherence to Asian values with more negative mental health help-seeking attitudes and suggests that the underutilization of professional mental health services by Chinese populations may be due to a cultural preference to consult family, friends, or traditional healers instead (Li & Browne, 2000; Shea & Yeh, 2008; Yang et al., 2008).

However, cultural identities and practices are complex constructs, and there has not been a consistent conceptual and operational representation of the processes of cultural adaptation (Kim, Laroche, & Tomiuk, 2004; Salant & Lauderdale, 2003). The term acculturation is often used to describe the entire domain of cultural adaptation, whereby individuals move along a continuum of involvement in their culture of origin to involvement in their host culture (Kim et al., 2004). Others have conceptualized cultural adaptation as involving two distinct processes, acculturation (participation in the mainstream, host, or dominant culture) and enculturation (participation in the heritage or indigenous culture), which is gaining favour in the empirical literature (Jang, Kim, Chiriboga, & King-Kallimanis, 2007). Berry's (1980) well-known framework for cultural adaptation was one of the earliest bidimensional approaches to cultural adaptation, as it discusses both the maintenance of relations with other ethnocultural groups and the maintenance of cultural heritage. With few exceptions (e.g., Lai, 2012), the definition and measurement of cultural identity and adaptation among older Chinese in Canada remain unclear.

The literature on cultural adaptation and mental health among older Chinese immigrants is small but suggests the importance of assessing both acculturation and enculturation, and examining these dimensions separately. Among Korean American older adults, those low in acculturation were less likely to endorse positive affect on measures of depressive symptoms (Jang Kim, & Chiriboga, 2005). Among older Chinese American immigrants, those with higher levels of acculturation were more likely to perceive a mental health need (Nguyen, 2011). These findings suggest that increased acculturation might facilitate the use of mental health services, and perhaps positively influence attitudes towards seeking mental health services. An important caveat is that these studies used acculturation proxies (e.g., English proficiency) rather than specific measures of acculturation/enculturation.

With respect to enculturation, research indicates that maintenance of cultural beliefs, values, and behaviours is high among Chinese Canadian older adults. Traditional health practices, use of traditional Chinese medicine (TCM), and health maintenance using preventive diet are widely reported behaviours among Chinese Canadians over the age of 55 (Lai & Surood, 2009). Moreover, Canadian immigrants from Mainland China with lower education and a non-Western religion have reported higher levels of identification with traditional Chinese health beliefs and practices (Lai & Surood). Lai (2012) reported that, conceptually, ethnic identity among older Chinese Canadians was multidimensional and reflected culture-related activities, community ties, linkage with country of origin, and cultural identification.

For Chinese elders, research has been equivocal as to whether the maintenance of traditional cultural values is protective or a risk factor associated with symptoms of mental illness, such as depression (Lai, 2004; Mjelde-Mossey, Chi, & Lou 2006). Research suggests that the

prevalence rates of psychiatric disorders may be lower in Chinese communities due to the protective advantage of traditional Chinese values and that ethnic identity is a strong predictor of psychological well-being among Asian Americans (Chae & Foley, 2010). However, studies have shown that rates of depression, somatization, and post-traumatic stress disorder among Chinese Americans of all ages are at least as high as those rates for other Americans (Lee, Lei, & Sue, 2001). In addition, a study conducted with Asian immigrant elders over the age of 65 found that stress due to a perceived cultural gap between elders and their adult children was associated with high levels of depression (Mui & Kang, 2006).

Before research on cultural adaptation and mental health among Chinese older adults can proceed, there needs to be greater attention to the bidimensional assessment of acculturation and enculturation in this age group. Studies with younger Chinese individuals often use the Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA; Suinn, Rickard-Figueroa, Lew, & Vigil, 1987). However, the SL-ASIA has been criticized as it is based on a unidimensional model of cultural adaptation (Abe-Kim, Okazaki, & Goto, 2001).

