Psychometric Evaluation of the 6-item Version of the Multigroup Ethnic Identity Measure with East Asian Adolescents in Canada

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Abstract

We examined the psychometric properties of scores on a 6-item version of the Multigroup Ethnic Identity Measure (MEIM) among East Asian adolescents in Canada. A series of confirmatory factor analysis (CFA) was conducted for 4,190 East Asians who completed a provincial survey of students in grades 7 to 12. The MEIM measured highly correlated dimensions of ethnic identity (*exploration* and *commitment*). Further, multi-group CFA indicated that the scale measured the same constructs on the same metric across three age groups and across four groups with varying degrees of exposure to Canadian and East Asian cultures. The findings suggest the short version of the MEIM can be used to compare levels of ethnic identity across different age or acculturation groups.

Keywords

acculturation; adolescent health survey; confirmatory factor analysis; measurement invariance; Asian

Growing numbers of immigrants and ethnic minority people have promoted interest in health issues related to ethnicity. In the field of adolescent development, ethnic identity has been of interest to researchers, as identity formation is a critical developmental task during adolescence. Ethnic identity is a type of social identity. According to Tajfel (1981), social identity is part of a self-concept that is derived from one's knowledge of and values and affections toward one's membership of social group(s). It is thus defined as "one's sense of belonging to an ethnic group and the part of one's thinking, perception, feelings, and behavior that is due to ethnic group membership" (Rotheram & Phinney, 1988, p. 13). Social

identity theory (Tajfel) posits that a sense of belonging and values attached to one's group are a source of psychological well-being. From a developmental perspective, identity is formed through exploring and experimenting alternative directions, values, and beliefs and making a commitment to one's choices (Marcia, 1980, 1994). Likewise, ethnic identity is developed through exploration of the meaning of one's ethnicity and one's commitment to the ethnic group (Phinney, 1992).

Identity development involves an interaction between individuals and their physical and social world (Liebkind, 2006); therefore, its developmental process and significance are not the same across adolescents. Ethnic identity formation can be a challenging and complex task, particularly for ethnic minority adolescents who often encounter discrimination due to negative stereotypes associated with their ethnicity (Costigan, Su, & Hua, 2009; Umaña-Taylor, Diversi, & Fine, 2002). Social identity theory (Tajfel, 1981) suggests that stronger ethnic identity is an asset; it has been associated with better psychosocial functioning such as higher self-esteem, fewer depressive symptoms, and a lower level of anxiety (Costigan, Koryzma, Hua, & Chance, 2010; Smith & Silva, 2011; Umaña-Taylor, 2011).

With increasing recognition of the importance of ethnic identity, particularly for immigrant and ethnic minority youth, the assessment of ethnic identity has become an issue. One of the most widely used scales of ethnic identity is the Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992). The measure has been psychometrically tested with diverse populations, differing by age, ethnicity, and location. Recently, the MEIM-Revised (MEIM-R), a short version of the MEIM, was developed (Phinney & Ong, 2007), but has not yet been tested with adolescents. Thus, the purpose of this study was to evaluate the psychometric properties of scores on the short version of the MEIM among East Asian students in grades 7 through 12.

Measuring Ethnicity

Ethnicity is a complex and abstract term so that there is no universally accepted definition (Clarke, Colantonio, Rhodes, & Escobar, 2008). However, the common elements of the definition involve a subjective belief in common descent and shared cultural characteristics such as beliefs, values, languages, religions, and customs (Clarke et al.; Forbes, 2010; Morning, 2008). In measuring ethnicity, individuals are categorized based on ancestral origins or self-identification with specific cultural groups which they feel they belong to, which is part of ethnic identity (Clarke et al.). Although categorization by ethnic origin appears to be more objective, there is no definite category of ethnicity due to its abstract definition. For instance, the list of ethnic groups differs between the Canadian and American census (Burton, Nandi, & Platt, 2010). Because of historic conflation between ethnicity and nationality and an increasingly diverse population, a number of self-reported options based on self-identification have been constructed. In general, there are four types of self-report options: (a) heritage or national origin categories (e.g., Chinese, Mexican), (b) panethnic categories (e.g., Asian, Latino), (c) hyphenated categories such as heritage- or panethnic-country of residence/nationality (e.g., Japanese-Canadian, Asian-American), and (d) country of residence/nationality only (e.g., Canadian) (Fuligni, Kiang, Witkow, & Baldelomar, 2008;

Kiang, Ferreira, & Fuligni, 2011). Because each study used different ethnic categories, categories in the following literature review were those used by the authors of the study.

