

Adaptation to Malay Culture among Non-Malays: The Psychometric Properties of the Vancouver Index of Acculturation (VIA)



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Abstract:

Introduction: The VIA assesses acculturation through two dimensions: (1) retention of one's heritage culture and (2) adaptation to mainstream (host) culture practices.

Objective: To validate the VIA English version for assessing acculturation among Malaysian non-Malays and non-Malaysians within Malaysia's majority Malay cultural context.

Methods: A total of 236 participants, comprising 136 non-Malaysians and 100 Malaysian non-Malays (127 females; mean age = 24.89 ± 5.82), completed the 20-item VIA (10 items assessing heritage culture retention and 10 items assessing mainstream [host] culture adaptation), using a 9-point Likert scale ranging from 1 (strongly disagree) to 9 (strongly agree). Analyses of confirmatory factor analysis (CFA), reliability, known-group comparisons, and a test-retest assessment were performed.

Results: The final CFA model retained 10 items: eight for Domain 1 (heritage culture maintenance) and two for Domain 2 (mainstream culture adaptation). Internal consistency was good for both domains ($\alpha = 0.87$ and $\alpha = 0.85$, respectively). Known-group comparisons (Malaysian non-Malay vs non-Malaysian) showed significant differences ($p = 0.001$ for both domains). Test-retest reliability indicated strong reliability for the heritage domain (ICC = 0.85) and moderate reliability for the mainstream domain (ICC = 0.73), both statistically significant ($p = .001$).

Discussion: The final CFA supports a stable two-domain structure with good internal consistency and test-retest reliability. Group differences indicate varying levels of cultural adaptation.

Conclusion: The dual processes of cultural maintenance and adaptation among non-Malay individuals in Malaysia suggest the potential application of the VIA for assessing acculturation within a predominantly Malay socio-cultural environment.

Keywords: Vancouver index of acculturation (VIA), Cultural maintenance, Psychometric properties, Cultural adaptation, Confirmatory factor analysis (CFA), Validation.

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1. INTRODUCTION

The Vancouver Index of Acculturation (VIA), developed by Ryder *et al.* [1], is among the most widely used instruments for examining acculturation in multicultural and cross-cultural settings (*e.g.*, [2, 3]). Unlike early unidimensional perspectives that conceptualised acculturation as a linear process in which adoption of a new culture necessarily involved the loss of one's original culture, the VIA is grounded in a bidimensional framework. This approach recognises that individuals can simultaneously maintain elements of their heritage culture while engaging with the mainstream culture, allowing for a more nuanced understanding of cultural adaptation and identity negotiation.

The VIA operationalises this bidimensional structure through two independent dimensions—heritage culture orientation and mainstream culture orientation—measured using 20 items rated on a 9-point Likert scale. This structure is consistent with Berry's acculturation model [4], which remains one of the most influential frameworks in acculturation research. Berry conceptualised acculturation as comprising four broad strategies—integration, assimilation, separation, and marginalisation—depending on the relative strength of individuals' orientations toward their heritage and host cultures. Subsequent theoretical developments have expanded this framework in important ways. The Interactive Acculturation Model, for instance, emphasizes the role of host society attitudes and expectations in shaping immigrants' adaptation processes [5]. Similarly, Segmented Assimilation Theory suggests several pathways with respect to adaptation, such as consonant, dissonant, and selective acculturation, associated with different social and economic outcomes [6]. From a motivational perspective, the Dual-Process Motivational Model suggests that acculturation is driven by the combined motivation to preserve one's cultural heritage and to participate in the mainstream culture [7]. Other integrative approaches, such as the incorporation of Antonovsky's salutogenic model, highlight the protective role of sense of coherence in mitigating acculturative stress [8]. More recent work drawing on Schwartz's theory of basic human values further demonstrates how underlying value orientations shape acculturation preferences and outcomes [9]. Longitudinal studies also indicate that acculturation and enculturation trajectories are dynamically linked to psychological well-being over time [10].

The VIA has been successfully applied across a vast array of cultural contexts. It is flexible in conceptual language and is culturally neutral as described in the studies (*e.g.*, [11, 12]). By taking its form, researchers can adapt the terms "heritage" and "mainstream" culture to apply to particular sociocultural contexts, a practice and method that is exceptionally appropriate for multicultural cultures including Malaysia. Among Malay, Chinese, Indian, and other ethnic members of society, social behavior occurs across daily social settings, while distinct cultural practices are preserved.