A promising alternative measure is the Vancouver Index of Acculturation (VIA), a bidimensional measure of cultural adaptation that assesses the heritage (enculturation) and mainstream (acculturation) dimensions of culture change (Ryder et al., 2000). However, to date, only one study has used the VIA with older adults. Abu-Bader, Tirmazi, and Ross-Sheriff (2011) examined the relationship between acculturation and depression among older Muslim immigrants (mean age: 63 years) in the United States. Their results indicated that adherence to one's heritage culture was significantly and positively related to depression and accounted for nine per cent of the variance in depression. The relationship between mainstream culture and depression was not significant.

Given the need for further research, this study had two goals: first, to assess the psychometric properties of the VIA with older Chinese adults, including the extent to which the VIA provides incremental information over and above traditional proxies for acculturation; and second, to use the VIA to determine whether acculturation and enculturation are distinct processes among Chinese older adults. It was hypothesized that acculturation and enculturation could be reliably separated as distinct constructs that demonstrate convergent and discriminant validity among Chinese older adults.

Although younger respondents of Chinese descent were well represented in the VIA standardization sample, and the measure has reliably assessed the bidimensional characteristics of cultural adaptation in younger ethnic Chinese, this is the first study to have examined these issues in older Chinese adults (Huynh, Howell, & Benet-Martinez, 2009; Ryder, Alden, & Paulhus, 2000). This study is part of a larger investigation of the effects of acculturation and enculturation on attitudes towards mental health help-seeking among older adults (Tieu, 2013).

Methods

Participants and Procedure

In total, 149 Chinese Canadian immigrants, age 55 and older, were recruited for the study. All were born outside of Canada and self-identified as being of Chinese descent. Participants spoke Cantonese or Mandarin and were community-dwelling individuals or assisted living residents.

Recruitment was conducted at local community organizations and churches serving the Chinese community, one assisted living facility for Chinese residents, and at events for Chinese seniors. Program directors, managers, and event coordinators were approached and provided with information regarding the purpose, intent, and requirements for participation in the study. Presentations to members of these groups were made in Cantonese and Mandarin, and described the purpose of the project and provided some details regarding the nature and content of interviews (e.g., time commitment, areas of focus). In addition, recruitment notices written in traditional Chinese characters were placed under the doors of each unit in the assisted living facility and throughout the Chinese community. The notice described the purpose and nature of the research study and included contact information.

Translation and back translation of the protocol was conducted using the World Health Organization's (2007) guidelines. Separate Cantonese and Mandarin protocols were created to reflect linguistic differences and to ensure accurate phrasing in both languages. Each version had two bilingual translators who independently conducted forward and backward translations. Meetings were held with the four translators and the first author (YT) to discuss discrepancies, and changes to the protocols were made based on unanimous decisions.

The questionnaire was pilot tested with two Chinese older adults for ease of administration, clarity, and length. Both individuals were fluent in Mandarin and Cantonese. Extensive expert consultation was sought with respect to Chinese character selection. The three expert consultants were Chinese and included a research assistant with a background in social work, a professional working in community-based social services for Chinese seniors, and a member of the Chinese

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community. All were fluent in Cantonese and Mandarin, familiar with Chinese culture, and been involved in similar research projects in the past. Experts were consulted and revisions made (a) after the initial translation was complete, (b) after pilot testing, (c) when discrepancies were noted by the translators, and (d) on the final version. Based on this feedback, the Cantonese version of the protocol was translated and back-translated six times, while the Mandarin version was translated and back-translated four times.

Research assistants received four hours of training that included direct observation and feedback from the first author (YT) on administering the protocol. The protocol was administered to participants in their language of choice, either Mandarin or Cantonese. Participants received a copy of the consent/information sheet and their names were entered into a drawing for a $100 gift certificate to a Chinese supermarket, whether or not they completed the protocol. The study was approved by the university research ethics board.

Measures

In addition to socio-demographic information, respondents were asked the following questions: (1) the age at which they had immigrated to Canada; (2) how long they had lived in Canada; (3) amount of Chinese spoken (all, most, or half of the time); (4) ability to speak English (well, a little, not at all); and (5) ability to comprehend English (well, a little, not at all). Health status was assessed with an adapted list of chronic medical conditions previously used with the general Canadian population (Statistics Canada, 2009).