Development of the MEIM

The original intention to develop the MEIM was to assess ethnic identity across diverse ethnic groups (Phinney, 1992). Grounded in Tajfel's social identity theory (Tajfel, 1981) and Marcia's developmental perspective (Marcia, 1980, 1994), Phinney (1992) proposed a 20-item ethnic identity measure. Major components of ethnic identity common to all ethnic groups included *Affirmation and Belonging* (five items), *Ethnic Identity Achievement* (seven items), and *Ethnic Behaviors* (two items). The original MEIM also included six items assessing attitudes toward other groups (*Other-Group Orientation* [OGO]), which is not part of, but may interact with ethnic identity. As a result of an exploratory factor analysis (EFA), Phinney selected a two-factor solution for ethnically diverse students in the United States (US): One factor represented *Ethnic Identity* and the other was *OGO*.

Roberts and colleagues (Roberts et al., 1999) examined the factor structure of a 14-item MEIM (not including the six OGO items) among students in grades 6 to 8 from European American, African American, and Mexican American backgrounds. An initial EFA resulted in eliminating two negatively worded items from *Ethnic Identity Achievement*, that may have been difficult for younger adolescents to understand. A subsequent EFA indicated two factors. *Affirmation, Belonging, and Commitment* included five items from the original *Affirmation and Belonging* subscale and two from the original *Achievement* subscale. The other factor, *Exploration* was comprised of three items from *Achievement* and two items from *Ethnic Behaviors*. The two constructs were consistent with the social identity and developmental perspectives. The two factors of ethnic identity were distinct but highly correlated (r 's = 0.70 – 0.75).

Phinney and Ong (2007) recently developed a short version (6-item) of the MEIM. The revised scale consisted of *Exploration* (three items) and *Commitment* (three items). One item from *Exploration* was new, "I have often done things that will help me understand my ethnic background better" while other items were from the 12-item MEIM. Phinney and Ong then conducted confirmatory factor analyses (CFAs) with an ethnically diverse sample of US university students. They found that a correlated two-factor model fit the data. *Exploration* ($\alpha = 0.76$) and *Commitment* ($\alpha = 0.78$) were highly correlated ($r = 0.74$).

Psychometric Testing of the MEIM with Diverse Populations

Many researchers have conducted psychometric analyses of the MEIM with diverse populations both within and outside the US. The two-factor structure continues to be tested. Some studies with adolescents (Dandy, Durkin, McEvoy, Barber, & Houghton, 2008; Gazis, Connor, & Ho, 2010; Pegg & Plybon, 2005; Spencer, Icard, Harachi, Catalano, & Oxford, 2000; Yancey, Aneshensel, & Driscoll, 2001) and adults (Avery, Tonidandel, Thomas, Johnson, & Mack, 2007; Yoon, 2011) have supported this structure, while other studies have not. An analysis of adolescent data in Zimbabwe supported a one-factor solution (Worrell, Conyers, Mpofu, & Vandiver, 2006). A three-factor model (e.g., *Cognitive Clarity, Affective*

Pride, and *Behavioral Engagement*) has been found to be optimal for young adults (Gaines et al., 2010; Juang & Nguyen, 2010; Lee & Yoo, 2004). While studies in Canada have used the MEIM (see review by Costigan et al., 2009) and a special version of the MEIM (Berry, Phinney, Sam, & Vedder, 2006), no psychometric analysis has been reported.

The review of psychometric studies on the MEIM indicated that the factor structure of the MEIM may vary across age or ethnic groups. Older youth, who have a higher level of cognitive ability, may have a well-differentiated and more complex sense of ethnic identity than younger youth (Juang & Nguyen, 2010; Lee & Yoo, 2004). Each ethnic group's unique histories, experiences, and values may result in different ethnic identity development (Cokley, 2007). Mixed findings of prior research thus may suggest that the MEIM is not invariant across age or ethnicity. That is, different groups (e.g., younger teens and older teens) may conceptualize the construct of ethnic identity differently or the scale may not operate in the same way across groups (Byrne, 2008; Cheung & Rensvold, 2002). If a measure is not invariant across groups, we do not know whether differences in observed means are *true* differences in the construct of interest or measurement artifact resulting from different psychometric responses to the scale items (Cheung & Rensvold). Measurement invariance is thus critical in meaningful group comparisons.

Measurement Invariance

Measurement invariance has been widely tested by multigroup confirmatory factor analysis (MG-CFA), and there are four levels of invariance to test. The first level is *configural invariance* to examine if people from different groups have the same conceptual framework to respond to the item (Wu, Li, & Zumbo, 2007). Configural invariance requires an identical factor structure (identical item sets associated with each factor), but not equivalent parameter estimates (e.g., factor loadings) across groups (Gregorich, 2006). Second, *weak invariance* is tested by constraining factor loadings to be equal across groups. This test investigates if the same amount of changes in the latent factor score results in the same amount of change in the observed item score across groups (Wu et al.). A lack of weak invariance may indicate that some items are more salient to the construct of interest for one group than for others (Campbell, Barry, Joe, & Finney, 2008). Third, the test of *strong invariance* assesses not only for equivalent factor loadings but also equivalent item intercepts (i.e., a location where a factor score is zero) across groups (Wu et al.). Equal factor loadings alone are not sufficient to calibrate the same observed item score to the same latent factor score regardless of group membership. The last level of invariance is *strict invariance*, which involves the equality of residual (error) variances. If item residuals include only random errors, not systematic errors, they are expected to cancel out each other, and do not influence invariant item-factor relationships across groups that are tested by strong invariance (Wu et al.). Strict invariance indicates that the measure can be used for reliable comparisons across groups.

