

Beyond somatization: Values acculturation and the conceptualization of mental health
among immigrant Chinese Canadian families

by

Lauren Julia Chance
B.Sc., University of Waterloo, 2007
M.Sc., University of Victoria, 2010

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In the Department of Psychology

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Supervisory Committee

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(Department of Psychology)

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Dr. Karen M. Kobayashi, Outside Member
(Department of Sociology)

Abstract

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This dissertation investigated the relations between values-based acculturation and conceptualizations of internalized distress among immigrant Chinese Canadian families with adolescents. Parents and adolescents were classified into one of three primary acculturation profiles (separated, integrated, or assimilated), according to Berry's (1997) model of acculturation based on their endorsement of Chinese and Western cultural values. Confirmatory factor analyses were used to determine if the factor structure of measures of internalized distress (e.g., the CES-D) differed according to individual's acculturation profile. Next, multivariate analyses of variance were used to compare the proportion of various symptom types (somatic, affective, interpersonal, low positive affect) across acculturation profiles, as well as with a comparison sample of non-immigrant families. Finally, hierarchical regression analyses were used to assess the relations between the proportion of somatic symptoms reported and both cultural and demographic variables believed to increase one's susceptibility to experience stigma related to mental health symptoms. As hypothesized, the traditional Western four-factor model of the CES-D fit best for participants who endorsed high levels of Canadian values and low levels of Chinese values (i.e., those classified as assimilated). Both the Western four-factor and

more holistic three-factor models showed acceptable model fit for individuals who endorsed both Canadian and Chinese values highly (i.e., those classified as *integrated*), and neither model fit the data among participants who endorsed low levels of Canadian values and high levels of Chinese values (i.e., those classified as *separated*). Contrary to hypotheses, parents and adolescents from non-immigrant families endorsed higher proportions of somatic symptoms compared to their immigrant counterparts. Furthermore, among immigrant Chinese Canadians, factors believed to lead to less reporting of somatic symptoms because of less perceived stigma (e.g., greater endorsement of Canadian values, younger age, longer time in Canada) were instead related to higher proportions of somatic symptoms. These unexpected findings were understood in the context of the cultural appropriateness of the specific somatic symptoms assessed by the CES-D. The expected pattern of group differences in the proportion of positive affect was found. Females reported a higher proportion of affective symptoms compared to males, and no acculturation-based or gender differences were found with respect to interpersonal symptoms. Several key implications emerged from the results of this dissertation. The value in grouping participants by cultural value endorsement rather than cultural background was demonstrated, in terms of both research and clinical practice. Future research could employ qualitative methods for a more nuanced understanding of how individuals conceptualize the various cultures that influence their perceptions of health, illness, and stigma. In terms of clinical practice, the importance of assessing cultural values in relation to symptom reporting was discussed, as well as the importance of ensuring front line health care professionals have the training needed to identify cultural variations in the reporting of distress.

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Dedication

This dissertation is dedicated to my family -- my husband, my parents, my brother, and my grandparents. In their own way, each of them has provided balance, perspective and unconditional support, through successes and disappointments, and through many long hours of researching, writing, and revising. Their love and encouragement have been invaluable throughout graduate school. In particular, I'd like to thank my husband Ben for moving across the country so that I could complete my residency training, and for the humour and sense of adventure that he brought with him. Finally, I'd like to thank Nibs for coaxing me away from my computer for long walks and much needed breaks.

Introduction

Understanding the individual experience of mental health or illness requires an understanding of the social and cultural contexts in which the individual exists. The internalized meanings of one's culture take the form of values and beliefs, and this cultural worldview influences how individuals define, understand, express, explain, and seek treatment for mental illness (Kirmayer, 1989; Kleinman, 1977; Tsai, Butcher, Muñoz, & Vitousek, 2001). The role of culture is particularly salient for immigrants, who must contend with potential discrepancies between cultural beliefs about mental health from their country of origin and the beliefs predominant in their adopted country.

In Canada and the United States, immigrants who experience psychological distress must rely on a medical system in which classification and diagnosis are based on Western values and social norms (Kirmayer, 1989), regardless of the ethnocultural heritage of the individual. The dominant mental health classification system in North America is *The Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association [APA], 2013). However, the validity of using the *DSM-5* to assess and diagnose immigrants to Canada and the United States is unclear, since immigrants with non-Western worldviews may not share the underlying assumptions on which the *DSM-5* has been developed. This is a critical issue to understand because diagnoses generated by the *DSM-5* provide a framework for subsequent treatment; in many cases, the presence or absence of a recognized diagnosis determines whether treatment is provided at all.

Knowledge of an immigrant client's acculturation level may provide insight into the appropriateness of using a Western diagnostic system with the client. Acculturation refers to the process by which individuals negotiate two (or more) sets of cultural influences on behaviour,

identity, and values, in the context of ongoing contact between these cultural groups (Berry, 1997; Schwartz, Unger, Zamboanga, & Szapocznik, 2010). Since conceptions of mental health are embedded in cultural worldviews, and acculturation may lead to changes in one's cultural worldview, acculturative changes may shape how individuals view mental health. In order to provide effective psychological treatment to immigrant populations in Canada and the United States, the manner in which acculturation shapes beliefs about mental health must be understood.

Defining Mental Health: Emic and Etic Perspectives

Studies of cultural conceptions of mental health may be approached from an *etic* or *emic* perspective. The etic perspective assumes the universality of mental health constructs, with the implication that a Western measure of depression, for example, can be used in another culture, provided it has been translated into the appropriate language. The emic perspective assumes that all mental health constructs are culture-specific and that each culture possesses unique cultural constructions of mental health. From the emic perspective, importing a Western measure of mental health and assuming equivalence based on linguistic translation alone would be inappropriate; adequate measurement of mental health constructs would require developing mental health assessment tools specific to the culture of interest (Tsai et al., 2001).

This dissertation focused on *internalized distress* as the mental health construct of interest. Internalized distress encompasses a range of symptoms (e.g., affective, somatic, interpersonal), which are experienced across cultures (e.g., Mak & Zane, 2004; Ryder et al., 2008), and yet are often used as shorthand to contrast cultural differences in the experience and expression of psychopathology. For example, training materials for competent cross-cultural practice frequently state that Chinese individuals experience distress somatically, whereas individuals of Western descent experience distress affectively. Of particular interest in this

dissertation was the concept of somatization, defined as the channeling of psychological distress into medically unexplained somatic complaints. The phenomenon of somatization within Chinese individuals is frequently discussed in relation to the Western diagnostic construct of depression, an illness construct defined by primary affective symptoms of low mood and loss of interest in activities, and secondary somatic (e.g., fatigue) and cognitive (e.g., guilt) symptoms (American Psychiatric Association, 2013).

The assessment of internalized distress in this dissertation relied on etic measures of North American constructs (e.g., depression), because of my interest in addressing current practice issues related to the assessment and diagnosis of immigrants in Canada. In general, immigrants who seek mental health care must interact with a system that relies on *DSM-5* criteria to label distress and suggest intervention strategies, regardless of the degree of fit between their heritage culture and Western culture. Nevertheless, results have been interpreted with the awareness that important dimensions of the Chinese mental health experience were not measured. Where possible, ethnographic research and culture-specific items have been integrated in order to broaden coverage of relevant mental health symptoms and guide interpretation of results. Through a variety of analytical approaches, I investigated how symptoms of internalized distress are experienced and expressed, in relation to the diverse patterning of acculturation experiences reported by Chinese Canadian immigrants.

The Current Study

The current study investigated relations between acculturation and the conceptualization of mental health within a community sample of immigrant Chinese Canadian adults and adolescents. Specifically, the experience and expression of somatic, affective, and interpersonal symptoms of internalized distress were considered. The cultural psychopathology literature

(Ryder, Yang, & Heine, 2002) has evolved beyond the assumption that Chinese individuals exclusively experience somatic symptoms of depression and few affective symptoms (i.e., the “repression hypothesis,” Stewart, Lee, & Tao, 2010, p. 370), to a more nuanced appreciation of the complexities inherent in untangling culture and conceptions of mental health (Cheung, 1998). Just as Western individuals report somatic symptoms, Chinese individuals report affective symptoms (Ryder et al., 2008); however, culture certainly impacts the salience and meaning of these symptoms. It has also been suggested that any evidence of greater emphasis on somatic symptoms in Chinese culture may function as a strategy to reduce or avoid stigma (Stewart et al., 2010).

Understanding the link between acculturation and conceptualizations of mental health among immigrant Chinese Canadian adults and adolescents is extremely relevant given the large influx of immigrants from such regions as mainland China, Taiwan, and Hong Kong in recent years. The largest proportion of immigrants that arrived in Canada between 1997 and 2006 emigrated from mainland China, while Hong Kong was the main sending region from 1987 until 1996 (Chui, Tran & Maheux, 2007). From 2006 until 2011, mainland China remained among the top two sending regions (behind only the Philippines); as of 2011, individuals of Chinese ethnicity represented 4.0% of the total Canadian population, with the majority of these individuals either first or second generation Canadians (Statistics Canada, 2011). Given the increasing proportion of individuals of Chinese ethnicity living in Canada, it is critical that relations between acculturation and conceptions of mental health are understood.

The current study contributes to the cultural psychopathology literature in several ways. First, I investigated how an individual’s acculturation to both Western (i.e., the dominant culture in Canada) and Chinese cultures relates to the clustering of symptoms of internalized distress

into meaningful factors (i.e., symptom meaning). Second, I investigated how acculturation was related to the relative proportion of somatic and affective symptoms reported (i.e., symptom expression). Third, I investigated whether individuals most vulnerable to stigma reported a higher proportion of somatic symptoms, compared to less vulnerable individuals. Taken together, these analyses provide critical information connecting acculturation with the experience and expression of symptoms of internalized distress.

Which Cultural Values Shape Conceptions of Mental Health?

The cultural values that influence how individuals perceive themselves, others, and the world around them are deeply rooted in the philosophical traditions that are intertwined with the development of distinct cultures. Markus and Kitayama (1991) contrast the holistic, integrated tradition of Chinese thought with the “Cartesian, dualistic tradition that characterizes Western thinking” (p. 277). While Western culture tends to parcel the world into discrete categories (e.g., body and mind, the self and others), many other cultures, including Chinese culture, view the world as a connected, integrated, and harmonious whole, in which self and other, person and situation, and body and mind are inseparable (Markus & Kitayama, 1991). These divergent philosophical traditions have implications for the more specific values systems (i.e., beliefs about the body-mind connection, beliefs about the self, beliefs about emotional expression) that shape individuals’ experiences of psychopathology. The emerging field of cultural neuroscience has demonstrated interrelations between culture and neural processes that underlie aspects of social cognition (such as interpersonal perception and emotion) that are relevant to understanding experiences of internalized distress (Chiao & Immodino-Yang, 2013).

Beliefs about body and mind. The Western cultural view of the relation between the body and the mind is one of duality: the physical body exists separately from the mind, and one’s

sense of self is localized in the mind (Ryder et al., 2002). In contrast, the Chinese cultural view is one of mind-body holism; mind and body exist as one entity, without the stark division of Western culture (Tsai et al., 2004). This holistic perspective is reflected in the language used to describe symptoms of psychopathology. Kleinman (1977) observed that Chinese individuals who reported somatic complaints tended to use the term *mên* to convey a simultaneous physical pressure on the heart and the emotion of sadness, with an emphasis on the physical component. A more recent ethnographic study of indigenous Chinese experiences of depression revealed an extensive terminology of expressions that articulate a joint sense of physical and psychological distress (Lee, Kleinman, & Kleinman, 2007). These terms invoked the concept of *xin*, or the “heart-mind” (Lee, Kleinman, et al., 2007, p. 4), referring to the heart as the physical place in which emotional pain was felt, as well as an integrated concept that alludes to both the physical heart and the mind. From the perspective of the participants, symptoms of low mood, a hallmark of depressive symptomatology in the *DSM-5* (American Psychiatric Association, 2013), were communicated indirectly through the description of multiple somatic symptoms and life stressors; if direct queries about mood symptoms were posed following the description of such symptoms, participants were often surprised that the interviewer did not infer low mood based on the information provided (Lee, Kleinman, et al., 2007). Although the *DSM-5* criteria for Major Depressive Disorder (MDD) includes affective, cognitive, and somatic symptoms (American Psychiatric Association, 2013), these symptoms are conceptualized as discrete indicators of the broader diagnostic category.

Beliefs about the connection between mind and body also influence treatment-seeking. In Chinese medicine, distinctions tend not to be made between practitioners who heal the body and practitioners who heal the mind; given the inseparability, the same treatments are often

sought out from a single practitioner (Tabora & Flaskerud, 1996). Within Western culture, mainstream health services are generally classified according to disorders of the body or mind. Cultural values about body-mind connections are intrinsically linked to how individuals understand their state of being, and thus inform how individuals make sense of disorder and how they believe disorder should be treated.

Beliefs about the self. Cultural beliefs about the nature of the self, and how others are understood in relation to the self, shape conceptions of mental health and psychopathology. Markus and Kitayama (1991) distinguished between the independent self-construal, in which internal attributes are the defining feature of the self, and the interdependent self-construal, in which relations with others are the defining feature of the self. Internal attributes are considered to be stable and trait-like for individuals possessing independent self-construals, whereas a given attribute is best understood as relationship- and situation-specific for individuals possessing interdependent construals. The primary function of the other within an independent self-construal tends to be one of self-comparison rather than self-definition. Similarly, efforts of individual self-agency within an interdependent self-construal tend to be directed towards building and maintaining interpersonal connections and achieving group-oriented goals. The independent self-construal is the prototypically Western self-system, and the interdependent self-construal is the prototypical Asian self-system (although it is important to acknowledge within-culture variability) (Markus & Kitayama, 1991).

Self-construals drive behavioural regulation via cognition, emotion, and motivation (Markus & Kitayama, 1991), and thus have important implications for understanding how culture shapes these basic psychological processes in relation to mental health. Individuals with interpersonal self-construals tend to frame knowledge of the self and others in a behavioural and

interpersonal context, rather than in terms of stable, internal attributes, as an individual with an independent self-construal might frame knowledge (Markus & Kitayama, 1991). Consistently, although Chinese individuals have been found to report the same affective symptoms of depression (e.g., irritability, tearfulness) that are reported in Western populations, these symptoms are understood in an interpersonal rather than individual context (Lee, Kleinman, et al., 2007). Further, the impact of these affective symptoms within interpersonal relationships causes significant distress, more so than other reported symptoms. The following excerpt from a participant's interview illustrates the interpersonal experience of depressive symptoms (Lee, Kleinman, et al., 2007, p. 4):

It seems everything is not smooth, and I want to vent my anger toward them. I want to wreak terrible vengeance toward others although they haven't done anything wrong to me. If they don't realize that I am suffering from depression, it will lead to quarrels. I will be misunderstood. They will think I am mischief-making. Actually, I always feel unhappy because of these . . .

The behavioural effects of the sadness or anger in a specific relational context (e.g., expressing unprovoked anger towards others, interpersonal conflict) are central to the understanding of depression in individuals with interdependent self-construals. According to Markus and Kitayama's (1991) framework, individuals strongly rooted in Chinese cultural norms (who would be predicted to, on average, identify with an interdependent self-construal) would recognize and feel distress over the interpersonal impact of frequent tearfulness or anger. In contrast, among individuals who identify with Western cultural norms and an independent self-construal, the identification of sadness or anger within the self, and how it interacts with other inner attributes of the self, is central to the understanding of depression.

Beliefs about emotional expression. Self-construals are thought to function as general organizing schemata, which regulate behaviour via influences on more specific schemata involving cognition, emotion, and motivation (Markus & Kitayama, 1991). For example, self-construal influences the types of emotions that are expressed behaviourally (Markus & Kitayama, 1991). Emotions may be classified as *ego-focused*, in which the self is the main target (e.g., anger, pride), or *other-focused*, in which the other is the main target (e.g., sympathy, shame) (Markus & Kitayama, 1991). Outward displays of ego-focused emotions reinforce the autonomy central to an independent self-construal (i.e., I am communicating my internal state of anger to the world) (Markus & Kitayama, 1991). In contrast, outward displays of other-focused emotions foster the interpersonal awareness and perspective-taking central to an interdependent self-construal (i.e., I feel shame in the eyes of others and I fear bringing shame to my family) (Markus & Kitayama, 1991). Emotions that are incongruent with one's self-construal are thought to be more likely to be actively inhibited or suppressed (Markus & Kitayama, 1991), as the expression of such emotions is likely to create distress.

Recent empirical studies have supported the theoretical link between Markus and Kitayama's (1991) theory of self-construal and beliefs about emotional expression across cultures. A number of these studies have found that self-construal accounts for cultural differences between Asian and Western individuals in the relation between emotional expression and depressive symptoms. For example, Cheung and Park (2010) found that anger suppression mediated the relationship between trait anger and depressive symptoms in both Asian American and European American samples. However, the relation between anger suppression and depressive symptoms was attenuated among Asian Americans compared to European Americans, and among individuals endorsing high levels of interdependent self-construal,

compared to those who endorsed low levels of interdependent self-construal (regardless of cultural background). In other words, anger suppression was less detrimental to mental health among individuals who viewed the self in a relational context rather than an individual context. Su, Lee, and Oishi (2013) also found that suppression of ego-focused emotions (such as pride and superiority) was unrelated to depressive symptoms among Chinese individuals, but related to a higher level of depressive symptoms among European American individuals (a relationship that was mediated by independent self-construal). A study of South Korean and American college students also supports the theoretical link between self-construal and beliefs about self- and other-focused emotions (Seo, 2011). Among South Korean college students, greater endorsement of an independent self-construal was related to greater acceptance of ego-focused emotions; among American students, greater endorsement of an independent self-construal was related to less acceptance of other-focused emotions. No main effect of cultural heritage was found. These results underscore the importance of untangling cultural heritage from belief systems about the self and emotions, a consideration that becomes increasingly important once the impact of immigration, and subsequent immersion in the settlement culture, is considered.

Levels of Influence of Culture on Mental Health

Culture impacts mental health on multiple levels. Although no consensus exists about the precise definition of mental illness or psychopathology, deviance from cultural norms is almost always identified as one necessary condition for the distinction between mental health and illness (Abdullah & Brown, 2011). Thus, the very definition of mental health and illness is embedded in a cultural context. Cultural norms about acceptable behaviour frame the definition of psychopathology (e.g., is there a problem?), both in terms of both subjective experience and the social response to the individual (Tsai et al., 2001).

Second, the experience and outward expression of psychological symptoms is embedded in culture (e.g., how is the problem experienced, and how are these internal experiences expressed?). Research suggests that most individuals, regardless of culture, simultaneously experience internalized distress in both somatic and affective terms (Kirmayer, 1989; Mak & Zane, 2004, Ryder et al., 2008). However, individuals are less likely to outwardly express emotional distress if such expressions fall outside of cultural norms (Kirmayer, 1989). For example, the expression of unprovoked anger within close interpersonal relationships has been shown to be distressing among Chinese individuals (Lee, Kleinman, et al., 2007), meaning that individuals may use other, more culturally congruent means of expressing emotional distress.

Third, cultural beliefs about symptom expression interact with beliefs about stigma to influence treatment decisions. Since the relational definition of the self is highly valued in Chinese culture, an individual's psychological disorder might bring shame upon the family (Abdullah & Brown, 2011). Therefore, an individual may seek treatment from a culturally condoned care provider. For example, in China, seeking treatment for nerve weakness from a neurologist is less stigmatized than seeking psychiatric help for mood disorder (Lee & Kleinman, 2007).

