

MULTIDIMENSIONAL ACCULTURATION AMONG SOUTH ASIANS: FACTOR
STRUCTURE OF THE VANCOUVER INDEX OF ACCULTURATION (VIA) AND
RELATIONSHIP TO EATING AND BODY-IMAGE DISTURBANCE

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ABSTRACT

Problem: Eating and body-image disturbance are commonly experienced by young women, and are known risk factors in the development of eating disorders and other psychopathology (Smolak & Striegel-Moore, 2001). Although previously believed to predominantly impact White women, eating and body-image disturbance are now known to be experienced cross-culturally (Soh, Touyz, & Surgenor, 2006). However, research examining the associations between acculturation and eating pathology among ethnocultural groups is mixed. One reason for these conflicting findings relates to inconsistencies in the definitions and measurement of acculturation. Although evidence is mounting in favour of bidimensional acculturation models (i.e., identification with mainstream and heritage culture are considered separate concepts), unidimensional conceptualizations persist (Ryder, Alden, & Paulhus, 2000).

Method: The current study aimed to assess the dimensionality of the Vancouver Index of Acculturation (VIA; Ryder et al., 2000), a commonly used bidimensional acculturation scale, among 276 male and female undergraduate students of South Asian background using confirmatory and exploratory factor analysis (Study 1). Next the associations between these four acculturation factors and eating and body-image pathology were examined using structural equation modeling (SEM) in 191 South Asian undergraduate women (Study 2).

Results: Results indicated that four factors (mainstream traditions acculturation; mainstream social affiliation acculturation; heritage traditions acculturation; heritage social affiliation acculturation) underlie the VIA in this sample (Study 1). The proposed model included indirect paths whereby acculturation factors were associated with eating and body-image pathology through thin-ideal internalization (Study 2).

Conclusions: Results indicated that neither mainstream nor heritage acculturation are wholly protective or harmful in their association with eating and body-image

pathology among South Asian students. Clinical implications, including the development of appropriate campus-wide interventions focusing on media literacy and weight-control beliefs are discussed.

DEDICATION

Dedicated to my great-grandfather, chemist and poet, Professor Puran Singh (1881-1931)

*“Just as the Banyan tree sprouts from a little seed,
so all that you see around in cities and streets, countries and gardens
is the expansion of human thoughts.
Human thought is the seed of this marvelous world...
This expanded world in its fullness is reduced to another mother-suggestion,
a thought, an idea, a seed.
Do ideas govern the world? No, not only do ideas govern,
but the idea itself is the world.”*

Professor Puran Singh

"The Scale of Nature" *Thundering Dawn*, " Vol. 1, No. 111, 1903-04

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Multidimensional acculturation among South Asians: Factor structure of the Vancouver Index of Acculturation (VIA) and relationship to eating and body-image disturbance

This study explores the relationships between bidimensional acculturation, and eating and body-image disturbance in diasporic South Asian women living in Canada. In order to contextualize the importance of this work, the following topics are summarized in the Introduction: First, an overview of demographic changes leading to increasing population diversity is presented. Next, methodological approaches and limitations to cross-cultural research are described. Concepts relating to the operationalization and measurement of acculturation are reviewed, and a summary of the literature on the relationship between acculturation and eating and body-image disturbance in South Asian women follows. Finally, the study purpose and study hypotheses are stated.

Increasing Population Diversity

The Canadian population is becoming increasingly diverse. Results from the 2011 National Household Survey indicate that over six million individuals are foreign-born and account for 20.6% of the total population, the highest proportion among G8 countries (Statistics Canada, 2013). Results from the most recent Canadian Census indicate that the proportion of foreign-born is the highest it has been in 75 years (Statistics Canada, 2007). Not only is the foreign-born population increasing, but it is also growing four times faster than the Canadian-born population (Statistics Canada, 2007).

Further contributing to population diversity is a shifting pattern of immigration, whereby new immigrants are increasingly arriving from Asia rather than Europe. Between 2001 and 2006, 58.3% of new immigrants were born in Asia or the Middle East. By contrast, only 12.1% of new

immigrants were Asian or Middle Eastern-born in 1971 (Statistics Canada, 2007). A similar shift has occurred in the United States (U.S. Census Bureau, 2012).

The increase in immigrants of non-European ancestry has contributed to the growth of the visible minority population. Visible minorities are defined as “persons, other than Aboriginal persons, who are non-Caucasian in race or non-white in colour” (Employment Equity Act, 1995, p. 2). In 2011, of the 19.1% of Canada’s total population identifying as a visible minority, 95.9% settled in large urban cities including Toronto, Montreal, and Vancouver (Statistic Canada, 2013). These patterns of increasing ethnic diversity are unlikely to remit. By 2031, it is projected that the Canadian visible minority population will double and will reach up to 31% overall, and will make up nearly 50% of Toronto and Vancouver’s populations (Statistics Canada, 2010; 2011).

South Asians

Individuals identifying as South Asian represent the largest visible minority group in Canada (Statistics Canada, 2007; Statistics Canada 2013). The term *South Asian* refers to individuals tracing ethnic identity to countries within the Indian sub-continent, including India, Pakistan, Sri Lanka, Bangladesh, and Nepal. Numbering 1.5 million in 2011, South Asians make up nearly 5% of Canada’s total population (Statistics Canada, 2013). The majority of South Asians in Canada trace ancestry to India, followed by Pakistan and Sri Lanka. The South Asian population in Canada most densely populates major urban centres. South Asians are the largest visible minority group in Hamilton, Toronto, Montreal, Calgary, and Edmonton (Statistics Canada, 2013).

Although the visible minority population is expected to increase faster than the general population in the next two decades, notable growth is projected for South Asians in particular. In

Toronto, the South Asian population is expected to triple from 718,000 in 2006 to 2.1 million in 2031, a scenario wherein 24% of the population would identify as South Asian (Statistics Canada, 2010). This increase is attributed to a sustained and consistent pattern of immigration, elevated fertility rates, and an overall younger population compared to other visible minority groups (Statistics Canada, 2010; Statistics Canada, 2011). The most recent census data indicate that the number of people identifying as South Asian rose by 33% between 1996 and 2001, whereas the overall population grew by only 4% (Statistics Canada, 2007).

Despite their increasing demographic presence, little research examines mental health outcomes in South Asians in Western countries. This oversight may be partially explained by a tendency to view South Asians as upwardly mobile and emotionally well-adjusted, which is a false stereotype referred to as the *Myth of the Model Minority* (Das & Kemp, 2007; Museus & Kiang, 2009). This belief emerged from a mainstream view that South Asian immigrants entering the United States from the 1960s onwards were a homogenous hardworking successful and family-oriented community (Atri, Sharma, & Cottrell, 2006; Masood, Okazaki, & Takeuchi, 2009). These generalizations obscure research documenting negative mental health outcomes in South Asians in Canada, the United States, and the United Kingdom (e.g., Bhui, McKenzie, & Rasul, 2007; Rahman & Rollock, 2004; Bhugra, Baldwin, Desai, & Jacob, 1999).

Importance of Cross-Cultural Psychology

The discipline of Psychology has been described as operating under a Eurocentric lens insofar its focus on the impact of cultural factors in research and practice is limited (American Psychological Association, 2008). However, calls for increased attention to cross-cultural factors in theoretical and applied contexts (e.g., Sue, Arrendo, & McDavis, 1992) have resulted in increased attention to issues of cultural diversity. For example, formal guidelines

outlining the importance of considering culture in psychology research, education, practice, and policy provide a framework from which specific strategies aimed at infusing cross-cultural competency in research and practice are recommended (APA, 2008). For example, consideration of acculturation, immigration, and the manner in which culture impacts variables of interest are specifically recommended (APA, 2008, p. 7, p. 12). Given the increasingly diverse ethnocultural landscape, the consideration of cross-cultural issues in research and practice is timely and necessary.

Methodological Approaches in Cross-Cultural Psychology

Various methodological approaches are employed within cross-cultural research. In their review of the history of these methodologies, Matsumoto and Yoo (2006) described the evolution of cross-cultural research approaches by defining several phases of studies characterized by their focus on particular research methods. For example, early stages involved simplistic cross-cultural group comparison studies, whereas later stages focused on defining cultural variables and the explanatory mechanisms through which cultural differences are produced. In the next section, the concept of acculturation is introduced. The importance of acculturation becomes particularly clear when the concept is contextualized as essential within later stages of cross-cultural research.

A large body of cross-cultural research examines how outcome variables of interest differ between two or more cultural groups. These cross-cultural comparison studies are noted to be the backbone of the cultural psychology field (Matsumoto and Yoo, 2006). These comparison studies persist and explore ethnic group differences in mental health outcomes including depression (e.g., Zivin et al., 2010), anxiety (e.g., Asnaani, Richey, Dimaite, Hinton, &

Hofmann, 2010), eating disturbance (e.g., Madanat, Hawks, and Novilla, 2006), and self-esteem (e.g., Katsounari, 2009).

Despite the importance of comparative studies in highlighting that psychological phenomena are not necessarily universal, a review of this literature reveals two interrelated limitations. First, comparison studies presume inter-group homogeneity. This assumption is problematic because it implies that mental health outcomes of interest are consistent within each ethnic group, with little empirical justification (Betancourt & Lopez, 1993; Matsumoto & Yoo, 2006). Second, outcome variables are compared across cultural groups that are defined based on country of birth, immigration status, or self-identified ethnicity. Group membership is therefore conceived as an independent variable and results are attributed to a vaguely defined static cultural mechanism, with no empirical justification, an error termed the *cultural attribution fallacy* (Matsumoto & Yoo, 2006). This assumption is problematic insofar as differences are attributed to “culture” when, in fact these independent variables offer little explanatory value and the specific aspects of culture responsible for differences are not specified (Betancourt & Lopez 2003). Accordingly, cross-cultural psychology research should aim to identify cultural differences in reference to specific antecedent variables (Poortinga, van de Vijver, Joe, & van de Koppel, 1987).

In summary, between-group comparisons assume inter-group homogeneity, do not account for subtle differences in the process of negotiating multiple identities (Brotto, Woo, & Ryder, 2007), and overlook the complexity of cultural factors. Rather than relying exclusively on these inter-group comparisons, researchers have heeded Poortinga et al.’s (1987) call to move beyond an overly simplistic assessment of between-group comparison to assessing well-defined cultural constructs that are presumed to vary individually, such as acculturation.

Acculturation Overview

Consideration and measurement of acculturation offers a more complex and nuanced approach to cross-cultural inquiry than previous cross-cultural comparison methodologies. Redfield, Linton, and Herskovits (1936) were among the first to highlight the importance of studying acculturation. They defined acculturation as “phenomena which result when groups of individuals having different cultures come into continuous first-hand contact” (p. 149). Later, Graves (1967) described psychological acculturation as involving changes occurring in minority groups following continuous first-hand contact with a dominant group. Acculturation may result in modification in aspects of self-identity, attitudes, behaviours, and values (Berry, 1980; Graves, 1967; Kagitcibasi & Berry, 1989; Matsudaira, 2006; Ryder, Alden, & Paulhus, 2000).

Acculturation appears to be associated with mental health outcomes in ethnocultural groups (Matsudaira, 2006). However, reviews of these associations reveal mixed results (e.g., Koneru, de Weisman de Mamani, Flynn, & Betancourt, 2007, Salant & Lauderdale, 2003; Soh, Touyz, & Surgenor, 2006; Wildes, Emery, & Simons, 2001). Inconsistent findings may be related to limitations in how acculturation is measured, which is a problem in the literature related to varying definitions and conceptualizations of the construct.

Acculturation as a Bidimensional Process

Some of the methodological limitations in acculturation research are tied to recent changes in the definition of the construct. In their seminal paper investigating the dimensionality of acculturation, Ryder et al. (2000) distinguished between unidimensional and bidimensional acculturation. Unidimensional conceptions presumed that individual acculturation ranges along a continuum, with complete immersion into one’s mainstream culture on one end and complete immersion into one’s heritage culture on the other (Lara, Gamboa, Kahramanian, Morales, &

Bautista, 2005). A mainstream culture in Canada would be considered the dominant culture that is shared by most Canadians to some extent, whereas a heritage culture would be a culture that is from one's background that differs from the mainstream, such as a South Asian culture. This unidimensional view is problematic as it assumes that heritage and mainstream acculturation are mutually exclusive. That is, one who identifies strongly with their mainstream culture, by definition, identifies weakly with their heritage culture. Unidimensional views of acculturation have been challenged by research indicating that heritage and mainstream acculturation are indeed separable and that heritage and mainstream dimensions are not necessarily strongly negatively correlated (e.g., Dere & Ryder, & Kimayer 2010; Koneru et al., 2007; Matsudaira, 2006; Ryder et al., 2000). Bidimensional models of acculturation posit that identification with heritage and mainstream culture can independently vary (Lara et al., 2005; Ryder et al., 2000), with someone identifying with one, both, or even neither cultures.

Acculturation Measurement

Despite the evidence in favour of bidimensional acculturation, the construct remains inconsistently operationalized and is still often measured in a manner that presumes a unidimensional model. In his review of measures of acculturation, Matsudaira (2006) claims that the majority of self-report acculturation scales reflect a unidimensional framework. These scales do not fully capture the range of cultural identification, as they do not distinguish those who may identify strongly with both heritage and mainstream culture (Keefe & Padilla, 1987; Matsudaira, 2006).

In addition to being measured via self-report instruments, unidimensional acculturation has also been measured via demographic variables such as length of residency in the mainstream culture, place of birth, or generational status. These chronologically reliant proxy measures are

problematic insofar as they assume that acculturation is a passive process and that over time, one loses one's heritage identity in favour of a acquiring a mainstream identity (Brotto et al., 2007, Matsudaira, 2006; Ryder et al., 2000). The use of proxy measures assessing cultural exposure is sometimes useful when insufficient acculturation data are available in study measures (e.g., James, Roberts, Hart, Ghai, Petrovic, & Lima, 2011) they provide a limited and overly simplistic operationalization of acculturation (Matsudaira, 2006; Sue, 2002). Matsudaira (2006) identified several self-report scales which assess heritage and mainstream acculturation separately (e.g., Cortes, Rogler, & Malagdy, 1994; Cuellar, Arnold, & Maldonado, 1995; Dona & Berry, 1994; Flannery, Reise & Yu, 2001, Kotic, 2002; Marin & Gamba, 1996; Nguyen, Messe, & Stollak, 1999; Rudmin & Ahmadzadeh, 2001; Ryder et al., 2000, Stephenson, 2000; Ward & Kennedy, 1994; Zea, Asner-Self, Birman, & Buki, 2003). These bidimensional scales more accurately capture the reality and complexity of cultural identification.

Although there is limited research on the measurement of bidimensional acculturation, key findings have emerged from Canadian research. In their seminal paper comparing unidimensional and bidimensional models of acculturation, Ryder et al. (2000) created the Vancouver Index of Acculturation (VIA), a self-report instrument assessing both heritage and mainstream acculturation. The internal structure of this measure was assessed using principal components analysis (PCA) in a Canadian sample of undergraduate students of East Asian background. Two separate components aligning with mainstream acculturation and heritage acculturation were extracted, thus providing suggesting a bidimensional conceptualization of acculturation.

Despite the evidence in favour of bidimensional acculturation and the existence of bidimensional measures, acculturation remains inconsistently defined and continues to be

measured with self-reported unidimensional scales or with demographic proxy variables. This inconsistency in conceptualization and measurement may explain the variation in documented relationships between acculturation and mental health outcomes (e.g., Koneru et al., 2007).

As a note, although many authors use the terms “host culture” or “dominant culture” to denote an individual's new or mainstream culture, and “ethnic culture” to denote an individual's ancestral culture, these terms are unintentionally loaded with ethnocentric connotations that assume that only non-Europeans are “ethnic” (Matsudaira, 2006; Rudmin & Ahmadzadeh, 2001). The terms “heritage culture” and “mainstream culture” (Ryder et al., 2000) will therefore be used in this paper.

Acculturation and Mental Health Outcomes: Review

Koneru et al. (2007) reviewed 86 studies examining the relationship between acculturation and general distress, substance use, and depression. They identified that the majority of studies examining the association between acculturation and mental health in ethnocultural groups were conducted with Latino and Asian samples. Second, mental health outcomes that were most commonly examined include symptoms of depression, general distress, substance use, and eating disorders. Within each mental health outcome, the direction of association with acculturation is inconsistent. For example, of five studies examining the relationship between acculturation and general distress in Asian samples, two studies indicate that higher acculturation is associated with higher distress, whereas results from four different studies found the opposite effect. Similar inconsistencies in the relationship between acculturation and general distress were also found in Latino samples. Mixed findings were also observed in the relationship between acculturation and depression in both Latino and Asian samples. The authors posited that these inconsistent findings were largely explained by

inconsistent and invalid operationalization and measurement of acculturation across studies. Of the 86 studies reviewed, 30 included single-item proxy measures of acculturation such as place of birth or generational status (e.g., Oppedal, Roysamb, & Heyerdahl, 2005), length of residence in the United States (e.g., Bratter & Eschbach, 2005; Gfroerer & Tan, 2003) and language fluency (e.g., Gowen, Hayward, Killen, Robinson, & Taylor, 1999). Of the remaining studies using self-report scales, a large majority measured acculturation along a unidimensional continuum construct (e.g., Haudek, Rorty, & Henker, 1999; Kuba & Harris, 2001). Salant and Lauderdale (2003) conducted a similar review and also observed inconsistent associations between acculturation and mental health outcomes in Asian samples and attributed disparate findings to the inconsistent measurement of acculturation. These reviews highlight that approaches to acculturation research are limited by a lack of attention to the theoretical conception of acculturation and poor selection of assessment instruments.