In the current study, which investigates acculturation among Malaysian non-Malay (Chinese and Indian) and non-Malaysian individuals from the perspective of Malay traditional culture, the VIA offers a relevant theoretical framework for examining acculturation. From Malaysian historical documentation, the presence of non-Malay populations (Chinese and Indian communities) in Malaysia is the result of historical migration. These groups represent the second- and third-largest population groups after the Malays, who form the majority ethnic group, accounting for more than 50% of the population. The migration of Chinese and Indian populations from their homelands (China and India) is believed to have begun as early as the 15th century and continued during British colonization, when many arrived as laborers and merchants. Over time, they established families and expanded across generations. In contrast, non-Malaysians represent more recent immigrants who have come to Malaysia for various reasons, particularly for education and employment.

Heritage orientation is reflected in participants' attachment toward their national or ethnic culture, and mainstream orientation is their interaction with Malay traditional culture, such as its language, customs, values and social practices, in keeping with the heart of Malaysian cultural identity.

Applying the VIA in this context allows for an examination of acculturation as a process of cultural coexistence rather than cultural replacement. For example, individuals who report strong identification with both their heritage culture and Malay culture may be characterised as integrated or bicultural, whereas those who retain strong ties to their heritage culture but show limited engagement with Malay traditions may reflect a separation orientation. Prior research using the VIA consistently demonstrates that integration is associated with more favourable psychological and social outcomes, including better well-being, social adjustment, and intercultural competence (*e.g.*, [13, 14]).

Taken together, the VIA provides a theoretically grounded and methodologically robust framework for examining acculturation within Malaysia's multicultural context. Its bidimensional structure enables a nuanced understanding of how non-Malay individuals navigate cultural adaptation, identity negotiation, and social integration in a society characterized by long-standing ethnic diversity. Accordingly, this study aimed to validate the VIA to determine its appropriateness for assessing acculturation among minority populations in Malaysia—specifically Chinese and Indian groups, as well as non-Malaysian groups—by capturing two key dimensions: the preservation of one's original cultural traditions and the adoption of new cultural practices within the Malay host environment.

2. METHODOLOGY

2.1. Study Design and Procedure

The study protocol was approved by the Human Research Ethics Committee of Universiti Sains Malaysia

(USM/JEPeM/17090391) and was conducted in accordance with the principles outlined in the Declaration of Helsinki. This cross-sectional validation study was conducted between February 2019 and January 2020 in Kota Bharu, Kelantan, Malaysia, and involved adult participants (mean age $\approx$ 25 years) comprising Malaysian non-Malays (Chinese and Indian) (Group 1) and non-Malaysians (Group 2), who were recruited through social media advertisements. Using a convenience sampling method, participants completed two phases of measurement: the VIA for confirmatory factor analysis (Phase 1) and the VIA for test-retest reliability (Phase 2, randomly selected from the CFA sample). Sociodemographic data were also collected.

Eligible participants completed the 20-item original English version of the Vancouver Index of Acculturation (VIA) to assess their acculturation. The 10 items presented in the odd-numbered positions (Q1, Q3, Q5, Q7, Q9, Q11, Q13, Q15, Q17, Q19) measured participants' heritage culture, defined as the cultural background of their family other than Malay culture. This may represent the culture of their birth, the culture in which they were raised, or any cultural background associated with their family. If participants identified with multiple cultures, they were instructed to select the one that had influenced them the most (e.g., Chinese, Indian, or other ethnic groups). For individuals who did not perceive any clear cultural influence, they were asked to identify a culture that had influenced earlier generations of their family. Participants were also required to indicate their specific heritage culture. An example of an item assessing heritage culture is: *"I frequently engage in the traditions of my cultural heritage"*

The remaining 10 items, presented in the even-numbered positions (Q2, Q4, Q6, Q8, Q10, Q12, Q14, Q16, Q18, Q20), measured orientation toward the mainstream (or host) culture. In this study, Malay culture, as the dominant culture in Malaysia, was defined as the host (mainstream) culture. An example of an item related to this domain is: *"I often participate in mainstream Malay cultural traditions."* In these items, the term "American culture" from the original version was replaced with "Malay culture" to align with the objective of this study, which examines acculturation among Malaysian non-Malays and non-Malaysians in relation to Malay cultural orientation.

Participants responded to all items using a 9-point Likert scale, ranging from 1 (strongly disagree) to 9 (strongly agree), by selecting the number that best reflected their level of agreement.