Acculturation and Enculturation

The Vancouver Index of Acculturation (VIA; Ryder et al., 2000) is a bidimensional measure of cultural adaptation that assesses the heritage (enculturation) and mainstream (acculturation) dimensions of culture change across several domains, including values, social relationships, and adherence to traditions. It is a 20-item, Likert-type (1 = *extremely disagree* to 9 = *extremely agree*) scale with two subscales: the Heritage dimension and the Mainstream dimension. An individual's levels of acculturation and enculturation are summarized by calculating a subscale mean for their scores on the Mainstream and Heritage dimensions respectively. Scores on each dimension range from 10 to 90.

Respondents of Chinese descent were well represented in the VIA standardization samples (Ryder et al., 2000). The original standardization sample consisted of 150 undergraduates of Chinese descent. In a replication study, 205 undergraduates identified Chinese as their heritage culture. Of these, 61 per cent were first-generation and 39 per cent were second-generation individuals (Ryder et al.). In these samples, the VIA reliably assessed the bidimensional characteristics of cultural adaptation in ethnic Chinese (Huynh et al., 2009; Ryder et al.).

The VIA and its subscales have demonstrated good internal consistency with various samples. Specifically, alpha coefficients ranged from .83 to .92 for the Heritage subscale and .80 to .89 for the Mainstream subscale among Puerto Rican and Indian American mothers, adults of East Asian descent, Chinese and Indo-Asian immigrants, North American sojourners in Taiwan, and Muslim adults (Asvat & Malcarne, 2008; Hsu et al., 2012; Kennedy, Parhar, Samra, & Gorzalka, 2005; Sood, Mendez, & Kendall, 2012). A meta-analysis of published studies involving the VIA found alpha coefficients that ranged from .66 to .92 for the Heritage subscale (14 studies) and .70 to .89 for the Mainstream subscale (13 studies) for participants with an average age of 22.47 years (Huynh et al., 2009).

The VIA exhibited a two-factor solution encompassing Heritage items and Mainstream items in three Chinese undergraduate samples, ranging in age from 18 to 25 years, using a principal components analysis with promax rotation (Ryder et al., 2000). In addition, the VIA has demonstrated concurrent and convergent validity through statistically significant correlations among the Heritage and Mainstream subscales and a number of key demographic indicators, such as percentage of time lived in a Western English-speaking country, proportion of education taken in Canada or the United States, generational status, and percentage of time that English is spoken at home (Gamst, Liang, & Der-Karabetian, 2011; Ryder et al., 2000; Sood et al., 2012). Ryder et al. reported that, as theoretically expected, the Heritage scale was associated with an interdependent self-identity, the Mainstream scale was associated with an independent self-identity, and high scores on both scales were related to a strong bicultural identity. The VIA has been translated into Chinese, and the version utilized in the current study was obtained from the authors of the Chinese translation (J. Teng and A. Ryder, personal communication, 1 April 2009).

Two additional measures of enculturation, developed for use with Chinese Canadian immigrant populations, were administered. The Chinese Health Beliefs (CHB) scale contains 12 items that assess levels of agreement regarding health beliefs related to eating, health maintenance, and functions of traditional Chinese medicine. The CHB has internal consistencies (Cronbach's alphas) ranging from .80 to .85 for older Chinese Canadians (Lai & Chau, 2007; Lai & Surood, 2009). The Belief in Chinese Culture and Values (BCCV) scale has 11 items and assesses agreement with statements regarding language use, gender roles, interracial marriage, food

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and diet, and parent-child relationships. The BCCV scale has an internal consistency (Cronbach's alpha) of .82 for older Chinese Canadians (Lai & Chau, 2007). Both the CHB and the BCCV are rated on a Likert-type scale (1 = *strongly disagree* to 5 = *strongly agree*). Higher scores indicate a stronger endorsement of Chinese cultural practices, beliefs, and values, suggesting a higher level of enculturation (Lai & Chau). Lai and Chau's translated versions of the scales were used in the current study.