Fourth, culture shapes beliefs about etiology of psychopathology (e.g., why is there a problem?; Kleinman, 1977). Contrasting Western diagnostic criteria and qualitative studies of Chinese experiences of psychopathology reveal that what is considered a *symptom* of psychopathology in one culture may be considered a *cause* of psychopathology in another culture. For example, the *DSM-5* (APA, 2013) defines excessive crying and irritability as affective symptoms of depression, and sleeplessness a somatic symptom of depression. However, in a qualitative study with first generation Chinese American women, Tabora and

Flaskerud (1996) noted that participants identified excessive crying and anger as a potential cause of mental illness, rather than as a symptom. Since Chinese cultural norms do not sanction the expression of ego-focused emotions like anger (Markus & Kitayama, 1991), anger may be viewed as disruptive to the relational self. Chinese individuals may also describe sleeplessness as a cause of mental illness, and depressed mood a *symptom* of sleeplessness (Lee, Kleinman, et al., 2007).

The importance of uncovering the various ways in which culture shapes mental health is illustrated by a seminal study on the phenomenology of Western psychiatric constructs in non-Western cultures (Kleinman, 1977). Patterns of somatic and affective symptom reporting were examined in a group of 25 Taiwanese psychiatric outpatients. Each of these patients exhibited a “depressive syndrome” (Kleinman, 1977, p. 3), which was defined as a cluster of symptoms including depressive affect, weight loss, low energy, mood changes throughout the day, constipation and dry mouth. Despite presentation to a psychiatric treatment setting, most participants (88%) initially reported only somatic symptoms to mental health staff. A large minority (40%) did not report affective symptoms at any point during treatment, and nearly one third (28%) did not conceptualize their illness as depression following treatment with anti-depressant medication. Although these clients sought treatment from a mental health specialist, the primary illness was still viewed as physical in nature (Kleinman, 1977). Their symptom expression and meaning ascribed to symptoms differed from the comparison sample of American psychiatric outpatients, in which only one person out of 25 reported exclusive somatic symptoms, and only 16% reported a combination of affective and somatic symptoms as their primary complaint. It is possible that somatic symptoms may have been most salient in the Taiwanese sample, or that fear of stigma prevented individuals from disclosing affective

symptoms. When studying cultural influences on mental health, it is critical to understand that every level of the experience of mental health is embedded within a cultural context.

Culturally Based Meanings of Symptoms

Symptoms of psychopathology are organized into recognizable categories of distress by diagnostic systems. The *DSM-5* (APA, 2013) is dominant in North America, whereas the *International Classification of Diseases* (10th ed., *ICD-10*; World Health Organization [WHO], 2015) is dominant in most WHO member states (other than the United States and Canada). Both the *DSM-5* and the *ICD-10* guide clinical assessment and diagnosis using the Western approach to mental health and illness, although culture has been receiving increasing attention with each revision. In the previous edition of the *DSM* (4th ed., text rev.; *DSM-IV-TR*; APA, 2000), the multiaxial system created a somewhat artificial division between mental and physical disorders, despite statements made to the contrary in the introduction of the *DSM-IV-TR* (Cheung, 1998). The role of culture was primarily addressed in an appendix that contained a single page outlining cultural case formulation, followed by a glossary of various culture-bound syndromes. The *DSM-5* endeavoured to solve these issues by moving to a non-axial system and adding the *Cultural Formulation Interview*. The non-axial system represents a shift to a more integrated diagnostic system, in which mental disorders and medical concerns are coded in a shared category. The *Cultural Formulation Interview* provides a list of interview questions which query cultural definitions of the presenting problem, the role of cultural identity, past and current help seeking, and misunderstandings in the clinician-patient relationship, along with supplementary modules which assess each domain in greater depth. Despite these improvements, many criticisms of the Western cultural worldview of the *DSM-IV-TR* still apply to the *DSM-5*, with its focus on diagnosing the individual, diagnostic criteria that require the recognition and

willingness to report both affective and somatic symptoms, and classification according to the patterning of behavioural symptoms rather than etiology of distress (Cheung, 1998).

The *Chinese Classification of Mental Disorders, Third Edition (CCMD-3)*; as cited in Chen, 2002) is used to classify and diagnose mental disorders in China. Some overlap exists between the *CCMD-3* and the *DSM-5* (APA, 2013) and *ICD-10* (WHO, 2015), representing efforts by the authors of the *CCMD-3* to develop a diagnostic system compatible with both Western systems (Chen, 2002; Stewart et al., 2010). For example, the *CCMD-3* (as cited in Lee, 2001) was the first version to classify depressive disorders as mood disorders rather than neurotic disorders. The *CCMD-3* (as cited in Stewart et al., 2010) also contains emic diagnostic categories relevant to Chinese culture (e.g., neurasthenia) and excludes diagnostic categories that are not viewed as mental disorders in Chinese culture, such as personality disorders. The *CCMD-3* and the *DSM-5* also differ on the basis of classification. Disorders in the *CCMD-3* (as cited in Chen, 2002), are classified according to both symptom presentation and etiology, meaning that some diagnostic categories are defined in terms of the presumed causes. For example, *qigong*-induced mental disorder refers to a broad grouping of somatic, affective, psychotic, and dissociative symptoms presumed to be caused by the excessive or improper practice of *qigong*, a traditional Chinese form of healing (*CCMD-3*; as cited in Lee, 2001). With very few exceptions (e.g., post-traumatic stress disorder, reactive attachment disorder, separation anxiety disorder, substance-specific intoxication and withdrawal syndromes), all *DSM-5* diagnoses are based on the presence or absence of observable or reportable symptoms, regardless of presumed symptom etiology.

The Western cultural construct of depression. The construct of depression is one of the most culturally salient mental health issues in Western culture. Conservative estimates place the

lifetime prevalence of Major Depressive Disorder (MDD) at 16.6% in the U. S. population (Kessler et al., 2005), a number that does not include individuals who experience subclinical depressive symptomatology. The *DSM-5* (APA, 2013) classifies MDD under *Depressive Disorders*, a category in which “sad, empty, or irritable mood, accompanied by somatic and cognitive changes that significantly affect the individual’s capacity to function” (p. 155) are the defining features. In order to diagnose MDD, one of two key symptoms is required: depressed mood (e.g., subjective reports of sadness or emptiness, objective reports of tearfulness, or irritability among children and adolescents) or loss of interest and pleasure in everyday activities (also known as *anhedonia*). Additional diagnostic criteria include somatic symptoms (changes in appetite and/or weight, sleep disruptions, an observable increase or decrease in activity level, fatigue) and cognitive symptoms (feelings of worthlessness or guilt, difficulty concentrating or making decisions, suicidal ideation). If a client were to present with strictly somatic symptoms in the absence of depressed mood and/or anhedonia, they would not meet criteria for MDD. Despite the acknowledgement in the *DSM-IV-TR* that “in some cultures, depression may be experienced largely in somatic terms” (APA, 2000, p. 353), no changes were made in the *DSM-5* to alter the primacy of mood-based symptoms in the diagnostic criteria for MDD.

The Chinese cultural construct of neurasthenia. *Shenjing shuairuo*, also known as neurasthenia, is an emic construct of internalized distress contained in both the *CCMD-3* and *ICD-10* (Stewart et al., 2010). Although the symptoms of neurasthenia overlap with symptoms of various mood, anxiety, and somatoform disorders, chronic fatigue syndrome (CFS) is perhaps the closest illness construct in Western culture (Cheung, 1998). Neurasthenia is categorized as a *neurotic disorder* within the *CCMD-3* (Cheung, 1998). The term *neurosis* is no longer used in the *DSM-5* (APA, 2013), but retains clinical utility outside of Western psychiatry, as a means of

describing mixed presentations of physical and psychological symptoms (Lee, 2001).

Neurasthenia translates to English as a weakness or exhaustion of the nervous system (Cheung, 1998). A *CCMD-3* diagnosis of neurasthenia (as cited in Lee, 2001; as cited in Stewart et al., 2010) requires the presence of chronic symptoms from three of five categories: (1) fatigue or weakness that is physical or mental in nature; (2) emotional distress (e.g., worry, irritability); (3) excitability; (4) nervous pain (e.g., headache); and (5) sleep disturbance (e.g., insomnia). In the *ICD-10* (WHO, 2015), a diagnosis of neurasthenia requires the presence of fatigue for diagnosis (Lee, 2001). In contrast, the *DSM-5* acknowledges neurasthenia with a brief entry in the glossary titled Cultural Concepts of Distress, separate from the primary diagnostic categories.

The origins of neurasthenia as an illness concept within Chinese culture demonstrates the cultural forces which shape ideas about mental illness, as well as the commonality of experiences across culture and time. The concept originated in Western psychiatry in 1869, and was classified within the second edition of the *DSM* as a form of neurosis (as cited in Cheung, 1998; as cited in Stewart et al., 2010). The construct made its way into Chinese culture in the first half of the 20th century, and gained recognition through the 1950's and 1960's. The presumed etiology of neurasthenia (overwork for the benefit of family and society) was more compatible with communist beliefs than the self-focused, "mentalistic" (p. 40) psychological disorders associated with individualistic, Western beliefs (Cheung, 1998). Neurasthenia was removed from the third edition of the *DSM* in 1980, and then reintroduced as a culture-bound syndrome in the fourth edition of the *DSM* in 1994 (as cited in Cheung, 1998). However, neurasthenia has retained its relevance in modern day China, due to its compatibility with cultural beliefs about mind-body holism (i.e., diagnostic criteria comprised of both somatic and affective symptoms, with neither symptom type given precedence in diagnosis; Cheung, 1998). The label of

neurasthenia also facilitates treatment seeking for affective and cognitive symptoms of distress, as distress due to overwork remains less stigmatized in Chinese culture than the shame associated with unexplained mental illness (Cheung, 1998). In contrast, the value placed on self-made, individual success in Western culture (Abdullah & Brown, 2011) means that attributing mental illness to overwork is also susceptible to stigma. The migration of neurasthenia from Western culture to Chinese culture demonstrates how sociocultural contexts shape the very definition of mental illness.

Intersections of internalized distress. Both the *DSM-5* (APA, 2013) and the *CCMD-3* are emic documents that legitimize and define the experience of mental health and illness within their respective cultures. In other words, these diagnostic guidelines shape the conceptualization and labeling of symptoms. A client presenting at a Western clinic with symptoms of fatigue, emotional distress, excitability or restlessness, unexplained pain, and sleep difficulties would likely trigger a diagnostic hypothesis of a mood disorder (if irritability was the most prominent form of emotional distress) or generalized anxiety disorder (if worry were a prominent presenting feature). In a Chinese cultural context, these same symptoms quite closely match the core symptoms of neurasthenia. This differential labeling of similar symptoms is not problematic, provided that diagnostic labels enhance clinical utility by helping individuals understand their symptoms and access treatment in a culturally-appropriate manner. However, the *DSM-5* and its predecessors have been broadly applied to populations outside of Western culture in an etic manner. For non-Western immigrants living in Canada and the United States, interactions with the mental health system generally involve the application of the *DSM-5* to diagnose and guide treatment, regardless of the goodness-of-fit between their cultural worldviews and the Western cultural worldview on which the *DSM-5* is based.

Somatization in Chinese Culture

The comparison of Chinese and Western diagnostic systems and categories illustrates how cultural values influence the grouping of symptoms into recognizable disorders. These cultural differences become most relevant when these cultures intersect with immigration. The issue of somatization, in the context of immigrant Chinese Canadians, arises from attempts to fit immigrant Chinese individuals into Western diagnostic categories, regardless of how closely their cultural worldview matches that of the West. Evidence of somatization emerges from studies (e.g., Kleinman, 1977; Lee, Tsang, Zhang, et al., 2007; Lee, Tsang & Kwok, 2007; Ma et al., 2009; Shen et al., 2006) in which Western diagnostic criteria have been directly applied to Chinese individuals. Studies that capture Chinese idioms of distress (e.g., Lee, Kleinman, et al., 2007), as well as those that directly compare somatic and affective symptomatology between Chinese and Western individuals (e.g., Ryder et al., 2008), shed light on the complexity inherent in the term “somatization.”

Theories of somatization. Multiple definitions and explanations of somatization exist. Somatization may be used to describe (a) the exclusive presentation of somatic symptoms; (b) an emphasis on somatic symptoms of distress in the presence of affective symptoms or cultural idioms of distress containing both somatic and affective components; or (c) the explicit decision to disclose only somatic symptoms, in order to avoid stigma. The “repression hypothesis” (Stewart et al., 2010, p. 370) defines somatization as a fundamentally different experience of mental illness, in which somatic symptoms predominate and few, if any, psychological symptoms are experienced (Ryder et al., 2002). This theory is not supported by recent research demonstrating that individuals of Chinese ethnicity report both somatic and affective symptoms (Mak & Zane, 2004), with any emergent differences a matter of relative proportion (e.g., Ryder

et al. 2008). Furthermore, comparisons between adult outpatients in China and Canada revealed no group differences in the ability to describe and identify emotional states (Ryder et al., 2008).

Similarly, evidence suggests that Western individuals experience somatic symptoms (e.g., Ryder et al., 2008), sometimes in the absence of affective symptoms; the *DSM-5* (APA, 2013) has an entire grouping of disorders (Somatic Symptoms and Related Disorders) dedicated to presentations of predominant somatic symptoms accompanied by distress or impairment. The distinction between disorders characterized primarily by mood, anxiety, and somatic symptoms in the *DSM-5* is another example of the Western cultural tendency to parcel constructs into discrete categories. The diagnostic category of Somatic Symptom Disorder would technically capture Chinese Canadian individuals who reported only somatic symptoms of distress: its primary diagnostic criteria are (a) one or more somatic symptoms that cause distress or impairment and (b) excessive thoughts, feelings, or behaviours about the somatic symptom(s). However, this category still fails to capture Chinese idioms of distress, or account for any integrated presentation of somatic and affective symptoms that deviate from Western understandings of internalized distress.

A second theory, the ‘dualistic versus holistic model’ (Stewart et al., 2010, p. 370) defines somatization as a focus on the physical, in which an individual experiences both psychological and somatic symptoms, but attends primarily to the somatic symptoms (Ryder et al., 2002). This theory fits with Chinese beliefs about mind-body dualism and the research described previously (e.g., Mak & Zane, 2004; Ryder et al., 2008), and has been supported by research with community samples as well. For example, Tsai, Simeonova & Watanabe (2004) found that Chinese American undergraduates who are less oriented towards American culture use more somatic words and more social words compared to non-immigrant European American

undergraduates, especially when discussing a conflict with their romantic partner. Furthermore, recent experimental research with non-clinical samples has suggested that Asian American undergraduates are more likely to misinterpret internal physical sensations compared to European American undergraduates, due to relatively greater attention to their immediate environment (Ma-Kellams, Blaskovitch, & McCall, 2012). These findings may partially explain a relatively greater emphasis on somatic symptoms of internalized distress among Chinese individuals. Additionally, ethnographic research has shown that Chinese individuals may report low mood implicitly via explicit reports of physical complaints and interpersonal distress, and may invoke somatic terms in the language they use to describe emotional distress (Lee, Kleinman, et al., 2007). A Chinese mental health professional may be more likely to understand these implications, whereas a Western mental health professional would likely only hear the somatic complaints, if they were unaware of how culture shapes experiences and descriptions of internalized distress.

Third, somatization may also function as an explicit response strategy, in which an individual selectively chooses to disclose the physical aspects, but not the psychological aspects, of their symptoms (Ryder et al., 2002). This theory is consistent with a “stigma avoidance model,” in which individuals emphasize somatic symptoms when seeking help due to stigmatization of psychological disorder (Stewart et al., 2010, p. 370). If the admission of psychological distress were believed to bring shame to one’s family, an individual with an interdependent self-construal would be more likely to emphasize the somatic aspects of their illness. This theory is likely not mutually exclusive with the dualistic versus holistic model; instead, it is likely that both contribute to the pattern of relative emphasis on somatic symptoms in Chinese culture. For example, an individual may experience distress both affectively and

somatically, but place greater emphasis on the somatic features of distress, and then minimize the affective symptomatology in their expressions of distress and help seeking.

Evidence for somatization. Support for somatization, and the repression hypothesis in particular, has frequently been inferred from epidemiological research in mainland China (e.g., Lee, Tsang, Zhang, et al., 2007; Ma et al., 2009; Shen et al., 2006) and Hong Kong (Lee, Tseng, & Kwok, 2007). Twelve-month prevalence rates of major depression range from 2.0% (Shen et al., 2006) to 8.4% (Lee, Tseng, & Kwok, 2007), and lifetime prevalence rates of major depression range from 3.5% (Lee, Tsang, Zhang, et al., 2007) to 5.3% (Ma et al., 2009). These estimates are notably lower than U.S. estimates of the lifetime prevalence of major depression (16.6%; Kessler et al., 2005). Among Chinese Americans, twelve-month prevalence estimates of major depression are 3.4%, similar to results found by Shen and colleagues (2006) in mainland China, while lifetime prevalence rates of major depression were estimated to be 6.9%, somewhat higher than estimates in mainland China (Takeuchi et al., 1998).

Epidemiological studies generally use semi-structured diagnostic interviews based on the *DSM*. Therefore, in order to meet criteria for clinical depression in these studies, key symptoms of low mood or anhedonia must be endorsed. The lower prevalence rates of depression among Chinese populations are often attributed to the belief that in Chinese culture, distress is primarily experienced and expressed in somatic terms. This assumption is limited by the etic nature of these assessments, which do not capture emic experiences of depression within Chinese culture (e.g., the fusion of somatic and affective experiences in descriptions of distress, implicit descriptions of affective symptoms embedded within explicit descriptions of somatic symptoms; Lee, Kleinman, et al., 2007) or the impact of stigma surrounding mental disorder in Chinese culture on self-reports of affective symptoms. Lee, Tsang, Zhang, and colleagues (2007)

suggested that they may have obtained higher rates of major depression than other studies because items querying low mood and anhedonia were not used to “rule-out” the presence of depression. The authors also used telephone interviews rather than face-to-face interviews in an effort to reduce the effects of stigma.

Cross-cultural research has built on these epidemiological studies by focusing on the complex relations between culture and somatization. These studies have generally shown that Chinese and Western populations experience both somatic and psychological symptoms of depression, and that cross-cultural differences emerge in the salience of a particular class of symptoms (Parker, Cheah & Roy, 2001; Ryder et al., 2008). For example, Parker and colleagues (2001) compared two groups of individuals meeting criteria for MDD: Chinese individuals living in Malaysia and Western individuals living in Australia. Chinese individuals were most likely to identify a somatic complaint as their main reason for seeking psychiatric consultation, whereas Australian individuals were most likely to nominate a psychological symptom (Parker et al., 2001). However, no group differences were found on 17 of 39 symptoms queried, which included both somatic (e.g., fatigue, body aches and pains) and psychological/cognitive symptoms (e.g., tearfulness, feeling worthless). When group differences emerged, they tended to follow the expected pattern (e.g., Chinese participants were more likely to report hypersomnia, chest pain, and difficulty breathing, whereas Australian participants were more likely to report depressed mood, irritability, anhedonia, hopelessness, poor concentration, and feelings of guilt), with some interesting variations in similar symptoms. Chinese participants endorsed weight loss and suicidal thoughts more often than their Australian counterparts, whereas Australian participants endorsed loss of appetite and thoughts of death more often.