2.2. Psychometric Analyses

Statistical analyses were conducted as follows:

2.2.1. Measurement Model Evaluation

2.2.1.1. Confirmatory Factor Analysis (CFA)

A total of 236 participants (M age = 24.89 years, SD = 5.82) were included in the CFA. The sample comprised

109 males (46.2%) and 127 females (53.8%). Regarding nationality, 100 participants (42.4%) were Malaysian and 136 (57.6%) were non-Malaysian. Most participants held a bachelor's degree (58.1%).

Following Kline's guideline [15], a minimum of 10 participants per freely estimated parameter is recommended. Given the 20-item scale, the required minimum sample size was 200. The present sample ($N = 236$) exceeded this recommendation. Before CFA, multivariate normality was assessed using Mardia's normalized kurtosis, with a critical ratio < 5 indicating acceptable normality [16].

Model identification was determined using degrees of freedom (df), calculated as $df = b - a$, where $b = p(p + 1)/2$ represents the number of unique covariance elements and a represents the number of free parameters. Models were classified as underidentified ($df < 0$), just identified ($df = 0$), or overidentified ($df > 0$).

Model validity was evaluated using overall fit and parameter estimates. Fit indices included chi-square ($p < 0.05$), SRMR ≤ 0.08 , RMSEA ≤ 0.06 , TLI ≥ 0.95 , and CFI ≥ 0.95 [17]. Factor loadings ≥ 0.50 were considered acceptable [18], and multicollinearity between latent variables was assessed using a correlation threshold of < 0.85 [17].

Model refinement was guided by theoretical justification, factor loadings, residuals, and modification indices. Model comparison was supported by Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC), with lower values indicating better fit and parsimony.

2.2.1.2. Internal Consistency and Known-Groups Validity

Raykov's construct reliability was used to assess internal consistency, with acceptable values ranging from 0.70 to 0.95 [19]. Meanwhile, known-groups validity was examined using independent t-tests to compare two domains across two independent groups (Malaysian non-Malay and non-Malaysian).

2.2.2. Model Stability

Test-retest reliability was assessed to examine the temporal stability of the scale [20], indicating the consistency of scores when the instrument is administered at two different time points. A reliable measure is expected to produce stable results over time, reflecting the underlying construct rather than temporary influences such as mood or situational factors. The Intraclass Correlation Coefficient (ICC) was used as the primary index, as it evaluates both agreement and consistency between measurements. Unlike simple correlations, ICC accounts for systematic differences and individual variability. ICC values range from 0 to 1, with values above 0.75 indicating good reliability and values above 0.90 reflecting excellent stability.

In this part, a total of 55 participants were randomly selected from the initial sample. The participants had a

mean age of 23.10 years ($SD = 4.18$). The majority were female (65.4%), while 34.6% were male. Most participants were Malaysian (80.8%), and 19.2% were non-Malaysian. In terms of ethnicity, the largest proportion comprised Chinese participants (71.2%), followed by Indian (9.6%) and others (19.2%). In terms of educational attainment, most participants held a Bachelor's degree (76.9%), while the remainder possessed a Diploma, Master's, or PhD qualification.

3. RESULTS

The mean scores for the *own-heritage* dimension (Domain 1) ranged from 6.04 to 7.35, while the mean scores for the *mainstream (Malay) heritage* dimension (Domain 2) ranged from 3.70 to 7.15. Model specification indicated a calculated df of 169. As $df > 0$, the model was overidentified, allowing model fit to be evaluated.

3.1. Model Validity

Initially, the full model (Model 1) did not demonstrate a satisfactory fit. Three items had factor loadings below 0.50. These items were removed one at a time, starting with the item that had the lowest factor loading during model revision. Item Q4 was first removed due to its low factor loading of 0.355. Next, Q3 was removed with a factor loading of 0.427, followed by Q2, which had a factor loading of 0.450.

Despite these removals, the goodness-of-fit indices were still unsatisfactory; therefore, the modification index (MI) was reviewed. In the next iteration, a correlated error between Q5 and Q7 was added as suggested by the MI. Subsequently, items with low factor loadings-Q12 (0.455), Q14 (0.489), Q10 (0.480), and Q16 (0.485)-were removed. Due to high standardized residuals, items Q19, Q20, and Q18 were also deleted.