Invariance of the MEIM has been investigated in a handful of studies. The factor structure of the MEIM has been equivalent across different ethnic groups (Avery et al., 2007; Gazis et al., 2010; Roberts et al., 1999; Spencer et al., 2000; Yoon, 2011). Of those studies, two reported the equality of factor loadings (Avery et al.; Gazis et al.) but did not achieve the highest level of invariance. Although researchers have compared scores on the MEIM across

ethnic groups (e.g., Gong, 2007; Negy, Shreve, Jensen, & Uddin, 2003), these comparisons may be meaningless without evidence of invariance.

No published studies have examined whether or not the MEIM is invariant across age groups. Cognitive development and ethnic identity development during adolescence may affect the way teens respond to the scale items. Similarly, none has investigated measurement invariance within the same ethnic group with differing levels of acculturation or differing degrees of cultural influences. Cultural characteristics may affect group members' response styles. For example, collectivistic orientation, characterized by conformity and harmony, is associated with a higher middle response bias; individualistic orientation, which values independence and individual competence, is related to a higher extreme response bias (Harzing, 2006; Johnson, Shavitt, & Holbrook, 2011). Due in part to different degrees of influences by overarching collectivistic cultures (e.g., Asian cultures) or individualistic cultures (e.g., North American cultures) among East Asian teens, immigrants and Canadian-born youth may not use the same metric in responding to the MEIM items. In fact, among Asian university students in the US, foreign-born students (versus US-born) and those in the institution with a higher percentage of Asian students tended to have a middle response bias (Wang, Hempton, Dugan, & Komives, 2008). Likewise, ethnic language use, which is an indicator of one's orientation to the ethnic culture (Chia & Costigan, 2006; Greenman & Xie, 2008), may also influence one's response style. The relationship between response styles and acculturation was reported by a study of Hispanic adults (Marin, Gamba, & Marin, 1992). These response biases can be a source of lack of weak and strong invariance (Cheung & Rensvold, 2000; Gregorich, 2006).

The Present Study

Despite numerous studies on the MEIM, there is no psychometric research: (a) using the 6-item MEIM for adolescents, (b) for East Asians living in Canada, or (c) investigating measurement invariance within an ethnic group. The objectives of this study were: (a) to evaluate the psychometric properties of scores on the 6-item MEIM among East Asian adolescents in British Columbia (BC); and (b) to examine measurement invariance across age groups and groups with differing degrees of cultural exposure. The current study focused on adolescents of East Asian backgrounds (Chinese, Korean, or Japanese), as they share many cultural patterns. The "East Asian" group accounts for nearly half of the visibly minority population in BC (Ministry of Attorney General and Minister Responsible for Multiculturalism, 2008).

The following hypothesis was tested:

- H1)** A correlated two-factor model would fit the data better than a one-factor model. In order to answer objective b, the following two research questions were asked:

- RQ1)** Is the 6-item MEIM invariant across early, middle, and late adolescence among East Asian students?
- RQ2)** Is the 6-item MEIM invariant across East Asian adolescents who vary in the degree of exposure to East Asian and Canadian cultures?

Methods

Survey Procedures

Data were drawn from the BC Adolescent Health Survey (BC AHS) of 2008 conducted by the McCreary Centre Society (Saewyc & Green, 2009; Smith, Stewart, Peled, Poon, & Saewyc, 2009). The BC AHS is a cross-sectional survey of adolescent health and risk behaviours and has been conducted every five years. The 2008 survey included a cluster-stratified random sample of students in grades 7 through 12 from more than 1,500 classrooms in public schools in 50 of 59 school districts. The anonymous, paper-and-pencil survey was administered by public health nurses and other trained personnel external to the school in the spring of 2008. With student consent and either parental consent or parental notification, students completed the questionnaires in schools. Approximately 29,000 students provided usable data, with an overall response rate of 66%. More detailed descriptions of the BC AHS have been reported elsewhere (Saewyc & Green). The University of British Columbia Behavioural Research Ethics Board approved both the original survey and this study.