An additional methodological flaw in acculturation research has also been proposed. Although many researchers consider the direct associations between acculturation and mental health outcomes, additional more proximal variables, may serve as mechanisms which underlie and explain these relationships. The omission of these intervening variables has been widely cited as a major flaw of acculturation research (e.g., Cummins, Simmons, & Zane, 2005; Koneru et al., 2007; Oppedal, Roysamb, & Sam, 2004; Rahman & Rollock, 2004; Shen & Takeushi, 2001). Researchers highlight the importance of considering hypothesized intervening variables using statistical techniques that assess the extent to which a proximal variable may explain the effect through which acculturation exerts its impact. These “unpacking studies” allow researchers to identify the “active cultural ingredients” that may produce differences in the outcome variables of interest (Matsumoto & Yoo, 2006, p. 241). Eating disorders including

Anorexia Nervosa (AN) and Bulimia Nervosa (BN) are serious mental health problems. An understanding of vulnerabilities contributing to the development of eating disorders is crucial given their elevated mortality rates, particularly AN (Smink, van Hoeken, & Hoek, 2012): Ten percent of individuals with AN will die within ten years of onset as a result of suicide or physiological consequences of starvation (Sullivan, 2002).

Researchers have identified vulnerabilities that may predict the development of eating disorders including problematic behaviours, attitudes, cognitions, and perceptions with respect to eating and body-image. Eating disturbance refers to maladaptive behaviours targeted at losing or controlling weight and shape. These behaviours may include dietary restriction, over-exercising, and inappropriate purging or compensatory behaviours such as self-induced vomiting and maladaptive laxative use (Hilbert, de Zwaan, Braehler, 2012). Eating disturbance also refers to maladaptive cognitions and attitudes towards eating (e.g., being preoccupied with thoughts about eating and controlling one's food intake). Body-image disturbance refers to dissatisfaction with one's body shape or weight (Cooper, Taylor, Cooper, & Fairburn, 1987; Cash & Deagle, 1997). Body dissatisfaction has been well-established as a risk factor in the development of eating disorders (Warren, Gleaves, Cepeda-Benito, Fernandez, & Rodriguez-Ruiz, 2005) and predicts binge eating, purging, problematic laxative use, and restriction (e.g., Gordon, Holm-Denoma, Troop-Gordon, & Sand, 2012; Stice, Mazotti, Krebs, & Martin, 1998). Both eating and body-image disturbance are typically assessed using self-report instruments including the Eating Attitudes Test (EAT-26; Garner, Olmstead, Bohr, & Garfinkel, 1982), the Eating Disorders Inventory (EDI; Garner, Olmstead, & Polivy, 1983), and the Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987).

A large body of research has examined eating and body-image disturbance in non-clinical

samples. There are several important reasons to examine disordered eating and body-image dissatisfaction in non-clinical populations. First, both disordered eating and body-image disturbance are risk factors in the development of clinical eating disorders (Stice, Davis, Miller, & Marti, 2008). Further, researchers have posited that non-clinical eating disturbance is not qualitatively different from symptoms reported in clinical samples; instead they represent two points along the same continuum (Polivy & Herman, 1987). Finally, maladaptive eating and body-image disturbance are also associated with negative mental health outcomes including low self-esteem, depression, and anxiety (Kostanski & Gullone, 1998; Stice, Hayward, Cameron, Killen, & Taylor, 2000).

Eating and body-image disturbance are most often assessed in non-clinical college and university female samples. Women on university campuses have been identified as particularly vulnerable for developing eating and body-image disturbance (Sepulveda, Carrobbles, Gandarillas, Poveda, & Pastor, 2007; Yager & O'Dea, 2008). This tendency is not surprising given that epidemiological studies reveal that the transition between adolescence and adulthood represents a time period of risk for disordered eating behaviours (Smink, van Hoeken, & Hoek, 2012; Striegel-Moore & Bulik, 2007).

Cultural Differences in Eating and Body-image Disturbance

Sociocultural models propose that learned cultural beliefs about body shape preference and attractiveness contribute to the development and maintenance of disordered eating and body-image disturbance (Smolak & Striegel-Moore, 2001; Striegel-Moore & Bulik, 2007).

Specifically, Western mass media outlets widely perpetuate thinness as an ideal body shape in women. When this unrealistic body shape becomes internalized, a discrepancy between self and ideal is created which is theorized to lead to restrictive eating, dietary restraint, and body

dissatisfaction (Striegel-Moore & Bulik, 2007). Numerous studies have documented the positive relationship between media exposure and internalization with disordered eating and body image disturbance. In a meta-analysis of 25 studies, Groesz, Levine, and Murnen (2002) concluded that women increased body dissatisfaction and disordered eating following exposure to images of slender women.

Some research suggests that ethnic minorities are less vulnerable to experience body-image disturbance due to the reduced importance of thinness in certain cultures, including South Asian culture (Grabe & Hyde, 2006; Buhrich, 1981; Nasser, 1988). However, the protective effects of this apparent preference for a larger body size have not been empirically supported (Soh et al., 2006) and mean effect sizes for differences in body-image dissatisfaction across White and non-White samples are small (Grabe & Hyde, 2006). Indeed, several studies indicate that South Asians endorse *higher* levels of body-image dissatisfaction than White comparison groups (e.g., Mumford & Choudry, 2000; Mumford & Whitehouse, 1988). These findings may be unexpected, given the prevailing belief that eating disorders are “Golden Girl” syndromes (i.e., Grabe & Hyde, 2006; Smolak & Striegel-Moore, 2001) or culture-bound syndromes (Prince, 1985; Keel & Klump, 2003) impacting women of upper socioeconomic class (e.g., Bruch, 1973; Morgan & Russell, 1975).

Body-image and Eating Disturbance Among South Asian Individuals

After case reports of South Asian women presenting with anorexia nervosa and bulimia nervosa in Malaysia and in the United Kingdom were reported decades ago (e.g., Buhrich, 1981; Bhadrinath, 1990; Ford & Dolan, 1989; Lacey & Dolan, 1988), researchers became interested in examining vulnerability factors for disordered eating in non-clinical female South Asian samples. Mumford and Whitehouse (1988) were the first to measure body dissatisfaction and

eating disturbance in diasporic South Asian women. They administered the Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987) and the Eating Attitudes Test (EAT-26; Garner, Olmstead, Bohr, & Garfinkel, 1982) to a sample of 14 to 16 year old South Asian and White females in England. Contrary to expectations, they found that South Asians reported significantly higher eating disturbance and reported body-image dissatisfaction at a degree similar to their non-South Asian counterparts. Mumford and Choudry (2000) compared BSQ and EAT-26 scores across three samples: women of South Asian descent living in London, England, women of European descent (English, Scottish, Welsh, and Irish) living in London, and women of South Asian descent living in Pakistan. Self-reported eating and body-image dissatisfaction were most strongly endorsed in both South Asian samples compared to the European sample.

Although most of these studies have been conducted with South Asian samples in the United Kingdom, similar results have been found in North America. In a study comparing self-reported body dissatisfaction among multi-ethnic undergraduate students at a Canadian university, dissatisfaction was second highest in undergraduate students of South Asian descent (highest dissatisfaction was reported by undergraduates of Chinese descent and lowest dissatisfaction was reported by students of European descent; Kennedy et al., 2004). In another study, South Asian-Canadian undergraduates reported greater body dissatisfaction than European-Canadian counterparts (Sahay & Piran, 1997).

These group comparison studies reveal that, contrary to expectations, South Asian women endorse greater eating and body-image disturbance than their non-South Asian counterparts. However, these comparison studies are largely descriptive. Although some authors

briefly mention the potential role of culture with respect to eating and body image disturbance (e.g., Kayano et al., 2008), they do not empirically assess individual-level cultural variables.

Acculturation and Eating and Body-Image Disturbance

Few studies have directly assessed the association of acculturation on eating and body-image disturbance in South Asian samples. As follow-up to their previous studies, Mumford Whitehouse, and Choudry (1992) and Mumford, Whitehouse, and Platts (1991), assessed the impact of “westernization” and “traditionalism” on eating and body-image disturbance in 14 to 16 year old South Asian females. Westernization and traditionalism scores were each derived from two Likert-type items assessing language, food, and dress preference. Contrary to their expectations, those endorsing greater traditionalism endorsed higher eating and body-image disturbance. The authors repeated this study on a sample of 14 to 16 year old South Asian girls living in Lahore, Pakistan and found the opposite effect: those endorsing greater westernization endorsed high body-image and eating disturbance. In another study of South Asian undergraduate women from in the United States, acculturation was not associated with eating or body-image disturbance (Iyer & Haslam, 2003).

Results from the studies above indicate that disturbance in eating and body shape are not culture-bound to European-ancestry or White samples. In fact, South Asian women in the United Kingdom, South Asia, and North America consistently report greater eating and body-image dissatisfaction compared to women of European descent. The impact of acculturation on eating and body-image disturbance is less clear due to inconsistent directions of associations. These mixed findings likely result from inconsistent measurement of acculturation (e.g., Mumford et al., 1991; Wildes et al., 2001), an issue that characterizes research on acculturation and mental

health in general. More formal assessment of bidimensional acculturation in studies of eating and body-image disturbance has been recommended (e.g., Mumford, et al., 1991; Soh, 2006).

The Need For Third Variable Analyses

Investigations into eating disorder vulnerability factors in South Asians have followed a similar evolution to cross-cultural studies in general. First, group comparison studies were conducted comparing eating disorder diagnoses and eating disorder risk factors in non-clinical cultural groups. Next, individual-level eating disorder vulnerability factors (eating and body-image disturbance) were compared across South-Asian and Caucasian samples. Finally, although limited by several methodological and conceptual inconsistencies in the definition and operationalization of acculturation, an examination of the association between individual-level cultural variables followed. The next step involves unpacking studies assessing the mechanisms through which cultural variables may exert their impact (Matsumoto & Yoo, 2006). This assessment can be completed by considering third variables which may mediate the relationship between acculturation and eating and body-image disturbance.

Thin-Ideal Internalization

Thin-ideal internalization refers to the extent to which one adopts and values societal norms and expectations of thinness (Thompson & Stice, 2001; Thompson, van den Berg, Roehig, Guarda, Heinberg, 2003). As discussed, the adoption of the Western body-image ideal is hypothesized as being one pathway through which disordered eating and body-image disturbance is maintained and developed and is proposed to be a mechanism through which cultural factors impact eating disorder symptoms (Mussap, 2009; Thompson & Stice, 2000; Smolak & Striegel-Moore, 2001; Striegel-Moore & Bulik, 2007). Markey (2004) outlined the importance of investigating the mechanisms through which cultural variables impact eating and body image

disturbance. He proposed a model through which cultural factors are related through eating and body image disturbance through intervening variables, including adoption of unrealistically thin body image ideals. Such internalization may occur via exposure to socialization agents including peers, family, and media which glorify thin and slender body shape in women (Markey, 2004; Thompson & Stice, 2001). As previously described, assertions that South Asians are not negatively impacted by Western body image ideals may be overstated. Ethnic minority populations may feel pressure to conform, and may subsequently internalize Western ideals (Sahay & Piran, 1997). Only one known study has examined internalization of a thin-ideal as a mediator of the relationship between bidimensional acculturation and body-image and eating disturbance. Mussap (2009) found that positive relationships between mainstream acculturation and eating disturbance were mediated by thin-ideal internalization in a sample of Muslim-Australian women.

Although advances in the measurement of acculturation have been made, several limitations remain. Inconsistent findings in the literature examining associations between acculturation and mental health outcomes are likely due to inconsistencies in the measurement of acculturation (e.g., Betancourt & Lopez, 2003; Salant & Lauderdale, 2003; Koneru et al., 2007, Lara et al., 2005, Matsudaira, 2006). Further, the role of acculturation on body-image and eating disturbance in diasporic South Asians remains unclear.

Study 1 Overview

Study 1 aimed to assess the dimensionality of acculturation in a sample of South Asian men and women. Acculturation was operationalized as a multidimensional process that is not simply determined by proxy variables such as immigration status or number of years lived in a given culture. Instead, acculturation was measured individually for each participant using a

widely used bidimensional acculturation scale, the Vancouver Index of Acculturation (VIA; Ryder et al., 2000), which includes subscales assessing both mainstream acculturation and heritage acculturation. Although other bidimensional acculturation scales have been developed (see Matsudaira, 2006), the VIA was selected for the following reasons. First, it was initially validated among individuals similar to the current study's target sample (i.e., undergraduate students at a Canadian university; Ryder et al., 2000). Since then, the VIA continues to be used frequently with undergraduate students samples (e.g., Meston & Ahrold, 2007; Ryder, Alden, Paulhus, & Dere, 2013). Another reason for its selection relates to the fact that VIA items address a range of behaviours, attitudes and values. Other scales have been critiqued for their over-reliance on items tapping into very specific acculturation domains such as language proficiency rather than assessing the full context of acculturative experiences (Cabassa, 2003). Finally, the VIA is constructed and worded such that it can be administered to individuals of any ethnic background. Selection of a generalizable measure rather than a measure targeting a single group ensures that the observed models in Study 1 and Study 2 can be confirmed in diverse ethnocultural groups in follow-up studies.

. The validity of the VIA has not been assessed in South Asian men and women. Given the importance of establishing the validity of measures across cultures (Matsumoto & Yoo, 2006), the factor structure of the VIA was assessed prior to examining its relationship with eating and shape disturbance (Study 2).

Study 1 Hypotheses

Hypothesis 1: The VIA will reflect a two-factor (Heritage Acculturation and Mainstream Acculturation) structure based on Ryder et al.'s (2000) findings.

Hypothesis 1a: The 10 Heritage subscale items will relate to a single “Heritage Acculturation” latent variable.

Hypothesis 1b: The 10 Mainstream subscale items will relate to a single “Mainstream Acculturation” latent variable.

Study 2 Overview

Once the factor structure of the VIA was established for South Asians, the relationship between heritage and mainstream acculturation and eating and body-image disturbance was assessed in a sample of South Asian undergraduate women. The relationship between acculturation and eating and body-image disturbance was not simply assessed by examining bivariate correlations, as in many previous studies. Instead, investigation of a possible proximal, intervening variable (i.e., thin-ideal internalization) provided a more complete understanding of the active ingredients in the relationship between acculturation and eating and body-image disturbance (Markey, 2004). Given that acculturation involves changes to attitudes and values, adoption of cultural norms about ideal body size may be impacted by the strength of one’s identification with mainstream and/or heritage culture (Crago & Shisslak, 2003; Mussap, 2009). A model whereby acculturation impacts eating and body-image disturbance through internalization of body image ideals was assessed using structural equation modeling (SEM) so that latent acculturation variables identified from Study 1 could be used in this model. If analyses from Study 1 revealed that the hypothesized two-factor structure offers poor fit for VIA items, hypotheses for study 2 were be revised accordingly.

Study 2 Hypotheses

Hypothesis 2: The acculturation measurement model found in Study 1 will demonstrate good model-data fit in the sample of South Asian women, suggesting that there are no sex

differences in the factor structure of the Vancouver Index of Acculturation (VIA).

Hypothesis 3: Data will support the hypothesized full SEM model such that thin-ideal internalization will mediate the effect of acculturation orientation on disturbed eating attitudes. Specifically;

Hypothesis 3a) Thin-ideal internalization will mediate the relationship between identification with mainstream acculturation and eating disturbance.

3b) Thin-ideal internalization will mediate the relationship between identification with Heritage Acculturation and eating disturbance.

Hypothesis 4: Data will support the hypothesized full SEM model such that thin-ideal internalization will also mediate the effect of acculturation orientation on body-image disturbance. Specifically;

Hypothesis 4a) Thin-ideal internalization will mediate the relationship between identification with mainstream acculturation and body-image disturbance.

Hypothesis 4b) Thin-ideal internalization will mediate the relationship between identification with heritage acculturation and body-image disturbance.

Method (Study 1)

Participants

Participants were 276 undergraduate students enrolled in an introductory psychology course at York University or Ryerson University in Toronto, Canada who self-identified as South Asian (31.2% men, 68.8% women). Participant age ranged between 17 and 34 years ($M=19.58$, $SD= 2.37$). Within this South Asian sample, 54.3% reported being born in Canada. Of those not born in Canada, the most frequently reported countries of birth included India (15.6%), Pakistan (11.2%), and Sri Lanka (8.7%; see Table 1 for additional sample characteristics).