Data Analysis

Internal consistencies of the subscales were assessed with Cronbach's alpha coefficients. VIA subscale intercorrelations were calculated to determine their orthogonality. Concurrent and discriminant validity of the subscales were examined through correlations with age at immigration, years living in Canada, English fluency, the CHB, and the BCCV. Two hierarchical regression analyses were performed to assess the incremental contribution of the VIA in predicting language ability (ability to comprehend English) and Chinese culture and values (the BCCV), above and beyond acculturation proxies (age at immigration to Canada, length of time living in Canada).

Ryder et al. (2000) conducted a principal components analysis and extracted two components, reflecting items on the Heritage and Mainstream subscales, so a confirmatory factor analysis was conducted in the current study to determine the factorial validity of the VIA. Confirmatory factor analyses were conducted using structural equation modelling in AMOS (version 20; Arbuckle, 2011). The following absolute fit indices were evaluated: χ^2, the standardized root mean square residual (SRMR), the adjusted goodness-of-fit index (AGFI), the root mean square error of approximation (RMSEA), and the comparative fit index (CFI). Specifically, χ^2 and its significance level were reported because a significant χ^2 can indicate poor fit (Boomsma, 2000; Cole, 1987). The SRMR is an index that should be less than .05 in a well-fitting model, and an AGFI should be greater than .80 for an indicator of good fit (Byrne, 2010; Cole, 1987). RMSEA values less than .05 indicate good fit, and values between .06 and .08 suggest acceptable fit (Boomsma, 2000; Schreiber, Stage, King, Nora, & Barlow, 2006). The CFI should have a value close to .95 to indicate good fit (Byrne, 2010; Schreiber et al., 2006). In general, a majority of the five indices should fall within the recommended ranges to indicate a well-fitting model (Schreiber et al.).

Results

Descriptive Data

Table 1 indicates the socio-demographic characteristics of the sample. The average age of participants was 73.92 years (SD = 9.99). Respondents reported living in Canada an average of 21.96 years (SD = 11.56) and had immigrated to Canada at an average age of 51.24 years (SD = 16.54). In terms of cultural identity, the majority of respondents saw themselves as "Chinese Canadian" (71%); smaller proportions reported being "Chinese" (24%) or "Canadian" (5%). When asked about satisfaction with reported incomes, three per cent of participants were "very well satisfied", 56 per cent were "adequately satisfied", 22 per cent were "not very well satisfied", five per cent were "very inadequately satisfied", and 15 per cent "did not know." Participants had an average of 3.01 children (SD = 1.75). The average number of individuals in a household was 2.23 (SD = 1.28). Although the majority of participants lived alone (24%) or with their spouses (34%), one-third of respondents lived in multigenerational households (34%), and eight per cent lived in an assisted living facility. Participants reported an average of 2.17 health conditions (SD = 2.02), which is significantly higher than the mean of 1.62 (SD = 1.30) reported by a comparative sample of 55- to 80-year-olds in the 2007 Canadian Community Health Survey (Statistics Canada, 2009) ($t(698) = 3.57$, $p < .001$). Conditions most frequently reported were high blood pressure (38%), arthritis (24%), and cataracts (19%).

Participants who completed the protocol in Cantonese (68%) had resided in Canada for significantly longer than those who completed the protocol in Mandarin (32%), with an average of 25.38 years (SD = 9.76) versus 14.83 (SD = 11.86) years respectively ($t(146) = 5.73$, $p < .001$). There were no group differences on the total VIA or the VIA Mainstream subscale. However, those who completed the protocol in Mandarin had significantly higher scores on the VIA Heritage subscale ($t(147) = –3.29$, $p < .001$).

Psychometric Properties of the VIA Subscales

The mean score for the VIA Heritage Subscale was 70.06 (SD = 10.05) and the Cronbach's alpha was .83. The mean score for the Mainstream subscale was 50.40 (SD 13.10) and the Cronbach's alpha was .84. The mean inter-item correlations for the Heritage and Mainstream subscales were .36 and .34 respectively. In support of the hypothesis that acculturation and enculturation are distinct phenomena in this sample of older Chinese immigrants, scores on the Heritage and Mainstream subscales were not significantly correlated ($r = –.10$, $p > .05$).

