

Attitude Towards the Ad: Assessing Measurement Invariance In Cross-Ethnic Research

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Abstract

The use of common psychometric scales on respondents from different cultures is common in cross-ethnic research. However, measurement instruments developed in the West often do not translate well to other contexts. In order for significant comparisons to be made, scales have to exhibit cross-national equivalence. However, this may not be sufficient as ethnic differences may inhibit generalization. Scales to measure attitude towards the ad, for example, are commonly used to assess the effectiveness of advertising campaigns. In this study a multi-item scale for measuring attitude towards the ad, which was developed in the West, is tested in Malaysia, in a multi-ethnic situation. The results indicate that there are differences in how the various ethnic groups respond to the questions. This has important implications for cross-cultural and cross-ethnic marketing research and practice.

Keywords: Invariance, cross-cultural, ethnic.

Introduction

Most marketing scales have been developed and tested in the West. Some have been shown to not travel well across ethnic groups (Weinfurt & Moghaddam, 2001) but nevertheless many multi-item scales are still used without considering whether they exhibit cross-cultural equivalence. This limits any meaningful comparisons and generalizations. Without evidence of measurement invariance, the cross-cultural findings of such studies must be considered weak or possibly wrong (Horn, 1991; Weinfurt & Moghaddam, 2001).

Many studies have assessed the cross-national measurement invariance of consumer behavior and marketing measures (Arrindell et al., 2001; Byrne & Campbell, 1999; Durvasula, Lysonski & Watson, 2001; Eid, Langeheine & Diener, 2003; Yoo & Donthu, 2002). However, relatively few studies have investigated cross-ethnic impacts on invariance (e.g. Laroche, Kim & Hui, 1997; Neff, 2001; Oetting, Swaim & Chiarella, 1998). Yet cross-cultural differences are likely to be significant, especially in multi-ethnic countries such as Malaysia.

Understanding ethnicity is seen as crucial in understanding the functioning and viability of Malaysia's multi-cultural society (Abraham, 1999). Malaysians tend to identify themselves by ethnic groups and not nationality. Ethnic divisions in Malaysia are based on language use (Platt, 1981; Watson, 1980b) in both formal and informal situations (Abraham, 1999). The ethnic diversity in Malaysia is divisive, with individual ethnic groups having their own perceptions of social reality (Milne, 1978). This means that cross-national marketing research that attempts to make comparisons and generalizations about Malaysian consumers, instead of Malay, Chinese, Indian or Iban sub-groups, is likely to be questionable.

This paper addresses the issue of cross-cultural equivalence by applying the framework proposed by Steenkamp and Baumgartner (1998) to assess the cross-ethnic invariance of a scale used to measure attitude towards the ad.

Research Method

Numerous studies have looked at viewer's attitude towards the advertisement (A_{AD}). Earlier work had developed versions of a theory of A_{AD} (Lutz, 1985; MacKenzie & Lutz, 1989; MacKenzie, Lutz, & Belch, 1986). It is held that advertising content and imagery (Miniard, Bhatla, & Rose, 1990; Mitchel, 1986) affect cognitive responses and A_{AD} , which in turn affect attitude towards the brand (A_B) (Biehal, Stephens, & Curlo, 1992; MacKenzie et al., 1986; Miniard et al., 1990) and purchase intention (Brown & Stayman, 1992; MacKenzie & Lutz, 1989). It is therefore an important measurement with a long history.

The initial scale, created by Henthorne, LaTour & Natarajan (1993), was chosen because it was a short self-report, in line with the study objectives, and has been used in a previous study, therefore enabling verification of its reliability, validity and generalizability. The initial scale was a four-point six-item scale. The initial scale had a Cronbach's alpha of 0.77 but no examination of the validity of the scale was reported. This scale was modified to suit the authors' research into the unintended effects of targeted advertisements (adding three more questions) and presented to respondents as a nine-item seven point Likert scale. The questions were translated from English into the Chinese, Malay and Iban languages used in Malaysia and then back-translated into English to ensure that audiences from different ethnic groups were being asked the same questions. The questions are presented in Table 1.