Procedure

Participants were recruited through their respective institution's online sign-up system where they could access a brief study description and inclusion criteria. The study description explained that participants would be requested to answer questions about cultural identity, attitudes related to eating and body-image, and demographic information. Upon signing-up for the study, participants were provided with a website address that linked to an online informed-consent document outlining the study purpose, requirements, risks, benefits, confidentiality, and compensation details. Participants could consent or refuse participation by selecting appropriate hyperlinks. Those who provided consent were linked to the password-protected study measures hosted by the Qualtrics™ survey hosting program. Two participants did not consent to participate and did not complete study measures.

Participants completed the self-report study measures online at a time and location of their choosing within one week of signing-up. Participants received a credit towards their final introductory psychology grade in exchange for their participation. Following completion of the questionnaires, a summary of study goals was presented and telephone numbers for university and community-based counseling and mental health resources were provided. The research ethics boards at both York University and Ryerson University approved study recruitment procedures, methodology, and questionnaires.

Measures

Demographics. Participants reported details about their age, sex, sexual orientation, education level, religion, place of birth, and parental income.

Bidimensional acculturation. The Vancouver Index of Acculturation (VIA; Ryder et al., 2000) is a widely used measure of acculturation (e.g., Grace, 2014; Meston & Ahrold, 2010;

Table 1

Demographic Characteristics for South Asian Sample (N=276)

Characteristic	% (n)
Sex	
Male	31.20 (86)
Female	68.80 (190)
Marital Status	
Single	98.60 (272)
Married	1.40 (4)
Sexual Orientation	
Heterosexual	98.20 (271)
Bisexual	0.70 (2)
Homosexual	0.70 (2)
Refused to answer	0.40 (1)
Education	
1st year university	58.70 (162)
2nd year university	21.40 (59)
3rd year university	15.20 (42)
4th year university	4.70 (13)
Religion	
Hindu	31.50 (87)
Muslim	27.90 (77)
Sikh	23.20 (64)
Christian	7.60 (21)
Mixed ^a	3.60 (10)
Other ^b	2.20 (6)
None or Agnostic	1.40 (4)
Refused to answer	2.50 (7)

(continued on next page)

Table 1 (continued)

Demographic Characteristics of South Asian Sample (N=276)

Characteristic	% (n)
Place of Birth	
Canada	54.30 (150)
India	15.60 (43)
Pakistan	11.20 (31)
Sri Lanka	8.70 (24)
Saudi Arabia	2.50 (7)
Other (Middle East) ^c	2.20 (6)
Bangladesh	1.80 (5)
Afghanistan	1.80 (5)
Other ^d	1.80 (5)
Parental Income	
\$0 - \$19,000	9.40 (26)
\$20,000-\$39,999	16.30 (45)
\$40,000-\$59,999	15.90 (44)
\$60,000-\$79,999	12.00 (33)
\$80,000-\$99,999	10.90 (30)
\$110,000-\$119,999	6.20 (17)
\$120,000 +	6.20 (17)
Did not know	22.10 (61)
Refused to answer	1.10 (3)

Note. ^aIncludes participants who reported two religious affiliations. Mixed religious affiliations included Hindu and Sikh (n=5), Muslim and Agnostic (n=2), Hindu and Christian (n=1), Sikh and Christian (n=1), and Sikh and Agnostic (n=1). ^bIncludes Buddhist (n=3), Zoroastrian (n=1), and Roman Catholic (n=1). One participant in this group did not specify religious affiliation. ^cIncludes Bahrain (n=1), Iran (n=1), Kuwait (n=1), Oman (n=1), and the United Arab Emirates (n=2). ^dIncludes China (n=1), Russia (n=1), England (n=1), Switzerland (n=1), and the United States (n=1).

Ryder, Alden, Paulhus, & Dere, 2013) . The VIA includes 10 items assessing heritage acculturation and 10 items assessing mainstream acculturation. Heritage and mainstream items are presented consecutively and are identical with the exception of the referenced culture. For example, item 1 reads, “I often participate in *my heritage* cultural traditions” and item 2 reads, “I often participate in *mainstream North American* cultural traditions”. Additional acculturation domains assessed include beliefs in values, preferences for entertainment, and maintenance of cultural practices. Items are rated on a 9-point scale ranging from 1 (strongly disagree) to 9 (strongly agree) with higher scores indicating greater acculturation to the referenced culture. Subscale scores are calculated by computing the mean of the 10 subscale items. In the current sample, internal consistency for the heritage subscale was .93 and internal consistency for the mainstream subscale was .87.

Data Analysis Plan

Hypothesis 1. Hypothesis 1 was tested by assessing the fit of a two-factor model based on the factor structure previously found by Ryder et al. (2000). Specifically, each of the 10 VIA heritage items was believed to be an indicator of a single “Heritage Acculturation” factor and each of the 10 VIA mainstream items was believed to be an indicator of a single “Mainstream Acculturation” factor (see Figure 1). Note that residual correlations between pairs of items were assumed, and were included as parameters in the hypothesized model: Although consecutive heritage and mainstream acculturation items differ with respect to referenced culture, they are otherwise identical with respect to content. This hypothesized two-factor model was estimated using maximum likelihood confirmatory factor analysis (CFA) based on Pearson product-moment correlations. Although observed variables are ordered item response variables, methods often employed for categorical variables (e.g., analyses of polychoric correlations) were not used

because research indicates that variables with more than five ordered categories can be treated as continuous (e.g., Finney & DiStefano, 2006). The two-factor model (and any additional models) were estimated using Mplus (version 6.1; Muthén & Muthén, 2008-2011). Fit statistics were adjusted for non-normality using the Satorra-Bentler chi-square (see Satorra & Bentler, 2001), implemented with the Mplus MLM estimator (Muthén & Muthén, 2010).

The following fit indices were considered to assess model-data fit. First, the chi-square goodness of fit test assessing the null hypothesis that the model fits the data perfectly was examined. A significant chi-square value suggests that the model does not fit the data. Next, incremental fit indices including the Tucker-Lewis Index (TLI), and the Comparative Fit Index (CFI) were examined. TLI and CFI values range between 0 (poor fit) and 1 (perfect fit), and values greater than .95 indicate good model-data fit (Hu & Bentler, 1999). The root mean square error of approximation (RMSEA) value (Browne & Cudeck, 1993) was also assessed. Following Browne and Cudeck (1993) and MacCallum, Browne, and Sugawara (1996), RMSEA less than .05 indicates close fit; RMSEA between .05 and .08 indicates acceptable fit; RMSEA between .08 and .10 indicates mediocre fit; RMSEA greater than .10 indicates poor fit. Given that RMSEA has distributional properties, confidence intervals were also considered in order to assess the null hypothesis of “close” fit (which is more realistic than the perfect fit hypothesis tested by the model chi-square; MacCallum et al., 1996). Finally, the standardized root mean square residual value (SRMR) was considered. SRMR values below .08 are considered to suggest good model-data fit (Hu & Bentler, 1999).

Results (Study 1)

Confirmatory Factor Analysis (CFA)

Correlations among mainstream items and heritage items are presented in Table 2

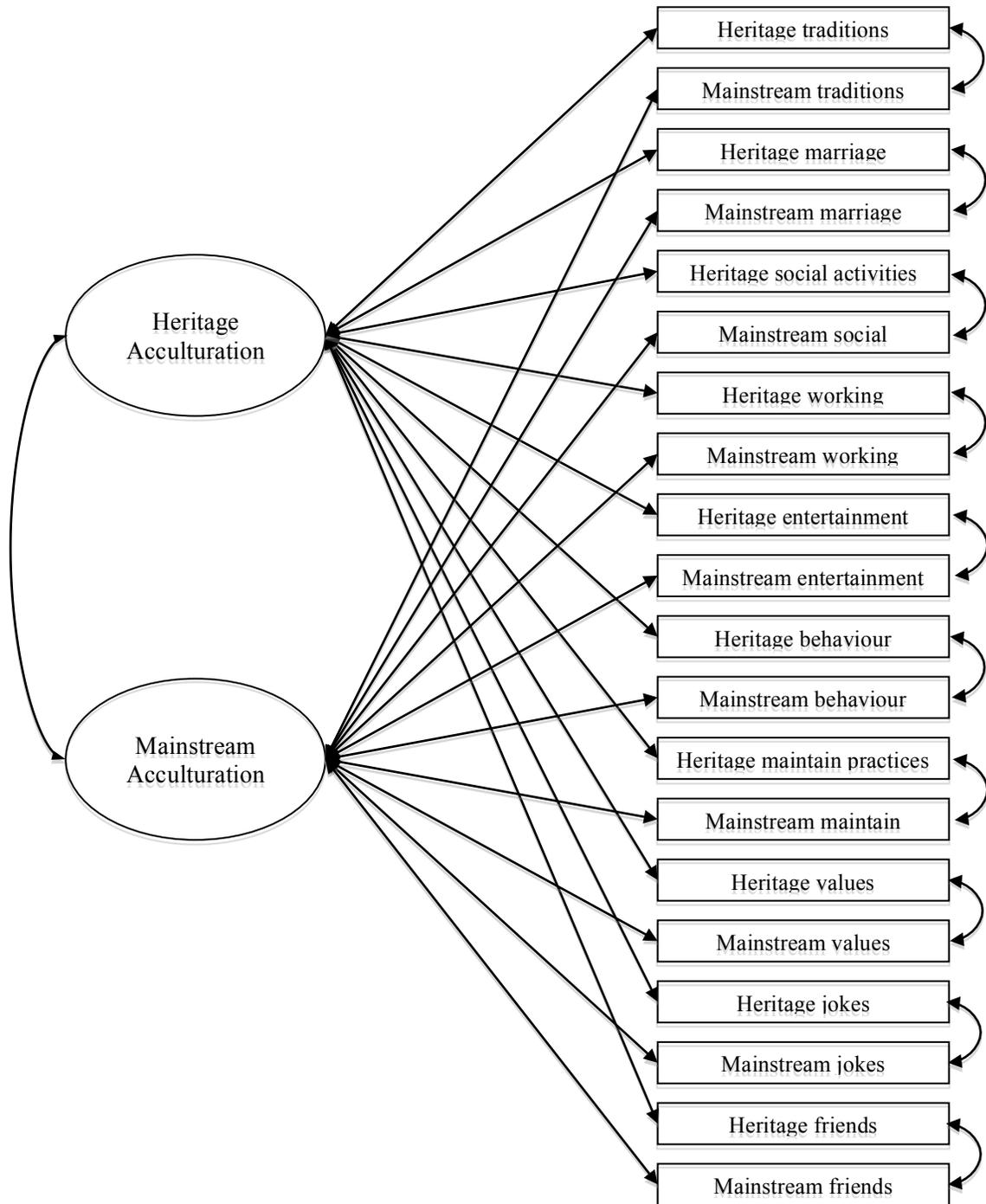


Figure 1. Hypothesized Two-Factor Model for the Vancouver Index of Acculturation (VIA) Items.

and in Table 3. Bivariate scatterplots indicated that although some correlations are weak, relationships between items were all approximately linear. With no strong evidence of curvilinearity suggesting that data required transforming, the CFA model was estimated. Taken together, fit indices suggest that the two-factor model fitted the data poorly [$\chi^2(159) = 681.94, p < .001$; TLI = .79; CFI = .82; RMSEA = .11, 90% CI (0.10, 0.12); SRMR = .10]. Poor model-data fit suggests that the estimates of individual parameters are inaccurate, and that important parameters or factors have not been included. For this reason, the model was not further interpreted.

Given that there was no *a priori* theoretical reason to hypothesize which additional factors may underlie heritage and mainstream acculturation, it was appropriate to compare the two-factor model to alternative models using CFA. Instead, two exploratory factor analyses (EFAs) were conducted to clarify the factor structure that produces correlations among the observed item responses. In the hypothesized CFA model presented above, residual correlations between adjacent mainstream and heritage VIA items were specified given their identical content. However, specification of residual correlations is not possible in EFA (Flora, LaBrish, & Chalmers, 2012). For this reason, separate EFAs (again with maximum likelihood estimation) were conducted for Mainstream Acculturation items and for Heritage Acculturation items. For each EFA, the scree plot of eigenvalues was inspected to help determine the number of factors to retain (see Figure 2 and Figure 3). For both EFAs, the scree plot leveled-off after the third eigenvalue; therefore one-, two-, and three-factor solutions were compared. Oblique rotations were implemented for the two and three-factor models. Specifically, Promax and Crawford-Ferguson analytical rotations (with kappa parameters set to 0, .25, .5 and 1; see Browne, 2001) were compared. The kappa parameter affects the trade-off between row and

Table 2

Pearson Correlations between Heritage Acculturation Items from the Vancouver Index of Acculturation (VIA)

Variable	VIA 1	VIA 3	VIA 5	VIA 7	VIA 9	VIA 11	VIA 13	VIA 15	VIA 17	VIA 19
VIA 1	—									
VIA 3	0.44	—								
VIA 5	0.59	0.69	—							
VIA 7	0.54	0.70	0.87	—						
VIA 9	0.52	0.48	0.60	0.57	—					
VIA 11	0.45	0.33	0.45	0.41	0.63	—				
VIA 13	0.57	0.47	0.58	0.54	0.66	0.67	—			
VIA 15	0.54	0.48	0.59	0.54	0.63	0.62	0.78	—		
VIA 17	0.44	0.43	0.51	0.47	0.64	0.54	0.65	0.67	—	
VIA 19	0.39	0.66	0.68	0.70	0.62	0.49	0.60	0.63	0.67	—

Note. Correlations greater than .39 are significant at $p < .05$. VIA = Vancouver Index of Acculturation; VIA 1 = heritage cultural traditions item; VIA 3 = heritage marriage item; VIA 5 = heritage social activities item; VIA 7 = heritage working item; VIA 9 = heritage entertainment item; VIA 11 = heritage behaviour item; VIA 13 = heritage maintain practices item; VIA 15 = heritage values item; VIA 17 = heritage jokes item; VIA 19 = heritage friends item.

Table 3

Pearson Correlations between Mainstream Acculturation Items from the Vancouver Index of Acculturation (VIA)

Variable	VIA 2	VIA 4	VIA 6	VIA 8	VIA 10	VIA 12	VIA 14	VIA 16	VIA 18	VIA 20
VIA 2	—									
VIA 4	0.31	—								
VIA 6	0.52	0.30	—							
VIA 8	0.48	0.24	0.76	—						
VIA 10	0.39	0.19	0.61	0.72	—					
VIA 12	0.52	0.24	0.52	0.59	0.57	—				
VIA 14	0.48	0.26	0.41	0.52	0.45	0.59	—			
VIA 16	0.42	0.18	0.41	0.47	0.40	0.49	0.69	—		
VIA 18	0.36	0.15	0.54	0.58	0.64	0.48	0.44	0.48	—	
VIA 20	0.36	0.16	0.61	0.70	0.62	0.46	0.47	0.47	0.71	—

Note. Correlations greater than .31 are significant at $p < .05$. VIA = Vancouver Index of Acculturation; VIA 2 = mainstream cultural traditions item; VIA 4 = mainstream marriage item; VIA 6 = mainstream social activities item; VIA 8 = mainstream working item; VIA 10 = mainstream entertainment item; VIA 12 = mainstream behaviour item; VIA 14 = mainstream maintain practices item; VIA 16 = mainstream values item; VIA 18 = mainstream jokes item; VIA 20 = mainstream friends item.

column parsimony (i.e., simple structure) and interfactor correlations. Because different rotations give equivalent expressions of a given exploratory factor model, it is desirable to compare rotations to find the solution with the most interpretable factor pattern in terms of simple structure.

EFA Results: Heritage Acculturation Items

A two-factor model offered the best model-data fit for Heritage Acculturation items (see Table 4). Although the chi-square goodness of fit test was significant, $\chi^2(26) = 59.24, p < .001$, the RMSEA value indicated good fit (RMSEA = .07) and average residual correlations were small (RMR = .04). Oblique Crawford-Ferguson rotation with kappa = 0 produced the most interpretable solution. Table 5 presents this pattern of factor loadings. The following six items had moderate to high loadings on factor 1 (all above |.40|) and low loadings on factor 2 (all below |.31|): “heritage maintain practices”, “heritage values”, “heritage behaviours”, “heritage jokes”, “heritage entertainment”, and “heritage cultural traditions”. These items all tap into domains related to culture and traditions. Factor 1 may thus reflect a “heritage traditional values and practices” latent variable. By contrast, the following four items had moderate to high loadings on factor 2 (all above |.49|) and low loadings on factor 1 (all below |.38|): “heritage working”, “heritage social activities”, “heritage marriage”, and “heritage friends”. These items each relate to social interaction and affiliation domains. Factor 2 may thus reflect a “heritage social affiliation” latent variable. High communality estimates indicate that factor 1 and factor 2 account for between 45% and 88% of variance of each of the 10 Heritage Acculturation items. Although “heritage social affiliation” and “heritage traditional values and practices” are related, they reflect separate constructs (inter-factor correlation = .72). Figure 4 depicts the relationship between the factors and Heritage Acculturation items based on these EFA findings.