Convergent and discriminant validity were assessed with Pearson product-moment correlation analyses between the Heritage and Mainstream subscales and the following measures: (1) the age at which participants had immigrated to Canada; (2) how long they had lived in Canada; (3) their ability to speak English,

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Table 1: Socio-demographic characteristics of the study sample (*n* = 149)

Characteristic		*n*[a]	%
Gender	Female	104	69.8
	Male	45	30.2
Marital status	Single[b]	62	41.6
	Married	87	58.4
Gross monthly income (individual)	Less than $1,499	69	46.3
	$1,500–$4,000+	25	16.8
	Not reported	55	36.9
Living arrangements	Alone	36	24.2
	With spouse	50	33.6
	With spouse and/or extended family	51	34.2
	Assisted living facility	12	8.1
Country of birth	Hong Kong	29	19.5
	Macau	3	2.0
	Mainland China	102	68.5
	Malaysia	3	2.0
	Southeast Asia[c]	10	6.7
	Taiwan	2	1.3
Country prior to Canada	Hong Kong	70	47.0
	Mainland China	54	36.2
	Taiwan	6	4.0
	Vietnam	6	4.0
	Other	13	8.7
Citizenship status	Landed immigrant	42	28.2
	Naturalized citizen	107	71.8
Highest level of education	No formal or elementary school	46	30.9
	Junior or senior high school	51	34.2
	Post-secondary school	52	34.9
Amount of Chinese spoken	All the time	117	79.1
	Most of the time	27	18.2
	Half of the time	4	2.7
Able to comprehend English	No	55	36.9
	Yes; a little	62	41.6
	Yes; well	32	21.5
Able to speak English	No	59	39.6
	Yes; a little	59	39.6
	Yes; well	31	20.8

[a] **Total of percentages may not sum to 100 due to rounding.**
[b] **Single: individuals who were never married and individuals who were divorced/separated/widowed.**
[c] **Southeast Asia: Cambodia, Thailand, Vietnam, Indonesia, and the Philippines.**

and (4) their ability to comprehend English; (5) the Chinese Health Beliefs Scale; and (6) the Belief in Chinese Culture and Values scale. As indicated in Table 2, those with higher scores on the Heritage subscale (i.e., were more enculturated) were older when they immigrated, had lived fewer years in Canada, and endorsed more Chinese beliefs and values. Surprisingly, scores on English proficiency were not related to scores on the Heritage subscale. Conversely, those with higher scores on the Mainstream scale (i.e., were more acculturated) were younger when they immigrated, had better English language skills, and endorsed fewer Chinese beliefs and values. Neither the Heritage nor the Mainstream subscales were significantly related to Chinese Health Beliefs. Thus, in general, correlations were in the expected direction and support the convergent and discriminant validity of the VIA subscales.

Of additional interest was the extent to which the VIA provided additional information, above and beyond frequently used proxy measures of acculturation, age at immigration, and years residing in Canada. To address this question, two hierarchical regression analyses were conducted, with ability to comprehend English and the BCCV as the dependent variables. In both analyses, age at immigration and years residing in Canada were entered in step 1 and the VIA subscales were entered in step 2. Table 3 summarizes the results of the hierarchical regression with English comprehension ability as the dependent variable. Age at immigration and years residing in Canada explained 41 per cent of the

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Table 2: Convergent and discriminant validity of the VIA heritage and mainstream subscales

Variable	1	2
1. Heritage	–	
2. Mainstream	–.10	–
3. Age at immigration	.26**	–.31**
4. Years living in Canada	–.35**	.15
5. Speak English	–.14	.36**
6. Comprehend English	–.10	.38**
7. CHB	.14	.10
8. BCCV	.40**	–.20*

***p* < .05, ****p* < .001 .
BCCV = Belief in Chinese Culture and Values scale.
CHB = Chinese Health Belief scale.

variance in language ability. When the VIA subscales were entered on the second step, the explained variance increased to 45 per cent. The change in R^2 was significant [*F*-change (2, 143) = 4.450, $p = .013$]. Table 4 summarizes the results of the hierarchical regression with the BCCV as the dependent variable. Age at immigration and years residing in Canada explained 6.6 per cent of the variance in the BCCV. When the VIA subscales were entered on the second step, the explained variance increased to 21 per cent. The change in R^2 was significant [*F*-change (2, 143) = 12.745, $p = .000$].[1]

Factor Analysis of the VIA

Given the a priori theory about the bidimensional nature of acculturation, a confirmatory factor analysis (CFA) on the VIA was performed. Tabachnick and Fidell (1989) recommend at least five cases per observed variable, and suggest that a sample size of 100 to 200 is reasonable for most purposes, particularly if the model is not too complex (Kline, 2005). Thus, the sample size of 149 was deemed to be sufficient for the factor analysis.