Table 1: Statements Used in the Attitude Towards the Ad Measurement Scale

Question	Statements Used:
1	The advertisement is good.
2	The advertisement is interesting.
3	The advertisement is informative.
4	The advertisement is appropriate.
5	The advertisement is easy to understand.
6	The advertisement is objective.
7	The advertisement is distinctive.
8	The advertisement is inappropriate. (reverse scored)
9	The advertisement is offensive. (reverse scored)

The sample populations for the current study were soft drink consumers in Sarawak, Malaysia, who identified themselves as belonging to the Malay, Iban, or Chinese ethnic groups. Convenience sampling was utilized, as this method has been suggested as satisfactory for theory-testing purposes (Mittal, 1995). The survey instrument was administered to 1173 respondents, with 376 identifying themselves as Iban, 405 Malay, and 392 Chinese. They were asked to comment on their attitude towards the ad after being shown a mock print advertisement by a fictitious Malaysian soft drink manufacturer.

Exploratory factor analysis, using the *SPSS v.10* statistical program, was used to assess the latent structure and variance of the attitude towards the ad construct in the Malaysian context. Confirmatory factor analysis (CFA), using the *AMOS 4* statistical program, was used to determine the measurement model (Bollen, 1989), configural invariance model, metric invariance model and scalar invariance model (Steenkamp & Baumgartner, 1998). The scale presented in Table 1 was then adjusted (i.e. measurement items were deleted) to obtain the best-fit statistics for a common scale that could be used to measure attitude towards the ad

from the perspective of ethnic Iban, Malay and Chinese soft drink consumers in Malaysia. The results before and after CFA are presented in Table 2.

Table 2: Results of Exploratory (EFA) and Confirmatory Factor Analysis (CFA)

Measure		EFA	CFA
Overall	Items	9	5
	Range	1 - 7	1 - 7
	Factors	2	1
	Variance	49.78	43.86
	Mean	3.9	3.7
	Std. Dev.	1.0	1.3
	Alpha	0.80	0.65
Iban	Mean	3.9	3.6
	Std. Dev.	1.1	1.5
	Alpha	0.82	0.74
Malay	Mean	3.9	3.7
	Std. Dev.	1.1	1.4
	Alpha	0.83	0.74
Chinese	Mean	3.8	3.8
	Std. Dev.	0.8	1.0
	Alpha	0.74	0.58

Findings

The initial findings indicated weakness in the original, single-factor scale, with exploratory factor analysis suggesting a two-factor model (see Table 2). In the initial run of the CFA with a two-factor model, though, the iteration limit was reached and the results that followed were therefore incorrect (see Table 3). The unidentified markers were only for Chinese respondents and required additional parameters. A second run for equality of covariances and means was conducted using only one model, which yielded a Chi-square value of 275.404 with 60 degrees of freedom ($p < .000$), and RMSEA of 0.055. Test of fit statistics were CMIN/df = 4.590, GFI = 0.947, AGFI = 0.904, and CFI = 0.895. It was apparent that several items in the initial model were responsible for the overall lack of fit. A critical ratio of less than 1.9 was observed and necessitated further pruning based on modification indices and standardized residual covariances indexes (Byrne, 2001; Kaplan, 1989; MacCallum, Roznowski, Mar, & Reith, 1994; Steenkamp & Baumgartner, 1998).

The four items that were dropped were:

- The advertisement is good;
- The advertisement is interesting;
- The advertisement is distinctive; and
- The advertisement is inappropriate.

The first two questions were from the original Henthorne et al. (1993) instrument, while the last two were added by the researchers for the purposes of the wider study, which was to investigate the unintended effects of ethnically-targeted advertising.

The corrected model was then fixed with a loading of one to Question 5 and its intercept to zero. The configural invariance model (CIM) produced a Chi-square of 26.867 with 15 degrees of freedom ($p < 0.03$), and RMSEA of 0.026 (see Table 3). Test of fit statistics were CMIN/df = 1.791, GFI = 0.991, AGFI = 0.973, and CFI = 0.987. Factor loadings were

significant for all ethnic groups. Evidence of configural invariance across the three ethnic groups for the measurement scale was shown.