Sample

The sample in this study included any students who selected “East Asian (e.g., Chinese, Japanese, Korean, etc.)” as their ethnic or cultural background(s). Of those East Asian Canadian youth ($N = 4,311$), 4,190 (97.2%), who had no missing responses to the ethnic identity questions, were included in the analysis. About half (52.2%) of the final sample was female. The majority (83.4%) of the sample marked only “East Asian” as their ethnic or cultural background. In addition, 11.7% of the sample reported “East Asian” and “European (e.g., British, French, Irish, German, Dutch, Ukrainian, Italian, etc.)” backgrounds; 3.9% reported “East Asian” and “Southeast Asian (e.g., Cambodian, Filipino, Indonesian, Vietnamese, etc.)” backgrounds.

Measures

Ethnic identity—The 6-item MEIM was used in the 2008 BC AHS to assess the degree of ethnic identity among adolescents in BC (Table 1). Prior to the survey, comprehension and clarity of the measure were tested through focus groups and individual interviews with youth. One item, “*I have often done things that will help me understand my ethnic background better*” was found to be cognitively difficult for students in pilot testing to understand. This item was newly created for the original MEIM-R (Phinney & Ong, 2007) and had been tested only with college student samples. In the BC AHS, it was replaced by a different item from the 14-item MEIM, “*I participate in cultural practices of my own group, such as special food, music, or customs.*”

The 6-item MEIM was scored using a 5-point Likert scale ranging from 1 (*strong disagree*) through 5 (*strongly agree*), so that higher scores indicated stronger ethnic identity. The BC AHS did not ask with which ethnic group students most identify, although students were asked to select one or more cultural or ethnic background(s) from nine response options. An ethnic group with which they most identify may not be consistent with the one(s) chosen as their cultural or ethnic background(s). For example, of 212 Korean American high school

students in Los Angeles (46% U.S.-born and 22% came to the U.S. before the age of 6), 39% self-identified as Korean, 41% as Korean American, and 20% as American (Shrake, 1996). Students who marked “East Asian” as their ethnic background could have identified with “Asian,” “Asian Canadian,” “Chinese,” “Korean Canadian,” “Canadian,” and so on.

Age group—The survey asked about students’ chronological age in years. Three age groups were created according to adolescent developmental stages: (a) early adolescents aged 12–14, (b) middle adolescents aged 15 or 16, and (c) late adolescents aged 17–19 (Table 2). Each stage is marked by significant physical, cognitive, and psychosocial changes (Breinbauer & Matilde, 2005; Saewyc, Taylor, Homma, & Ogilvie, 2008).

Cultural exposure (Acculturation)—Acculturation is the process by which changes in behaviors, norms, beliefs, and values occur as a result of long-term contact between different cultural groups. One group acquires the norms, values, and behaviors of the culture of the other group (generally a dominant group) while interacting with the other group; at the same time, they can maintain some of their original cultural patterns (Berry, 2003). We used a combination of two proxy measures to assess the degree of exposure to Canadian and East Asian cultures: length of time in Canada (an indicator of temporal exposure to Canadian culture) and language spoken at home (an indicator of linguistic exposure to East Asian culture). The two measures have been used as valid proxies for acculturation (e.g., Greenman & Xie, 2008).

Respondents were grouped into four categories based on their answers to the following questions: “How long have you lived in Canada?” and “How often do you speak a language other than English at home?” We referred to those who reported having lived in Canada all their life as Canadian-born students and other students as immigrants. Canadian-born students and immigrant students were then classified into either (a) speaking a language other than English at home most of the time (referred to as speaking a heritage language at home) or (b) speaking a language other than English at home never or sometimes (referred to as speaking English at home). The vast majority (95.4%) of students who spoke a language other than English at home most of the time were single-ethnic East Asians; thus, this was used as a proxy measure of exposure to East Asian cultures. As a result, four groups of East Asian adolescents were created: (a) immigrants speaking a heritage language at home, (b) Canadian-born speaking a heritage language at home, (c) immigrants speaking English at home, and (d) Canadian-born speaking English at home (Table 2).

Results

Data Analysis Strategy

Factor structure—To examine whether a two-factor model of ethnic identity fit the data better than a one-factor model, a confirmatory factor analysis (CFA) was performed using polychoric correlations with a robust maximum likelihood estimation. The use of polychoric correlations is appropriate because individual items with Likert-type response formats are considered ordinal variables, not interval (Joreskog, 1994; Jöreskog & Moustaki, 2001; Kline, 2013). As proposed by Phinney and Ong (2007), the two-factor model had three

indicators of *Exploration* and three indicators of *Commitment*. The one-factor model had all six items that loaded on a single factor of *Total Ethnic Identity*.