Results of the CFA showed a lack of support for the hypothesized model reported by Ryder et al. (2000) ($\chi 2$ (169, $n = 149$) = 497.66, $p < .001$, SRMR = .10, AGFI = .69, RMSEA = .12, CFI = .71). Post hoc modifications to the model were not conducted as previous research has not indicated an alternative factor structure for the VIA.

Schmitt (2011) has recommended following up a poor fitting CFA model with an exploratory factor analysis. A maximum likelihood factor analysis with varimax rotation was conducted as the two factors were theorized to be orthogonal, and the factor structure described by Ryder et al. (2000) was replicated (Table 5). Two factors were extracted that explained 38 per cent of the variance. The first factor explained 20 per cent of the variance and included items from the Heritage subscale, while the second factor explained 18 per cent of the variance and included items from the Mainstream subscale. Factor loadings for the Heritage and Mainstream subscales ranged from .31 to .83, and from .45 to .75, respectively.

Discussion

Older Asian immigrants encounter the combined challenges of aging and cultural adaptation, and have to balance adapting to age-related changes, such as declining health, while adjusting to differences in socio-cultural environment, like learning English as a second language later in life (Lee et al., 2001). In their review, Salant and Lauderdale (2003) reported that most studies with Asian immigrants continue to adopt unidimensional models when assessing acculturation. In contrast, the VIA is based on a bidimensional model whereby acculturation and enculturation are viewed as orthogonal constructs. However, studies using the VIA have, with one exception (Abu-Bader et al., 2011), focused exclusively on younger participants and none have focused on older Chinese immigrants. In their sample of 70 immigrant Muslim older adults residing in the United States (mean age: 63 years), Abu-Bader et al. (2011) reported that mean scores on the Heritage and Mainstream subscales were 46.0 ($SD = 5.2$) and 30.4 ($SD = 8.9$) respectively. These mean scores were significantly ($p < .05$) lower than those scores reported in this study,

Table 3: Hierarchical regression predicting English comprehension

Variables Entered	*B*	*SE* (*B*)	ß	*t*	*p*	Variance explained by model (R^2)
Model 1						.410
Age at immigration	–.036	.005	–.799	–7.835	.000	
Years in Canada	–.015	.007	–.223	–2.183	.031	
Model 2						.445
Age at immigration	–.032	.005	–.703	–6.713	.000	
Years in Canada	–.010	.007	–.161	–1.548	.124	
Heritage subscale	.033	.048	.046	.689	.492	
Mainstream subscale	.112	.038	.195	2.938	.004	

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Table 4: Hierarchical regression predicting the BCCV

Variables Entered	*B*	SE (*B*)	ß	*t*	*p*	Variance explained by model (R^2)
Model 1						.066
Age at immigration	–.010	.005	.263	2.050	.042	
Years in Canada	.001	.007	.009	.070	.944	
Model 2						.207
Age at immigration	.008	.005	.211	1.688	.094	
Years in Canada	.007	.007	.116	.935	.351	
Heritage subscale	.234	.049	.376	4.731	.000	
Mainstream subscale	–.058	.039	–.118	–1.485	.140	

BCCV = Belief in Chinese Culture and Values.

indicating greater endorsement of both Heritage and Mainstream items in the Chinese sample.