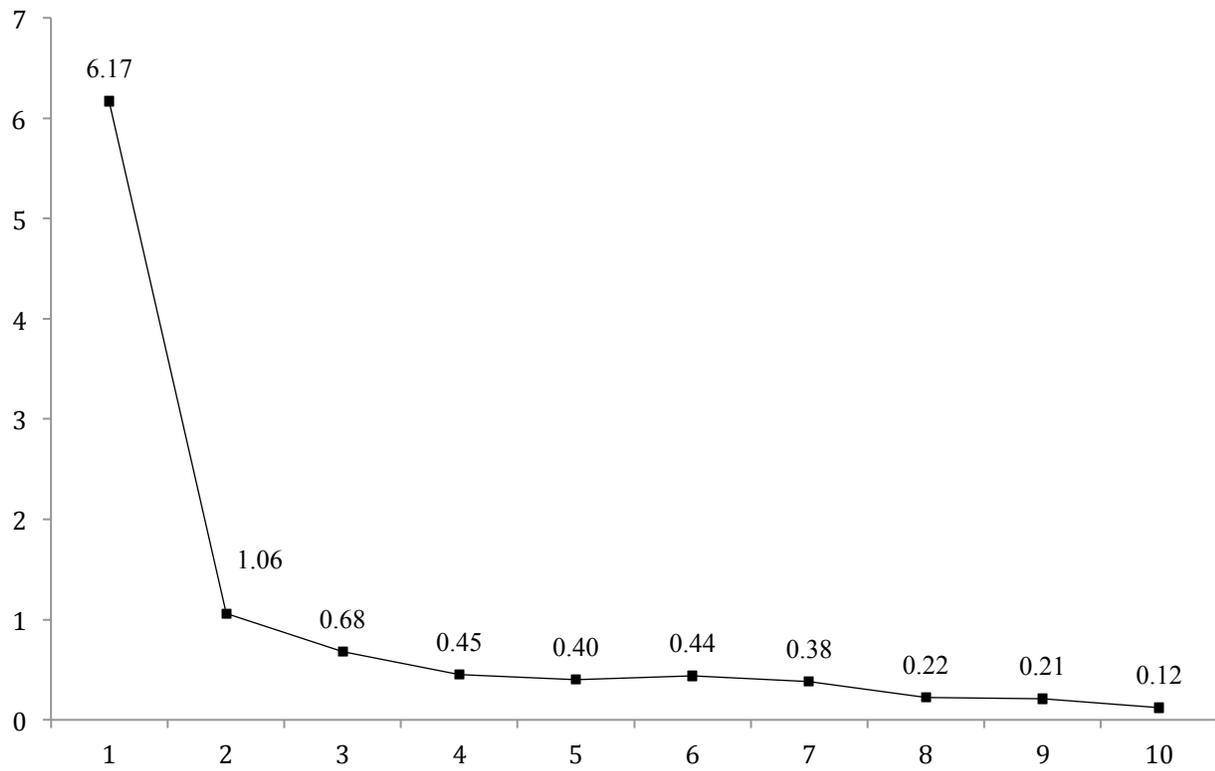


Figure 2. Scree plot of eigenvalues from the unreduced correlation matrix for Heritage Acculturation items for the Vancouver Index of Acculturation (VIA).

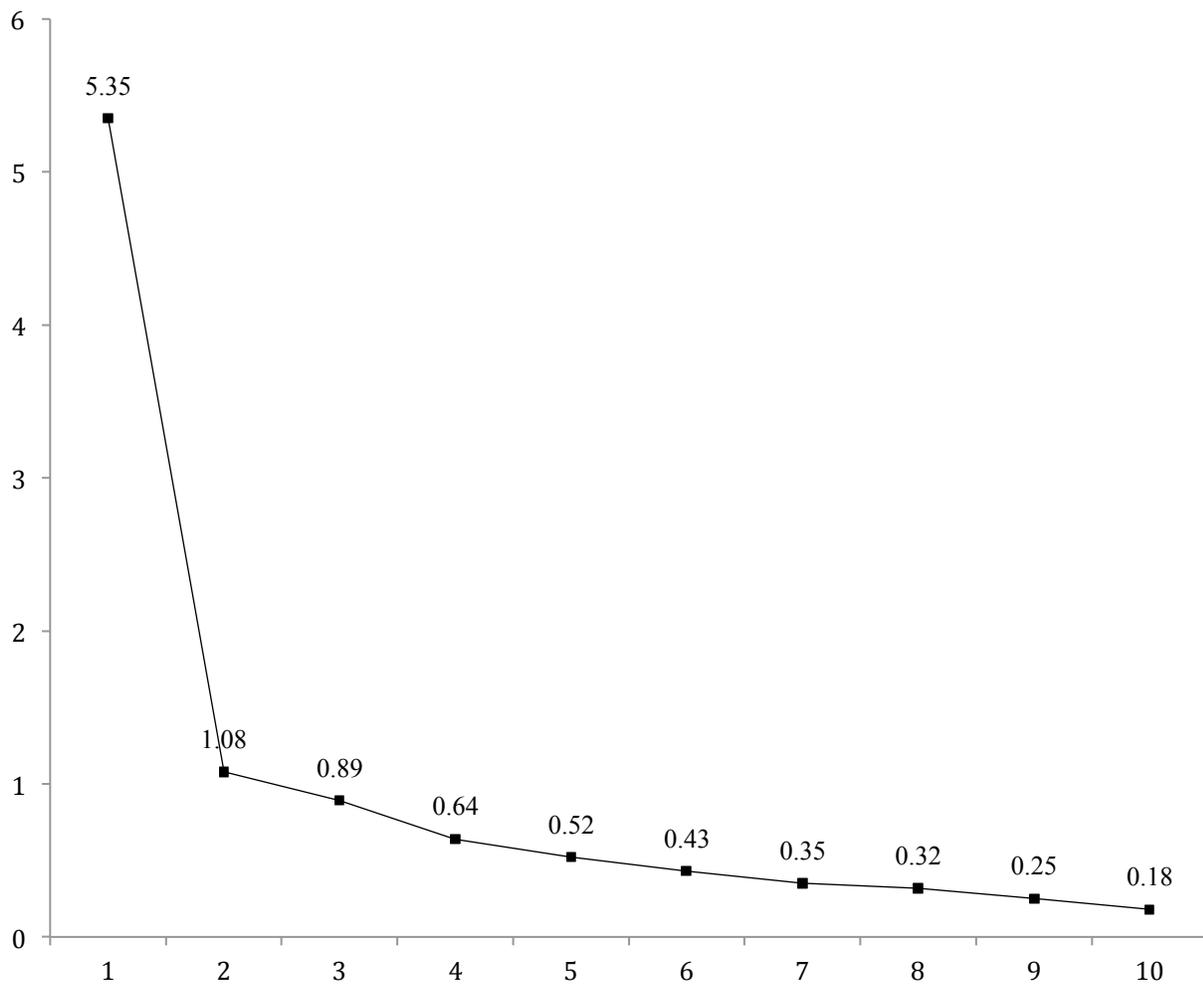


Figure 3. Scree plot of eigenvalues from the unreduced correlation matrix for Mainstream Acculturation items for the Vancouver Index of Acculturation (VIA).

Table 4

Fit Statistics for One, Two and Three-Factor Models for Exploratory Factor Analyses: Heritage and Mainstream Items

Heritage Items			
<i>Fit Indices</i>	<i>Chi-square goodness of fit test</i>	<i>RMSEA</i>	<i>RMR</i>
One-Factor	$\chi^2 (35) = 213.66, p < .001$	0.14	0.09
Two-Factor	$\chi^2 (26) = 59.24, p < .001$	0.07	0.04
Three-Factor	$\chi^2 (18) = 16.79, p = .54$	0.02	0.00
Mainstream Items			
<i>Fit Indices</i>	<i>Chi-square goodness of fit test</i>	<i>RMSEA</i>	<i>RMR</i>
One-Factor	$\chi^2 (35) = 154.38, p < .001$	0.11	0.08
Two-Factor	$\chi^2 (26) = 67.98, p < .001$	0.05	0.08
Three-Factor	$\chi^2 (18) = 32.35, p = .02$	0.05	0.02

Note. RMSEA = Root mean square of approximation; RMR = Root mean square residual value.

Table 5

Factor Loadings and Communalities for Exploratory Factor Analysis with Crawford-Ferguson Rotation ($Kappa = 0$) for Heritage Acculturation Items (Two-Factor Solution)

Item	Factor 1	Factor 2	Communality
VIA 13 (heritage maintain culture)	0.89	-0.01	0.45
VIA 15 (heritage values)	0.84	0.03	0.57
VIA 11 (heritage behaviour)	0.82	-0.11	0.86
VIA 17 (heritage jokes)	0.76	0.02	0.88
VIA 9 (heritage entertainment)	0.66	0.18	0.62
VIA 1 (heritage cultural traditions)	0.40	0.31	0.58
VIA 7 (heritage working)	-0.06	0.98	0.77
VIA 5 (heritage social activities)	0.05	0.90	0.74
VIA 3 (heritage marriage)	0.04	0.73	0.59
VIA 19 (heritage friends)	0.38	0.49	0.64

Note. VIA = Vancouver Index of Acculturation; VIA 1 = heritage cultural traditions item; VIA 3 = heritage marriage item; VIA 5 = heritage social activities item; VIA 7 = heritage working item; VIA 9 = heritage entertainment item; VIA 11 = heritage behaviour item; VIA 13 = heritage maintain practices item; VIA 15 = heritage values item; VIA 17 = heritage jokes item; VIA 19 = heritage friends item.

EFA Results: Mainstream Acculturation Items

A two-factor model offered the best model-data fit for Mainstream Acculturation items. Although the chi-square goodness of fit test was significant, $\chi^2(26) = 67.98, p < .001$, the RMSEA value indicated acceptable fit (RMSEA = .08) and average residual correlations were small (RMR = .05). Oblique Crawford-Ferguson rotation with kappa = .75 produced the most interpretable solution. Table 6 presents this pattern of factor loadings. The following items had high factor loadings on factor 2 (all above |.55|) and low factor loadings on factor 1 (all below |.27|): “mainstream working”, “mainstream social activities”, “mainstream entertainment”, “mainstream friends”, and “mainstream jokes”. By contrast, items related to mainstream cultural traditional values and practices including “mainstream maintain culture” and “mainstream values” had high loading on factor 1 (|.97| and |.73|, respectively) and low loadings on factor 2 (|.12| and |.03|, respectively). Importantly, “mainstream behaviours and “mainstream cultural traditions” cross-loaded moderately onto both factor 1 and factor 2. Finally, “mainstream marriage” had low factor loadings on both factors, and thus does not strongly relate to either. Moderate to high communality estimates imply that factor 1 and factor 2 account for between 45% and 88% of variance of each of the Heritage Acculturation items (except “mainstream marriage” with communality = .10).). Although “mainstream social affiliation” and “mainstream traditional values and practices” are related, they reflect separate constructs (inter-factor correlation = .69). Figure 5 depicts the relations between the factors and Mainstream Acculturation items based on these EFA findings.

Final CFA Model Results

EFA results suggest that the pattern of correlations among all 20 VIA items is determined by four latent variables. Specifically, correlations between Heritage Acculturation items are

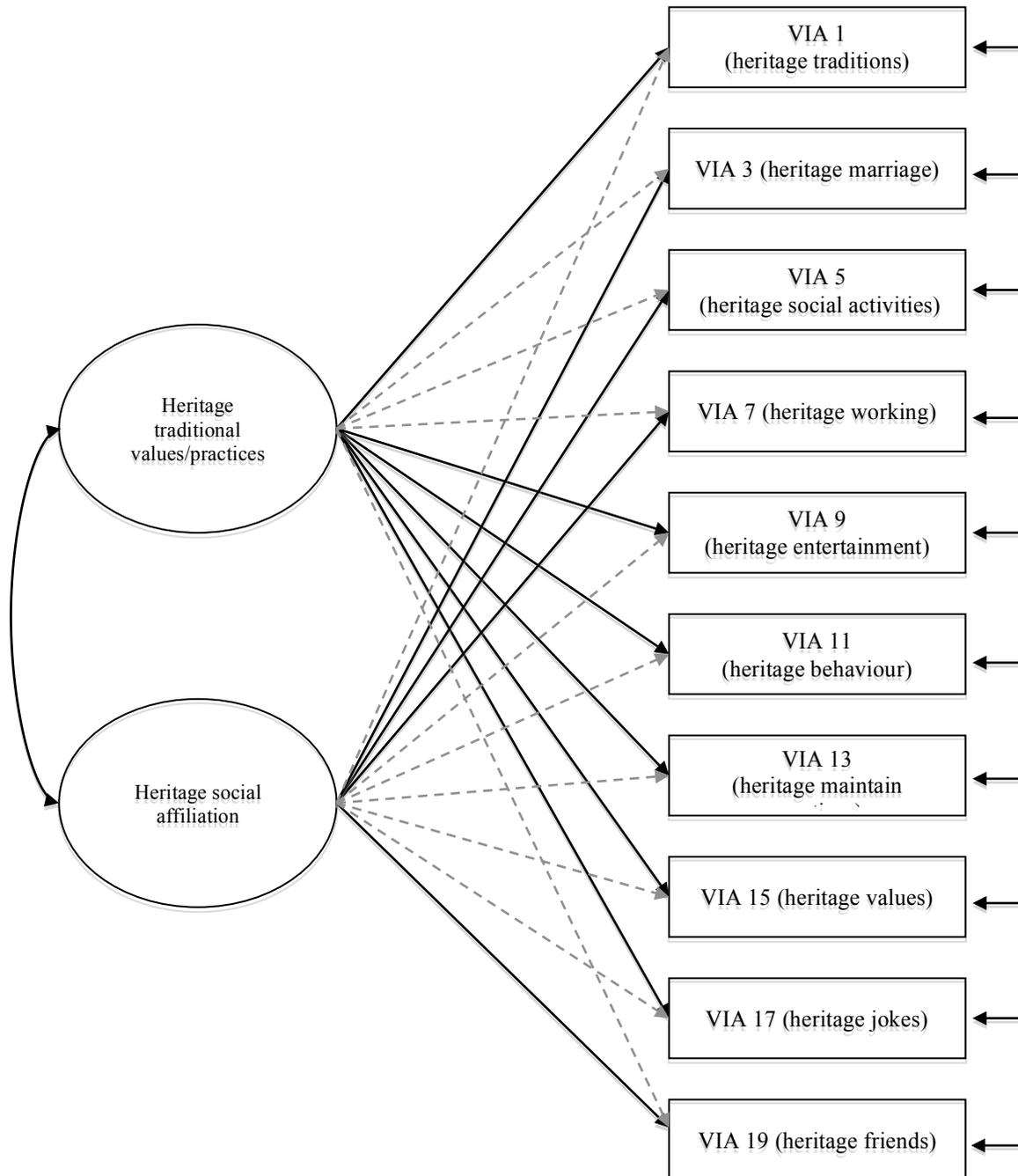


Figure 4. Relationship between Heritage Acculturation items from the Vancouver Index of Acculturation (VIA) and factors based on results from Exploratory Factor Analysis (EFA). Dashed arrows correspond to smaller factor loadings and solid arrows correspond to larger factor loadings following factor rotation. VIA = Vancouver Index of Acculturation; VIA 1 = heritage cultural traditions item; VIA 3 = heritage marriage item; VIA 5 = heritage social activities item; VIA 7 = heritage working item; VIA 9 = heritage entertainment item; VIA 11 = heritage behaviour item; VIA 13 = heritage maintain practices item; VIA 15 = heritage values item; VIA 17 = heritage jokes item; VIA 19 = heritage friends item.

Table 6

Factor Loadings and Communalities for Exploratory Factor Analysis with Crawford-Ferguson

Rotation (Kappa = .75) for Mainstream Acculturation Items Two-Factor solution)

Item	Factor 1	Factor 2	Communality
VIA 8 (mainstream working)	0.26	0.73	0.80
VIA 6 (mainstream social activities)	0.16	0.73	0.68
VIA 10 (mainstream entertainment)	0.23	0.66	0.64
VIA 20 (mainstream friends)	0.25	0.63	0.62
VIA 18 (mainstream jokes)	0.27	0.55	0.52
VIA 14 (mainstream maintain culture)	0.97	-0.12	0.85
VIA 16 (mainstream values)	0.73	0.03	0.56
VIA 12 (mainstream behaviours)	0.52	0.30	0.53
VIA 2 (mainstream cultural traditions)	0.43	0.25	0.36
VIA 4 (mainstream marriage)	0.24	0.11	0.10

Note. VIA = Vancouver Index of Acculturation; VIA 2 = mainstream cultural traditions item; VIA 4 = mainstream marriage item; VIA 6 = mainstream social activities item; VIA 8 = mainstream working item; VIA 10 = mainstream entertainment item; VIA 12 = mainstream behaviour item; VIA 14 = mainstream maintain practices item; VIA 16 = mainstream values item; VIA 18 = mainstream jokes item; VIA 20 = mainstream friends item.

determined by one's involvement in heritage traditions and practices (factor 1, "heritage traditional values and practices"), and by one's preference for heritage social interactions (factor 2, "heritage social affiliation"). Mainstream acculturation is determined by analogous factors. These include one's involvement in domains related to mainstream traditions and culture (factor 3, "mainstream traditional values and practices"), and one's preference for mainstream social interactions (factor 4, "mainstream social affiliation"). Given the low factor loading and communality estimate for item 4 ("mainstream marriage"), it is unlikely that comfort with marrying someone from one's mainstream culture is an indicator of mainstream acculturation, thus this item was removed from the final model.