CFAs were conducted using LISREL version 8.80 for Windows, with a robust maximum likelihood estimation on polychoric correlations (Jöreskog & Moustaki, 2001). The chi-square (χ^2) goodness of fit test has been used to assess the magnitude of discrepancy between observed covariances and covariances predicted by the model, with non-significant results indicating a good model fit (Davey & Salva, 2010). However, because the χ^2 test is sensitive to sample size, even trivial discrepancies in large samples can result in non-significant findings (Davey & Salva). For this reason, we used other fit indices to assess model fit although χ^2 statistics are reported in tables. Cutoff values were < 0.08 for the root mean square error of approximation (RMSEA), > 0.95 for the comparative fit index (CFI), < 0.08 for the standardized root mean square residual (SRMR) (Brown, 2006; Browne & Cudeck, 1992; Hu & Bentler, 1999).

Measurement invariance—A series of MG-CFA with ordinal variables was conducted using LISREL (Jöreskog & Sörbom, 2006a). Using estimated item thresholds calculated by PRELIS, which were set to be equal across groups, polychoric correlation and asymptotic covariance matrices were computed and used for MG-CFAs by LISREL (Jöreskog & Sörbom, 2006b; Millsap & Yun-Tein, 2004). Following procedures proposed by Wu et al. (2007), configural invariance was tested by constraining an appropriate factor structure determined by previous single-group CFAs (i.e., one-factor or two-factor model) to be the same across groups. The same criteria for single-group CFA described above (RMSEA < 0.08 , CFI > 0.95) were used to evaluate if respondents from different groups had the same basic conceptualization of ethnic identity. Weak, strong, and strict invariance was examined by constraining factor loadings, intercepts, and residual variances, respectively to be equal. Again, chi-square difference tests are sensitive to sample size (Brannick, 1995; Kelloway, 1995); thus as recommended by Cheung & Rensvold (2002), we used a difference in CFI (CFI) to assess differences between nested models. When CFI between two nested models (e.g., configural model and weak invariance model) was less than 0.02, the more restricted model was supported. Only when a less constrained model was supported, the next level of invariance was examined.

Reliability—Using polychoric correlations, we computed the ordinal coefficient alpha. The ordinal alpha corrects for the negative bias in Cronbach's alpha, and thus is a suitable reliability estimate with Likert-type response scales (Zumbo, Gadermann, & Zeisser, 2007; Gadermann, Guhn, & Zumbo, 2012). Criteria to assess the level of internal consistency are the same as Cronbach's alpha (e.g., > 0.8 considered good).

Psychometric Properties of the Scores on the 6-item MEIM

Table 3 presents results of psychometric analysis. The correlated two-factor model, comprised of *Exploration* and *Commitment*, demonstrated an adequate fit to the data (RMSEA = 0.061; CFI = 0.99; SRMR = 0.03). Factor loadings ranged from 0.67 to 0.87. A correlation (r) of the two factors was 0.85. Ordinal alphas were 0.76 for Exploration and 0.87 for Commitment.

In the one-factor model, CFI of 0.98 and SRMR of 0.04 indicated an adequate fit to the data whereas RMSEA of 0.094 exceeded the cutoff value (< 0.08). Factor loadings ranged from 0.63 to 0.85. Ordinal alpha was 0.88.

Measurement Invariance

Table 4 shows the results of a series of MG-CFA. First, configural invariance across different age groups was tested and supported (RMSEA = 0.065, CFI = 0.99). Weak, strong, and strict invariance were also supported (CFI > 0.90). The 6-item MEIM was invariant among early, middle, and late adolescents of East Asian heritage, suggesting that items were interpreted similarly across age groups.

Based on the fit indices (RMSEA = 0.067, CFI = 0.99), configural invariance was supported: The four groups of East Asian teens with differing degree of exposure to East Asian and Canadian cultures had the same conceptual frames when responding to the 6-item MEIM (Table 4). The weak, strong, and strict invariance model fit as well as the configural model (CFI > 0.90). It can be concluded that the scores of the 6-item MEIM carry the same meaning for the four different degrees of cultural exposure groups.

Mean Differences

Measurement invariance was supported across three age groups and four cultural exposure groups; thus, observed mean differences across these groups can be considered true differences in levels of ethnic identity. We compared means across groups using analysis of variance with post hoc least significant difference tests and calculating Cohen's d as an effect size. Data were weighted to adjust for the differential probability of selection, response rates, and proportion of enrollment (Saewyc & Green, 2009). The weighted sample included 4,850 adolescents.

Mean scores on both Exploration and Commitment differed among three age groups, $F(2, 4864) = 9.69, p < .001$ for Exploration; $F(2, 4864) = 5.23, p < .001$ for Commitment. As shown in Table 5, the early adolescence group (ages 12–14) had a lower mean Exploration score than the middle adolescence group (ages 15–16) and the late adolescence group (ages 17–19); and a lower mean Commitment score than the late adolescence group. However, these differences were small, as all Cohen's d s were less than 0.2.