There are two possible explanations for these results. First, Canada's multiculturalism policy, introduced in 1971 and followed by the Multiculturalism Act of 1988, encourages members of Canadian society to "preserve, enhance, and share their cultural heritage" (Canadian Multiculturalism Act, 1988, Section 3(1)(a)). In contrast, the United States adopts an assimilation or "melting pot" model. Given that both study samples had resided in the host country for over 20 years, it may be that these official multicultural policies influenced the Heritage and Mainstream scales, with Chinese older adults reporting scores that reflected both the retention of their cultural heritage and the adoption of mainstream values. Support for this is found in the only other study to report mean values on the VIA subscales, with first-generation East Asian Canadian university students reporting means of 68.26 (*SD* = 10.54) and 59.91 (*SD* = 11.96) on the Heritage and Mainstream scales respectively (Hsu et al., 2012). These values, particularly on the Heritage subscale, are comparable to those found in this study. Second, the samples were very different in terms of demographic variables. Compared to the participants in this study, Muslim older adults were predominantly male (70%), younger (mean age of 63 years), more likely to be married (81%), and better educated (40% held a graduate degree). While it was beyond the scope of this study to review the relationship between demographic variables and acculturation, it may be the case that sampling differences influenced scores on the VIA subscales. The relationships between demographic variables and acculturation are complex, and findings are often inconsistent. For example, Lai (2012) reported that among older Chinese Canadians, the demographic correlates differed depending on the dimension of ethnic identity under investigation.

Table 5: Results of a two-factor solution using a maximum likelihood factor analysis with varimax rotation[a]

VIA Item	Factor 1	Factor 2
	Heritage Subscale	Mainstream Subscale
1	.31	
3	.36	
5	.63	
7	.59	
9	.63	
11	.59	
13	.73	
15	.71	
17	.83	
19	.61	
2		.56
4		.47
6		.75
8		.74
10		.61
12		.54
14		.48
16		.45
18		.60
20		.57

[a] Factor loadings > .30 are listed.
VIA = Vancouver index of Acculturation.

The internal consistencies of the Heritage and Mainstream subscales were good for this sample at .83 and .84 respectively. However, these values were lower than those reported by Ryder et al. (2000) in their sample of 204 Chinese undergraduate students (Heritage = .91, Mainstream = .89) and by Hsu et al. (2012) in their sample of first-generation East Asian students (Heritage = .86, Mainstream = .88).

The results of this study support acculturation and enculturation as distinct processes among Chinese older adults. The Heritage and Mainstream scales were not significantly correlated. Moreover, the VIA subscales demonstrated convergent and discriminant validity in this population. Participants who immigrated at an older age and lived fewer years in Canada had higher

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scores on the Heritage subscale. They were also more likely to endorse Chinese beliefs and values. Conversely, immigration to Canada at a younger age and greater English fluency were related to higher scores on the Mainstream subscale. These individuals were less likely to endorse Chinese beliefs and values.

Interestingly, the Chinese Health Belief Scale was not related to either the Heritage or Mainstream subscales. Measures of cultural adaptation vary widely in terms of their focus on behaviors, values, attitudes, social norms, cultural identification, and language. The VIA was explicitly developed to reflect "values, social relationships, and adherence to traditions" (Ryder et al., 2000, p. 53). Thus, its content is more similar to the Belief in Chinese Culture and Values scale than the Chinese Health Belief scale, which focuses on traditional Chinese health practices (e.g., "one should avoid eating seafood after surgical operation"). In general, cultural adaptation is a theoretical construct that has yet to be fully validated, and measures vary because it is unclear how lifestyle dimensions (e.g., language preferences, ethnic norms) and psychological dimensions (e.g., attitudes, cognitions, behaviours) are affected by culture change (Gamst et al., 2011; Matsudaira, 2006).

Consistent with the work of Ryder et al. (2000), this study also found that the VIA subscales provided incremental predictive power, above and beyond two single-item acculturation proxies: age at immigration and length of time in Canada. Moreover, the scale's brevity and clarity make it an excellent choice for older adults. The Chinese translation provides an additional tool for investigating bidimensional models of acculturation in a population for whom assessment instruments are sadly lacking.