In the final model (Model 12), a total of 10 items remained. This final model demonstrated good fit indices, acceptable factor loadings, and no multicollinearity between factors. Moreover, the AIC and BIC values showed a decreasing trend, indicating an improvement in model fit. Table 1 presents the fit indices for both the original and final models. Meanwhile, Table 2 below presents the list of factor loadings for all items in the original model and final model of VIA.

In the final model, there was one correlated error covariance between items Q5 and Q7 ($r = 0.578$). The correlation between the *own heritage* and *mainstream (Malay) heritage* factors was $r = 0.334$. No multicollinearity was detected, as none of the correlations exceeded 0.85. Therefore, the correlations between factors were considered acceptable.

Table 1. Fit indices for original model and revised model.

Model	χ^2 (df), p -value	SRMR	RMSEA (90% CI)	CFI	TLI	AIC	BIC
Model 1 (original model)	562.49 (169), <0.001	0.101	0.114 (0.104,0.125)	0.763	0.734	18235.03	18377.05
Model 12 (final model)	53.33 (33), 0.014	0.063	0.065 (0.030, 0.097)	0.971	0.960	8726.48	8802.68

Table 2. Factor loadings of original model and final model of VIA.

Factor	Item	Factor Loading (original model)	Factor Loading (final model)
Own Heritage	Q1	0.579	0.579
	Q3	0.427	-
	Q5	0.705	0.582
	Q7	0.776	0.668
	Q9	0.685	0.665
	Q11	0.716	0.786
	Q13	0.735	0.805
	Q15	0.789	0.845
	Q17	0.681	0.654
Malay Heritage	Q19	0.802	-
	Q2	0.461	-
	Q4	0.355	-
	Q6	0.767	0.840
	Q8	0.701	0.870
	Q10	0.555	-
	Q12	0.516	-
	Q14	0.612	-
	Q16	0.619	-
	Q18	0.624	-
	Q20	0.627	-

To provide evidence of known-groups validity, an independent samples *t*-test was conducted to examine differences in VIA scores between Malaysian and non-Malaysian participants. Independent samples *t*-tests revealed significant differences in both *own heritage* and *mainstream (Malay) heritage* scores of the VIA between Malaysian and non-Malaysian participants. Malaysian participants ($M = 7.12$, $SD = 1.13$) scored significantly higher on *own heritage* compared to non-Malaysian participants ($M = 6.47$, $SD = 1.65$), $t(232.86) = 3.57$, $p = .001$. Similarly, Malaysian participants ($M = 6.63$, $SD = 1.41$) scored significantly higher on *mainstream (Malay) heritage* compared to non-Malaysian participants ($M = 5.93$, $SD = 1.82$), $t(233.35) = 3.33$, $p = .001$.

3.2. Model Reliability

Both factors of the revised VIA model have good reliability as indicated by Raykov's rho values, *i.e.*, 0.87 for the *own heritage* domain and 0.85 for the *mainstream (Malay) heritage* domain. In terms of test-retest reliability, the average ICC of 0.85 was found for the *own heritage* domain, with a 95% confidence interval ranging from 0.74 to 0.91, $F(51, 51) = 6.59$, $p = .001$. Meanwhile, a moderate test-retest reliability was revealed by the *mainstream (Malay) heritage* domain with an ICC of 0.73, with a 95% confidence interval ranging from 0.53 to 0.85, $F(51, 51) = 3.73$, $p = .001$.

4. DISCUSSION

This study evaluated the psychometric performance of the Vancouver Index of Acculturation (VIA) within a Malaysian sample. The final model retained ten items, comprising eight items representing the heritage culture domain and two items reflecting orientation toward Malay culture as the mainstream domain. Overall, the model demonstrated acceptable fit indices, satisfactory factor loadings, and good internal consistency. In addition, the instrument showed adequate temporal stability over a two-week interval, supporting its reliability for repeated measurement. Taken together, these findings suggest that the revised VIA may serve as a useful instrument for assessing acculturation orientations in the Malaysian context, although further validation with broader samples is recommended.