Table 6 presents mean differences across four different cultural exposure groups. Very small effect sizes on Exploration and Commitment were detected between two groups of students speaking a heritage language at home (Cohen's $d = 0.05, p = 0.256$) and between two groups of students speaking English at home (Cohen's $d = 0.09, p = 0.045$), regardless of temporal exposure to Canadian culture (i.e., immigrants or Canadian-born). In contrast, immigrants and Canadian-born students speaking a heritage language at home reported higher levels of Exploration and Commitment than immigrants and Canadian-born students whose primary home language was English, with small to medium effect sizes (Cohen's d s of 0.23–0.49, all $ps < 0.01$).

Discussion

This study investigated psychometric properties of the scores on the 6-item MEIM administered to East Asian adolescents in western Canada. In line with a study of ethnically diverse university students (Phinney & Ong, 2007), the two-factor model demonstrated a better fit than the one-factor model, supporting the first hypothesis. For East Asian teens, ethnic identity was comprised of *Exploration* and *Commitment* components, as suggested by developmental perspectives (Marcia, 1980, 1994). Similar to previous studies (Phinney & Ong; Yoon, 2011), the present study showed a high correlation between the two distinct components of ethnic identity. The correlation of 0.85 among our adolescent sample is higher than 0.74 among university students with a mean age of 20 years (Phinney & Ong) and 0.67 among upper-division undergraduate and graduate students with a mean age of 31 years (Yoon). Unlike adults, adolescents may not have a well-differentiated sense of ethnic identity (Juang & Nguyen, 2010; Lee & Yoo, 2004). In addition, adults with a high level of ethnic identity may be able to maintain a strong sense of commitment to their ethnic groups without a further effort to learn about and understand their groups (i.e., ethnic identity exploration). For these reasons, our adolescent sample may have the higher correlation than those among older samples.

Despite the high inter-factor correlation, ethnic identity assessed by the MEIM-R is interpreted as consisting of two distinct but related components. As argued by Dandy and colleagues (2008), there is a strong theoretical rationale for the distinction between identity exploration and a sense of belonging to a group with which one identifies. The strong association between the two factors is theoretically expected. Exploration requires a certain level of commitment and then leads to a stronger commitment; a commitment to one's ethnic group increases interest in exploration (Phinney & Ong, 2007).

Phinney and Ong (2007) stated that the two subscales may be useful in studying the process of ethnic identity development; the combined scale may be used when the overall strength of ethnic identity is the focus of the study. Researchers may thus use either a combined measure of *Total Ethnic Identity* or two separate subscales of *Exploration* and *Commitment*, depending on their research or practical interests (Phinney & Ong; Roberts et al., 1999).

Ordinal alpha coefficients for *Total Ethnic Identity* and *Commitment* indicated good internal consistency reliability of the items whereas for *Exploration* the alpha coefficient was lower, yet acceptable. The small number of the items in the subscale partially contributed to the lower alpha. However, studies using the 12-item MEIM reported similar levels of Cronbach's alpha for *Exploration* (5 items) and *Commitment* (7 items); for instance, 0.70 and 0.84, respectively (Roberts et al., 1999), and 0.74 and 0.83, respectively (Dandy et al., 2008).

The results of MG-CFAs provided statistical evidence of measurement invariance of the 6-item MEIM. The ethnic identity scale measured the same constructs on the same metric across three age groups of East Asian teens as well as across four groups categorized based on primary home language and years in Canada. Regardless of their developmental levels, linguistic barriers, or cultural differences, younger teens and older teens, and immigrant

students and Canadian-born students had similar conceptual frames, and responded to the items on the 6-item MEIM in a similar way. Contrary to past research, which used the 12-item or 14-item MEIM, that did not ensure higher levels of invariance than weak invariance (e.g., Avery et al., 2007), this study achieved strict invariance. The brevity of the 6-item MEIM may contribute to this finding, although even a simple scale cannot be assumed to be invariant given the potential response style biases. The results also highlight the importance of group or individual interviews and pilot tests with youth to evaluate understandability and clarity of the items, particularly when a measure is administered to new populations.

In this cross-sectional study, levels of ethnic identity exploration and commitment increased from early adolescence (ages 12 – 14) to late adolescence (ages 17 – 19). These differences, although statistically different, were very small. Longitudinal studies have investigated trajectories of ethnic identity during adolescence; however, the findings did not necessarily indicate universal trends in ethnic identity development. A study of African American and Latino youth reported a linear increase in exploration over three years after 8th/9th grades (French, Seidman, Allen, & Aber, 2006). Another study reported a decelerating level of exploration over 4 years after 10th grade, with Latino youth experiencing more deceleration than African American youth, whereas no average growth pattern was found in the development of the commitment aspect (Pahl & Way, 2006). Among Asian, Latino, and European American youth, there was no normative change in either exploration or commitment over four years of high school (from grades 9th to 12th), with an exception of Asian youth indicating a small reduction in a level of commitment over time (Kiang, Witkow, Baldelomar, & Fuligni, 2010). Ethnic identity development patterns varied across individuals and within-individual changes in ethnic identity were associated with family cohesion, proportion of same-ethnic peers, and ethnic centrality (Kiang et al.), and perceived discrimination (Pahl & Way). The declining level of ethnic identity among Asian American youth may be related to acculturation (Kiang et al.). In other words, there are many factors other than developmental stages which influence ethnic identity formation.