In order to evaluate the fit of the hypothesized four-factor model suggested by the above EFA, a CFA model was estimated. Nine mainstream items and all Heritage Acculturation items were included in the model. Residual correlations between consecutive items with identical content were again specified, as were inter-factor correlations. Two four-factor model alternatives were compared. In the first model, all items had one freely estimated primary loading (as implied by the EFA results), and their secondary cross-loadings were constrained to zero with the exception of the "mainstream cultural traditions" and "mainstream behaviours" items, which were allowed to cross-load onto both mainstream acculturation factors. In the alternative model, these two items did not cross load and were only determined by the mainstream traditional values and practices factor. Fit statistics for each model are presented in Table 7. Although the chi-square test of model fit is significant for each model, remaining fit indices are improved compared to the original two-factor CFA model (see Figure 1). An adjusted chi-square difference test (Satorra, 2000) was conducted to compare the fit of these two models. The first model which included cross loading mainstream items fit significantly better than the alternative model, $\chi^2(2) = 18.09, p < .01$. Figure 6 depicts the final retained four-factor model.

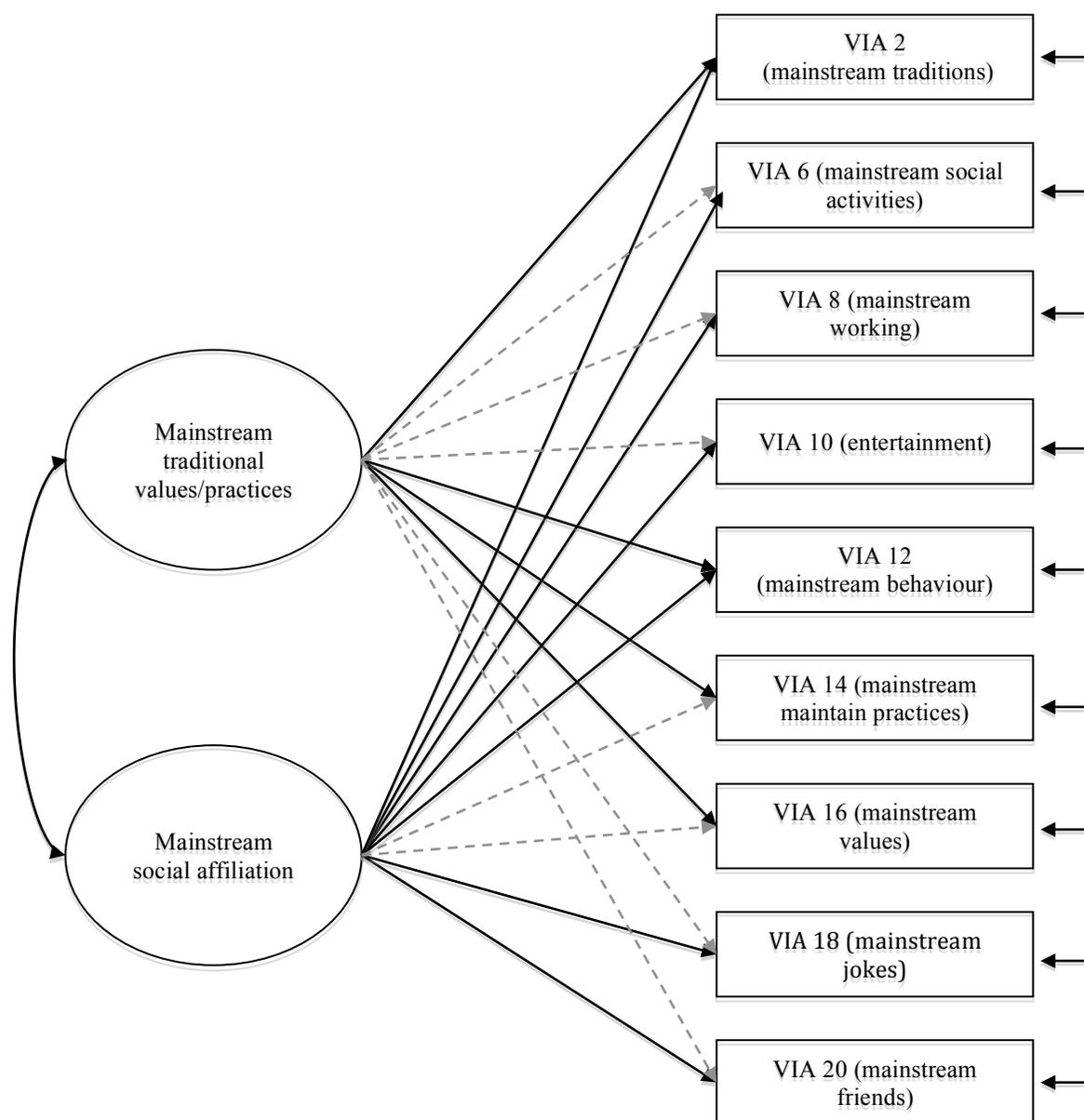


Figure 5. Relationship between Mainstream Acculturation items from the Vancouver Index of Acculturation (VIA) and factors based on results from Exploratory Factor Analysis (EFA). Dashed arrows correspond to smaller factor loadings and solid arrows correspond to larger factor loadings following factor rotation. VIA = Vancouver Index of Acculturation; VIA 2 = mainstream cultural traditions item; VIA 4 = mainstream marriage item; VIA 6 = mainstream social activities item; VIA 8 = mainstream working item; VIA 10 = mainstream entertainment item; VIA 12 = mainstream behaviour item; VIA 14 = mainstream maintain practices item; VIA 16 = mainstream values item; VIA 18 = mainstream jokes item; VIA 20 = mainstream friends item.

All factor loadings were positive and significant ($p < .001$), ranging between .28 and .92. The inter-factor correlations between the mainstream factors (.66) and between the heritage factors (.76) were also both significant, $p < .01$.

Method (Study 2)

Participants and Procedure

Female participants who completed Study 1 also participated in Study 2 ($N = 192$; see Table 8). Participant age ranged between 17 to 33 years ($M=19.64$, $SD=2.39$). 52.6% of participants were born in Canada. Of those born outside of Canada, countries of birth included India (13.02%), Pakistan (13.54%), and Sri Lanka (7.81%). The same on-line data collection procedure used for Study 1 was also used in Study 2. Study 2 also used the following additional measures.

Measures

Body dissatisfaction. The Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987) is a 34-item self-report scale intended to measure concerns about perceived body shape and emotional and behavioural consequences of this body shape dissatisfaction. Example items include “Have you worried about your flesh not being firm enough”, “Have you felt so bad about your shape that you have cried”, and “Have you avoided wearing clothes which make you particularly aware of the shape of your body”? Participants are asked to consider the frequency of endorsement of each statement in the last four weeks and give a response ranging from Never (1) to Always (6). Scores range from 34 to 204 with higher scores indicating greater body shape dissatisfaction. The BSQ has been previously used in South Asian samples (e.g., Mumford, Whitehouse, & Choudry, 1990; Mumford & Choudry, 2000). Rosen, Jones, Ramirez, and Waxman (1996) reported that the BSQ was internally consistent and highly correlated with other

measures of body dissatisfaction in a sample of undergraduate students. Coefficient alpha in the current sample was .98.

The Eating Disorders Inventory (EDI-2; Garner, 1991) is a widely used measure of eating disorder symptoms that has been used to assess disturbance in clinical and non-clinical samples. The EDI-2 includes a Body Dissatisfaction (BD) subscale. The BD subscale includes nine items assessing dissatisfaction with various body regions. Example items include “I think that my stomach is too big,” “I think that my buttocks are too large”, and “I think that my thighs are too large”. Participants rate their frequency of agreement with each statement by selecting from six responses ranging from “Always” to “Never”. Scores are derived by re-coding response categories to range from 0 to 3 with higher scores indicative of greater dissatisfaction (total scores range from 0 to 27). The BD subscale has been considered in previous studies examining body dissatisfaction in multi-ethnic university samples including South Asians (e.g. Gupta, Chaturvedi, Chandarana, & Johnson, 2001). Internal consistency in the current sample was .89.

Disturbed eating attitudes. The Eating Attitudes Test (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982) was originally developed to screen for anorexia nervosa in clinical samples. It has also been widely used in research settings to assess eating disturbance in diverse non-clinical samples, including South Asian samples (e.g., Iyer & Haslam, 2003; Mumford & Choudry, 2000; Sjostedt, Schumaker, & Nathawat, 1998; Mumford, Whitehouse, & Choudry, 1990; Mujtaba & Furnham, 2001).

Example items include “I vomit after I have eaten,” “I give too much time and thought to food,” and “I am terrified about being overweight”. Participants select from six response choices ranging from “always” to “never”, which are re-coded into scores ranging from 0 to 3 so that responses in the least symptomatic direction (i.e., “sometimes”, “rarely”, and “never”) are all

Table 7

Fit Statistics for Two-Factor Models with and without Cross Loading Items

Fit Indices	Chi-square goodness of fit test	RMSEA	SRMR	CFI	TLI
Model: With cross loadings	$\chi^2 (135) = 322.98, p < .001$	0.07	0.07	0.93	0.91
Model: No cross loadings	$\chi^2 (137) = 347.26, p < .001$	0.08	0.06	0.92	0.91

Note. RMSEA = Root mean square of approximation; SRMR = Standardized root mean square residual value; CFI = Comparative fit index; TLI = Tucker-Lewis index.

Figure 6

Final Four-Factor Model for the Vancouver Index of Acculturation (VIA) Items

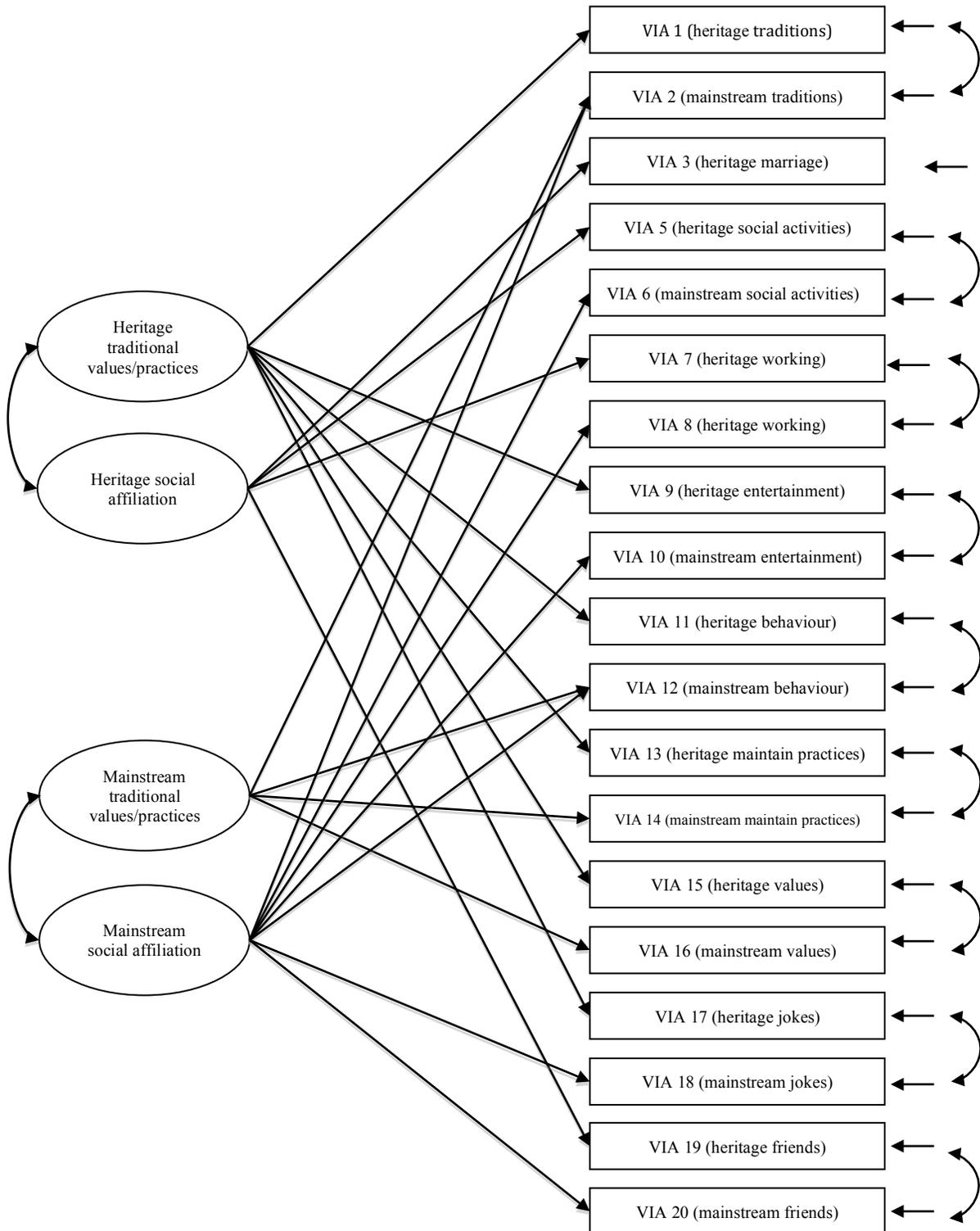


Table 8

Demographic Characteristics for the South Asian Women Sample (N = 192)

Characteristic	%	n
Marital Status		
Single	98.40	189.00
Married	1.60	3.00
Sexual Orientation		
Heterosexual	98.00	188.00
Bisexual	1.00	2.00
Homosexual	0.50	1.00
Refused to answer	0.50	1.00
Education		
1st year university	60.90	117.00
2nd year university	19.30	37.00
3rd year university	14.10	27.00
4th year university	5.25	11.00
Religion		
Hindu	31.80	61.00
Muslim	30.20	58.00
Sikh	18.80	36.00
Christian	8.30	16.0
Mixed ^a	6.80	13.00
None or Agnostic	4.20	8.00
Other	0.00	0.00
Refused to answer	0.00	0.00

Table 8 (continued)

Demographic Characteristics of the South Asian Women Sample (N = 192)

Characteristic	%	n
Place of birth		
Canada	52.60	101.00
India	13.02	25.00
Pakistan	13.54	26.00
Sri Lanka	7.81	15.00
Saudi Arabia	2.60	5.00
Other (Middle East) ^b	3.65	7.00
Bangladesh	2.60	5.00
Afghanistan	2.08	4.00
Other ^c	1.56	3.00
Parental Income		
\$0 - \$19,000	10.40	20.00
\$20,000-\$39,999	13.50	26.00
\$40,000-\$59,999	15.60	30.00
\$60,000-\$79,999	9.40	18.00
\$80,000-\$99,999	12.50	24.00
\$110,000-\$119,999	5.20	10.00
\$120,000 +	6.30	12.00
Do not know	27.10	52.00
Refused to answer	0.00	0.00

Note. ^aIncludes participants who reported two religious affiliations. Mixed religious affiliations included Hindu and Sikh (n=5), Muslim and Agnostic (n=4), Hindu and Christian (n=2), and Sikh and Christian (n=2). ^bIncludes Bahrain (n=1), Iran (n=2), Oman (n=1), and the United Arab Emirates (n=3). ^cIncludes Switzerland (n=1), and the United States (n=2)

assigned a score of 0, whereas response choices in the most symptomatic direction (i.e., always, usually, and often) are assigned a score of 3, 2, and 1, respectively. Scores range from 0 to 78 with higher values indicating greater disturbance. Internal consistency in the current sample was .91.

Thin-ideal internalization. The Internalization subscale of the Sociocultural Attitudes Towards Appearance Scale-3 (SATAQ-3; Thompson et al., 2004) is a nine-item subscale which assesses acceptance of cultural standards of physical appearance in mass media (e.g., “I would like my body to look like the models who appear in magazines”). All items are rated with a five-point scale ranging from 1 (definitely disagree) to 5 (definitely agree). Internal consistency in the current sample was .92. This subscale has demonstrated good reliability in multi-ethnic samples (e.g., Madanat et al., 2006; Mussap, 2009).

Height and weight. Self-reported height and weight were provided to calculate a Body Mass Index (BMI) score for each participant. BMI represents a ratio of weight to height (i.e., weight in kilograms/height in meters²). Given that many eating and body-image outcomes are correlated with BMI (for example, higher BMI is associated with higher scores on the BD scale of the EDI; Garner, 2004; Yates, Edman, & Aruguele, 2004; Mumford & Choudry, 2000; Shroff & Thompson, 2003), BMI will be included as a covariate in hypothesized models to obtain the unique effects of primary variables of interest.