Table 3: Model Comparisons for Attitude Towards the Ad

Test*	Marker	Chi Sq	df	P	CMIN/df	GFI	AGFI	CFI	RMSEA
MM1	-	0	0			1	-	1	0.144
MM 2	-	275.404	60	0.000	4.590	0.947	0.904	0.895	0.055
MM 3	-	170.739	42	0.000	4.065	0.961	0.922	0.933	0.051
MM4	-	74.472	27	0.000	2.758	0.980	0.953	0.966	0.039
MM 5	-	26.867	15	0.030	1.791	0.991	0.973	0.987	0.026
CIM	Q5	26.867	15	0.030	1.791	0.991	0.973	0.987	0.026
MIM	Q5	37.479	23	0.029	1.630	0.987	0.975	0.984	0.023
SIM	Q5	37.479	23	0.029	1.630	0.994 (RFI)	0.999 (IFI)	0.999	0.023

Note – MM = Measurement Model, CIM = Configural Invariance Model, MIM = Metric Invariance Model, SIM = Scalar Invariance Model

In order to test for metric invariance, the matrix of all factor loadings was constrained. Chi-sq changed to 37.479 with 23 degrees of freedom ($p < .029$), and RMSEA of 0.023. As for the test of fit, the data shows a slight drop (CMIN/df = 1.630, GFI = 0.987, AGFI = 0.975, and CFI = 0.984). Nonetheless, metric invariance is supported. The next step was to impose scalar invariance where intercepts of the invariant factor loadings were constrained to be equal across all ethnic groups. The findings in Table 3 indicate that there were no major changes as compared to the metric invariance test, except that the RFI, IFI, and CFI were better at 0.994, 0.999, and 0.999 respectively. The final model, which retains only five of the original nine questions, is invariant across the three ethnic groups (see Table 4). However, the variance explained by the new model is worse at 43.86% compared to 49.78% for the original model.

Table 4: Results for Items by Ethnicity after SEM for Attitude Towards Ad

Ethnic Group	Measurement Path	Standardized Regression Weight	Critical Ratio
Iban	The advertisement is objective	0.425	11.432
	The advertisement is easy to understand	0.679	4.015
	The advertisement is appropriate	0.679	16.707
	The advertisement is informative	0.708	16.698
	The advertisement is offensive	0.137	4.015
Malay	The advertisement is objective	0.444	11.432
	The advertisement is easy to understand	0.703	4.015
	The advertisement is appropriate	0.760	16.707
	The advertisement is informative	0.741	16.698
	The advertisement is offensive	0.149	4.015
Chinese	The advertisement is objective	0.359	11.432
	The advertisement is easy to understand	0.570	4.015
	The advertisement is appropriate	0.662	16.707
	The advertisement is informative	0.624	16.698
	The advertisement is offensive	0.122	4.015

Implications

It is important for cross-national marketing researchers to note the impact of variance of multi-item scales on their findings and conclusions (Horn, 1991). This paper examines the impact of ethnicity on measurement invariance by utilizing a procedure recommended by Steenkamp & Baumgartner (1998). The findings indicate that ethnicity may affect responses to measurement scales such as attitude towards the ad (A_{AD}) and that this has important implications for utilizing scales developed in the West in Eastern markets.

The results show that a scale developed in the West to measure A_{AD} had to be modified substantially by deleting four of the original nine questions before it could be used to compare the perceptions of consumers belonging to three distinctive ethnic groups in Malaysia. This disparity creates doubt about the veracity of many previous studies that have attempted to make cross-national or cross-ethnic comparisons without first assessing measurement invariance.

A more fundamental concern is whether the final A_{AD} scale measures what it originally intended to. One deleted question was simply a negative rewording (“the advertisement is inappropriate”) of an item used in the original Henthorne et al. (1993) instrument (“the advertisement is appropriate”). The other three deleted items relate more to perceptions of creative elements (“the advertisement is good ... interesting ... [and] distinctive”) rather attitudes related to the overall impact of the ad, which appear to be captured by the remaining five items (see Table 4). However, as Henthorne et al. considered creativity to be an important dimension of attitude towards the ad, this suggests that a limited number of relevant dimensions are being assessed in the current multi-ethnic study. This raises important issues about the relevance, as well as invariance, of scales used in cross-ethnic marketing research, that warrant further research and debate.

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