Linguistic exposure may be a key factor associated with levels of ethnic identity. Canadian-born East Asian youth speaking a heritage language at home and their immigrant peers had similar levels of ethnic identity; Canadian-born youth speaking English at home and their immigrant peers had only slightly different levels of ethnic identity. On the other hand, small to medium differences were observed between East Asian youth speaking a heritage language at home and their peers speaking English at home. Similar findings were reported by Phinney (2003), who found that ethnic language proficiency, but not generation (US-born or foreign-born), was a significant predictor of ethnic identity among adolescents from Armenian, Vietnamese, and Mexican backgrounds. Oh and Fuligni (2010) also found a significant association between heritage language use with parents and stronger ethnic identity among adolescents from Latino American and Asian backgrounds. Heritage language proficiency is a powerful tool to learn about one's heritage culture, for example, by reading books and talking to same-ethnic members. Adolescents speaking a heritage language at home likely have more opportunities to participate in cultural practices at home or in the community. These opportunities may help developing adolescents' sense of belonging to their culture. At the same time, strong ethnic identity can promote heritage language proficiency. A cross-sectional study of Korean American adolescents showed that

greater family cohesion was associated with stronger ethnic identity, which in turn, was positively associated with heritage language proficiency (Park, 2007). Maintenance of adolescents' or their parental native language becomes challenging as they spend more time in environments where English is the primary language spoken (e.g., schools). Strong ethnic identity may serve as an incentive to maintain heritage language.

Limitations to this study should be taken into account when interpreting the results. First, this was a secondary analysis of existing data. The original survey (the 2008 BC AHS) was not developed specifically for psychometric evaluation of the 6-item MEIM. There would be other approaches to examining the validity of the instrument, such as correlating the 6-item MEIM scores with the 12-item MEIM scores or other ethnic identity measures (e.g., the Ethnic Identity Scale developed by Umaña-Taylor, Yazedjian, & Bámaca-Gómez, 2004). Family ethnic socialization could also be positively correlated with ethnic identity (Juang & Syed, 2010; Umaña-Taylor, Bhanot, & Shin, 2006). Second, the BC AHS did not ask about respondents or their ancestors' countries of origin, groups with which respondents identified, or generational status. We thus treated "East Asians" as one ethnic group in this study although they consisted of youth of Chinese, Korean, or Japanese heritage. The current study assumes that self-reported East Asians have many similarities while recognizing within-group differences in their ethnic identity characteristics. Finally, a limitation inherent to the 6-item MEIM is the small number of items to measure ethnic identity. Compared to the 12-item MEIM, the 6-item MEIM, especially 3-item subscales, are more limited in their ability to measure this multidimensional concept.

Despite the limitations, the 6-item MEIM appears to be a reliable and valid instrument to measure levels of ethnic identity among East Asian adolescents in Canada. Given that ethnic identity is a potential protective factor associated with psychological adjustment and risky behaviors (e.g., Choi, Harachi, Gillmore, & Catalano, 2006; Shrake & Rhee, 2004), it is important to assess its levels and development. This scale is useful particularly when incorporated into large-scale youth health surveys. Such surveys as the BC AHS contain many questions to cover a wide range of areas related to adolescent life, including demographic information, physical and psychosocial health, and social environments and relationships. Therefore, multiple, lengthy measures are not generally feasible, especially when administered to early teenagers or in school settings due to respondent burden and constraints of time. The use of the 6-item measure would thus be a practical choice.

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Table 1

The 6-item Multigroup Ethnic Identity Measure (British Columbia Adolescent Health Survey version)

Factor	Items	Response options
Exploration	• I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree
	• I participated in cultural practices of my own group, such as special food, music, or customs	
	• I have often talked to other people in order to learn more about my ethnic group	
Commitment	• I have a strong sense of belonging to my own ethnic group	
	• I understand what my ethnic group membership means to me	
	• I feel a strong attachment towards my own ethnic group	

Table 2

Characteristics of the Sample

		n	(%)
Age	12 – 14 years old	1,892	(45.2)
	15 – 16 years old	1,325	(31.6)
	17 – 19 years old	973	(23.2)
Cultural exposure	Immigrants speaking a heritage language at home	1,632	(39.1)
	Canadian-born speaking a heritage language at home	697	(16.7)
	Immigrants speaking English at home	507	(12.2)
	Canadian-born speaking English at home	1,336	(32.0)