Data Analysis Plan

Hypothesis 1. Before proceeding with the full SEM, the CFA presented in Study 1 examining the four-factor structure of the VIA in the total sample of men and women were

repeated to ensure that this four-factor structure fitted the female sample. Methods used for this analysis are previously described on page 20.

Hypotheses 2. Bootstrapping was used to assess the hypothesized indirect effects in the relationships between acculturation and eating and shape-related disturbance through the thin-ideal internalization intervening variable. Intervening effects have been traditionally assessed through a causal steps approach outlined by Baron and Kenny (1986) to assess mediation. In this approach, a variable is deemed to be a mediator if certain statistical criteria are met. However, this causal steps approach has been questioned for several reasons, which are summarized by Hayes (2009). First, the causal steps approach suffers from low power. Second, it is based on the fact that the intervening effect is *inferred* from hypothesis tests, rather than being directly quantified. Further, the commonly used Sobel test is flawed given that its valid use is contingent upon the assumption of a normally distributed sampling distribution of the indirect effect, a condition that is rarely met with realistic sample sizes.

Hayes (2009) suggests that alternative bootstrapping approaches overcome these limitations in that they have higher power, involve direct estimation of the indirect effect, and make no assumption about the shape of the sampling distribution of the indirect effect. Bootstrapping further differs from the causal steps approach in that there is no requirement for an initial relationship between the independent and dependent variables for an indirect effect to be present. Bootstrapping produces an empirically derived confidence interval estimate of the indirect effect. If zero does not fall within this interval, the indirect effect is significantly different from zero (with specified level of confidence as Type I error probability, i.e., alpha level; Hayes, 2009). Bias-corrected bootstrapped confidence intervals were calculated using MPlus (version 7;

Muthén & Muthén, 2008-2012), regardless of whether the acculturation latent variable of interest was directly associated with either body-image disturbance or eating disturbance.

Sample Size Considerations

Given that factor analysis does not focus on significance tests, a relevant power analysis to determine adequate sample size was not conducted for Study 1. Instead, factor overdetermination (i.e., the extent to which each factor is represented by a sufficient number of variables; MacCallum, Widaman, Zhang & Hong, 1999) was considered in assessing the adequacy of the current sample size. MacCallum et al. (1999) propose that factor overdetermination is partly defined by a high ratio of variables to factors (i.e., the number of variables should be several times larger than the number of factors), high factor loadings on a minimum of three to four variables), and good simple structure. In the current analysis, given that the ratio of variables to factor is 19:4, factor loadings are high, and simple structure is achieved, it appears that factors are highly overdetermined. The current sample size is likely adequate, and parameter estimates are reasonably accurate relative to population parameters.

Results (Study 2)

Descriptive Statistics

The univariate distribution for internalization scores appeared approximately normal with corresponding low skewness and kurtosis. Reported body shape concerns, body-image disturbance, eating disturbance, and BMI were all somewhat positively skewed. However, maximum likelihood estimation is robust against violations of normality to some extent, and is the preferred method of estimation even when normality assumptions are violated (Savalei & Bentler, 2006). Additionally, adjustments to standard errors and model fit statistics which account for non-normality were used in the present analyses (e.g., the Satorra-Bentler chi-square value which adjusts for excess kurtosis; Bryant & Satorra, 2012). Given that robust methods were

employed in the current study (e.g., the MLR process in Mplus; Muthen & Muthen, 2008-2012), skewed variables were not transformed.

Bivariate Relationships

Pearson product-moment correlations between continuous variables were significant and were in the expected direction (see Table 9). All measures of eating and body-image disturbance (i.e., BD, BSQ, EAT-26, and SATAQ scores) were positively correlated, although not so highly correlated to suggest that they measure the same construct. BMI had significant but low correlations with body and eating disturbance scores. Whether one was born in Canada or elsewhere was not significantly associated with any other variables. However, given that it is possible that country of birth may be associated with cultural identification, country of birth will be included in the SEM model as a control variable along with BMI.

Structure of the VIA in Women

As per Hypothesis 1, CFA was used to verify that the four-factor structure of the VIA found in Study 1 for both men and women fitted the female sample data only. Fit statistics were nearly identical, indicating that mainstream traditions, mainstream social interactions, heritage traditions, and heritage social interactions account for the pattern of correlations among VIA items in the sample of South Asian women. These findings provide support for Hypothesis 1. Given this adequate fit, the hypothesized full SEM model depicted in Figure 7 was estimated.

Full SEM Model Fit

Fit statistics for the estimated model presented in Figure 8 were examined. Although the chi-square goodness of fit test was significant, $\chi^2(340) = 574.87, p < .01$, RMSEA was acceptable (RMSEA = .06) and SRMR was indicative of good fit (SRMR = .07). Although

incremental fit indices were lower than desirable, (CFI = .91; TLI = .89), the other fit statistics suggested that the model fit the data reasonably well and parameter estimates were interpreted.

Measurement Models

Standardized factor loadings and inter-factor correlations among the four latent acculturation variables are presented in Figure 9. Factor loadings ranged from .32 to .93 and reflect the expected pattern based on results from Study 1. The inter-factor correlation between mainstream acculturation factors was positive ($r = .63$), but not so strong to imply that the factors measure the same construct. The inter-factor correlation between Heritage Acculturation factors was somewhat high ($r = .72$). BSQ and BD scores were positively associated with the body-image latent variable (factor loadings = .73 and .96, respectively).

Indirect Effects: Acculturation and Eating Disturbance

Thin-ideal internalization (INT) was proposed to mediate the relationships between each of the four acculturation variables and i) disturbed eating attitudes (EAT) and ii) body-image disturbance (BD). Standardized and unstandardized path coefficients, standard errors, and significance values for these paths are reported in Table 10. The 95% bootstrapped confidence intervals for proposed indirect effects are presented in Table 11.

Mainstream acculturation → Internalization → Eating Disturbance

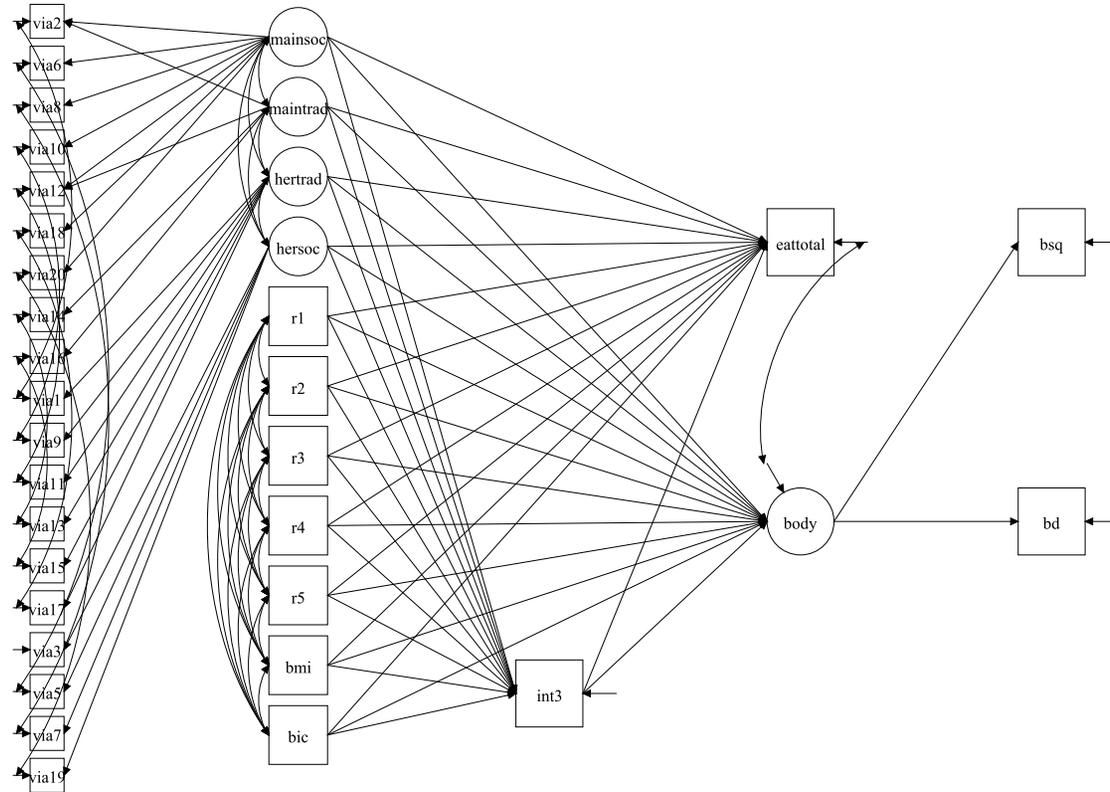
In the full SEM model, the proposed mediator, internalization of a thin-ideal (INT) was positively associated with increased eating disturbance (EAT). Controlling for INT, there was a negative conditional effect of acculturation to mainstream traditions (MAINTRAD) on EAT, such that greater identification with mainstream traditions was associated with lower disturbed eating attitudes. At the same time, MAINTRAD was also associated with greater disturbed eating attitudes through its positive association with INT which, in turn, was associated with higher

Table 9

Correlations among Variables

Measure	Mean	SD	1	2	3	4	5
1. EAT-26	9.80	11.51	1.00	.70**	.54**	.35**	.24**
2. BSQ	86.41	43.40		1.00	.69**	.38**	.44**
3. BD	8.27	6.81			1.00	.31**	.39**
4. SATAQ-I	26.57	7.18				1.00	.15*
5.. BMI	23.43	3.24					1.00

Note. * $p < .05$ ** $p < .01$. EAT-26 = Eating Attitudes Test; BSQ = Body Shape Questionnaire; BD = Body Dissatisfaction subscale of the Eating Disorders Inventory; SATAQ-I = Internalization subscale of the Sociocultural Attitudes Towards Appearance Scale-3; BMI = Body Mass Index calculated based on subjective self-reported weight and height (weight in kilograms/height in metres).



Note. VIA = Vancouver Index of Acculturation, mainsoc = identification with mainstream acculturation latent variable, maintrad = identification with mainstream traditions latent variable, hersoc = identification with heritage social affiliation latent variable, hertrad = identification with heritage traditions latent variable, r1 = Sikh, r2 = Muslim, r3 = Christian, r4 = Other religion, r5 = No religion, BMI = body mass index, BIC = born in Canada, Int3 = internalization of a thin-ideal, eattotal = disturbed eating attitudes, body = body-image disturbance latent variable, BSQ = Body Shape Questionnaire scores, BD = Body Dissatisfaction scale scores.

Figure 7

Hypothesized Full SEM Model

EAT scores. The 95% bootstrapped confidence interval indicates that this indirect effect was significant.

Identification with mainstream social affiliation (MAINSOC) was not significantly associated with EAT controlling for INT. Although identification with mainstream social affiliation was associated with decreased internalization of a thin ideal (INT), which in turn is associated with greater eating disturbance, this indirect effect was not significant. These findings partially support hypothesis 3a., stating that thin-ideal internalization will mediate the relationship between mainstream acculturation and eating disturbance.

Heritage Acculturation → Internalization → Eating Disturbance

Controlling for internalization, identification with heritage traditions (HERTRAD) was directly associated with increased disturbed eating attitudes. However, HERTRAD was also associated with decreased internalization, which in turn, was associated with higher EAT scores. The 95% bootstrapped confidence interval indicates that this indirect effect was significant.

The direct effect of HERSOC on EAT was not significant. However, HERSOC was associated with higher INT scores which, in turn, was associated with higher EAT scores. The 95% bootstrapped confidence interval indicates that this indirect effect was significant which supports hypothesis 3b stating that thin-ideal internalization will mediate the relationship between heritage acculturation and eating disturbance

Acculturation → Internalization → Body Dissatisfaction

Thin-ideal internalization was not significantly associated with body dissatisfaction. None of the relationships between latent acculturation variables and body dissatisfaction was significant. However, there was a significant indirect effect between identification with mainstream traditions and body dissatisfaction through internalization. The indirect effect between identification with heritage traditions and body dissatisfaction through internalization

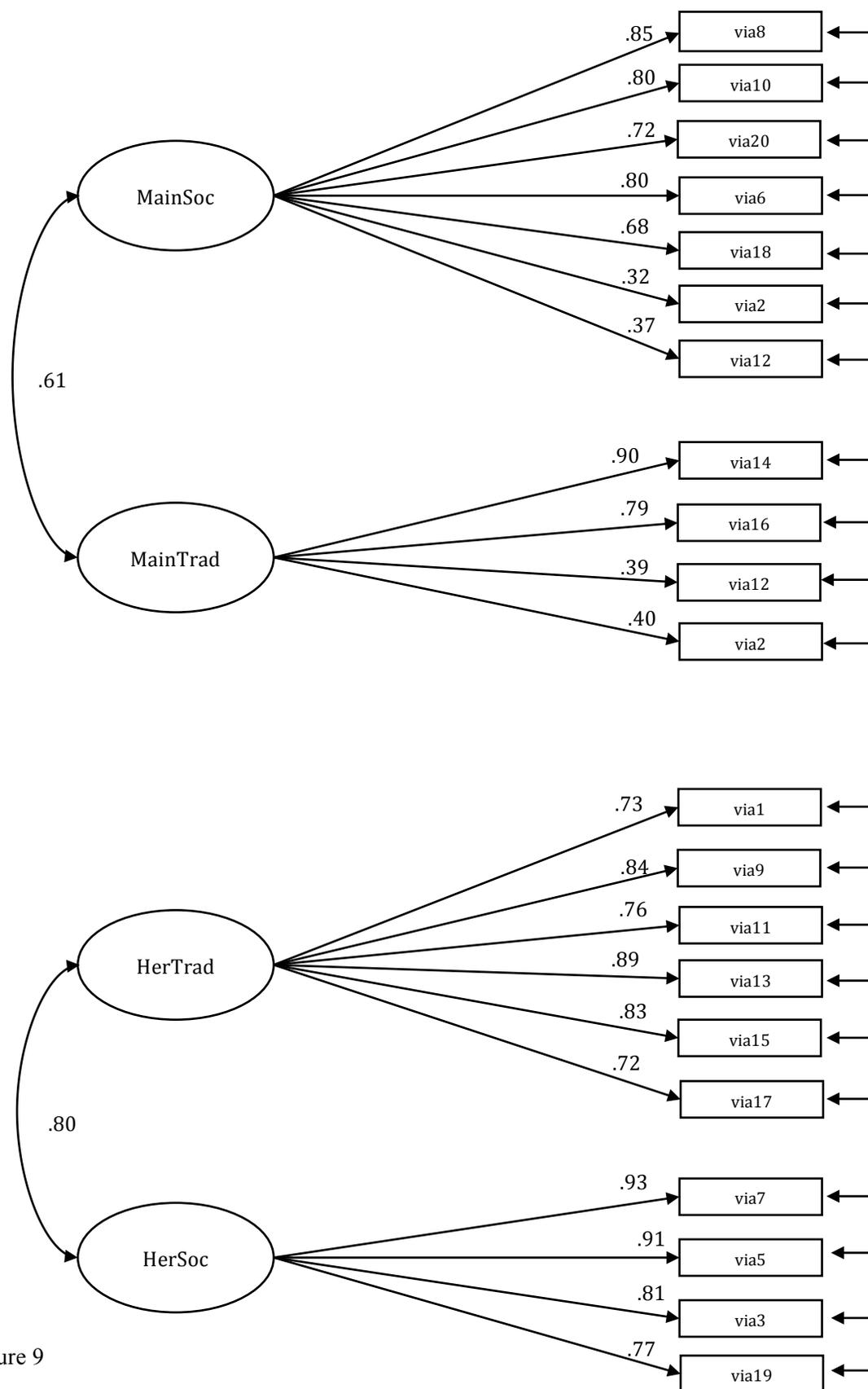


Figure 9

Measurement Model

Table 10

Standardized and Unstandardized Path Estimates

Estimated Paths	Unstandardized	Standardized	Standard Error	<i>p</i> -value
MAINSOC--> EAT	2.78	.24	.16	.12
*MAINTRAD-->EAT	-3.41	-.30	.15	.04
HERSOC-->EAT	-3.94	-.34	.19	.07
*HERTRAD-->EAT	3.86	.34	.15	.03
*MAINSOC-->INT	-2.08	-.31	.15	.04
*MAINTRAD-->INT	2.22	.34	.12	.01
*HERSOC-->INT	2.40	.36	.17	.04
*HERTRAD-->INT	-2.76	-.42	.14	.003
*INT-->EAT	0.82	.47	.06	<.001
MAINSOC-->BODY	-0.03	-.03	.14	.83
MAINTRAD-->BODY	-0.03	-.03	.12	.81
HERSOC-->BODY	-0.10	-.10	.15	.51
HERTRAD-->BODY	0.18	.18	.11	.08
*INT--> BODY	0.10	.67	.06	<.001

* $p < .05$.