Evidence also supports Lee, Tsang, Zhang and colleagues' (2007) hypothesis that assessment method may influence symptom reporting via the effects of stigma. Ryder and colleagues (2008) compared patterns of psychological and somatic symptom reporting between outpatient clinics in Changsha, China and Toronto, Canada. Evidence for somatization was dependent on assessment method: Chinese participants reported greater somatic symptomatology during structured and unstructured clinical interviews, but not when they independently completed a self-report questionnaire. Furthermore, the cross-cultural differences in spontaneously reported somatic symptoms during unstructured interviews disappeared when age and education were controlled. More consistent support was found for the phenomenon of "psychologization" (Ryder et al., 2008, p. 309) among Canadian participants (all of whom were of European ancestry), who reported significantly more psychological symptoms regardless of assessment method (structured clinical interview, unstructured clinical interview, self-report questionnaire). Additionally, factor analyses revealed cultural differences in the meaning of cognitive symptoms of depression: items pertaining to difficulty concentrating and making decisions loaded on the psychological symptom factor in the Chinese sample, and the somatic symptom factor in the Canadian sample (Ryder et al., 2008). Additional research comparing these two outpatient samples has suggested that symptom reporting differences occur at the level of individual symptoms, rather than symptom categories. Controlling for overall level of symptom severity, Canadian outpatients reported more atypical somatic symptoms (e.g., increased appetite, weight gain, hypersomnia) during structured clinical interviews than Chinese outpatients; group differences were not found in the endorsement of typical somatic symptoms (e.g., decreased appetite, insomnia) (Dere et al., 2013). High levels of emotional suppression and depressed mood were also noted among Chinese outpatients, while Canadian outpatients

endorsed higher levels of hopelessness (Dere et al., 2013). Taken together, the literature to date suggests that cross-cultural differences in symptom reporting are a matter of relative emphasis, rather than a dichotomy in how distress is experienced and reported. Just as Chinese individuals experience and report psychological symptoms, Western individuals experience and report somatic symptoms (Parker et al., 2001; Ryder et al., 2008).

This dissertation built on these studies by examining within-group differences in somatic and psychological symptom reporting in a population of immigrant Chinese Canadians. Each of the studies of culture and internalized distress reviewed thus far focused on adults; this dissertation expanded the focus to adolescents, as well as their parents. Most importantly, this dissertation assessed participants' level of acculturation towards both Chinese and Western cultures, to account for the variety of acculturation profiles that emerge in an immigrant population which may affect how symptoms of internalized distress are experienced or reported.

Immigration, Acculturation, and Mental Health

Cultural beliefs about mental health represent one aspect of the broader process of acculturation. Following immigration, an individual's conceptualization of internalized distress should relate to the extent to which they (a) maintain their heritage culture beliefs and (b) adopt settlement culture beliefs. The independence of the heritage culture and settlement culture is critical. Despite conceptual and empirical support for the two-dimensional acculturation model (e.g., Costigan & Su, 2004; Ryder, Alden, & Paulhus, 2000), acculturation is frequently measured as a one-dimensional, linear process in the literature. However, to assume that greater engagement in the settlement culture means an equivalent loss of engagement in the heritage culture incorrectly reduces the complexity inherent in the acculturation process.

Berry (1997, 2002, 2003) developed a framework for understanding how the heritage and settlement cultural dimensions interact. This framework consists of four broad *acculturation strategies*, which reflect various combinations of preferences for cultural maintenance and cultural contact: *integration* (maintenance of the heritage culture paired with adoption of aspects of the settlement culture), *separation* (maintenance of the heritage culture and rejection of the settlement culture), *assimilation* (rejection of the heritage culture and embracement of the settlement culture), and *marginalization* (rejection of both heritage and settlement cultures). The sociopolitical structure of society functions as a third dimension of acculturation, permitting or constraining the range of acculturation strategies available to immigrants (Berry, 1997, 2002). Specifically, government policies and the overarching attitudes of the dominant cultural group (i.e., White individuals of European ancestry) create the context in which non-dominant cultural groups acculturate (Portes & Rumbaut, 2006). Therefore, acculturation preferences and the actual manner in which the acculturation process unfolds may differ across individuals. In the current study, Berry's (1997, 2003) framework was used to classify participants according to their self-reported culturally-based values, rather than their acculturation preferences. Values consistent with heritage and settlement cultures are captured in individuals' *acculturation profiles*, and are expected to relate to conceptions of mental health.

Limitations exist within Berry's framework. By identifying the dominant White European culture as the default settlement culture, it does not capture the complexity of acculturation unfolding among various cultural groups in modern metropolitan cities (Abraído-Lanza, Armbrister, Flórez & Aguirre, 2006). For example, Ferguson, Bornstein, and Pottinger (2012) found that immigrant Jamaican American adolescents were more likely to be *tricultural* (i.e., strongly oriented towards Jamaican, Black/African American and European American

cultures) than bicultural, and that these adolescents more closely identified with Black/African American culture than European American culture. Berry's integrated acculturation strategy also does not capture the synthesized cultural entities that may emerge from cultural contact (e.g., *pochismo*, a hybrid of American and Mexican cultures, distinct from both original cultures; Abraído-Lanza et al., 2006), nor provide information about the context-dependent use of heritage or settlement cultures at different points in time and/or in response to different social interactions (i.e., alternation; LaFramboise, Coleman, & Gerton, 1993). Rather than reflecting four finite and distinct acculturation paths, Berry's acculturation strategies are best understood as prototypical starting points for understanding the myriad ways in which acculturation may proceed.

Research has supported Berry's general framework. For example, Chia and Costigan (2006) found that integrated, separated, assimilated, and marginalized acculturation profiles emerged from their cluster analysis of Chinese Canadian college students, while Schwartz and Zamboagna (2008) found that these categories emerged in their latent class analysis of behavioural acculturation among Hispanic American college students. Groups representing variants on Berry's integrated acculturation profile also emerged in both studies (e.g., a group who endorsed both Chinese and Western cultural identity and Western behaviours, but who engaged in few Chinese behaviours; a group who endorsed both Hispanic and Western cultural orientation, with a relative preference to engage in Western culture). Taken together, these studies demonstrate that although variations in acculturation profile may occur, the basic heuristic of differentiating individuals based on endorsement of heritage and settlement culture orientation is an acceptable framework for understanding within-group differences in individuals' acculturation patterns.

Values-Based Acculturation

Acculturation can be conceptualized as higher order process that is instantiated in proximal domains of everyday life: both everyday behaviours (e.g., language, media use, social contacts) and private, internal conceptions (Costigan & Dokis, 2006; Costigan & Su, 2004; Schwartz et al., 2010). Private domains can be further divided into *cultural identity* (one's sense of belonging to one's heritage and/or new culture) and *cultural values* (Schwartz et al., 2010). In this dissertation, the endorsement of Chinese and Western values was used to index the extent to which individuals maintained their Chinese cultural worldview and adopted aspects of a Western cultural worldview.

Research has explored how both heritage and settlement cultural values change following immigration, in terms of developmental stage and generational status. Studies of families who immigrate from cultures where interdependent self-construals are dominant (e.g., Vietnam, Pakistan, Armenia, Mexico) to cultures where independent self-construals are dominant (e.g., Norway, Sweden, Australia, the United States) have consistently found that adolescents endorse Western values (e.g., adolescent independence values) to a greater extent than their parents, and interdependent cultural values (e.g., adolescent obligations to the family) to a lesser extent than their parents (Phinney, Ong, & Madden, 2000; Sam & Virta, 2003). Furthermore, first generation adolescents tend to support adolescent obligations to the family to a greater extent than second generation adolescents (Phinney et al., 2000), although these differences may decrease over time (Juang & Cookston, 2009). In contrast, differences in value endorsement were not found between adults whose adolescents were first or second generation, despite significant differences between these groups of parents in terms of length of residence (Phinney et al., 2000). Longitudinal research with Chinese American adolescents revealed that while

family obligation behaviours decreased over time (e.g., *how often* do you assist your family?), family obligation values (e.g., *how important* is it to assist your family) remained stable (Juang & Cookston, 2009). Taken together, these results suggest that, on average, adolescents and their parents will endorse Western and heritage culture values to different extents, that first generation adolescents will endorse heritage cultural values to a greater extent than their second generation counterparts, and that values and behaviours may diverge over time.

The domain of cultural values encompasses the belief systems that influence how mental health and illness is approached within a given culture (e.g., beliefs about the body-mind connection, beliefs about the self, beliefs about emotional expression). Therefore, it is presumed that shifts in cultural values are accompanied by shifts in these same beliefs. For example, the adoption of Western values might be accompanied by a more dualistic view of the mind and body, a shift towards a more independent view of the self, or different beliefs about the appropriateness of expressing ego-focused emotions. Without acculturative changes in the values domain, it is unlikely that an individual's experience and expression of mental health will shift, even if they are behaviourally engaged in the new settlement culture. For these reasons, acculturation in terms of cultural *values* was the focus of the current study.

Acculturation and Mental Health

A large body of literature has explored the relations between acculturation and *level* of mental health symptomatology. That is, research has asked whether certain ways of acculturating are associated with more psychological distress compared to other ways of acculturating, with little consistency across studies (Koneru, de Mamani, Flynn, Betancourt, 2007). The lack of consistency in findings has been attributed to variations in the measurement instruments used to assess acculturation, the majority of which measure acculturation along a single dimension (e.g.,

Takeuchi et al., 2002). However, two consistent results have emerged: research has found that an integrated acculturation profile is associated with the most positive mental health outcomes, whereas marginalization, perhaps best described as a proxy of multiple risk factors (e.g., discrimination by dominant society, alienation, powerlessness; Portes & Rumbaut, 2006), is associated with poorer mental health. For example, an international study of immigrant adolescents found that an integrated acculturation profile was associated with the most positive psychological adaptation, whereas a marginalized acculturation profile was associated with the poorest psychological adaptation (Berry, Phinney, Sam, & Vedder, 2006). Among first generation (i.e., foreign-born immigrants) and second generation (i.e., Canadian-born children of immigrants) Chinese Canadian college students, individuals classified as marginalized reported poorer psychological functioning than the individuals classified as integrated or assimilated (Chia & Costigan, 2006).

Although the study of relations between acculturation profile and *level* of mental health symptomatology provides critical knowledge about the mental health of immigrants, another key question is rarely examined: how does acculturation relate to the *experience* of mental health symptoms. Based on the cultural differences in the recognition, expression, explanation, and treatment of mental health described earlier, one may expect that differential acculturation in the domain of values among immigrants would shape how they experience and express mental health symptoms. For example, an individual who fits the *separated* profile (i.e., high endorsement of Chinese values, low endorsement of Western values) would likely value a holistic approach to the mind and body, an interdependent self-construal, and limited expression of ego-focused emotions, and thus experience distress in a more traditionally Chinese mode than an individual who has incorporated Western values into their belief system (i.e., the *integrated*

profile) or an individual who has primarily adopted Western values in place of Chinese values (i.e., the *assimilated* profile). Without understanding how values-based acculturation relates to symptom meaning and expression, there are limits to the knowledge gained from studies that analyze links between acculturation and level of symptoms, because acculturation differences may mean that individuals understand and report their symptoms in a fundamentally different manner. It is crucial to develop an understanding of *how* individuals experience and express psychological symptoms in relation to their acculturation profile.

Research Questions and Hypotheses

In this dissertation, I investigated the relations between acculturation and how immigrant Chinese Canadian adults and adolescents experience mental health symptoms. These relations were investigated cross-sectionally, within a sample of immigrant Chinese Canadian families and a comparison sample of non-immigrant Canadian families. Acculturation was operationalized in terms of cultural values, since this domain of acculturation was expected to be most relevant to conceptualizations of mental health. It was expected that differences in symptom meaning and symptom expression would emerge based on individuals' acculturation profile in the domain of values. That is, different acculturation profiles (e.g., separated, integrated, assimilated) index discrepant value endorsement with respect to Chinese and Western cultures, which were expected to translate into different ways of understanding and expressing internalized distress.

Assessment of Internalized Distress

Two measures of internalized distress were used: the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) for parents and adolescents and the Achenbach Youth Self-Report (YSR; Achenbach & Rescorla, 2001) for Chinese Canadian adolescents (the Canadian comparison sample did not complete the YSR). A Chinese variant of the CES-D

(CDS-22; Lin, 1989) was also used to measure internalized distress among a subset of parents. Theoretically, the CDS-22 and the CES-D represent an interesting contrast to the YSR based on how they were developed. The CES-D was developed using a “top-down,” construct-driven approach to psychopathology (Achenbach & Rescorla, 2007) with item content largely guided by extant measures of depression in Western clinical populations (Radloff, 1977). A limitation of this approach is the category fallacy, meaning that if Western definitions of mental illness (e.g., depressive symptoms) are framed as universal and used cross-culturally, the results will generally confirm the Western model (Kleinman, 1977). In other words, symptoms related to the depressive syndrome that exist outside of the Western definition are not queried, and the construct of depression remain constrained to the symptoms seen in Western culture.

In contrast, the YSR was created using a bottom-up, empirically-based approach, in which a list of common adolescent symptoms were identified, piloted, and then factor analyzed to produce empirically derived syndromes, representing problem areas that tend to co-occur (Achenbach & Rescorla, 2007). Three syndromes make up the subscales of the Internalizing scale: Anxious-Depressed, Withdrawn-Depressed, and Somatic Complaints. The YSR has been extensively validated cross-culturally, and good model fit has been found in thirty societies (Ivanova et al., 2007). The impressive level of cross-cultural validity may be due to the bottom-up construction of the YSR. Despite the empirically based construction of the YSR, it is important to note that it retains etic elements; items were identified based on Western definitions of affective, behavioural, and cognitive problems among adolescents. Additional details of these measures are provided in the Methods section.

Research Question 1: Acculturation and Symptom Meaning

The first set of analyses evaluated the hypothesis that the underlying factor structure of measures of internalized distress would differ based on individuals' value-based acculturation profiles. With respect to the CES-D, previous factor analyses have suggested a four-factor structure (Figure 1a) for the CES-D among White adults and adolescents: *somatic symptoms* (seven items reflecting typical somatic symptoms, e.g., I did not feel like eating; my appetite was poor), *depressed affect* (seven items, e.g., I felt that I could not shake off the blues even with help from my family or friends), *interpersonal symptoms* (two items, e.g., People were unfriendly), and *positive affect* (four reverse-scored items, e.g., I felt that I was just as good as other people; Perreira, Deeb-Sossa, Harris, & Bollen, 2005; Radloff, 1977). However, among adult Chinese American populations, principal components analyses show that depressed affect and somatic symptoms merge into the same factor (Kuo, 1984; Ying, 1988). More recently, confirmatory factor analyses found that this three-factor model of the CES-D exhibited significantly better model fit than the original four-factor model, among adolescents in Mainland China (Wang, Armour, Wu, Ren, Zhu, & Yao, 2013). Other studies of the CES-D among Chinese populations have found that although somatic and affective items generally cluster onto different factors, some item cross-over occurs. For example, in their study of the factor structure of the CES-D in Mainland China, Yen, Robins, and Lin (2000) found evidence for a primarily somatic factor that contained affective items referencing feeling blue and depressed; a primarily affective factor that contained both interpersonal items, along with a somatic item that referenced interpersonal relations (i.e., talking less); and the same positive affect factor found in the original factor analyses. The convergence of symptoms of depressed affect and somatic complaints suggests that among immigrant Chinese Americans, a distinction is not made between depressed affect

and somatic symptoms. Chinese beliefs about the connection between mind and body have been implicated in this convergence of affective and somatic symptoms (Tsai et al., 2001; Ying, 1988).

To test the hypothesis that the factor structure of the CES-D would differ between acculturation groups, confirmatory factor analyses were conducted separately for each acculturation profile and family member (father, mother, adolescent), provided the acculturation profile retained sufficient sample size for these analyses. In contrast to exploratory factor analyses, a confirmatory approach is driven by theory, allows for the testing of overall model fit, and provides evidence that any factor structure observed in exploratory analyses is due to real patterns in the data (rather than chance variation in individual samples). Several exploratory factor analyses have suggested that a three-factor model of the CES-D may be appropriate in Chinese populations; confirmatory factor analyses are the next step to verifying this hypothesis. Given the extensive validation of the four-factor model of the CES-D in non-immigrant Western populations, I did not investigate the factor structure of the CES-D in our Canadian sample.

Hypothesis 1a: Factor structure of the CES-D (Assimilated profile). Among immigrant Chinese Canadians classified as having an assimilated acculturation profile, it was hypothesized that the four-factor model of the CES-D (Figure 1a) found in non-immigrant populations would fit the data better than the three-factor (Figure 1b).

Hypothesis 1b: Factor structure of the CES-D (Separated profile).

Among immigrant Chinese Canadians classified as having a separated acculturation profile, it was hypothesized that the three-factor model of the CES-D (Figure 1b) would exhibit better fit than the four-factor model (Figure 1a).

Immigrant Chinese Canadians classified as having an integrated acculturation profile endorse the cultural values consistent with both heritage and settlement cultures; theoretically, either a three-factor or four-factor model could exhibit the best fit. It was hypothesized that the factor structure would be influenced by developmental stage, since research suggests that adolescents in immigrant families endorse Western values to a greater extent and heritage cultural values to a lesser extent than their parents (Phinney et al., 2000; Sam & Virta, 2003). In other words, even though both adults and adolescents exhibiting an integrated acculturation profile endorse values consistent with both Chinese and Western cultures, within-family differences in the absolute level of Chinese and Western value endorsement are likely to occur. Among adolescents, the absolute level of endorsement of Western values is likely to be greater than adults' endorsement of Western values.

Hypothesis 1c: Factor structure of the CES-D (Integrated profile). It was hypothesized that the four-factor model of the CES-D (Figure 1a) would exhibit better fit than the three-factor model (Figure 1b) among adolescents classified as having an integrated acculturation profile. In contrast, the three-factor model of the CES-D was hypothesized to exhibit better fit among adults classified as having an integrated acculturation profile, compared to the four-factor model.

Finally, exploratory analyses were undertaken to investigate the structure of the CDS-22 in our sample of immigrant parents. Aside from the original study from which this measure was developed (Lin, 1989), no further research has explored its factor structure. Because of the limited psychometric research on this measure, exploratory rather than confirmatory analyses were used, and no specific hypotheses were made about factor structure. Contrary to many studies of the CES-D with Chinese populations, Lin (1989) did not find evidence of extensive

merging of somatic and affective symptoms on the CDS-22. Instead, three factors emerged that were primarily defined by somatic, interpersonal, or affective items (although the affective symptoms “I felt that I could not shake off the blues even with help from my family or friends” and “I felt depressed” both loaded on the somatic factor, rather than the affective factor). The six culture-specific items were distributed across these three factors: “No chance to talk” and “Remembering unhappy past” cross-loaded on to both somatic and interpersonal factors, “Feeling suffocated” cross-loaded on to both somatic and affective factors, while the remaining three items (“Others didn’t trust me,” “Suspicious of others,” and “Couldn’t trust others”) loaded onto the interpersonal factor.

With respect to the *YSR*, the extensive cross-cultural validation of this measure has not been extended to Chinese adolescents. In this dissertation, confirmatory factor analyses were performed to determine if the three-factor structure of the *YSR* Internalizing scale (i.e., Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints; Figure 2) was replicated in a sample of immigrant Chinese Canadian adolescents. Given the etic nature of this assessment tool (i.e., somatic and affective symptoms are assigned to separate subscales) the three-factor structure of the Internalizing scale may only generalize to immigrant adolescents who endorse a high level of Western values.

Hypothesis 1d: Factor structure of the *YSR*. It was hypothesized that the three-factor structure of the *YSR* (Figure 2) would be replicated among Chinese Canadian adolescents who exhibit an assimilated or integrated acculturation profile, but not among adolescents who exhibited a separated acculturation profile.

Research Question 2: Acculturation and Symptom Expression

The second research question investigated the relations between acculturation in the domain of values and the expression of symptoms of internalized distress. Specifically, the proportion of somatic, affective, and interpersonal symptoms was compared between the acculturation profiles that are formed based on parents' and adolescents' endorsement of Chinese and Western values. Somatic and interpersonal symptoms are most congruent with Chinese values of mind-body holism and interdependent self-construal; affective symptoms are most congruent with traditional Western conceptualizations of internalized distress (i.e., these symptoms are a key criterion of Depressive Disorders). Creating proportional scores accounts for variation in overall severity of distress symptoms. This research question was investigated with both the CES-D (for parents and adolescents) and the YSR (for adolescents only).

One previous study has examined proportional symptom reporting on the CES-D among Chinese American university students (Yen et al., 2000). A broad, unidimensional measure of acculturation (i.e., measuring behaviour, identity, and values) was administered to the Chinese Americans in this study, with no significant effect of acculturation found in relation to reporting of somatic or affective symptoms. I built on this research by assessing the dimensions of acculturation most salient to symptom reporting (i.e., values) in a bidimensional manner, which provides more clarity about the role of acculturation to both Chinese and Western cultures.