Sampling is both a strength and weakness of this study. The demographic characteristics of the sample were similar to a nationally representative Canadian Chinese sample in terms of place of birth (People's Republic of China or Hong Kong), recency of immigration (22 years), educational level (one-third with post-secondary education), and income (average monthly income of $1,500) (Statistics Canada, 2001). However, women were over-represented (70% in this sample, 54% in the national sample) as were individuals with poor English fluency. Chinese older adults in this study reported lower rates of English language abilities (60% understood at least some English and 63% spoke some English) than the 85 per cent of Chinese Canadians who could carry on a conversation in either English or French (Statistics Canada, 2001). On a positive note, it appears that this study was successful in recruiting older adults who may not have been able to participate in Statistics Canada surveys due to language barriers. These are individuals who are more likely to experience barriers to accessing services. However, recruitment procedures may have also biased the sample, as participants were drawn from Chinese community organizations and a Chinese assisted living facility devoted to maintaining Chinese cultural practices. Additional data analyses indicated that the Heritage subscale was not normally distributed (Shapiro-Wilk = .98, $p < .05$) and was negatively skewed, suggesting that these participants did maintain their heritage culture. Furthermore, because the sample was drawn from community organizations and venues where Chinese people congregate and socialize, it is unlikely that socially isolated or frail older adults were adequately represented.

The study extends research on cultural adaptation by providing evidence for the utility of the bidimensional model of cultural adaptation beyond an undergraduate Chinese sample to Chinese older adults. Understanding and measuring acculturation is important because it is a defining characteristic of highly heterogeneous immigrant populations, and has significant implications for conducting culturally sensitive research and helping minority older adults access services. For example, in the cultural influences on mental health model (CIMH), culture is important for understanding the prevalence, etiology, and phenomenology of distress, as well as the assessment and treatment of mental health problems and help-seeking behavior (Hwang et al., 2008). Research has clearly indicated that Asian cultural beliefs and beliefs about mental illness negatively impact attitudes towards mental health help-seeking (Jang, Chiriboga, & Okazaki, 2009; Jang et al., 2005).

Given that this is the first study to investigate the VIA with older Chinese individuals, future research should replicate this finding in other samples of Asian older adults and other immigrant groups. Chinese Canadian older adults are a diverse group that vary considerably in country of origin, length of residency in Canada, education, religion, and so forth. (Lai & Surood, 2009). Moreover, Huynh et al. (2009) found that the reliability of bidimensional acculturation measures varied by ethnicity, with better reliabilities reported for those of Chinese descent compared to those of Latin descent. Thus, it is important to examine bidimensional measures such as the VIA with other cultural groups.

To the best of our knowledge, the only other study to factor analyse the VIA was Ryder et al. (2000), using a principal components analysis. Although our exploratory factor analysis was able to replicate their two-factor structure, results of the confirmatory factor analyses indicated a poor fit. Although the sample size in this study met the criteria for a simple model, in general, larger sample sizes are better for conducting confirmatory factor analysis (Kline, 2005). Obtaining a sufficiently large and representative sample was a significant

challenge in this study and is a common obstacle in conducting ethnic minority research with older adults.

In addition, test-retest reliability was not evaluated in this study, thus future research should assess the stability of the VIA in this population. Clearly, cultural adaptation is a dynamic process that changes over time, and future research will benefit from a longitudinal perspective. Establishing the stability of bidimensional measures of acculturation is an important first step in this line of research.

Finally, the development of bidimensional measures of acculturation for older immigrant populations will pave the way for new and exciting advances in theory and research. Bidimensional models have been around for some time, (e.g., Berry, 1980); however, theory development has not taken a lifespan perspective and addressed how age, acculturation, and enculturation interact over time. A better understanding of these interactions, for example, in health and mental health domains are promising avenues of future research that could potentially lead to improved access and enhanced utilization of resources among older immigrant populations.

Note

1 Two additional hierarchical regression analyses were performed, with the ability to speak English and the Chinese Health Beliefs Scale as the dependent variables. The VIA subscales provided incremental information above and beyond acculturation proxies in predicting the ability to speak English (*F*-change (2, 143) = 3.51, p = .033]). However, they did not provide incremental information in predicting the Chinese Health Beliefs Scale (*F*-change (2, 143) = 1.60, *p* = .205).

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