Note. MAINSOC = Mainstream social affiliation factor; EAT = Eating attitude disturbance; MAINTRAD = Mainstream traditions factor; HERSOC = Heritage social affiliation factor; HERTRAD = heritage traditions factor; INT = thin-ideal internalization; BODY = body image disturbance.

Table 11

95% Bootstrapped Confidence Intervals for Indirect Effects

Indirect Effect	lower 2.5%	upper 2.5%
*MAINTRAD→INT→EAT	0.02	0.30
MAINSOC→INT→EAT	-0.32	0.03
* HERTRAD→INT→EAT	-0.36	-0.03
* HERSOC→INT→EAT	-0.03	0.38
* MAINTRAD→INT→ BODY	0.04	0.41
MAINSOC→INT→ BODY	-0.44	0.02
* HERTRAD→INT→ BODY	-0.50	-0.07
HERSOC→INT→ BODY	-0.02	0.51

NOTE. * Denotes a confidence interval that does not cross 0. MAINSOC = Mainstream social affiliation factor; EAT = Eating attitude disturbance; MAINTRAD = Mainstream traditions factor; HERSOC = Heritage social affiliation factor; HERTRAD = heritage traditions factor; INT = thin-ideal internalization; BODY = body image disturbance.

was also significant which partially supports hypotheses 4a and 4b stating that thin-ideal internalization will mediate the relationship between mainstream and heritage acculturation and body-image disturbance. In summary, Study 2 results provide partial support for hypothesis 3 and hypothesis 4. The model adequately fit the data, but not all proposed paths were significant.

Discussion (Study 1 and Study 2)

This study is the first to examine the associations between self-reported multi-dimensional acculturation and eating and body-image among South Asian-Canadian undergraduate students. Prior to assessing these relationships, the factor structure of the Vancouver Index of Acculturation (VIA) was examined among South Asian undergraduate men and women. Specifically, the validity of the purported bidimensional factor structure of the Vancouver Index of Acculturation was assessed through a series of exploratory and confirmatory factor analyses (Study 1). Next, associations between measured acculturation latent variables (based on Study 1 results) and self-reported eating and body-image disturbance were explored among South Asian women.. The extent to which one internalizes the importance of being thin was proposed to mediate these relationships (Study 2).

Acculturation is Not Unidimensional

Heritage Acculturation items and Mainstream Acculturation items were expected to be indicators of two hypothesized factors representing “Heritage Acculturation” and “Mainstream Acculturation” based on the previously documented bidimensional structure of the VIA. Contrary to this prediction, the proposed two-factor model demonstrated poor model-data fit. Instead, results from subsequent exploratory EFAs and CFAs indicated that, for each VIA subscale, the pattern of correlations between subscale items was best explained by an additional factor. Accordingly, self-reported acculturation was best explained by four latent variables which were

labeled as “heritage traditions”, “heritage social affiliation”, “mainstream traditions”, and “mainstream social affiliation”.

Results strengthen calls (e.g., Ryder et al., 2000; Soh et al., 2006) to move away from unidimensional acculturation models and the measurement approaches that follow. Despite the continued use of unidimensional acculturation self-report measures or proxy variables such as immigration status or place of birth (e.g., Soh et al., 2006; Wildes et al., 2001), Study 1 results indicate that a one-dimensional operationalization of acculturation does not sufficiently capture the process of cultural identification in young men and women of South Asian origin. If identification with mainstream culture necessitates relinquishment of one’s heritage culture (as suggested by unidimensional acculturation models), heritage and mainstream factors would have been highly negatively correlated, and a unifactorial model would have offered better model-data fit. Instead, identification with one’s mainstream and heritage culture among South Asian men and women in Canada appear to capture separate processes (inter-factor mainstream correlation = .72; inter-factor heritage correlation = .69).

Heritage and Mainstream Acculturation Factors

The first heritage factor was indicated by items tapping into the following heritage domains: participation in South Asian cultural traditions, enjoyment of South Asian entertainment (e.g., movies/music), enjoyment of South Asian humour, maintenance of South Asian cultural practices, belief in South Asian values, and engagement in South Asian behaviours. Although these items span a range of domains, they are similar insofar as they all relate to one’s engagement and valuation of South Asian traditions and practices and the factor was accordingly labeled “heritage cultural traditions”. By contrast, the second heritage factor was indicated by items tapping into the following domains: willingness to marry a non-South Asian, enjoyment of social activities with South Asians, comfort working with South Asians, and

interest in having South Asian friends. These latter items all appear to tap into one's preference and comfort in engaging with other South Asians and this factor was accordingly labeled "heritage social interactions".

The mainstream acculturation items loaded in a similar manner and analogous factor labels were assigned (i.e., "mainstream cultural traditions" and "mainstream social interactions"). The exception was that preference for North American humour and North American entertainment loaded more closely with the remaining social interaction items. This result suggests that enjoyment of North American entertainment and humour reflects affinity for social interaction. By contrast, enjoyment of South Asian entertainment and humour reflects engagement in cultural traditions. This difference may be explained insofar as heritage entertainment platforms (e.g., television and film depicting South Asian content) may be uniquely connected to heritage cultural traditions among diasporic South Asians in a variety of ways. For example, comprehension of South Asian languages dialects or accents may be tied to preference for South Asian television programming. Similarly, familiarity with South Asian cultural idioms may impact one's preference for South Asian entertainment. South Asian entertainment may also engender feelings of shared cultural experience for diasporic South Asians.

South Asian entertainment includes the Indian film industry which was created in the early 20th century in Mumbai (formerly Bombay) and is colloquially referred to as "Bollywood". Not only are Bollywood films popular within the Indian subcontinent, but they are also widely distributed internationally in response to growing South Asian populations across the globe. They are often melodramatic, stylized, and exaggerated (Akhtar & Choksi, 2005) and typically centre around themes relating familial obligation, respect for elders, and the importance of marriage. They also depict more social norms including dress, cuisine, music, and dance. Bollywood films

have been described as holding a unique role in the construction, maintenance and transmission of South Asian identity and cultural norms (Akhtar & Choksi, 2005; Malik, Trimzi, & Galluci, 2011; Tirumala, 2009; Therwath, 2010), particularly among diasporic South Asians and have been described as “bridge between home and diaspora” (Tirumala, 2009). By contrast, North American entertainment is not a vehicle for tradition in the same manner.

Recall that the VIA includes alternating, mirrored heritage and mainstream items. Consecutive pairs of items address the same content and vary only in the specified target culture (i.e., “I enjoy North American food; item 2: I enjoy food from my heritage culture). The finding that items did not load in the identical manner further bolsters the position that heritage and mainstream acculturation are separate. If identification with mainstream culture necessitates the relinquishment of one’s identification with heritage culture, one would expect that all corresponding VIA items would be load in exactly the same pattern across the heritage and mainstream factors.

Acculturation Varies According to Life Domain

The discourse on acculturation measurement centres on the validity of conflicting theories surrounding dimensionality (i.e., unidimensionality versus bidimensionality). Less attention has been focused on whether cultural identification is context dependent (Arends-Toth & van de Vijver, 2004). Study 1 results suggest that cultural identification among diasporic South Asians may indeed depend on life domain. For example, for both heritage and mainstream acculturation scales, items tapping into affinity and interest in traditions loaded more closely together, whereas items tapping into interest in social interactions loaded together.

Study hypotheses were based on the original two-factor structure of the VIA (Ryder et al., 2000) and distinctions based on acculturation domain were therefore not expected. However, several studies are consistent with the concept of differences in acculturation according to life

domain. For example, it has been suggested that acculturation may depend on whether the life domain occupies a public versus private space (e.g., Cabassa, 2003). In their study of acculturation among Turkish-Dutch adults in the Netherlands, Arends-Toth and van de Vijver (2004) reported that participants endorsed a stronger affiliation for their heritage Turkish culture in more private life areas such as child-rearing, cultural habits, celebrations, and food. However, mainstream Dutch acculturation was endorsed in domains relating to language use, social contacts, and neighbourhoods – contexts which involve external, public interactions. Indeed, South Asian heritage cultural traditions items also capture more private life events that take place within the home or within one's private life (e.g., importance of maintaining South Asian values/traditions; preference for south Asian humour/entertainment), while heritage social affiliation items capture more public arenas (e.g., preference for interacting with other South Asians at work or in social activities).

The latent variables underlying each of heritage and mainstream acculturation subscales may also reflect distinctions between domains that are more likely to be influenced by one's family versus one's external social world. This distinction may be particularly pronounced in cultures wherein familial values exert a strong influence. Indeed, the influence of family in South Asian culture has been described as being of paramount importance and is believed to foster a respect and acknowledgement of religion, traditions, and cultural celebrations (e.g., Das & Kemp, 1997; Farver, Narang, Bakhtawar, & Bhada, 2002; Ibrahim et al., 1997; Shariff, 1999). Deviation from South Asian culture is discouraged and is often the cause of interfamilial conflict and stress. As a result, many South Asians are described as living "between two worlds" (Das & Kemp, 2011) or as having dual identities inside and outside of their home. These dual identities may also contribute to the distinction between acculturation in private versus public or familial versus non-familial domains. The endorsement of living dual cultural identities in private versus

public domains is observed in a qualitative study of identity construction among South Asian college-aged men and women living in New York City (Jensen, 2011). Respondents articulated the importance of preserving South Asian cultural expectations such as clothing choice at home yet also wanting to date. One young woman is cited as stating, “I am not only Bangladeshi or only American. It’s just that sometimes I am more of one of them, sometimes more of the other. It depends on who I am with and where I am...” Another stated, “There are certain things I cannot do at home, certainly not in front of my dad, like wearing shorts or be out late...I use short dresses and stuff when I hang out with friends on the weekends, but my parents don’t know.” It is reasonable to expect that identification with heritage culture may depend on whether the specific domain falls under the influence of family versus school and work. One might expect that one’s tendency to identify with one’s heritage culture within private or familial domains, would be related to one’s tendency to identify with domains more likely under the influence of school, work, or friends. Indeed, the heritage social affiliation and heritage traditions factors were strongly correlated ($r = .72$).

Although cross-cultural differences in eating and body-image disturbance have been explored in non-White samples, the nature of these associations remains unclear. Further, methodological limitations obscure the mechanisms through which acculturation may be associated with eating and body-image disturbance. Study 2 employed a structural equation modeling (SEM) framework in order to elucidate the role of thin-ideal internalization as an intervening variable in the relationship between four latent acculturation variables (derived from Study 1) and eating and body-image disturbance among women of South Asian heritage.

Thin-Ideal Internalization

Results showed that thin-ideal internalization may be a mechanism through which cultural identification is associated with symptoms of disordered eating in a diasporic sample of women.

As expected, thin-ideal internalization was positively associated with greater eating and body-image disturbance. However, the relationships between each acculturation factor and measures of disturbance were more complex than expected. Importantly, the indirect effects on eating and body-image disturbance through thin-ideal internalization varied according to both acculturation dimension (i.e., mainstream acculturation versus heritage acculturation) and acculturation domain (i.e., acculturation to social affiliation versus traditions).

Multidimensional Acculturation

Identification with mainstream culture has been theorized to be associated with eating and body-image disturbance based on the presumption that the former is associated with internalization of Western cultural ideals (Soh et al., 2006). This association is believed to occur through the internalization of Western body-image ideas (Markey, 2004). In a study examining bidimensional acculturation among an ethnocultural sample, mainstream acculturation was associated with increased eating and body-image disturbance through a mediating effect of thin-ideal internalization (Mussap, 2009). Current study results were consistent with this finding insofar as acculturation to mainstream traditions was associated with increased eating and body-image disturbance through the indirect effect of thin-ideal internalization. However, examination of both indirect and direct effects reveals both positive and negative associations between mainstream acculturation on eating disturbance. Specifically, when controlling for thin-ideal internalization, identification with mainstream traditions was negatively associated with eating disturbance. At the same time, the indirect effect of mainstream traditions on eating disturbance indicates that acculturation to mainstream traditions was associated with greater thin-ideal internalization, which in turn is associated with greater eating disturbance. It is important to note that the above relationships did not hold for acculturation to mainstream social interactions. In fact, mainstream traditions and social interactions were associated with thin-ideal internalization

in opposite directions, as the latter was associated with decreased thin-ideal internalization. Additionally, mainstream social interaction was also not associated with body-image disturbance.

Although heritage acculturation has been proposed to be a mitigating factor in the development of eating and body-image disturbance because it has been negatively associated with thin-ideal internalization (Mussap, 2009), the current results are only partially consistent with this idea. As with mainstream acculturation, both positive and negative associations between heritage acculturation and eating and body-image disturbance were observed. The direct positive relationship between acculturation to heritage traditions and each of body-image and eating disturbance suggests that identification with heritage traditions may be associated with eating and body-image disturbance. Yet, heritage traditions was also associated with decreased thin-ideal internalization. By contrast, acculturation to heritage social affiliation was positively associated with thin-ideal internalization, which in turn was associated with increased eating disturbance.

In sum, the results paint a more nuanced picture of the relationship between acculturation and eating and body-image disturbance among South Asian women. Results indicate that the relationship between acculturation and thin-ideal internalization and eating and body-image disturbance depends on both acculturation dimension (e.g., mainstream versus heritage acculturation) as well as acculturation domain (e.g., traditions versus social affiliation). Mainstream acculturation and heritage acculturation are not necessarily uniformly protective or harmful insofar as being associated with disordered eating and body-image disturbance. These findings strengthen the idea that acculturation may not be a uniform construct as assumed in previous research, and extends Study 1 results by validating the distinctions among latent acculturation domains. It appears that the tendency to identify with domains related to mainstream values, such as traditions and beliefs may be associated with a tendency to internalize broad cultural values such as the importance of a slender body. Conversely, one's identification

with mainstream social domains may be associated with a sense of belongingness which may mitigate the impact of thin-ideal internalization.

Additional Intervening Variables

The tendency to internalize the value of thinness and weight control has been robustly associated with both cultural identity and eating and body-image disturbance and was thus investigated as a potential intermediate variable in the current study. However, it is possible that other important variables were not included in the current model. Although no other studies have specifically examined mediating variables in diasporic South Asian women in Canada, other potential mediators can be identified from existing research.

Self-esteem was found to mediate a negative relationship between heritage acculturation and disordered eating and body-image in a sample of Australian women of primarily Middle Eastern origin (Mussap, 2009). Indeed, low self-esteem has been widely associated with increased eating and body-image disturbance in women (e.g. Bearman, Presnell, Martinez, & Stice, 2006; Garner, 2004) and is considered to be a core factor in the maintenance of eating disorders (Fairburn, Cooper, & Shafran, 2003). It is plausible that self-esteem may mediate a path between multidimensional acculturation and eating and body-image disturbance in South Asian women.

Findings from two recent studies examining bidimensional acculturation in South Asian and multi-ethnic university samples suggest that mood state may mediate the relationship between cultural identity and eating disturbance. The tendency to experience negative mood (dispositional negative affectivity) was identified as a predictor of eating disturbance and body dissatisfaction in South Asian University students in the United States (Chang, Perera, & Kupfermann, 2013). In a separate study, mainstream acculturation was associated with positive affectivity in a multi-ethnic sample (19% identified as South Asian) of University students in

Canada (Kuo & Kwantes, 2014). In general, difficulty with negative mood states is considered a key factor that maintains eating disorder psychopathology (Fairburn et al., 2003). It is plausible that multidimensional acculturation may be associated with eating and body-image disturbance through an indirect effect of negative and positive affectivity.

Perfectionism has also been associated with problematic dieting behaviours (e.g., Downey, Reinking, Gibson, Cloud, & Chang, 2014) and disturbance in body-image (e.g., Wade & Tiggemann, 2014). Increased identification with heritage culture has been associated with increased perfectionism, which was associated with body-image and eating disturbance in diasporic South Koreans residing in New Zealand (Chan, Ku, & Owens, 2010). This relationship remains to be assessed in other ethnocultural groups.

Clinical Implications

Study findings add to the accumulating body of evidence countering unidimensional acculturation models. Accordingly, clinicians and researchers should abandon the operationalization of acculturation through purported proxy variables such as dominant language preference (Bhugra & Bhui, 2003), country of birth (e.g., Sundquist & Winkleby, 2000) immigration status (e.g., Dubowitz, Acevedo-Garcia, Salkeld, Lindsay, Subramanian, & Peterson, 2007) and number of years in the new specified country (e.g., Ball & Kenardy 2002). Instead, acculturation should be considered an individual-level, multidimensional concept that may vary with respect to domain and dimension. A deeper understanding of these individual-level variables along with the mechanisms through which culture may impact outcome variables aids clinicians in providing culturally competent care to diverse clients. For example, this understanding may allow clinicians to distinguish mere exposure to culture from psychological changes resulting from identification with culture (Matsudaira, 2006).

Despite the research supporting multidimensional acculturation models, researchers and clinicians continue to use language that subtly reinforces unidimensional models. Study findings highlight that the widespread incorrect usage of the term “acculturation” is problematic. Researchers and clinicians often describe study participants or clients as being “acculturated” when in fact, the concept being conveyed is that participants are acculturated to Western or mainstream culture (e.g., Sinha & Warfa, 2013). One must be mindful that acculturation terms should be fully defined and should not be used interchangeably or synonymously when specific acculturation dimensions or domains are intended. The use of consistent and accurate terminology is crucial in ensuring that research in the acculturation field is properly compared and integrated.