The reduction of the original 20-item scale to a more concise 10-item version underscores the importance of cultural sensitivity when applying Western-developed instruments in non-Western settings. Similar patterns have been noted in previous studies. For example, research conducted among East Asian populations in the United Kingdom found that several items in the original VIA showed weak factor loadings, leading to a refined 17-item model with improved psychometric performance. These results point out that the interpretation and relevance of acculturation items may differ across cultural contexts, especially in regard to an understanding and relationship to "mainstream" culture [21]. Comparable observations have been reported in studies involving Filipino adolescents in Canada, where certain mainstream-oriented items were interpreted differently from those by

Chinese participants [22]. Likewise, research involving Hong Kong Chinese students who migrated to Vancouver, Canada, has shown that collectivist values and strong family obligations can influence responses to heritage-related items [23]. Reviews of measurement tools in multicultural health research note that the VIA has been applied and validated with diverse cultural groups (*e.g.*, refugees), yet it also underscores the importance of ensuring that instruments are culturally appropriate and psychometrically sound when applied beyond their original development context [24]. Together with the present findings, this body of evidence highlights the importance of establishing construct equivalence before applying acculturation measures across cultural groups.

The revised Vancouver Index of Acculturation (VIA) demonstrated good internal consistency in the present study, in line with findings from earlier research involving Asian populations. For instance, a study among older Chinese Canadians reported strong reliability coefficients, with Cronbach's alpha values of .84 for the mainstream subscale and .83 for the heritage subscale, indicating satisfactory internal consistency [25]. The current findings are consistent with these results and suggest that the VIA is effective in capturing the dual processes of cultural maintenance and cultural adaptation. Similar evidence has also been reported in studies involving Chinese international students, where the VIA demonstrated strong internal reliability and robust psychometric properties [26]. Also, the present findings additionally indicated that Malaysians scored significantly higher than non-Malaysians on both their own heritage and Malay mainstream orientation, providing support for known-groups validity. Taken together, these findings indicate the potential applicability of the VIA in Asian populations; however, further validation is warranted due to the reduction in the number of scale items. This is particularly relevant in the Malaysian context, where long-standing interactions among Malay, Chinese, Indian, and other cultural groups necessitate an instrument capable of meaningfully assessing multiple cultural orientations within a multicultural society. However, the revised model was derived based on modifications within the same dataset and was not cross-validated using an independent sample. Therefore, the findings should be interpreted with caution, and future studies are needed to confirm the stability of the model in different samples.

Evidence of temporal stability over two weeks provides preliminary support for the stability of the VIA. This stability is consistent with previous research indicating that acculturation orientations tend to remain relatively stable over short intervals (*e.g.*, [1, 27]). In collectivist societies such as Malaysia, where cultural values and social affiliations are strongly embedded [28-31], such stability is both theoretically and empirically expected.

Recognizing gaps in the current literature, recent reviews have also emphasised the need for rigorous psychometric evaluation of acculturation measures, particularly in Asian populations. One recent review noted that although acculturation research among international

students has expanded substantially, relatively few studies have systematically evaluated the measurement quality of the instruments used [32]. Similarly, a 2024 scoping review reported that inconsistencies in measurement validity may partly explain mixed findings regarding the relationship between acculturation and well-being among South Asian adolescents [33]. The present study responds directly to these concerns by providing empirical evidence for the cultural suitability and psychometric soundness of the VIA within the Malaysian context.

CONCLUSION

This study provides preliminary evidence for the potential use of a culturally adapted Vancouver Index of Acculturation (VIA) in assessing acculturation among Malaysians. The findings are generally consistent with the bidimensional nature of acculturation and indicate acceptable internal consistency and temporal stability for the retained items. However, these results should be interpreted with caution. Several limitations need to be acknowledged, including the limited representation of various ethnic groups in the sample and the need for further validation using other relevant psychological and behavioral constructs. Future research with larger and more diverse samples is recommended to further examine the psychometric properties of the instrument in the Malaysian context.

AUTHORS' CONTRIBUTIONS

The authors confirm their contributions to the paper as follows: N.S., N.Y.: Study conception and design; N.S.: Data collection; N.S., N.Y., R.A.: Analysis and interpretation of results; N.S., N.Y., R.A.: Draft manuscript. All authors reviewed the results and approved the final version of the manuscript.

LIST OF ABBREVIATIONS

VIA	= Vancouver Index of Acculturation
CFA	= Confirmatory Factor Analysis
SRMR	= Standardized Root Mean Square Residual
RMSEA	= Root Mean Square Error of Approximation
TLI	= Tucker-Lewis Index
CFI	= Comparative Fit Index
AIC	= Akaike Information Criterion
BIC	= Bayesian Information Criterion

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study protocol was approved by the Human Research Ethics Committee of Universiti Sains Malaysia (USM/JEPeM/17090391).

HUMAN AND ANIMAL RIGHTS

All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

Research data can be provided upon request.

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CONFLICT OF INTEREST

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