Yen and colleagues (2000) also compared these Chinese American students to their counterparts in mainland China, as well as a group of Caucasian American students. The Chinese American students reported a similar proportion of somatic symptoms to the Caucasian American students. Unexpectedly, the students from mainland China reported a *lower* proportion of somatic symptoms compared to both cultural groups of American students; no

group differences were found in terms the proportion of affective symptoms. However, given that this study was based on samples of university students, it is not known whether these results generalize to a community sample, encompassing a broader range of age and education levels. Figure 3 depicts a conceptual model of hypothesized group differences in the proportion of somatic, interpersonal, and affective symptoms of distress.

Hypothesis 2a: Somatic and interpersonal symptoms of distress. It was hypothesized that the highest proportions of somatic and interpersonal symptoms of distress would be reported by immigrant Chinese Canadians exhibiting a *separated* acculturation profile in the values domain. Immigrant Chinese Canadians exhibiting an *integrated* acculturation profile were expected to report relatively lower proportions of somatic and interpersonal symptoms of distress, followed by immigrant Chinese Canadians exhibiting an *assimilated* acculturation profile. It was hypothesized that *non-immigrant* Canadians would report the lowest proportion of somatic and interpersonal symptoms of distress.

Hypothesis 2b: Affective symptoms of distress. The opposite pattern was expected in relation to affective symptoms of distress. Immigrant Chinese Canadians who exhibit a *separated* acculturation profile in the values domain were hypothesized to report the lowest proportion of affective symptoms of distress. It was hypothesized that immigrant Chinese Canadians exhibiting an *integrated* acculturation profile would report a higher proportion of affective symptoms of distress, with immigrant Chinese Canadians exhibiting an *assimilated* acculturation profile reporting a higher proportion of affective symptoms than those classified as *separated* or *integrated*. *Non-immigrant* Canadians were hypothesized to report the highest proportion of affective symptoms of distress.

Although the positive affect items on the CES-D were not the primary focus of this dissertation, differences in endorsement of positive affect among acculturation profiles were investigated. For clarity, in this dissertation “affective symptoms” refers to the negatively valenced mood-based symptoms of depression (e.g., sadness, depression); positive affect refers to the positively valenced indicators of mood (e.g., happiness, hopefulness). As described previously, cultural worldviews are related to beliefs about the types of emotions that should be expressed (e.g., ego-focused versus other-focused; Markus & Kitayama, 1991). The CES-D positive affect items are largely ego-focused (e.g., “I was happy”), meaning that one would expect them to follow the same pattern as the proportion of affective symptoms endorsed.

Hypothesis 2c: Positive affect. It was hypothesized that proportion of positive affect endorsed would be lowest among immigrant Chinese Canadians exhibiting a *separated* acculturation profile in the values domain. Immigrant Chinese Canadians exhibiting an *integrated* acculturation profile were expected to report relatively higher proportions of positive affect, with immigrant Chinese Canadians exhibiting an *assimilated* acculturation profile reporting a higher proportion of positive affect than both other immigrant groups. It was hypothesized that *non-immigrant* Canadians would report the highest proportion of positive affect.

Interactions between acculturation profile and gender. In addition to testing these hypotheses about the relations between acculturation profile and symptom responding on measures of internalized distress, the interactions between acculturation profile and gender were also investigated. Gender differences in level of depressive symptomatology are a well-established finding in Western populations, with the prevalence among females approximately twice the prevalence seen in males (APA, 2013). However, gender differences in depressive

symptomatology are frequently not found in Chinese populations (Juang & Cookston, 2009; Lee et al., 2007, Takeuchi et al., 1998, Zhang & Norvilitis, 2002). When gender differences are found, they are typically less pronounced than Western populations (Lee, Tsang, & Kwok, 2007); or tend not to be stable, (i.e., diminishing once education and income are controlled, Ying, 1988). Taken together, studies of gender differences within Chinese and Western populations suggest that culture and gender may intersect to predict *levels* of depression. In addition to investigating the role of acculturation profile, this dissertation assessed whether culture interacts with gender to influence proportional symptom reporting.

Limited research has examined the role of gender with respect to the *pattern* of symptom reporting, which was the focus of this dissertation. One previous study investigated the role of gender with respect to the *proportion* of somatic or affective symptoms reported, rather than the *level*, and found no relation between gender and either type of symptom (Yen et al., 2000). In general, however, the relative proportion of somatic symptoms to affective symptoms is typically not assessed, confounding the results with overall *level* of depression. For example, one study found that Chinese American females endorse both somatic and affective symptoms of distress to a greater extent than males (Mak & Zane, 2004). This suggests that females may report higher levels of internalized distress using both somatic and affective descriptors, but does not provide evidence about the relative proportion of each symptom type.

Understanding gender differences attitudes towards psychological help-seeking and beliefs about mental illness can also provide clues as to the symptom-reporting patterns one might expect. More positive attitudes towards psychological treatment may be related to greater comfort expressing affective symptoms, meaning that proportionally fewer non-affective symptoms (e.g., somatic, interpersonal) may be expressed. Results are mixed; while some

studies of Asian American college students have found that gender was unrelated to attitudes towards psychological help-seeking (Kim & Kendall, 2014), other studies have found that females hold more positive attitudes towards psychological help-seeking compared to males (Shea & Yeh, 2008). This latter finding reflects patterns seen among non-immigrant Western populations, in which females frequently report more positive attitudes than males; among Asian populations, gender differences tend to be less pronounced (Nam, Chu, Lee, Lee, Kim & Lee, 2010). In contrast, Wang, Huang, Jackson, and Chen (2012) found that among university students in China who had never sought psychological treatment, females held more negative implicit attitudes towards mental illness than males; no gender differences were found with respect to explicitly reported attitudes. Although consistent findings with respect to gender differences were not found across studies, it is clear that culture plays a role in determining attitudes towards treatment-seeking. Treatment-seeking and symptom expression both relate to cultural conceptions of mental health; therefore, culture and gender likely intersect to predict symptom expression as well.

In order to better understand the complex relationship between gender, culture, and symptom expression, Hypothesis 2 also evaluated whether gender interacted with acculturation profile to influence how immigrant Chinese Canadian adults and adolescents express symptoms of internalized distress. These analyses evaluated whether symptom responding differs based on gender across acculturation profile groups, or whether the expected acculturation profile differences in symptom endorsement were evident only for males or females. No specific hypotheses were made, due to the relative lack of research exploring gender and symptom *expression*.

Research Question 3: Somatization, Acculturation, and Demographic Characteristics

Of particular interest is the identification of individuals who report high levels of somatic symptoms of distress alongside few affective symptoms of distress; these individuals are most likely to be screened out by Western diagnostic standards. While empirical evidence generally does not support the “repression hypothesis” of somatization (Stewart et al., 2010), the “stigma avoidance model” (Ryder et al., 2002; Stewart et al., 2010) remains a plausible explanation for why some individuals of Chinese ethnicity may report primarily somatic symptoms of internalized distress. Stigma refers to “the devaluing, disgracing, and disfavoring by the general public of individuals with mental illnesses” (Abdullah & Brown, 2011, p. 935). Stigma occurs both publically, in the form of societal reactions to individuals with mental health problems, and privately, in the form of self-stigma (i.e., the internalization of society’s negative attitudes and beliefs; Corrigan, 2007). As discussed previously, the stigma avoidance model suggests that Chinese individuals may report only their somatic symptoms of distress to avoid bringing stigma to themselves, and perhaps more importantly, to their family. In their review of cultural beliefs and mental illness stigma, Abdullah and Brown (2011) describe the salience of the family context for individuals of Chinese ethnicity. Knowledge that a family member suffers from mental illness may impact perceptions of the suitability of their family members as marriage partners, and the functional impairment that results from mental illness may reduce one’s potential for occupational success or the ability to care for one’s parents in old age (Abdullah & Brown, 2011; Lauber & Rössler, 2007). By describing their distress in primarily somatic terms, with relatively few affective or interpersonal symptoms, individuals may minimize the impact of stigma on their family and reduce the likelihood of rejection from their community. However, if these individuals interact with the public mental health system, they may also not be directed

towards mental health services if they only disclose somatic symptoms. Therefore, it is crucial that individuals most vulnerable to the impact of stigma are identified.

When determining who is at risk of under-reporting affective symptoms to avoid stigma, it is important to consider both cultural and demographic factors. As discussed previously, the interplay between culture and stigma is part of the broader link between culture and mental health; beliefs about the causes of mental illness, help-seeking behaviour, and familial/societal attitudes intersect. Beliefs that lead to mental health stigma are embedded in one's cultural context; for example, individuals with an interdependent self-construal may not seek help for internalized distress if they fear it will bring shame to their family. Various factors linked to increased stigma (i.e., beliefs that a mental illness is the fault of the individual, related to dangerous behaviour, and/or rare; Feldman & Crandall, 2007) are salient among individuals of Chinese descent. For example, mental illness may be attributed to personal weakness among the individual or their family, or transgressions in one's current or past lives (Lam, Tsang, Chao & Corrigan, 2006; Lauber & Rössler, 2007). Furthermore, if a person with mental illness displays unusual or atypical behaviours, they may be stigmatized for failing to comply with cultural norms (Abdullah & Brown, 2011).

The stigma avoidance theory of somatization suggests that greater endorsement of Chinese values would be related to a higher proportion of somatic symptoms in order to avoid bringing stigma to one's family. Evidence that immigrant Chinese Canadians report more somatic symptoms during face-to-face, structured clinical interviews, compared to independently-completed questionnaires, suggests that somatization may indeed serve a stigma-reduction function (Ryder et al., 2008). Empirical studies linking values and stigma have provided conflicting results. For example, greater endorsement of Asian cultural values has been

linked to greater perceived stigma and less positive attitudes towards psychological services among international, first-generation, and U.S.-born Asian American college students (Miville & Constantine, 2007; Shea & Yeh, 2008). However, Shea and Yeh (2008) also found that greater endorsement of one specific facet of Asian values (i.e., an interdependent self-construal) was unrelated to perceptions of stigma, and actually related to *more* positive attitudes towards psychological help-seeking. Taken together, these results suggest that endorsement of Asian values on a broad level may be linked to less favourable attitudes towards psychological treatment of distress.

In addition to cultural values, various demographic factors related to stigma were hypothesized to be related to proportionally higher somatic symptom reporting. Given the limited amount of research exploring stigma cross-culturally, little is known about the demographic factors that may impact the perceptions of stigma among immigrant Chinese Canadian populations; however, there is evidence to suggest that among immigrant families, age, SES, neighbourhood context, and length of residence in one's adopted country may be risk factors for experiencing mental health stigma, and therefore reporting predominantly somatic symptoms.

First, older individuals may be more at risk of engaging in self-stigma compared to younger individuals. Among Chinese immigrants in Scotland, older age was related to beliefs about mental illness, such that older individuals were more likely to hold negative beliefs about mental illness (e.g., people with mental illness are dangerous or not suitable to marry). Additionally, epidemiological research has shown that the likelihood of mental health service use decreases with age for Chinese American immigrants (Nguyen & Lee, 2012). If older individuals experience significant internalized distress, they may be more likely to emphasize

somatic symptoms, or avoid seeking out mental health care, due to negative beliefs about the meaning of mental illness.

Additionally, individuals occupying lower levels of SES (i.e., less education, lower income) may be more likely to endorse a high proportion of somatic symptoms to reduce the risk of stigma. Research exploring the relations among SES and internalized distress among Chinese Americans have shown that greater endorsement of both somatic symptoms and affective symptoms of distress is related to greater financial stress (Takeuchi et al., 2002), and lower education attainment (Mak & Zane, 2004). However, the results of both studies are confounded with overall level of distress. It is unclear whether lower SES confers a specific risk for a higher proportion of somatic symptoms relative to affective symptoms, for the purpose of reducing stigma. Knifton (2012) found that among Chinese immigrants in Scotland, lower SES was linked to negative beliefs about mental illness. Lower education or income level may also confer risk for stigma via one's vulnerability to the negative social and familial impacts of stigma. For example, a qualitative study of economically precarious immigrant Chinese Americans revealed that the ability to work was central to individuals' sense of self and role within their family (Yang et al., 2013). Concerns about the impact of admitting mental illness and potentially losing one's status and role within the family could therefore motivate individuals to focus on somatic symptoms rather than affective symptoms.

With respect to the role of neighbourhood context, it is possible that one's immediate community may impact how one reports symptoms of distress, given the significant role of societal and familial beliefs in the experience of stigma. If an individual lives in a community with a relatively high proportion of individuals of Chinese ethnicity, the risk of bringing shame to one's family may be more salient, and they may be more likely to exclusively report somatic

symptoms compared to someone who lived in a community with relatively fewer Chinese neighbours. This hypothesis is not intended to contradict the evidence for protective effects of immigrant families living in communities with a large population of families of a similar cultural background. For example, living in a neighbourhood with a higher percentage of immigrants is related to fewer overall internalizing symptoms among children from immigrant families (Georgiades, Boyle, & Duku, 2007). However, regardless of cultural background, living in a community with individuals who share the same cultural beliefs about mental health may increase the likelihood that symptoms of distress are described in a manner that reduces the likelihood of stigma from one's community. In the case of immigrant Chinese Canadians, living in a community with many other immigrant Chinese Canadian families may mean that somatic symptoms are emphasized, to avoid bringing shame to one's family by acknowledging mental health challenges.

Finally, amount of time spent in Canada may be a risk factor for stigmatization. Newcomer families are more likely to have limited social networks and encounter multiple stressors associated with resettlement (Concha, Sanchez, de la Rosa & Villar, 2013; Dyson, Qi, & Wang, 2013; Li, 2009). The stress associated with navigating an unfamiliar culture, language, and place of residence may contribute to a sense of heightened vulnerability and fear of disclosing distress in the early years of settlement. As families live in Canada for longer periods, they may become more familiar with the dominant culture in Canada and the systems in place to provide healthcare and support, and therefore become less worried about stigma. It was expected that individuals who have lived in Canada for a shorter period of time would report a higher proportion of somatic symptoms compared to their counterparts who have lived in Canada for longer.

It is important to note that reporting primarily somatic symptoms of distress and/or seeking out culture-specific treatment (i.e., traditional Chinese medicine) is not problematic in and of itself. Even the most culturally informed adaptations of Western mental health services may not be the most appropriate treatment of internalized distress for all individuals of non-Western backgrounds. If individuals endorse high levels of Chinese values and are able to seek treatment that alleviates distress via their own community resources, which is more likely in a community with a large Chinese population, then somatization is not a concern; it is simply another mode of describing distress. However, if strong endorsement of Chinese values translates into fears of bringing stigma to oneself and one's family from their immediate immigrant Chinese Canadian community, individuals may be hesitant to seek out treatment within this community. Should these individuals present to the traditional Western healthcare system with symptoms of internalized distress, it is important to understand who is most likely to report a high proportion of somatic symptoms, which may not be recognized as distress in the context of Western medical or psychological services.

The data analyzed in this dissertation do not allow for the untangling of the direct and indirect relations between cultural values and somatization, as global perceptions of mental illness or experiences of stigma were not measured directly. However, a significant relation between greater endorsement of Chinese cultural values and somatization might suggest *direct* effects of cultural beliefs (i.e., the increased salience of somatic symptoms, independent of stigma) as well as the *indirect* effects of cultural beliefs via stigma (i.e., the increased reporting of somatic symptoms, due to culture-specific beliefs about stigma). Evidence that stigma could be a contributing factor may be suggested by the finding that individuals who are demographically most at risk of being stigmatized report the most somatic symptoms, above and

beyond the role of cultural values. While the stigma avoidance hypothesis cannot be assessed directly in the current study, the link between factors that increase risk of stigma and somatization can provide indirect support for the plausibility of this hypothesis.

Hypothesis 3a. It was hypothesized that greater endorsement of Chinese values would be related to a higher proportion of somatic symptoms endorsed. It was also hypothesized that older age, lower SES, greater community contact with individuals of Chinese ethnicity, and shorter length of residence in Canada would each be related to higher proportions of somatic symptoms reported, beyond the effects of endorsement of Chinese values.

In addition to considering the individual effects of each demographic variable, it was hypothesized that the cumulative effect of the proposed risk factors would be related to the proportion of somatic symptoms reported. In other words, an index of risk could be created for each individual, with more risk factors for stigmatization related to a higher proportion of somatic symptoms endorsed.

Hypothesis 3b. It was hypothesized that a greater number of risk factors for stigmatization (i.e., greater endorsement of Chinese values, older age, lower SES, greater neighbourhood contact with other Chinese individuals, shorter time in Canada) would be related to a higher proportion of somatic symptoms.

Method

Participants were drawn from three samples: a sample of immigrant Chinese Canadian families with an adolescent child between the ages of 12 and 17, comprised of both randomly sampled families and a convenience sample (sample 1, $N = 182$); a smaller convenience sample of immigrant Chinese Canadian families with an adolescent child between the ages of 10 and 14 (sample 2, $N = 96$); and a convenience sample of non-immigrant Canadian families with an adolescent child between the ages of 10 and 14 (sample 3, $n = 55$). All participating families were recruited from either a mid-sized city or a large metropolitan area in Western Canada. Participant characteristics and study procedures are described separately for each sample. Table 1 summarizes the sample size for fathers, mothers, and adolescents in each sample, along with the measures of internalized distress administered to each sample.

Sample 1: Immigrant Chinese Canadian Families (Random and Convenience Sample)

Participants. Immigrant Chinese Canadian families ($n = 182$) were eligible to participate if both parents emigrated voluntarily from mainland China, Taiwan, or Hong Kong after the age of 18, self-identified as being of Chinese ethnicity, had lived in Canada for at least two years, and had a child between 12 and 17 years of age. Of the 182 families who participated, data were gathered from 165 fathers, 179 mothers, and 181 adolescents. Five fathers and one mother from two-parent households declined participation; single-parent households (two led by fathers, 12 led by mothers) accounted for the remaining missing parent data. One adolescent declined participation. On average, fathers were 47.03 years old ($SD = 5.67$), mothers were 44.66 years old ($SD = 4.69$), and adolescents were 14.94 years old ($SD = 1.73$). Approximately half (51.6%) of adolescents were female. Slightly more than half of the adolescents (54.9%) immigrated after the age of six (i.e., the first generation). The remaining adolescents immigrated prior to the age

of six (i.e., the 1.5 generation) or were born in Canada (i.e., the second generation). For parents, the mean length of residence in Canada was 10.95 years ($SD = 7.03$) for fathers and 10.49 years ($SD = 6.32$) for mothers. The majority of fathers (89.6%) and mothers (91.2%) were currently married, with an average length of marriage of 19.02 years ($SD = 4.23$). In the majority (95.7%) of families, both parents emigrated from the same region (mainland China, 64.2%; Taiwan, 20.4%; Hong Kong, 11.1%).

A small percentage of fathers did not complete high school (7.5%), 11.2% completed high school, 20.4% completed vocational school or college, 27.2% completed a 4-year university degree, and 33.5% completed graduate or professional school. Mothers' educational levels were: 6.1% did not complete high school, 13.6% completed high school, 32.7% completed vocational school or college, 33.3% completed a 4-year university degree, and 14.2% completed graduate or professional school. The majority of fathers (73.2%) worked full-time, and 15.9% were engaged in part-time employment. Approximately half of mothers worked full-time (50.9%), and 18.6% were employed part-time. Among parents who were not employed, 5.1% of fathers and 9.3% of mothers were looking for employment, and 5.7% of fathers and 21.1% of mothers were not in the labor force. Various levels of household income were represented in this sample: 14.2% of families reported income less than \$25,000 per year, 26.5% reported income in the \$25,000 - \$40,000 range, 15.4% reported income in the \$40,000 - \$50,000 range, 17.9% reported income in the \$50,000 - \$75,000 range, and 13.6% reported income greater than \$75,000 annually.