Results indicate that university students of South Asian origin have elevated self-reported eating and body-image disturbance, putting them at risk for the development of full-blown eating disorders. These findings challenge the notion that disordered eating is culture-bound (Prince, 1985) and a so-called “Golden Girl” syndrome (Smolak & Striegel-Moore, 2001). Results strengthen the growing literature documenting that eating and body-image disturbance negatively impacts women of South Asian background, a fact that often surprises Western clinicians (Nasser, Katzman, & Gordon, 2001) whose assumptions may reflect a belief in the model-minority myth. At-risk South Asians, especially those who may be recent immigrants and may therefore be assumed to not be “Westernized”, may be overlooked if clinicians assume that they are not susceptible to eating disturbance. Paired with the general tendency whereby eating disorders tend to be unrecognized and overlooked in non-specialized mental health settings (Cachelin & Striegel-Moore, 2006; Fursland & Watson, 2014) and findings reporting that members of ethnic minority groups are less likely to seek and to be referred for eating disorder treatment (Sinha & Warfa, 2013), minorities such as South Asians may be missed. In order for at-

risk South Asians to be appropriately identified, clinicians should explore their own assumptions regarding the prevalence of eating and body-image disturbance in non-White samples.

Additionally, many are reluctant to disclose symptoms of disordered eating, thus it is crucial that clinicians query body-image and eating disturbance directly (Fursland & Watson, 2014).

Elevations in measures of eating and body-image disturbance among South Asian students in the current study reflect a phenomenon impacting young women in post-secondary education more broadly. Study findings underscore the need for prioritization of campus-wide interventions targeting eating and body-image disturbance among diverse student populations. These prevention efforts may be particularly beneficial in college and university campuses, given that this period represents a transition period in the lives of young women, a time known to be risky in general in the development of eating and body-image psychopathology (Smolak & Striegel-Moore, 2001).

Given the association between thin-ideal internalization and eating and body-image disturbance, on-campus interventions aimed at dismantling the thin-ideal would be beneficial. One factor widely cited for driving thinness is the media's portrayal of women with unrealistically thin body shapes. Accordingly, interventions aimed at reducing the negative impact of unrealistic images portrayed in the media have been developed (Thompson & Stice, 2001). Although it would be impossible to avoid exposure to media altogether, education on the widespread use of computerized software to alter and modify body shape and size allows young woman and men to be more informed consumers of these images. It is believed that such media-literacy approaches serve to "inoculate" viewers against internalizing unrealistic standards (Fairburn, 2014) by promoting critical evaluation of media images (Irving & Berel, 2001; Spettigue & Henderson, 2004). Such interventions have been effective in non-clinical samples of college women (Yager & O'Dea, 2008; Irving, DuPen, & Berel, 1998).

Preliminary evidence suggests that thin-ideal internalization may also be dismantled through correction of the often mistaken belief that one's body weight and shape can and should be controlled (Laliberte, Balk, Tweed, Smith, & Ghai, 2014). Correction of these weight control beliefs may result in a reduction in the importance of striving for a body size that is unrealistic for most women. Additionally, believing that weight should be controlled (versus believing in striving for healthy lifestyle and accepting one's natural weight) is associated with self-reported eating disturbance and body dissatisfaction in young female university samples (Laliberte, Newton, McCabe, & Mills, 2007; Laliberte et al., 2014). Accordingly, some eating disorder treatment programs incorporate the provision of accurate information about the primary role of genetics in determining weight regulation and body size and encourage acceptance of one's natural set-point weight (e.g., Laliberte, 2010). Preliminary evidence suggests that weight-control beliefs can also be altered through self-help and bibliotherapy interventions in non-clinical undergraduate university samples. For example, in a sample of Canadian undergraduate men and women, weight control beliefs changed after participants read a book chapter outlining the role of genetics in the regulation of body weight. Specifically, beliefs in striving for a healthy lifestyle and accepting one's natural weight increased. This change in weight control beliefs was associated with improvement in self-reported body satisfaction and self-esteem and with a reduction of problematic dieting behaviours (Laliberte et al., 2014). Translating evidence-based clinical tools into university settings would be beneficial.

Limitations

Several limitations must be considered when interpreting the above results. Given that South Asians are underrepresented in psychology research, this study fills an important gap in the acculturation and eating and body-image field. However, results cannot be assumed to generalize across all South Asians given the diversity of this group. Although South Asians may trace roots

to the same geographic region within the Indian subcontinent, they should not be considered to be a homogenous group: South Asians encompass a diverse group with multiple places of birth, languages of origin and religions (Ibrahim, Ohnishi, & Sandhu, 1997; Shariff, 2009). The current study also examines acculturation and eating and body-image disturbance in diasporic South Asians living in Canada. The majority of participants reported their ancestral country or country of origin as India, Pakistan, or Sri Lanka. It is possible that current findings may not generalize to South Asians with different immigration histories, or to more homogenous samples of South Asians. For example, previous studies have demonstrated differences in mainstream acculturation between South Asians living in Australia compared to South Asians living in Canada and in the United Kingdom due to differences in the political landscape and immigration policies (Ghuman, 2000). Studies including a larger sample of participants of various South Asian ethnicities are needed to identify the existence of differences or similarities in acculturation or eating and body-image disturbance in this diverse group. Generalizability is also limited by the fact that participants were recruited from a convenience sample of undergraduate students enrolled in an introductory psychology course. Acculturation experiences, eating attitudes, and body-image experience may differ for older South Asians or for South Asians who are not enrolled in post-secondary education.

The majority of participants were students enrolled at York University, an ethnically diverse urban post-secondary campus in Toronto. York University's diverse demographic student profile is not replicated at most colleges and universities. Forty-one percent of York University's undergraduate students are of non-European origin (Hobson, 2000). Although student ethnicity data are not published, York University's population is reflective of the ethnic diversity in Toronto. In addition to its large South Asian population, institutional opportunities involving South Asian culture are widespread. For instance, York University hosts over 13 active

university-sponsored student organization centering around South Asian culture, as well as academic programs focusing on South Asian content. Although there are no known studies directly comparing bidimensional acculturation experiences of South Asians (or other ethnocultural groups) across ethnically diverse and ethnically homogenous campuses, it is possible that heritage cultural identification may be stronger at culturally inclusive institutions where opportunities for heritage cultural identification are available.

Results may be subject to biases introduced from online data collection methods. Research on the psychometric equivalence of Internet versus in-person paper-and-pencil questionnaire completion is mixed. As reviewed by Campos, Zucolotoa,, Bonafe, Jordani, and Maroco (2011), several studies comparing factor structure and reliability have documented differences in online versus in person data collection formats for measures of memory, anxiety, personality, and stress. Potential nonequivalence of these data collection formats has been attributed to variations in participants' perceptions of anonymity and social desirability, researcher-participant interactions, and interactions with other participants (Buchanan, Johnson, & Goldberg, 2005). Although some researchers have found no differences between Internet and paper-and-pencil data collection in measures of burnout in college students (Campos et al., 2011) equivalence of data collection format for current study measures has not been systematically explored. Results are also subject to limitations inherent in using self-reported data. Participants' responses are subject to accurate memory and honest disclosure of cultural identification and eating and body-image disturbance. Participants were informed that the study questionnaire would involve topics related to cultural experience and attitudes about eating. There may be non-random differences between students who have discomfort disclosing information about cultural diversity and eating attitudes may impact and those who do not.

Due to limitations in sample size, data from the same study sample was used in all consecutive factor analyses completed in Study 1. In order to ensure reliability of the final four-factor structure of the VIA, additional studies are required to confirm this structure. It should be noted, however, that once the initially hypothesized two-factor structure was rejected, analyses shifted into an exploratory mode. Although *confirmatory* factor analysis was used to assess the two-factor structure for each of the mainstream and heritage items, this methodology was nonetheless an *exploratory* analysis: a CFA was employed, as its methodology allowed for the consideration of potential method effects resulting from the shared wording of adjacent VIA items.

Study 2 results are limited by the use of a cross-sectional study design. Directionality of influence cannot be determined between cultural identification, thin-ideal internalization, body-image, and eating disturbance. For example, it is plausible that individuals who have increased body-image or eating concerns develop increased identification with mainstream culture. Similarly, it is plausible that prior thin-ideal internalization precedes cultural identification. Longitudinal studies are required to elucidate the temporal relationship between these variables. It is also possible that cultural identity may share common origins with body-image and eating disturbance. For example, a general preference for conformity may underlie both cultural identification and eating disturbance.

Future Directions

Fit indices and the obtained pattern of factor loadings suggest that the VIA is a factorially complex measure of acculturation among. Future studies should expressly verify the obtained factor structure of the VIA across multi-ethnic samples in order to ensure the generalizability of obtained latent variables (Matsumoto & Yoo, 2006). Although the VIA was recently developed, the cultural landscape is constantly changing in response to increasing immigration,

globalization, and communication. Studies aimed at further refining of the VIA may be beneficial in ensuring that all relevant domains of acculturation are captured, and in fine-tuning items that may require modification (e.g., mainstream marriage). Alternative methodological approaches may be beneficial in the refinement of the VIA. The bulk of acculturation scale development is expert-informed; that is, domains of interest for particular ethnocultural groups are selected by researchers. These traditional approaches may be limited as they may not directly include perspectives of diasporic South Asians. Instead, paradigms wherein collaboration between investigators and those being investigated may be more appropriate. Participatory research orientations, such as Community Based Research (CBR) and Participatory Action Research (PAR), are being increasingly employed in studies examining health and social issues (Cornwall & Jewkes, 1995; Flicker, Savan, Kolenda, Mildemberger, 2007) and allow for collaborative knowledge-production through all stages of research (Bergold & Thomas, 2012). Collaboration between researchers and diasporic South Asians in all stages of scale development may provide richer and more nuanced detail about acculturation domains that may not be captured through standard methods.

Although the current study employed self-report measures of body dissatisfaction, body-image is a multifaceted construct (Cash, 2011). For example, body-image quality of life is believed to capture the extent to one's day-to-day life is impacted by body-image concerns (Cash & Fleming, 2002). On the other hand, appearance investment is proposed to assess the extent to which one's thoughts and behaviours revolve around body-image concerns (Cash, 2004). Researchers propose that these constructs, although related, are distinct insofar as they are differentially associated with disordered eating and should therefore be measured using different instruments (Cash, 2011). Although the measures employed in the current study purportedly assess body-image satisfaction, this evaluative domain is thought to be distinct from more

affective, cognitive, and behavioural domains (Cash and Fleming, 2002; Ghai, Milosevic, Laliberte, McCabe, & Taylor, 2014). The preceding analyses should thus be replicated with additional measures of body-image disturbance in order to assess whether findings generalize to additional facets of pathology.

Although acculturation domains were examined in men (Study 1), their association with eating pathology and body-image disturbance was not a primary study goal (Study 2). Although disordered eating and body-image concerns are more commonly found among women (e.g., Varnado-Sullivan, Horton, & Savoy, 2006), reports of such concerns are increasing among men (e.g., Yager & O'Dea, 2008). Further studies assessing the relationship between acculturation and eating and body-image disturbance among diasporic South Asian men are warranted. It is important to note the growing literature indicating that body-image disturbance manifests differently in men compared to women. Rather than reporting a preference for thinness or weight loss, men endorsing body-image disturbance report a preference for a muscular body (Cafri & Thompson, 2004; McCreary, 2007; Ousley, Cordero, & White, 2008). Selection of appropriate body-image measures such as the Drive for Muscularity Scale (DMS: McCreary & Sass, 2000) should be employed in future studies, as traditional thin-ideal measures developed to assess disturbance in women may not tap into unique male body-image concerns.

These aforementioned research directions would clarify the construct of acculturation and its relationship to disordered eating pathology among a single, yet demographically important population, diasporic South Asians. However, the current study provides a platform from which broader questions about various ethnocultural communities may be pursued. This study is the first to identify multiple VIA acculturation domains within each acculturation dimension. Psychometric studies using large multi-ethnic samples and employing appropriate theory-driven

factor analytic methods should be pursued to assess the validity of the current model cross-culturally.

This study provides unique contributions to the acculturation literature in a number of ways. First, it incorporates methodology that improves upon the limitations of a large body of cross-cultural research employing proxy measures of cultural identification such as ethnicity or immigration status. The use of a continuous measure of acculturation along with inclusion of an intermediate variable corrects the assumption that ethnicity is an explanatory variable. Instead, insights into the intervening variables through which acculturation may impact eating and body-image disturbance among diasporic South Asians (e.g., thin-ideal internalization) were clarified. This approach heeds the calls to extend the cross-cultural literature on body-image disturbance into third-wave approaches (Matsumoto & Yoo, 2006). Another methodological improvement was achieved through the use of theory-driven techniques (e.g., EFA) versus data-driven PCA (e.g., Ryder et al., 2000). Although PCA and exploratory factor analysis (EFA) are often confused, they differ in their fundamental purpose (Decoster, 1998; Henson & Roberts, 2006; Matsunaga, 2010; Fabrigar, Wegener, MacCallum, & Strahan, 1999). EFA and PCA are distinct in that the former is a theory generation technique intended for the identification of latent variables that account for observed variables, whereas the latter is a data reduction approach intended to summarize observed data into the fewest number of components without regard to latent variables (Benson & Roberts, 2006; Fabrigar et al., 1999; Matsunaga, 2010). Accordingly, many researchers suggest that PCA is rarely appropriate and that EFA is preferred (e.g., Costello & Osborne, 2005; Matsunaga, 2010). Further, the decision to assess the factor structure of each subscale in separate EFAs allowed for the consideration of method effects resulting from residual correlations between adjacent heritage and mainstream items. Additionally, the use of SEM revealed both positive and negative relationships between acculturation and eating and body-

image disturbance, which may have been otherwise obscured. Indeed, the distinction between acculturation factors separated by domain among South Asians has not been previously documented.

In summary, this study is the first to examine the association between multidimensional acculturation and eating and body-image in diasporic South Asians in Canada. Despite the growing population of South Asians living in Western nations, only a handful of studies in the United Kingdom and North America have examined these constructs among this population. Study 1 reveals that acculturation in South Asians is a more complex process than hypothesized and that the VIA is factorially complex. Results suggest that acculturation is not only determined by dimension (i.e., heritage versus mainstream culture) but is also influenced by life domain. Specifically, the extent to which one identifies with one's heritage and mainstream culture may differ in domains related to one's engagement and valuation of South Asian traditions and practices versus domains related to social and interpersonal domains. Study 2 results highlight that heritage and mainstream acculturation may or may not be associated with eating and body-image disturbance, depending upon acculturation domain. As documented in Caucasian samples, thin-ideal internalization contributes to both eating and body-image disturbance in diasporic South Asians. Acculturation research is characterized by inconsistent findings largely due to a lack of parsimony in construct definition, measurement, and interpretation. It is hoped that results from this study spark newfound interest and provide direction in finding integration within a disjointed field, especially with the constantly growing number of South Asian individuals living in Canada and other Western countries.

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Appendix A: Vancouver Index of Acculturation (VIA)

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

Please write your heritage culture in the space provided: _____

Use the following key to help guide your answers:

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

- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. I often participate in my <i>heritage cultural</i> traditions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 2. I often participate in mainstream North American cultural traditions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 3. I would be willing to marry a person from my <i>heritage culture</i> . | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 4. I would be willing to marry a North American person. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 5. I enjoy social activities with people from the same <i>heritage culture</i> as myself. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 6. I enjoy social activities with typical North American people. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 7. I am comfortable working with people of the same <i>heritage culture</i> as myself. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 8. I am comfortable working with typical North American people. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 9. I enjoy entertainment (e.g., movies, music) from my <i>heritage culture</i> . | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

10. I enjoy North American entertainment (e.g., movies, music).	1	2	3	4	5	6	7	8	9
11. I often behave in ways that are typical of my <i>heritage culture</i> .	1	2	3	4	5	6	7	8	9
12. I often behave in ways that are 'typically North American.'	1	2	3	4	5	6	7	8	9
13. It is important for me to maintain or develop the practices of my <i>heritage culture</i> .	1	2	3	4	5	6	7	8	9
14. It is important for me to maintain or develop North American cultural practices.	1	2	3	4	5	6	7	8	9
15. I believe in the values of my <i>heritage culture</i> .	1	2	3	4	5	6	7	8	9
16. I believe in mainstream North American values.	1	2	3	4	5	6	7	8	9
17. I enjoy the jokes and humor of my <i>heritage culture</i> .	1	2	3	4	5	6	7	8	9
18. I enjoy typical North American jokes and humor.	1	2	3	4	5	6	7	8	9
19. I am interested in having friends from my <i>heritage culture</i> .	1	2	3	4	5	6	7	8	9
20. I am interested in having North American friends.	1	2	3	4	5	6	7	8	9