Table 3

Results of Confirmatory Factor Analyses of the 6-item Multigroup Ethnic Identity Measure

	One-factor	Two-factor	
S-B χ^2 (df)	344.08* (9)	133.34* (8)	
RMSEA (90% CI)	0.094 (0.086, 0.103)	0.061 (0.052, 0.071)	
SRMR	0.04	0.03	
CFI	0.98	0.99	
Standardized factor loadings		<i>Exploration</i>	<i>Commitment</i>
Spending time trying to find out more about group	0.66	0.73	—
Participating in cultural practices of group	0.63	0.67	—
Talking to other people to learn more about group	0.68	0.77	—
A strong sense of belonging to group	0.82	—	0.84
Understanding what group membership means to me	0.79	—	0.79
A strong attachment towards group	0.85	—	0.87
Interfactor correlation	—	0.85	
Ordinal coefficient alpha	0.88	0.76	0.87

Note. S-B χ^2 = Satorra-Bentler scaled chi-square; RMSEA = root mean-square error of approximation; CI = confidence interval; SRMR = standardized root mean-square residual; CFI = comparative fit index.

* $p < 0.001$.

Table 4

Results for Measurement Invariance Tests of the 6-item Multigroup Ethnic Identity Measure (Correlated Two-factor Model)

Model		S-B χ^2 (df)	RMSEA	CFI	CFI
Age					
Configural	Constraining the factor structure to be equal	165.86* (24)	0.065	0.99	—
Weak	Constraining the factor structure and factor loadings to be equal	225.77* (38)	0.060	0.99	0.00
Strong	Constraining the factor structure, factor loadings, and intercepts to be equal	270.29* (50)	0.056	0.99	0.00
Strict	Constraining the factor structure, factor loadings, intercepts, and residual variances to be equal	239.19* (62)	0.045	0.99	0.00
Cultural Exposure					
Configural	Constraining the factor structure to be equal	182.50* (32)	0.067	0.99	—
Weak	Constraining the factor structure and factor loadings to be equal	265.40* (53)	0.062	0.99	0.00
Strong	Constraining the factor structure, factor loadings, and intercepts to be equal	514.58* (71)	0.077	0.98	0.01
Strict	Constraining the factor structure, factor loadings, intercepts, and residual variances to be equal	405.84* (89)	0.059	0.98	0.01

Note. S-B χ^2 = Satorra-Bentler scaled chi-square; RMSEA = root mean-square error of approximation; CFI = comparative fit index; 3 CFI = difference in comparative fit indices

*
 $p < 0.001$.

Table 5

Mean Differences on Ethnic Identity Among Age groups

		12 – 14 years	15 – 16 years	17 – 19 years
<u>Exploration</u>				
M (SD)		3.38 (0.76)	3.45 (0.80)	3.50 (0.76)
Cohen's <i>d</i> (<i>p</i> -value ^a)	vs. 12–14	-	0.09 (.005)	0.16 (< .001)
	vs. 15–16	-	-	0.06 (.108)
<u>Commitment</u>				
M (SD)		3.59 (0.79)	3.64 (0.83)	3.68 (0.80)
Cohen's <i>d</i> (<i>p</i> -value ^a)	vs. 12–14	-	0.06 (.060)	0.12 (.001)
	vs. 15–16	-	-	0.05 (.163)

^aPost hoc least significant difference tests to compare group means

Table 6

Mean Differences on Ethnic Identity Among Cultural Exposure Groups

		Heritage language speakers ^a		English speakers ^b	
		Immigrants (I-H)	Canadian-born (C-H)	Immigrants (I-E)	Canadian-born (C-E)
Exploration					
M (SD)		3.58 (0.72)	3.53 (0.75)	3.36 (0.78)	3.23 (0.81)
Cohen's <i>d</i> (<i>p</i> -value ^c)	vs. I-H	-	0.07 (.141)	0.31 (< .001)	0.46 (< .001)
	vs. C-H	-	-	0.23 (< .001)	0.38 (< .001)
	vs. I-E	-	-	-	0.16 (< .001)
Commitment					
M (SD)		3.81 (0.76)	3.76 (0.78)	3.49 (0.79)	3.42 (0.83)
Cohen's <i>d</i> (<i>p</i> -value ^c)	vs. I-H	-	0.05 (.256)	0.41 (< .001)	0.49 (< .001)
	vs. C-H	-	-	0.35 (< .001)	0.42 (< .001)
	vs. I-E	-	-	-	0.09 (.045)

^aThose who speak a heritage language at home^bThose who speak English at home^cPost hoc least significant difference tests to compare group means