Procedure. The majority of the sample (67%) was randomly recruited through a survey research centre, which contacted individuals with Chinese last names from the recruitment area. The remaining families were referred to the research team by participating families. Fathers ($n = 165$), mothers ($n = 179$), and adolescents ($n = 181$) independently completed self-report

questionnaires at home. Two research assistants provided families with questionnaire booklets and answered any questions that arose. At least one (and typically both) research assistants spoke the family's native language. Family members were given the option of completing questionnaires in Chinese or English script, and nearly all parents selected the Chinese questionnaires. All English measures were translated into Chinese by a team of bilingual individuals from China, Taiwan, and Hong Kong, and then back-translated by another team of bilingual individuals. In order to ensure accuracy, the back-translated English measures were compared to the original English measures, and the few discrepancies were resolved by discussion. Families received small monetary compensation for their time. The project received approval from the university's Human Research Ethics Board.

Sample 2: Immigrant Chinese Canadian Families (Convenience Sample)

Participants. Immigrant Chinese Canadian families ($N = 95$) were eligible to participate if they self-identified their ethnicity as Chinese, if both parents were foreign-born, and if they had an adolescent between 10 and 14 years. For the purpose of the current study, parents who immigrated prior to the age of 18 were excluded (five fathers and one mother). Data were not collected from two fathers. At the time of the study, mothers were on average 42.01 years old ($SD = 4.25$), fathers were on average 44.85 years old ($SD = 4.64$), and adolescents were on average 11.89 years old ($SD = 1.80$). The sample was approximately equal in terms of gender, with 55% girls and 45% boys. Approximately half of the children (51.0%) were foreign-born and immigrated at the age of 6 or older, while the remaining 49.0% of children were either Canadian born, or immigrated prior to the age of six. The mean length of residence in Canada was 6.64 years ($SD = 5.25$) for mothers and 7.39 years ($SD = 6.40$) for fathers. All of the participating families were two-parent families, and parents had been married an average of 17.09 years ($SD =$

4.20). In the majority of families (93%), both parents emigrated from either mainland China (42%) or Taiwan (45%). A small number of families emigrated from Hong Kong (7%), and in the remaining families (7%), each parent emigrated from a different sending region, including regions other than the three main regions of origin (e.g., Singapore).

In terms of education level, 11.7% of fathers completed elementary, junior high or high school, 20.8% completed vocational school or college, 34.4% completed a 4-year university degree, and 26.0% completed graduate or professional school. Among mothers, 17.9% completed elementary, junior high or high school, 37.9% completed vocational school or college, 29.5% completed a 4-year university degree, and 7.4% completed graduate or professional school. In this sample, approximately one third (33.7%) of families reported household income less than \$25,000 per year, 21.8% reported income in the \$25,000 - \$40,000 range, 10.9% reported income in the \$40,000 - \$50,000 range, 10.9% reported income in the \$50,000 - \$75,000 range, and 14.9% reported income greater than \$75,000 annually.

A subset of 51 families participated in a second assessment (Time 2) an average of 4.11 years later ($SD = 0.84$). At Time 2, fathers were on average 49.07 years old ($SD = 3.81$), mothers were on average 45.74 years old ($SD = 3.64$), and children were on average 15.93 years old ($SD = 1.85$). Families who participated at both Time 1 and Time 2 did not differ significantly from families who did not participate at Time 2 in terms of parent age, child age, length of residence in Canada, child generational status, length of parents' marriage, or parents' education level.

Procedure. Families were recruited primarily through a multicultural intercultural agency (e.g., offering settlement services, English language instruction, social opportunities, etc.). Employees at the agency approached all potentially eligible families in order to explain the

purpose of the study and the procedures should a family choose to participate. Contact information for interested families was then passed to the research team. A research assistant contacted each interested family, answered further questions, and scheduled an appointment for data collection. Additional families were recruited through Chinese religious services and referrals from participating families.

Fathers ($n = 88$), mothers ($n = 94$), and adolescents ($n = 95$) independently completed self-report questionnaires. Most participating families completed the study in their own homes, although one family chose to come to the university. Two research assistants were always present during the study, at least one of which spoke the families' native language. Family members had the option of completing the measures in English or Chinese script. Most fathers (89.7%) and mothers (92.1%) completed the measures in Chinese script, whereas all participating children completed the measures in English. All English measures were translated into Chinese by a team of bilingual individuals from China, Taiwan, and Hong Kong. The Chinese versions were then back-translated by another team of bilingual individuals. In order to ensure accuracy, the back-translated English measures were compared to the original English measures, and the few discrepancies were resolved by discussion. Families received small monetary compensation for their time. The project received approval from the Human Research Ethics Board at the University of Victoria.

The Current Study: Combined Sample 1 and Sample 2

In order to increase the power of planned statistical analyses, data from the immigrant Chinese Canadian families who comprise Sample 1 were combined with the immigrant Chinese Canadian families who comprise Sample 2. Specifically the data from Sample 1 were combined with the CES-D data (parents and adolescents) from Sample 2, Time 1 and the YSR data

(adolescents only) from Sample 2, Time 2, as well as the concurrently administered measures of Chinese and Canadian value acculturation. In the combined sample of immigrant Chinese Canadian families the fathers were on average 46.43 years old ($SD = 5.41$) and mothers were on average 43.80 years old ($SD = 4.77$). The average length of residence was 10.38 years ($SD = 7.94$) for fathers and 9.55 years ($SD = 6.69$) for mothers. Adolescents were on average 13.89 years old ($SD = 2.26$) in the sample to be used for CES-D analyses, and 53.2% were female. Adolescents were on average 15.16 years old ($SD = 1.83$) in the sample to be used for YSR analyses, and 54.2% were female.

Sample 3: Non-Immigrant Canadian Families (Convenience Sample)

Participants. Non-immigrant Canadian families ($N = 55$) were eligible to participate if there was an adolescent in the family between the ages of 10 and 14, the parents and grandparents were born in Canada, and the family identified as Canadian. Among these families, a total of 38 fathers, 54 mothers, and 55 adolescents participated. The discrepancy between mothers' and fathers' participation rates was primarily due to the 14 families led by single mothers (compared to two families led by single fathers); among two-parent families, only three fathers declined participation. On average, fathers were 43.87 years old ($SD = 5.69$), mothers were 43.33 years old ($SD = 4.69$), and adolescents were on average 12.81 years old ($SD = 1.32$). The majority of adolescents were male (60%). Parents had been married an average of 16.96 years ($SD = 4.30$). A small percentage of fathers did not complete high school (5.3%), 13.2% completed high school, 39.5% completed vocational school or college, 31.6% completed a university degree, and 10.5% completed graduate or professional school. All participating mothers completed high school, with 21.8% identifying high school as their highest level of education completed. Just over one-third (34.5%) completed vocational school or college,

21.8% completed a 4-year university degree, and 16.4% completed graduate or professional school. Reports of household income were averaged between mothers' and fathers' reports : 10.9% reported income of less than \$25 000, 12.7% reported income in the \$25 000 - \$40 000 range, 7.3% reported income in the \$40 000 - \$50 000 range, 12.7% reported income in the \$50 000 - \$75 000 range, and 40.8% reported income greater than \$75 000.

Procedure. Non-immigrant Canadian families were recruited through letters distributed within the school system to children in the target age range. These letters explained the purpose of the study and provided families with the research team's contact information. Families contacted the team if they were interested in participating. Procedures were similar to the data collection method used with immigrant Chinese Canadian samples. Two research assistants visited families at home, and fathers, mothers, and adolescents independently completed a questionnaire booklet. Families received small monetary compensation for their participation. This project was approved by the Human Research Ethics Committee at the University of Victoria.

Measures

Demographics. All families completed a demographic questionnaire, which contained questions about date of birth, gender, highest level of education obtained, income, length of residence, and income. Immigrant Chinese Canadian fathers, mothers, and adolescents also answered an item assessing their perceptions of neighbourhood ethnic composition (e.g., "How much contact do you have with other Chinese individuals in your neighbourhood?"), answered on a 1 ("none") to 5 ("a lot/regular") scale. For categorical analyses, answers of 3 ("moderate" contact) or higher were classified as "high contact," and answers of 1 or 2 ("a little" contact) were classified as low contact.

Chinese Values. Chinese values were assessed using an 11-item version of the 36-item Asian Values Scale (AVS; Kim, Atkinson, & Yang, 1999). The AVS was developed to reflect common values across several Asian cultures, and assesses endorsement of values such as family recognition through achievement, collectivism, humility, and conformity to norms (Kim, Atkinson, & Yang, 1999), all of which are values consistent with high cultural valuation of an interdependent self-construal (Markus & Kitayama, 1991). A sample item reads, “People should think about their group before themselves.” Participants responded on a 7-point scale, with 1 corresponding to “strongly disagree” and 7 corresponding to “strongly agree.” Overall scores were created by averaging responses across items, so that overall scores were on the same scale as the item-level responses. Internal consistency was adequate to good in both samples of immigrant Chinese Canadians ($\alpha = .82$ for fathers, $\alpha = .81$ for mothers, $\alpha = .77$ for adolescents in Sample 1; $\alpha = .81$ for fathers, $\alpha = .75$ for mothers, $\alpha = .77$ for adolescents in Sample 2).

The concurrent and discriminant validity of the 36-item AVS has been demonstrated among Asian American college students. Confirmatory factor analyses demonstrated good model fit for a two-factor acculturation model in which the AVS loaded onto a latent values acculturation factor and was conceptually distinct from measures of behavioural acculturation (Kim, Atkinson, & Yang, 1999). Criterion validity has also been demonstrated. Among Asian Australian college students, higher AVS scores have been shown to relate to more negative attitudes towards seeking out psychological services, demonstrating that the cultural values measured by the AVS are linked to beliefs about help-seeking (Hamid, Simmonds, & Bowles, 2009).

Western Values. In the current study, the construct of Western values was assessed using the 8-item Adolescent Independence Values scale (abbreviated as WVS, or Western Values

Scale, to create a parallel acronym to the AVS; Rosenthal, Ranieri & Klimidis, 1996). Strong measures of Western values have not been developed to the same extent as measures of culture-specific values (e.g., the AVS). In the current study, the narrower domain of adolescent autonomy values was selected to reflect a value domain that is both representative of Western culture and not representative of Chinese culture. Items on this scale reflect typical Western beliefs about adolescent autonomy, in a manner consistent with an independent self-construal (Markus & Kitayama, 1991). Adolescent autonomy values are expected to be particularly salient to immigrant Chinese Canadians participating in this current study, given that all participants are either adolescents themselves, or parents of adolescents; family members will be actively thinking about and discussing their views on adolescent autonomy. Parallel items were asked for adolescent males and females (e.g., “It is all right for girls over the age of 18 to decide when to marry and whom to marry,” and “It is all right for boys over the age of 18 to decide when to marry and whom to marry.”) Participants responded on a 5-point scale, with 0 corresponding to “strongly disagree” and 4 corresponding to “strongly agree.” Overall scores were created by averaging responses across items, so that overall scores were on the same scale as the item-level responses. Other aspects of independence measured on the WVS include dating, moving away from home for post-secondary education or employment, and choosing one’s own career. Internal consistency was good in both samples of Chinese Canadians ($\alpha = .82$ for fathers, $\alpha = .79$ for mothers, $\alpha = .88$ for adolescents in Sample 1; $\alpha = .85$ for fathers, $\alpha = .86$ for mothers, $\alpha = .86$ for adolescents in Sample 2).

Depressive Symptoms. Internalized distress in the form of depressive symptoms was measured using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), a 20-item self-report measure developed for use in community samples. Fathers, mothers, and

adolescents from each of the three samples completed this measure. Participants were asked to rate the frequency with which they had experienced various feelings or displayed various behaviours in the past week on a 4-point scale, with a rating of 0 indicating rarely or none of the time and a rating of 3 indicating most or all of the time. A higher overall score on the CES-D indicates more frequent and numerous depressive symptoms (Radloff, 1991).

The CES-D shows good reliability and validity in populations of non-immigrant adolescents and adults (Radloff, 1977; Radloff, 1991). This measure has also shown good reliability amongst Chinese American adolescents (Greenberger & Chen, 1996; Juang, Lerner, von Eye, & McKinney, 1999; Juang, Syed & Takagi, 2007), Chinese university students in Canada (Chia & Costigan, 2006) and in Hong Kong (Soto, Perez, Kim, Lee, & Minnick, 2011), and Chinese American adults (Ying, 1988). In the current study, internal consistency was good across Chinese Canadian samples ($\alpha = .85$ for fathers, $\alpha = .84$ for mothers, $\alpha = .88$ for adolescents in Sample 1; $\alpha = .88$ for fathers, $\alpha = .83$ for mothers, $\alpha = .89$ for adolescents in Sample 2) and within the non-immigrant Canadian sample ($\alpha = .89$ for fathers, $\alpha = .92$ for mothers, $\alpha = .86$ for adolescents).

Parents from Sample 1 completed the Chinese Depression Scale (CDS-22; Lin, 1989), an expanded version of the CES-D. The CDS-22 contains the core affective, somatic, and interpersonal items from the CES-D, as well as six additional items developed through consultation with Chinese mental health workers (Lin, 1989). Although the core of this measure is a Western, etic tool, the additional culture-specific items add an emic dimension to the measure. The additional items are specific to experiences during the Cultural Revolution of the late 1960's and early 1970's (e.g., I feel suspicious of others). The modal year of birth for both fathers and mothers in our sample is 1962, with a range of 1938-1970 for fathers, and a range of

1945-1971 for mothers. Therefore, the majority of the adult sample experienced childhood and early adolescence in the context of the Cultural Revolution. This scale has shown excellent reliability ($\alpha = .90$) and validity in a sample of adults living in Tianjin, a large city in northern China (Lin, 1989). The CDS-22 excludes the four items comprising the positive affect scale, based on evidence suggesting a positive upward response bias on these items (Lin, 1989). In Sample 1, internal consistency on the CDS-22 was excellent ($\alpha = .93$ for fathers, $\alpha = .92$ for mothers).

Adolescent Internalizing Symptoms. Internalized distress was also measured using the Internalizing scale of the Achenbach Youth Self-Report (YSR; Achenbach & Rescorla, 2001). The Internalizing scale consists of three subscales: the 13-item Anxious-Depressed subscale (sample items: I am afraid I might think or do something bad; I feel worthless or inferior), the 8-item Withdrawn-Depressed subscale (sample items: There is very little I enjoy; I am unhappy, sad, or depressed), and the 11-item Somatic Complaints subscale (sample item: I have nightmares; Headaches without known medical cause). The cross-cultural validity of the YSR has been demonstrated across multiple societies (Ivanova et al., 2007), although little is known about the psychometrics among adolescents living in mainland China or Taiwan, or among immigrant Chinese adolescents. In the current sample, internal consistency was adequate for the Withdrawn-Depressed ($\alpha = .74$) and Somatic Complaints ($\alpha = .79$) subscales and good for the Anxious-Depressed subscale ($\alpha = .80$).

Results

Missing Data

Overall, a very small amount of data (.01%) was missing at the item level for fathers, mothers, and adolescents. Participants were excluded from analyses if more than 20% of items were not completed on any one of the three main measures in a given analysis (Asian Values Scale, Adolescent Independence Values, and either the CES-D, CDS-22, or YSR). In psychometric studies of the CES-D, cases were omitted if more than four items were missing (Radloff, 1977), which corresponds with the 20% criterion used in the current study. If a participant missed 20% or fewer items on the AVS (i.e., no more than 2 items missed) or the WVS (i.e., no more than 1 item missed), the mean was calculated using the items completed. If a participant missed 20% or fewer items on the CES-D, CDS-22, or YSR, which were analyzed at the item level, the mean of their individual item responses was entered for each missing item. Comparisons of various methods for dealing with missing values (e.g., mean imputation, expectation maximization, multiple imputation) show similar results across these methods when less than 10% of data are missing (Barzi & Woodward, 2004).

The final sample sizes were as follows: $n = 247$ immigrant Chinese Canadian fathers, $n = 270$ mothers, and $n = 271$ adolescents for analyses of the CES-D; $n = 165$ fathers and $n = 178$ mothers for analyses of the CDS-22; and $n = 232$ adolescents for analyses of the YSR. The smaller participant samples for analyses of the CDS-22 and YSR are the result of combining data across samples; the extra six items added to the CES-D to create the CDS-22 were only administered to parents in Sample 1, and the YSR was administered to all of the adolescents in Sample 1, but only a subset of Sample 2 adolescents who participated in the second wave of data collection.

Definition of Acculturation Profiles

The main hypotheses of this dissertation focused on how one's acculturation profile relates to the experience and expression of internalized distress. Therefore, the classification of participants into the acculturation profile of best fit was essential to the aims of this dissertation.

To assess acculturation, participants typically complete questionnaires that assess their orientation towards the heritage and settlement cultures (in this case, with respect to cultural values), resulting in two independent continuously distributed scores for each participant.

Various methods can be used to convert these measures of heritage and settlement cultural values into the distinct categories necessary for classification. Given the complexities associated with the construct of acculturation and its measurement, various methods were considered to convert these continuous measures to categorical groups. The final method of choice was selected by cross-referencing its classifications with other methods I tried, and validated with conceptually relevant cultural variables. The details of this process are described below.

One method involved independently classifying scores on heritage and settlement measures as 'high' or 'low' based on the mean, median, or scale midpoint, and then grouping participants into one of the four acculturation profiles based on a combination of their high or low classification on each measure (Arends-Tóth & van de Vijver, 2006). Selecting the mean or median score as the cut-off value creates sample-dependent groups of participants who are only *subjectively* high or low relative to other participants, rather than *objectively* high or low within the full range of possible scores. The midpoint split procedure avoids this issue by using the midpoint of each measure of cultural value endorsement as the cut-off between high and low groups, so that acculturation profiles reflect participants' actual level of value endorsement, rather than their value endorsement relative to the rest of the sample.

Although the midpoint split produces more objective and theoretically sound classifications than the sample mean or median, ambiguity arises when the midpoint value is contained within the measure (Arends-Tóth & van de Vijver, 2006). This ambiguity is an issue for both of the measures of cultural values used in the current study: the Asian Values Scale (AVS) has a midpoint of 4 on a scale ranging from 1 to 7 and the Western Values Scale (WVS) has a midpoint of 2 on a scale ranging from 0 to 4. On both measures, the midpoint is defined as “neither agree nor disagree,” and overall scores are created by calculating the mean of item responses (i.e., the total score is on the same scale as individual items). Since there is no consensus in the literature about how to interpret these midpoints (Arends-Tóth & van de Vijver, 2006), I compared the pattern of acculturation profiles produced by two different methods for classifying participants as “high” or “low” on each value scale. First, I required explicit *agreement* to classify a participant as ‘high’ on Chinese and Western values, meaning that participants with total scores at the midpoint were classified as ‘low.’ Second, I required explicit *disagreement* to classify a participant as “low” on Chinese and Western values, meaning that participants with total scores at the midpoint were classified as ‘high.’

Using the first method, a mean score of at least 5 (‘mildly agree’) on the AVS and at least 3 (‘agree’) on the WVS was required to be classified as ‘high endorsement,’ whereas mean scores below these cutoffs were classified as ‘low endorsement.’ Using these criteria, the distribution of acculturation profiles was as follows: 23 fathers (9.3%) with an integrated acculturation profile, 119 fathers (48.2%) with a separated acculturation profile, 11 fathers (4.5%) with an assimilated acculturation profile, and 94 fathers (38.1%) with a marginalized acculturation profile; 16 mothers (5.9%) with an integrated acculturation profile, 108 mothers (40.0%) with a separated acculturation profile, 15 mothers (5.6%) with an assimilated

acculturation profile, and 131 mothers (48.5%) with a marginalized acculturation profile; and 63 adolescents (23.2%) with an integrated acculturation profile, 44 adolescents (16.2%) with a separated acculturation profile, 96 adolescents (35.4%) with an assimilated acculturation profile, and 68 adolescents (25.1%) with a marginalized acculturation profile. Notably, this method classified nearly half of parents as marginalized, a number higher than even the largest estimates found in previous studies. For example, a cluster analysis of multiple domains of acculturation by Chia and Costigan (2006) classified 32.3% of participants as marginalized; Schwartz and Zamboagna (2008) found that only 2.3% of their participants fit this profile.

The second method classified mean scores greater than 4 on the AVS and greater than 2 on the WVS (responses labeled as ‘neither agree nor disagree’ on both scales) as ‘high endorsement’ of the cultural values represented by each scale. This interpretation of the midpoint resulted in a substantial change in the numbers of participants represented in each group. Among fathers, 181 were classified as integrated (73.2%), 45 were classified as separated (18.2%), 16 were classified as assimilated (6.5%), and five were classified as marginalized (2.0%). Among mothers, 163 were classified as integrated (60.4%), 65 were classified as separated (24.1%), 29 were classified as assimilated (10.7%), and 13 were classified as marginalized (4.8%). Among adolescents, 220 were classified as integrated (81.2%), 12 were classified as separated (4.4%), 37 were classified as assimilated (13.7%), and only two were classified as marginalized (0.7%). Although this method produced prevalence estimates of the marginalized acculturation profile that were more consistent with previous literature, the substantial shift in classification suggested that alternative methods should be considered.

In order to assess the percentage of participants who unambiguously represented each acculturation profile, a ‘three-group method’ was used. Participants were divided into three

groups (low values endorsement, a midpoint group, and high value endorsement) on each measure of cultural values. The midpoint group consisted of participants whose mean score fell 0.5 above or below the scale's midpoint (i.e., between 3.5 and 4.5 on the AVS, between 1.5 and 2.5 on the WVS). Scores lower than 3.5 on the AVS and 1.5 on the WVS were classified as low value endorsement and scores greater than 4.5 on the AVS and 2.5 on the WVS were classified as high value endorsement. Definitive classification could not be made if either cultural values scale score fell at the midpoint. A large percentage of fathers ($n = 148$, 59.9%), mothers ($n = 170$, 63.0%), and adolescents ($n = 117$, 43.1%) could not be classified into an acculturation group using this strategy, as their AVS and/or WVS score fell in the midpoint group. More parents had midrange scores on the WVS compared to the AVS (51.0% versus 16.3% for fathers; 54.8% versus 25.7% for mothers). For adolescents, the opposite was true: 33.0% fell in the midrange category on the AVS, whereas only 15.0% fell in the midrange category on the WVS.

Among the fathers who could be confidently classified into an acculturation profile using the three-group method, 77 were classified as integrated (31.2%) and 20 were classified as separated (8.1%), with one father classified as assimilated and one father classified as marginalized. Similarly, 65 mothers were classified as integrated (24.1%), 26 were classified as separated (9.6%), and nine (3.3%) were classified as assimilated. Among adolescents, 134 were classified as integrated (49.4%), eight were classified as separated (3.0%), and 12 were classified as assimilated (4.4%). No mothers or adolescents were classified as marginalized using this method. Although the groups produced using this method confidently represent the acculturation profiles, the power necessary to perform various statistical analyses was notably reduced. Therefore, I continued to search for alternative classification strategies that could index participants' acculturation profile while preserving more of the sample.

As an alternative to various split procedures, Arends-Tóth and van de Vijver (2006) describe a *proximity procedure*, in which measures of heritage and settlement cultural values are conceptualized as a two-dimensional space, such that a single point with x and y coordinates represents each participant's combination of scores, as well as prototypical scores for each acculturation profile. These prototypical scores are created through various combinations of the most extreme score possible on each measure: for example, the prototypical score for integration would be a score of 7 on the AVS and a score of 4 on the WVS, the highest scores possible. The Euclidean distance between participants' scores and the prototypical score of each acculturation profile is then computed (Arends-Tóth & van de Vijver, 2006). Because the AVS and WVS are scaled differently (with the greater range of response options available on the AVS), all participant scores and prototype scores were standardized before distance scores were computed. Prototypical scores were standardized separately for fathers, mothers, and adolescents, given the differences in mean values and standard deviations for each group. Each participant received four scores, one for each acculturation profile, with smaller values representing a closer match to the acculturation profile of interest. These distance scores may be used continuously, although the dependence between distance scores for each acculturation profile must be considered when interpreting results (Arends-Tóth & van de Vijver, 2006). Descriptive statistics for each acculturation profile and family member are presented in Table 2. Across family members, the smallest mean distance score (i.e., the closest match) was associated with the integrated profile, while the largest mean distance score was associated with the marginalized profile. For fathers and mothers, the next smallest mean distance score (i.e., the next closest match) was associated with the separated profile, whereas the next smallest mean distance score for adolescents was the assimilated profile.

The distance scores calculated using the proximity procedure can also be used categorically. In the current study, each participant was classified into one of the four acculturation profiles according to his or her smallest distance value out of the four. Membership in these categories was cross-tabulated with the categories created using the three-group split procedure. As shown in Table 3, the proximity procedure classified the participants who could not be grouped using the three-group method. In addition, the classification of participants who were definitively classified using the three-group method did not change. Interestingly, the distribution produced by the proximity procedure was identical to the distribution that was produced using the second midpoint split procedure (i.e., average scores at the midpoint or above were classified as ‘high’ value endorsement) for fathers (i.e., 181 integrated, 45 separated, 16 assimilated, and five marginalized) and mothers (i.e., 165 integrated, 65 separated, 29 assimilated, 13 marginalized). For adolescents, most participants retained similar classifications, although 12 participants classified as integrated with the midpoint split procedure were re-classified as separated with the distance score procedure, and three participants were re-classified from assimilated to marginalized. The proximity procedure allowed us to retain all participants (even those with midrange scores on the AVS and/or WVS) and demonstrated good convergence with two of the three other classification methods I computed. Therefore, each of the main dissertation hypotheses were tested using the acculturation profiles created with the proximity procedure.

Validation of Acculturation Profiles

In order to evaluate the validity of the acculturation profiles created using the proximity procedure, groups were compared based on their pattern of responding to several theoretically linked measures. Two subscales were drawn from the Family Obligations Scale (Fulgini et al.,

1999) and individual items were drawn from the Acculturation Goals Scale that was created for the larger project. Each validation measure assesses Chinese or Western values in a manner that is theoretically related, yet distinct, from the constructs assessed by the AVS and WVS. The subscales assessing family obligations reflect core Chinese values, including the importance of adolescents respecting their family (e.g., “Treat parents with great respect”) and supporting their family in the future (e.g., “Spend time with your parents even after you no longer live with them”). These constructs share an emphasis on interdependent self-construals and therefore are expected to be related to the AVS and WVS, but non-overlapping. The individual items from the Acculturation Goals Scale assessed the importance each family member placed on following traditional Chinese values and adopting Western values (i.e., “How important is to you that you follow traditional Chinese values?” and “How important is it to you that you adopt the values of Canadian culture?”), as well as the importance that parents placed on their adolescent’s achievement of these goals (i.e., “How important is it to you that your child follow traditional Chinese values?” and “How important is it to you that your child adopt the values of Canadian culture?”). Overall levels of distress as assessed by the CES-D and the YSR were also compared between groups. The Family Obligations Scale and the CES-D was administered to both Sample 1 and Sample 2. The Acculturation Goals Scale and YSR were administered to all of Sample 1, but only a subset of Sample 2 (those families who participated in a second wave of data collection). Therefore, groups were somewhat smaller ($n = 152$ integrated fathers, $n = 33$ separated fathers, $n = 16$ assimilated fathers; $n = 147$ integrated mothers, $n = 48$ separated mothers, $n = 28$ assimilated mothers; $n = 184$ integrated adolescents, $n = 14$ separated adolescents, $n = 31$ assimilated adolescents).

A series of one-way ANOVAs were used to assess Acculturation Profile group differences in responding to the Family Obligation scale, select items from the Acculturation Goals Scale, and total scores on each measure of internalized distress. Because of the very small number of participants classified as marginalized, analyses focused on comparisons among separated, integrated, and assimilated acculturation profiles. It was expected that individuals with separated and integrated profiles would endorse family obligation values most highly, and place the greatest emphasis on following traditional Chinese values, in comparison to assimilated individuals. The reverse was predicted to be true on the items assessing the emphasis placed on adopting Western values, with assimilated and integrated individuals scoring more highly than separated individuals. Based on past research, participants classified as integrated were expected to report the lowest overall levels of internalized distress. Post hoc Bonferroni tests were used to determine how groups differed from one another. The results of these group comparisons are presented in Table 4.

Group differences were found in the predicted direction on the measures of family obligation values. Interestingly, separated individuals frequently endorsed these values to a greater extent than their integrated counterparts. Although this distinction was not predicted, it is also not contradictory to the acculturation framework on which this study is based. By definition, both individuals classified as separated and individuals classified as integrated maintain close ties with their heritage culture; however, this framework does not preclude the possibility that differences in the closeness of these ties may occur. Among fathers, mothers, and adolescents, separated individuals endorsed beliefs about family respect and future support to a greater extent than either integrated or assimilated individuals (the difference between separated and integrated fathers reached trend level on the measure of future support). On the measure of

family respect, the scores of integrated mothers and adolescents were significantly higher than their assimilated counterparts; among fathers, a trend emerged showing the same pattern. Integrated and assimilated fathers and adolescents did not significantly differ on their beliefs about future support; there was a trend towards integrated mothers endorsing future support to a greater extent than their assimilated counterparts.

The items measuring individuals' goals for themselves (or their children) to follow Chinese or Western values largely failed to differentiate the groups, with two exceptions. Separated adolescents rated following traditional Chinese values as significantly more important than assimilated adolescents. In addition, although the post-hoc test did not identify specific pairwise differences, inspection of the means associated with a significant F-test for mothers' goals for their children show a trend towards separated mothers placing more importance on their child following Chinese values than assimilated mothers. These items may have been less effective in discriminating between acculturation profiles due to their general nature, compared to the more specific values queried on the AVS, WVS, and family obligations measure. Family members may be more likely to endorse the concept of following or adopting cultural values in general, but respond differently when queried about specific examples of these values.

Contrary to previous research suggesting that integrated individuals report the fewest mental health symptoms, no significant group differences were observed on the CES-D or the YSR. There was a trend toward significance at the omnibus level for mothers' CES-D scores, but no significant group level differences were observed.

Overall, the ratings of respect for family and future support values effectively differentiated acculturation profiles, with a similar pattern across family members in the

predicted direction. These findings provide evidence for the validity of the acculturation profiles produced by the proximity procedure.

Research Question 1: Acculturation and Symptom Meaning

The internal structure of symptoms of internalized distress among Chinese Canadian immigrants was investigated with the use of confirmatory factor analysis of the two measures of internalized distress discussed previously: the CES-D (for parents and adolescents; Hypotheses 1a, 1b, and 1c) and the YSR (for adolescents only; Hypotheses 1d). The hypothesized models were evaluated using structural equation modeling (SEM), with AMOS 20 software (Arbuckle, 2011). Both confirmatory and exploratory factor analyses were carried out. Model fit of confirmatory factor analyses was evaluated using the chi-square goodness-of-fit test (χ^2), the comparative fit index (CFI; Bentler, 1990), and the root-mean-square error of approximation (RMSEA; Steiger, 1990). Good model fit is indicated by a non-significant chi-square value, a CFI of .95 or greater, and an RMSEA of less than .05. Acceptable fit is indicated by CFI values between .90 and .95 (Kline, 2010), and an RMSEA between .05 and .08 (Byrne, 2010).

In order to compare fit between models, the Bayesian Information Criterion (BIC; Raftery, 1995) was used. Although the chi-square difference test is typically the preferred model comparison statistic, it is only meaningful when comparing nested models, which contain the same observed and latent variables, and can be converted to one another by adding or removing parameters. The models to be compared in the current study are non-nested, as they contain different latent variable structures. The BIC takes model complexity into account when measuring goodness-of-fit (Byrne, 2010). It is recommended as a model comparison statistic for non-nested models (Raftery, 1995), and has been previously used to compare a series of non-nested models of the CES-D among adolescents from mainland China (Wang et al., 2013). To

compare models, the smaller BIC value is subtracted from the larger BIC value, with differences greater than ten indicative of “very strong support” (Raftery et al., 1995, p. 139) that the model with the smaller BIC fits better than the model with the larger BIC at a probability level of $p < .05$, while differences between six and ten are indicative of “strong support” (Raftery et al., 1995, p. 139).

Research Question 1: Preliminary Analyses. Each outcome measure of internalized distress (the CES-D and additional six items created for the CDS-22, the YSR) was screened for deviations from normality at the level of individual items, the unit of analysis in confirmatory and exploratory factor analyses. Univariate non-normality was defined as skewness values greater than 2.0, and kurtosis values greater than 7.0, as suggested by Curran, West, and Finch (1996). As might be expected in an analysis of mental health symptoms in a community sample, 42.3% of fathers’ items and 38.5% of mothers’ items showed positive skewness (i.e., values were clustered at the lower end of the item rating scale). Fewer items displayed significant skewness for adolescents, on both the CES-D (15% of items) and the YSR (21.9% of items). Regarding kurtosis, a minority of items displayed significant kurtosis (fathers: 23.1%; mothers: 15.4%; adolescents’ YSR: 9.4%). Univariate kurtosis was not found with regards to adolescents’ CES-D items.

The impact of skewness and kurtosis varies depending on statistical technique; for example, tests of variances and covariances (e.g., SEM) are more influenced by kurtosis than skewness (DeCarlo, 1997). In particular, multivariate kurtosis may be problematic for SEM analyses (Byrne, 2010). Examination of Mahalanobis’ distance revealed multivariate outliers within the CES-D data (14 cases among fathers’ data; 15 cases among mothers’ data; 18 cases among adolescents’ data), as well as 14 cases among adolescents’ YSR data. Even after

removing participants with significant Mahalanobis' distance values, Mardia's multivariate kurtosis value (computed as part of each CFA) remained significant for fathers, mothers, and adolescents (on both the CES-D and the YSR). One-way ANOVAs showed that participants classified as outliers reported significantly higher overall distress scores than non-outliers (fathers, $F(1, 256) = 41.34, p < .001$; mothers, $F(1, 272) = 58.71, p < .001$; adolescents, $F(1, 272) = 33.98, p < .001$ on the CES-D, $F(1, 230) = 45.97, p < .001$ on the YSR). A decision was made to retain multivariate outliers in the CFA's, given that deletion did not eliminate non-normality, and would have reduced the representativeness of the sample by disproportionately eliminating the most distressed participants.

Departures from normality have been shown to underestimate overall model fit, and overestimate the significance of parameter estimates (Byrne, 2010). In particular, the chi-square goodness-of-fit statistic is too liberal when used with kurtotic data and small sample sizes, meaning that significant chi-square values (suggesting poor fit) are produced, even if the model is a reasonable approximation of the data (Kenny, 2014). AMOS offers two potential solutions to the issue of computing CFA analyses with non-normal data: the asymptotic distribution-free (ADF) method of estimation or bootstrapping procedures (Byrne, 2010; Tabachnick & Fidell, 2007). ADF estimation requires much larger sample sizes than is available in the current study; chi-square values produced by ADF estimation have been shown to be inflated with sample sizes as small as $N = 200$ (Byrne, 2010; Curran, West, & Finch, 1996), approximately the size of the largest group tested in this dissertation. Bootstrapping reduces the impact of non-normal data by providing information about the stability of parameter estimates; to achieve this, multiple samples are drawn from the original database, with replacement (Byrne, 2010). In this dissertation, 500 samples were drawn, as recommended by Byrne. The distribution produced by

this sampling procedure can be analyzed using traditional inferential statistical methods, without the assumption of normality. This procedure was used whenever possible when testing models with confirmatory factor analyses.

Second-order models were used to represent the CES-D and the YSR. Theoretically, individual item responses can be explained by a series of first-order factors, as well as a single second-order factor representing internalized distress (Byrne, 2010). The primary goal of Research Question 1 was to determine the number and nature of the first-order factors linking item-level responses with the broader construct of internalized distress. When testing a second-order model, it is important to ensure that the higher-level model (i.e., the first-order factors and second-order factor) is identified (meaning that the model contains enough information to estimate the required parameters; Byrne, 2010). As a rule, second-order models containing four first-order factors are identified; ten pieces of information are provided by the sample covariance matrix (i.e., $p(p+1)/2$ when p equals four first-order factors; Byrne, 2010), which is greater than the number of parameters to be estimated (i.e., four regression weights plus the four first-order factor variances equals eight parameters). With only three first-order factors, models become just-identified (i.e., 6 pieces of information provided by the sample covariance matrix and 6 parameters to be estimated), and additional parameters must be specified in the models. As recommended by Byrne, model identification was achieved by constraining two first-order factor residuals to be equal; this pair was selected from the residuals most similar in magnitude.

Hypotheses 1a & 1b: Factor structure of the CES-D (Assimilated and separated profiles). I predicted that a four-factor structure of the CES-D (Figure 1a) would exhibit the best model fit among Chinese Canadians classified as *assimilated* (Hypothesis 1a), whereas a three-

factor structure of the CES-D (Figure 1b) would exhibit the best model fit among Chinese Canadians classified as *separated* (Hypothesis 1b).

Sample sizes for each *assimilated* group (16 fathers, 29 mothers, and 34 adolescents) and for *separated* fathers and adolescents (45 fathers and 24 adolescents) were too small for CFA analyses. Commonly used guidelines for conducting factor analyses typically suggest either a minimum total number of participants (N), or a participant-to-variable ratio ($N:p$) ranging from 5:1 to 10:1. However, it has been shown that sample size alone is not the most important determinant of good correspondence between a sample and the population it represents (MacCallum, Widaman, Zhang, & Hong, 1999). For example, sample sizes as low as $N = 60$ achieved good levels of correspondence when communalities were high (ranging from 0.6 to 0.8) and factors were strongly determined (i.e., a ratio of 20 observed variables to three latent factors; MacCallum et al., 1999). The four-factor model (Figure 1a) approximates the latter criterion, with a 20:4 ratio of items to factors; the three-factor model (Figure 1b) meets it exactly, with a 20:3 ratio. Thus, CFA analyses were only considered when subgroups included at least 60 participants.

There were 65 mothers classified as separated, and within this group, 70% of the communalities among CES-D items were greater than 0.6. Taken together, these values support the use of model fit tests with this subgroup of mothers and a second-order factor analysis was conducted. The results showed that neither the three-factor model nor the four-factor model met criteria for acceptable model fit on any of the fit indices (see the rows labeled “unmodified” in Table 5). The difference in BIC values between the four-factor and three-factor models ($\Delta\text{BIC} = 5.11$) did not support superior fit of the three-factor model, contrary to Hypothesis 1b.

Model modifications. Given that model fit was not adequate for either the three- or four-factor model, modification indices were examined to determine if model fit could be improved by adding additional parameters. Once model modifications are introduced, analyses shift from a confirmatory mode to an exploratory mode, and interpretations of modified models should include the caution that model fit may be driven by the nature of the sample (Byrne, 2010; Raykov & Marcoulides, 2000). To reduce overspecification of a model and maximize the theoretical meaningfulness of such modifications, Byrne (2010) recommends three rules for the modification of models: 1) the modifications made should be meaningful (e.g., the correlation of error terms, which may indicate overlapping item content, or the addition of cross-loadings, which may indicate an observed variable loads significantly on more than one latent factor); 2) models already showing acceptable fit should not be modified to further improve fit and 3) only modifications with a substantial expected parameter change (EPC) associated with them should be made. Guidelines do not exist to quantify what constitutes a ‘substantial’ parameter change; instead, it has been suggested that the parameter change associated with the highest meaningful modification index be made first (Raykov & Marcoulides, 2000). Subsequent modifications should be made one at a time, as altering a single parameter impacts the entire model (Raykov & Marcoulides, 2000). In this dissertation, successive modifications were made in this manner, until 1) either the 3-factor or 4-factor model for a given subsample met criteria for acceptable fit on two of three fit indices or 2) modifications no longer produced significantly better overall model fit, as indicated by the chi-square difference test.

Model modifications for mothers classified as *separated* are summarized alongside the original models in Table 5; the models containing all modifications that resulted in significantly improved model fit are depicted in Figure 4 (three-factor model) and Figure 5 (four-factor

model). Among separated mothers, the largest expected parameter change associated with modification indices for the three-factor model was related to cross-loading item 4 (“I felt that I was just as good as other people”) on the merged affective-somatic factor (EPC = 1.34). One additional modification resulted in a significant improvement in model fit (cross-loading item 12, “I was happy,” on the affective-somatic factor; EPC = - .74). No further modifications significantly improved the fit of the three-factor model. The largest modification associated with the four-factor model (EPC = 1.37) also suggested cross-loading item 4 on the factor representing affective symptoms. No further modifications significantly improved overall fit of the four-factor model. As with the unmodified models, BIC differences between three-factor and four-factor models containing the additional path between item 4 and the first-order factor assessing affective symptoms did not support differences in model fit ($\Delta\text{BIC} = 4.74$).

For both the three-factor and four-factor models, all indicator variables (i.e., CES-D items) loaded significantly on their respective first-order factors, in the predicted direction, with one exception. The modified cross-loadings between item 4 (“I felt that I was just as good as other people,” a *positive* affect item) were positively related to first-order factors assessing *negative* affect. Contrary to what was found, one would hypothesize that higher scores on item 4 would be related to lower scores on the factor measuring negative affective symptoms. Also, contrary to the theoretical model, the first-order positive affect factor did not load significantly on the second-order CES-D factor for mothers classified as separated (Figure 4).

Post-hoc analyses with the whole sample of assimilated and separated profiles. Given the small number of participants classified as *assimilated* or *separated*, I combined fathers, mothers, and adolescents in each group to test Hypotheses 1a and 1b. Including fathers, mothers, and adolescents in the same model created the potential for some dependence within the data, as

family members with the same acculturation profile would be included in the same analyses. However, data from members of the same family comprised less than half of the combined sample; specifically, 25.3% of the individuals classified as *assimilated* ($n = 79$) and 43.3% of individuals classified as *separated* ($n = 134$) belonged to the same family. Therefore, I tested these models as if the data were independent, since the majority of participants did not belong to the same family. Bootstrapping was not used with these combined samples, since assumptions of independence must be met for bootstrapping to be successful (Byrne, 2010).

Fit statistics for the combined samples of *assimilated* and *separated* participants are summarized in Table 6 (see the rows labeled “unmodified”). For participants with an *assimilated* profile, both the four-factor and three-factor models fell just short of criteria for acceptable model fit (based on CFI and RMSEA values). A comparison of BIC values suggested very strong support that the four-factor model fit the data better than the three-factor model for the *assimilated* group ($\Delta\text{BIC} = 10.07$), which was consistent with Hypothesis 1a. For participants with a *separated* acculturation profile, both the four-factor and three-factor models fell short of criteria for acceptable model fit across fit indices.

Although differences in model fit were found in the expected direction for both *assimilated* and *separated* samples, none of the models showed good fit to the data; therefore modification indices were considered. For *assimilated* family members, the largest modification index associated with both the four-factor model (EPC = .22) and the three-factor model (EPC = .27) suggested correlating the error term associated with item 5 (“I had trouble keeping my mind on what I was doing”) with the error term associated with item 7 (“I felt that everything I did was an effort”). This change makes theoretical sense, since difficulty concentrating could be related to a sense of expending increased effort to complete everyday tasks. With this modification, the

four-factor model showed acceptable fit to the data according to two of three fit indices (Table 6); therefore, no further model modifications were made. A comparison of BIC values between the modified three-factor model (Figure 6) and the modified four-factor model (Figure 7) showed strong support in favour of the four-factor model ($\Delta\text{BIC} = 6.50$), as seen with the unmodified models for assimilated participants. For both of the 3-factor and 4-factor modified models, all item and factor loadings were significant, and in the predicted direction.

For *separated* family members, the addition of modification indices did not significantly improve model fit for either the three-factor model (Figure 8) or the four-factor model (Figure 9); furthermore, model fit indices remained below criteria for acceptable model fit even with modifications. For these models, all item loadings were significant and in the predicted direction, as were the pathways between the first-order factors and the second-order factor.

Hypothesis 1c: Factor Structure of the CES-D (Integrated Profile). To test the hypothesis that the factor structure of the CES-D among *integrated* parents would best fit a three-factor solution, whereas a four-factor structure would fit best for *integrated* adolescents, both the three-factor and four-factor models of the CES-D were tested for each family member. Fit statistics are summarized in Table 7. Overall, both the three-factor (Figure 10) and four-factor (Figure 11) models displayed acceptable fit for fathers on two of the three fit indices (the CFI and the RMSEA), and all factor loadings were significant and in the hypothesized direction. For mothers and adolescents, these same fit indices fell just below the cutoff for acceptable fit. Mothers' three-factor and four-factor models are displayed in Figures 12 and 13, respectively; adolescents' three-factor and four-factor models are displayed in Figures 14 and 15. Despite falling short of acceptable fit criteria, the factor loadings within each of these models were significant and in the hypothesized directions, with the exception of Item 7 ("I felt that

everything I did was an effort”) in the adolescents’ models. This item did not load significantly onto either the somatic symptoms first-order factor ($b^* = .07, p = .31$) in *integrated* adolescents’ four-factor model, or the affective-somatic symptoms first-order factor latent factor ($b^* = .09, p = .21$) in *integrated* adolescents’ three-factor model.

Comparison of BIC values for each parent did not support Hypothesis 1c, in that the three-factor model did not fit the data better than the four factor model for either parent ($\Delta\text{BIC} = 2.46$ for fathers, $\Delta\text{BIC} = 0.04$ for mothers). The difference in BIC values associated with adolescents’ data showed very strong support for model differences ($\Delta\text{BIC} = 32.84$); however, contrary to Hypothesis 1c, the three-factor model fit the data better than the four-factor model.

Post-hoc analyses. Since *integrated* fathers’ data displayed acceptable fit, model modifications were only considered for *integrated* mothers and *integrated* adolescents. For mothers, suggested modifications did not significantly improve model fit relative to the unmodified model, nor improve model fit indices enough to meet criteria for acceptable fit. For adolescents, prior to exploring the modification indices for adolescents’ three-factor and four-factor models, each model was tested without Item 7, given the non-significant loading of this item in both original models. As shown in Table 6, dropping this indicator entirely resulted in acceptable model fit according to two of three fit indices for both the three-factor (Figure 14) and four-factor (Figure 15) models. Once Item 7 was dropped, the difference in BIC values between the three-factor and four-factor models no longer supported relatively better fit for the four-factor model for *integrated* adolescents ($\Delta\text{BIC} = 1.32$).

Summary of Hypothesis 1a, b, and c results. Overall, the results of the series of confirmatory factor analyses partially supported Hypotheses 1a, 1b, & 1c. Consistent with Hypothesis 1a, the four-factor model (Figure 7) fit the data best for *assimilated* participants, and

met criteria for acceptable model fit with one modification, but only when fathers, mothers, and adolescents were combined in to a single sample. Hypothesis 1b was not supported, as overall model fit was consistently poor for participants classified as *separated*. In addition, no difference between three-factor and four-factor models was found when *separated mothers* were analyzed separately. Hypothesis 1c was not supported, in that differences in model fit were not found for fathers, mothers, or adolescents classified as *integrated*. Despite the absence of support for the differential model fit predicted by Hypothesis 1c, both the three-factor and four-factor models demonstrated acceptable model fit without modifications for *integrated fathers* (Figures 10 and 11, respectively), and with one modification for *integrated adolescents* (Figures 14 and 15, respectively). For *integrated mothers*, both the three-factor (Figure 12) and four-factor (Figure 13) fell just short of acceptable fit, and neither model fit the data substantially better than the other. In summary, the four-factor model fit the data best for *assimilated* participants, the three-factor and four-factor models generally fit the data well for *integrated* participants, and neither model fit the data well for *separated* participants.

Exploratory Factor Analysis of the CDS-22. Given the limited research exploring the factor structure of the Chinese Depression Scale (CDS-22), exploratory factor analyses were conducted on these items, rather than confirmatory factor analyses. Only Sample 1 participants completed the CDS-22, reducing the size of both *assimilated* (fathers, $n = 13$; mothers, $n = 23$) and *separated* (fathers, $n = 19$; mothers, $n = 23$) groups. Thus, although the original intention was to explore factor structure among parents classified as *assimilated*, *integrated*, and *separated*, sample size only permitted analyses of those in the integrated groups.

Integrated fathers' and *mothers'* data were analyzed separately, using exploratory factor analysis. To improve interpretability of factors and account for the possibility of correlation

between factors, direct oblimin rotation was used. This rotation simplifies factor interpretation, while allowing factors to correlate with one another (Tabachnick & Fidell, 2007). Parallel analysis was used to determine the number of factors to extract. This procedure compares the initial eigenvalues generated from factor analysis of the data to eigenvalues generated from a random data set with the same number of variables and participants; Monte Carlo PCA for Parallel Analysis (Watkins, 2000) was used to generate random data. Factors are retained if the eigenvalue from the actual data set is greater than its corresponding random eigenvalue. Parallel analysis has been described as a more statistically sound criterion for determining the number of variables to extract, compared to traditional methods; it is less arbitrary than the eigenvalue greater than 1.0 criterion and less subjective than the Scree test (Ledesma & Valero-Mora, 2007). Parallel analyses supported the extraction of two factors for fathers, and one factor for mothers; as a comparison, the eigenvalue greater than 1.0 criterion supported the extraction of two factors for both parents. Notably, neither method supported the three-factor structure found in the original psychometric study of the CDS-22 (Lin, 1989), for either parent.

The unique factor loadings for each parent are shown in Table 8. These factor loadings were obtained from the pattern matrix, which contains the unique contribution of each factor to the variance in a variable, which increases the interpretability of the factors. An item was considered to load on a factor if its factor loading was .30 or greater; these item loadings were used to interpret the meaning of each factor. For fathers, a mixture of somatic (e.g., “I had trouble keeping my mind on what I was doing”), affective items, (e.g., “I felt depressed”), as well as both interpersonal items (e.g., “I felt that people disliked me”) were present on the first factor. The second factor was comprised of primarily affective items (e.g., “I had crying spells”) as well as two somatic items (e.g., “My sleep was restless,” “I talked less than usual”). Five of

the six culture-specific items developed for the CDS-22 loaded on the first factor for fathers. In Lin's (1989) original study of the CDS-22, these same five of culture-specific items loaded on a factor with the two interpersonal items, with some cross-loadings on the somatic factor. In this dissertation, the sixth item, "I feel suffocated," loaded exclusively on the second factor (which comprises both affective and somatic symptoms); in Lin's study, it loaded on both the somatic and affective factors.

For mothers, factor loadings of each item on the single factor ranged from .42 ("People were unfriendly") to .81 ("I felt lonely"). This included all of the original interpersonal, somatic, and affective CES-D items as well as the six culture-specific items developed for the CDS-22.

Hypotheses 1d: Factor Structure of the YSR. It was hypothesized that the three-factor structure of the YSR (Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints) found in extant research would be replicated among Chinese Canadian adolescents who exhibit an *integrated* or *assimilated* acculturation profile in the domain of values (Hypothesis 1d). To test this hypothesis, the 180 *integrated* adolescents who completed the YSR were combined with the 31 *assimilated* adolescents, for a total of 211 participants. Model fit statistics are summarized in Table 9; only one fit index (the RMSEA) met criteria for acceptable model fit. It was originally hypothesized that the fit of the three-factor YSR model would be poorer for adolescents classified as *separated*, compared to adolescents classified as *integrated* or *assimilated*. However, the sample size ($n = 18$) of adolescents who completed the YSR and were classified as *separated* did not permit analysis of this component of Hypothesis 1d.

Post-hoc analyses. Model modifications were used to determine if model fit of the YSR could be substantially improved among adolescents classified as *integrated* or *assimilated* (Table 9). The largest expected parameter change (EPC = 0.12) was associated with correlating the

error terms between two items on the Anxious/Depressed subscale (Item 6: “I feel that I have to be perfect” and Item 28: “I think about killing myself”). This modification produced a significant improvement in model fit, as did the subsequent modification (EPC = 0.10), which involved correlating the error terms between Item 15 (“I feel overtired without good reason”) on the Somatic Complaints scale with Item 29 (“I don’t have much energy”) on the Withdrawn/Depressed scale. Although model fit did not reach an acceptable level with these modifications, there were no additional modifications that resulted in a significant model fit. This series of model modifications is summarized in Table 9, and the final YSR model is depicted in Figure 16. In light of the poor model fit of the three-factor model of the YSR, a one-factor model (i.e., all items loaded on a single higher-order factor) was tested, in order to explore whether an undifferentiated model of internalized distress would fit the data better. However, the one-factor model also did not meet criteria for acceptable fit on most fit statistics, $\chi^2(465) = 953.00$, CFI = .71, RMSEA = .07, RMSEA 90% CI (.06, .08).

Research Question 2: Acculturation and Symptom Expression

The next set of analyses examined patterns of symptom expression among Chinese Canadian immigrant families and non-immigrant Canadian families. In order to represent the relative balance of each symptom type, proportion scores were created by dividing the sum of each symptom type (i.e., somatic, affective, interpersonal on both the CES-D and the YSR; positive affect on the CES-D) by the overall scale score. This method was used in place of raw scale scores to account for overall levels of depression. Because positive affect items were reverse scored to create overall CES-D scale scores, the reverse-scored total was used to calculate a proportion score measuring *failure to endorse* positive affect (i.e., the proportion of *low* positive affect).

Due to differences in how subscales were created in the original instruments (i.e., the CES-D subscales are construct-driven, whereas the YSR subscales are empirically-derived), similar items were sometimes associated with different scales. For example, “I could not get ‘going’” (a CES-D item) and “I don’t have much energy” (a YSR item) both reflect the psychomotor slowing and fatigue that can accompany depression, without making specific reference to an affective state. However, the CES-D item is classified as a somatic symptom whereas the YSR item is part of the Withdrawn/Depressed subscale. To create proportion scores, each YSR item was classified as affective, somatic, or interpersonal on the basis of face validity. Good inter-rater reliability of item classifications ($\kappa = .86$) was achieved by seeking out independent ratings from a fellow senior doctoral graduate student (e.g., had passed their candidacy exams). The few discrepancies (3 items) were resolved through discussion. This process resulted in parallel items being classified in the same way on both measures; for example, the YSR item “I feel that no one loves me” (originally classified on the “Anxious/Depressed” subscale) was classified as “interpersonal,” similar to the CES-D item, “I felt that people disliked me.” The YSR item “I don’t have much energy” was also re-classified as a somatic complaint. On the CES-D, 7 items contributed to the somatic scale, 7 items contributed to the affective scale, 2 items contributed to the interpersonal scale, and 4 items contributed to the positive affect scale. On the YSR, items counts were 12 (somatic), 13 (affective), and 7 (interpersonal).

Research Question 2: Preliminary Analyses. A series of factorial ANCOVAs were used to investigate Hypothesis 2. Because Hypothesis 2 analyses were based on grouped data, outlier screening was conducted separately for each of the four groups. The few univariate outliers found were transformed to less extreme values (i.e., equivalent to a z-score of 3.27), in order to

minimize their impact on analyses while preserving data (Tabachnick & Fidell, 2007). Using Curran and colleagues' (1996) recommendations for univariate nonnormality (i.e., absolute skewness scores no greater than 2.0, absolute kurtosis scores no greater than 7.0), most CES-D and YSR proportion scores were normally distributed. The exception was proportion of interpersonal symptoms on the CES-D; fathers' scores showed notable skewness (2.39), and mothers' scores showed notable skewness (2.93) and kurtosis (11.35). A square root transformation applied to parents' interpersonal proportion scores was successful in producing a normal distribution; therefore, these transformed scores were used in the main analyses.

Before completing the main analyses, acculturation groups (i.e., *integrated*, *separated*, and *assimilated* acculturation profiles among immigrant families, and *non-immigrant* Canadian families) were compared on the variables of age and family income (all family members), education level (fathers and mothers), and gender (adolescents). One-way ANOVAs revealed that groups differed in terms of age, for fathers, $F(3, 274) = 3.23, p = .02$, and adolescents, $F(3, 316) = 19.28, p < .001$, but not for mothers, $F(3, 305) = 3.23, p = .87$. Among fathers, *integrated* participants were significantly older than *non-immigrant* Canadian participants; among adolescents, *separated* participants were significantly younger than all other groups, while *non-immigrant* participants were significantly younger than *integrated* and *assimilated* participants. To account for small discrepancies in parental reports of income, fathers' and mothers' reports were averaged to obtain a family income variable, which was then used in one-way ANOVAs to determine if acculturation groups differed on this variable. These analyses revealed that acculturation groups differed in terms of family income, for fathers, $F(3, 289) = 10.64, p < .001$, mothers, $F(3, 303) = 10.50, p < .001$, and adolescents, $F(3, 310) = 12.51, p < .001$. For parents, the *non-immigrant* Canadian group reported significantly higher family income compared to the

separated and *integrated* groups, but not the *assimilated* group; for adolescents, the *non-immigrant* Canadian group reported significantly higher income than all three groups of immigrant adolescents. On the variable of parental education, groups of fathers did not differ based on their level of education, $F(3, 275) = 1.07, p = .34$. However, groups of mothers significantly differed on the variable of maternal education, $F(3, 305) = 1.19, p = .02$, with *integrated* mothers reporting higher levels of education than *separated* mothers. Among adolescents, chi-square analyses showed that acculturation groups did not differ by gender, $\chi^2(3) = 4.11, p = .25$. Because only a subsample of adolescents from immigrant families completed the YSR, these preliminary analyses were repeated in this subsample. Similar to the results for the full sample, acculturation profile groups did not differ on gender, $\chi^2(2) = 2.26, p = .32$. Unlike the full sample, these groups also did not differ on adolescent age, $F(2, 224) = .34, p = .71$, nor family income, $F(2, 170) = .40, p = .67$. Therefore, no covariates were included in the main analyses of adolescents' acculturation profiles with respect to the YSR.

Hypotheses 2a, 2b, and 2c: Main Analyses. A series of factorial ANCOVAs (for analyses of the CES-D) and ANOVAs (for analyses of the YSR) were used to analyze the main effects of acculturation profile and gender, as well as the interaction between these two variables, on the proportion of each type of symptom of internalized distress. To account for differences in sample size between groups, Type II Sums of Squares were used; this approach weights marginal means by cell sample size, and has been recommended for non-experimental research (Tabachnick & Fidell, 2007). The assumptions of homogeneity of variance and homogeneity of regression (ANCOVA only) were assessed; significant findings were not impacted by deviations from these assumptions.

Running a series of ANCOVAs increases the risk of chance findings, relative to including all dependent variables from the same questionnaire in a single MANCOVA (Tabachnick & Fidell, 2007). However, moderately correlated dependent variables reduce the power of MANCOVA (Tabachnick & Fidell, 2010). Many proportion scores exhibited moderate to high correlations with one another, with a few exceptions (see Table 10 for parent data, and Table 11 for adolescents' data). Furthermore, the proportional nature of the data means that each of the four symptom scores will sum to 1.0, both at the individual level and the mean level. The extent of dependence among the dependent variables supports the use of ANCOVA rather than MANCOVA.

Parents. In order to assess the main effects of acculturation profile and gender, as well as the interactions between these variables, a series of 4 (acculturation profile) X 2 (gender) between-subjects ANCOVAs were performed, with parental age, family income, and parental education included as covariates. Because parents within the same family were sometimes categorized into different acculturation profiles, a mixed between-subjects (acculturation profile) and within-subjects (gender) model could not be used. A drawback of the use of between-subjects ANCOVA is that this approach analyzes parents' data as if it were independent. Hierarchical linear modelling (HLM) was considered as a strategy for analyzing parents' data, since it accounts for data dependency by testing individuals (Level 1; i.e., mothers and fathers) nested within families (Level 2). However, nesting individuals within families would mean that the effects of acculturation profile (another Level 2 variable) could not simultaneously be tested. Although cultural values could be incorporated into the model as a continuous variable (instead of categorical), the ability to simultaneously consider the impact of both sets of values (i.e., the bidimensional model of acculturation) would be lost. Kenny, Kashy, and Cook (2006) have

stated that tests of mean differences (such as ANCOVAs) are not affected by dependence in the data. Furthermore, the correlations between fathers' and mothers' proportion scores, although statistically significant, were small in magnitude according to Cohen's 1988 criteria (Kenny et al., 2006), ranging from $r = .11, p = .08$ (interpersonal symptoms) to $r = .22, p < .001$ (low positive affect). When the degree of non-independence is less than .50 (e.g., Pearson correlation coefficient or intraclass correlation), there is relatively little impact on significance testing (Kenny et al., 2006). In addition, the current study involved a within-dyad independent variable (i.e., gender of parent) and a positive correlation between dyad members for the variables under consideration. Under these conditions, any potential bias in variances would result in significance testing that is too conservative, increasing the probability of Type II errors (Kenny et al., 2006). These considerations support the use of analytical techniques that assume independence. Thus,, parent data were analyzed with ANCOVA in order to assess if a significant interaction existed between acculturation profile and gender. To assess whether dependence between mothers' and fathers' data impacted the main effects of interest, additional analyses were conducted: separate ANCOVAs with fathers and mothers to assess the main effect of acculturation profile, and a paired samples *t*-test to assess the main effect of gender.

Table 12 shows the estimated marginal mean values of CES-D proportion scores for fathers and mothers within each acculturation profile. With respect to the proportion of somatic symptoms, a significant main effect for acculturation group was found for parents, $F(3, 542) = 11.24, p < .001$. Post-hoc analyses with a Bonferroni correction to account for multiple comparisons were conducted to understand the nature of the main effect of acculturation profile on somatic symptoms. Hypothesis 2a predicted that the proportions of somatic symptoms would be highest among the *separated* group, followed by the *integrated* group, then the *assimilated*

group, with individuals from *non-immigrant* families reporting the lowest proportions of somatic symptoms (Figure 3). Contrary to Hypothesis 2a, but similar to Yen and colleagues' (2000) results, the opposite pattern was found: *non-immigrant* parents reported a significantly higher proportion of somatic symptoms than all three groups of immigrant parents. The predicted pattern was observed among immigrant parents, with parents classified as *separated* reporting the highest proportion of all immigrant groups, followed by parents classified as *integrated* and parents classified as *assimilated*; however, mean differences among these groups were not significant. No main effect of gender, and no significant interaction between acculturation group and gender, was found with respect to proportion of somatic symptoms reported by parents. With respect to the proportion of interpersonal symptoms, main effects of acculturation profile, $F(3, 542) = .67, p = .56$ and parent gender, $F(1, 542) = 1.47, p = .23$ were not found. The interaction between acculturation profile and gender was also not significant, $F(3, 542) = .48, p = .70$.

Hypothesis 2b predicted that the proportion of affective symptoms would be lowest among the *separated* group, with *integrated* participants reporting higher proportions of affective symptoms than the *separated* group, and *assimilated* participants reporting the highest proportion of affective symptoms among all immigrant groups (Figure 3). It was hypothesized that individuals from non-immigrant families would report a higher proportion of affective symptoms than all immigrant groups. However, no main effect of acculturation profile was found for parents, $F(3, 546) = 1.29, p = .28$. There was a trend towards a main effect of gender, $F(1, 546) = 2.85, p = .09$, with mothers reporting a higher proportion of affective symptoms than fathers. To determine whether the trend towards significance was disproportionately impacted by including *non-immigrant* Canadians, analyses were repeated with only immigrant Chinese

Canadian parents; the main effect of gender reached significance, $F(1, 440) = 5.20, p = .02$.

The interaction between acculturation profile and gender was not significant, $F(3, 546) = 1.16, p = .33$.

Finally, Hypothesis 2c predicted that the proportion of low positive affect would be highest among immigrant parents classified as *separated*; low positive affect would be seen to a lesser extent among *integrated* participants and *assimilated* participants, with the non-immigrant parents reporting the smallest proportion of *low* positive affect. Hypothesis 2c was supported; a significant main effect of acculturation profile was found, $F(3, 546) = 11.39, p < .001$. Post-hoc analyses of means between groups showed that, as expected, *non-immigrant* parents endorsed a smaller proportion of low positive affect compared to all three groups of immigrant parents. Interpreted in terms of the original, positively valenced direction of the positive affect items, *non-immigrant* Canadian parents reported higher proportions of positive affect than their immigrant counterparts; no differences between parents classified as *separated*, *integrated*, and *assimilated* were found. No main effect of gender was found, $F(1, 546) = .58, p = .45$, and no interaction between acculturation profile and gender was found, $F(3, 546) = .29, p = .83$.

A series of one-way ANCOVAs were also run for fathers and mothers separately, to determine if the pattern of main effects of acculturation profile was replicated among completely independent samples. The significant main effects with respect to proportion of somatic symptoms and proportion of low positive affect were replicated when fathers' and mothers' data were analyzed separately. A trend towards a main effect of acculturation profile emerged with respect to the proportion of affective symptoms reported by fathers, $F(3, 261) = 2.21, p = .09$, but not mothers, $F(3, 291) = .00, p = 1.00$; however, group-level differences were not found for fathers. Next, paired sample *t*-tests were used to determine if the pattern of main effects of

gender differences would be replicated when accounting for dependency between fathers' and mothers' data. Similar to the results of the factorial ANCOVAs, no gender differences were found between fathers and mothers with respect to proportion of somatic symptoms, interpersonal symptoms, and low positive affect. A significant difference was found with respect to the proportion of affective symptoms, $t(269) = -2.944, p < .01$, with mothers reporting a significantly higher proportion of affective symptoms than fathers.

Adolescents. As with parents, a series of 4 (acculturation profile) by 2 (gender) ANCOVAs were used to test the main effects of acculturation profile and gender, as well as the interaction between these two variables. Adolescent age and family income were included as covariates in these analyses. Because all adolescents came from different families, dependence within the data was not a concern. Table 12 shows the mean values of CES-D proportion scores for adolescent males and females within each acculturation profile.

With respect to the proportion of somatic symptoms on the CES-D, a significant main effect of adolescents' acculturation profile (i.e., *separated*, *integrated*, *assimilated*, or from a *non-immigrant* family) was found, $F(3, 303) = 3.26, p = .02$. Similar to parents' results, the results of the ANCOVA with adolescents' data contradicted Hypothesis 2a. Post-hoc mean comparisons revealed that adolescents from *non-immigrant* families reported the highest proportion of somatic symptoms, followed by *integrated* and *assimilated* adolescents, with *separated* adolescents reporting the lowest proportion of somatic symptoms. No main effect of gender was found with respect to proportion of somatic symptoms, $F(1, 303) = .55, p = .46$, and the interaction between acculturation profile and gender was also not significant, $F(3, 303) = .95, p = .42$. Hypothesis 2a was not supported with respect to the proportion of interpersonal symptoms; no main effect of acculturation profile, $F(3, 303) = .07, p = .98$, nor gender, $F(1,$

303) = .21, $p = .64$, was found. The interaction between acculturation profile and gender was also not significant, $F(3, 303) = .16, p = .92$.

With respect to the proportion of affective symptoms, Hypotheses 2b was not supported; no main effect of acculturation profile was found, $F(3, 303) = .15, p = .93$. However, a main effect of gender was found, such that females reported a higher proportion of affective symptoms than males, $F(1, 303) = .530, p = .02$. To determine if this main effect was disproportionately influenced by the inclusion of *non-immigrant* Canadians, analyses were repeated without this group; the effect of gender remained significant, $F(1, 254) = 6.17, p = .01$. The interaction between acculturation profile and gender was not significant, $F(3, 303) = .94, p = .42$.

Consistent with Hypothesis 2c, a main effect of acculturation profile was found with respect to the proportion of low positive affect, $F(3, 303) = 2.64, p = .05$. However, homogeneity of variance was violated in this case, meaning that more stringent criteria for significance (i.e., $p < .025$; Tabachnick & Fidell, 2007) should be applied. Therefore, this result may be more accurately interpreted as a trend. Group differences were consistent with Hypothesis 2c; adolescents from *non-immigrant* families reported a significantly smaller proportion of low positive affect than *separated* adolescents, with *integrated* and *assimilated* adolescents' proportion scores falling in the middle. In other words, adolescents from *non-immigrant* families reported a higher proportion of positive affect than *separated* adolescents. Main effects of gender, $F(1, 303) = .34, p = .56$, and interactions between acculturation profile and gender, $F(3, 303) = .43, p = .74$, were not significant with respect to proportion of low positive affect.

Analyses of adolescents' proportion scores on the YSR were conducted in a slightly different manner. First, adolescents from *non-immigrant* families did not complete the YSR,

leaving three acculturation profiles to compare (*separated, integrated, assimilated*).

Furthermore, sample size limitations only allowed for the evaluation of interactions between acculturation profile and gender among integrated and assimilated adolescents; the group of *separated* participants ($n = 18$) was too small to divide further by gender (i.e., cells containing less than 10 participants were created). Therefore, first a factorial 2 (*integrated, assimilated*) by 2 (*male, female*) ANOVA was conducted. Main effects of acculturation profile and gender, as well as interactions between acculturation profile and gender, were not found with respect to proportion of somatic symptoms, affective symptoms, or interpersonal symptoms on the YSR. In order to test the main effect of acculturation profile among all three acculturation profiles, a one-way ANOVA was conducted. However, the addition of separated participants did not reveal any significant differences for any of the proportion scores. Finally, three independent-samples *t*-tests (one for each symptom type: proportion of somatic, affective, and interpersonal symptoms) were conducted to determine if gender differences were observed when *separated* participants were included; no significant differences were found. Overall, the expected acculturation profile differences predicted in Hypothesis 2a (proportion of somatic and interpersonal symptoms) and Hypothesis 2b (proportion of affective symptoms) were not found on the YSR.

Summary of findings for Research Question 2. Overall, the results of analyses of Research Question 2 suggest that non-immigrant parents report a higher proportion of somatic symptoms and a higher proportion of positive affect compared to immigrant parents, regardless of their acculturation profile. Differences among groups of immigrant parents were in the expected direction for proportion of somatic symptoms (i.e., *separated* parents reported the highest and *assimilated* parents reported the lowest), but did not significantly differ. Mothers

also reported a higher proportion of affective symptoms than fathers; however, the strength of this difference was dependent on the analysis used. No interactions between acculturation profile and gender were found for parents. Adolescents' results with respect to the CES-D were generally consistent with parents' results; participants from immigrant families differed from their non-immigrant counterparts with respect to proportion of somatic symptoms (in the opposite direction predicted) and proportion of symptoms of low positive affect (in the expected direction). Both mothers and adolescent females also reported higher proportions of affective symptoms than their male counterparts. No interactions between acculturation profile and gender were significant, and no significant results with respect to adolescents' YSR proportion scores were found.

Post-hoc analyses: Overall level of internalized distress. Given that the hypothesized main effects of acculturation profile with respect to the proportion of somatic symptoms and the proportion of affective symptoms were not found, I investigated whether proportional symptom responding was related to level of distress. Yen and colleagues (2000) found higher proportions of somatic symptoms and lower proportions of affective symptoms among treatment-seeking Chinese students, compared to Chinese students who were not seeking psychological treatment. Therefore, I analyzed the data to determine 1) if the hypothesized acculturation profile differences were observed among the participants reporting high levels of distress, and 2) if fathers, mothers, and adolescents reporting high levels of distress reported a pattern of somatic and affective symptoms similar to Yen and colleagues' study, compared to their counterparts reporting low levels of distress. Given the post-hoc nature of these analyses, I chose to focus only on the proportion of somatic symptoms and proportion of affective symptoms, since these were the primary outcome variables of interest in this dissertation.

To answer the first post-hoc research question, Hypotheses 2a (somatic symptoms) and 2b (affective symptoms) were tested with a combined sample of fathers, mothers and adolescents who reported high levels of distress on the CES-D. Participants were combined to allow adequate sample size for acculturation profile comparisons. The literature suggests that CES-D scores of 16 or greater among adults represent high levels of depressive symptoms that may warrant treatment; for adolescents, sensitivity and specificity in detecting clinical depression improves greatly when a more stringent criterion of 23 or greater is applied (Roberts, Andrews, Lewinsohn, & Hops, 1990). Theoretically, the cutoff score for parents could be met through exclusive endorsement of somatic symptoms (i.e., 7 items, with a maximum score of 3 on each item, for a total of 21 on the CES-D). Adolescents would need to endorse a low level of affective or interpersonal symptomatology relative to somatic symptomatology, in order to meet their cutoff score.

Table 13 displays the number of participants classified as high distress or low distress on the CES-D, grouped by acculturation profile. As shown in the table, “high distress” participants were fairly equally distributed across fathers, mothers, and adolescents; only 27.6% of these participants were from the same family. The "high distress" group contained 149 participants, or 16.2% of the total sample. Five of these participants were classified as *marginalized*, and were excluded from acculturation group comparisons due to small sample size. The proportion of individuals classified as "high distress" was similar across acculturation profiles ($n = 22$, or 16.4% of *separated* individuals; $n = 86$, or 15.6% of *integrated* individuals; $n = 16$, or 20.3% of *assimilated* individuals; and $n = 20$, or 14.9% of individuals from *non-immigrant families*). A one-way (acculturation profile) ANCOVA was conducted to compare groups of high distress participants, with family income included as a covariate. It was expected that a main effect of

acculturation profile with respect to the proportion of somatic and affective symptoms endorsed would be found among this high-distress subsample. However, no main effects of acculturation profile were found with respect to proportion of somatic symptoms, $F(3, 139) = .84, p = .47$, or proportion of affective symptoms, $F(3, 139) = .87, p = .46$. Notably, the unexpected differences (i.e., *non-immigrant* participants reported higher proportions of somatic symptoms than immigrant Chinese Canadian participants) found in previous analyses were not found among the high-distress subsample.

The second post-hoc research question proposed that participants with high scores on the CES-D would report higher proportions of somatic symptoms and lower proportions of affective symptoms, relative to their counterparts whose scores fell below the cutoff value, regardless of acculturation profile. A series of independent sample *t*-tests were used to examine this question among fathers, mothers, and adolescents separately. Due to significant differences in variance between the high distress group and the low distress group in each of these analyses, an adjusted *df* was used. Non-immigrant families were excluded from these analyses, since the goal was to focus on symptom reporting differences specifically among immigrant Chinese Canadian participants, in order to determine if Yen and colleagues' (2000) results would be replicated.

Mean values for the proportion of somatic and affective symptoms in high distress and low distress groups are displayed in Table 14. It was expected that those with high levels of distress would report a significantly higher proportion of somatic symptoms compared to those with low levels of distress; this pattern was observed among fathers, $t(182.80) = -2.66, p < .01$ and mothers, $t(148.69) = -1.94, p = .05$. However, the opposite pattern was observed among adolescents' CES-D scores, with low distress responders reporting a higher proportion of somatic symptoms than high distress responders, $t(223.89) = 6.74, p < .001$. It was also expected that

those with high levels of distress would report a lower proportion of affective symptoms compared to those with low levels of distress. However, the opposite pattern was found among all family members, with individuals reporting high levels of distress endorsing a higher proportion of affective symptoms on the CES-D, among fathers, $t(75.94) = -12.41, p < .001$, mothers, $t(97.99) = -8.08, p < .001$ and adolescents, $t(125.80) = -11.57, p < .001$.

Although sample sizes on the YSR did not permit analyses of differences among acculturation profiles, differences between high responders and low responders could be tested, using the same approach as with CES-D proportion scores. On the YSR, standardized scores were used to determine if adolescents' scores were clinically significant; a T-score of 60 or greater suggests that an adolescent is reporting more internalized distress than 84% of same-age, same-gender peers (Achenbach & Rescorla, 2001). This cutoff score corresponds to a raw score of 19 or 20 on the YSR, which could be achieved by exclusive endorsement of somatic symptoms (i.e., 11 somatic items with a maximum score of 2, for maximum possible score of 22 through exclusive somatic symptom endorsement). Mean values are displayed in Table 14. Yen and colleagues' (2000) findings were partially replicated with the YSR data; adolescents who reported high levels of internalized distress on the YSR clinical range reported a significantly *higher* proportion of somatic symptoms than their lower-scoring counterparts $t(157.64) = -3.33, p < .01$. Consistent with the pattern seen in the proportion of affective symptoms on the CES-D, there was a trend towards high responders reporting a higher proportion of affective symptoms on the YSR, compared to low responders, $t(218.03) = -1.98, p = .06$.

Research Question 3: Somatization, Acculturation, and Demographic Characteristics

The third research question investigated whether the proportion of somatic symptoms reported was associated with cultural (i.e., endorsement of Chinese values) and demographic

(i.e., SES, age, neighbourhood composition, length of residence for parents, generational status for adolescents) variables related to risk of stigmatization among immigrant Chinese Canadians. Parallels exist between aspects of this research question and the analyses of proportion of somatic symptoms in Research Question 2. In the context of Research Question 3, the focus was on the combination of cultural and demographic variables that might predict the proportion of somatic symptoms from the perspective of identifying conditions that might increase the likelihood of participants being motivated to avoid stigma. Another difference is that Research Question 3 examined cultural values in a continuous manner, which avoids the issue of small sample sizes that arose when dividing the sample by acculturation profile. The use of hierarchical regression analyses allows for the inclusion of both cultural values variables in a continuous manner, rather than dichotomizing values in order to assign participants to acculturation profiles. In addition, participants' bidimensional acculturation can be assessed via the *interaction* between continuous measures of Chinese values and Western values, which avoids the limitations of the categorical approach to acculturation (e.g., exclusion of participants classified as marginalized, the absence of a discrete cutoff to guide the creation of acculturation profiles).

Hypothesis 3a. Relations between variables believed to confer risk of stigmatization (i.e., endorsement of Chinese values, age, SES, neighbourhood contacts, time in Canada), and the proportion of somatic symptoms endorsed, were investigated using a series of four hierarchical regression analyses (fathers', mothers', and adolescents' CES-D scores; adolescents' YSR scores). The higher the proportion of somatic symptoms that an individual reports relative to affective symptoms, interpersonal symptoms, or low positive affect, the more likely it is that their distress will not be identified when assessed according to Western models of distress. In

order to assess the relations between stigma-related demographic variables and the proportion of somatic symptoms reported, over and above the effects of cultural influences on somatization, scores on the measures of Asian values and Western values were entered in Step 1 of the hierarchical regression. An interaction term was calculated as the product of Chinese values and Western values and was entered in Step 2. Both value measures were centered prior to calculating the interaction term in order to reduce the impact of multicollinearity when testing the significance of the interaction. Finally, demographic variables (age, SES, neighbourhood contact with other Chinese individuals, length of residence for parents, generational status for adolescents) were entered in Step 3. SES was measured using a composite variable, created by averaging mothers' and fathers' standardized scores on reports of family income and the highest level of education obtained by each parent. Such combined measures of SES have been used in previous empirical research with immigrant families (e.g., Huynh & Fuligni, 2012). Since including the variable of neighbourhood contact in these analyses reduced the overall sample size, hierarchical regression analyses were also conducted without this variable, with the entire sample. The pattern of effects did not differ between analyses with and without the variable of neighbourhood contact; therefore, the results of analyses that included neighbourhood contact are presented in this dissertation.

Parents. Table 15 displays the standardized regression coefficients, R^2 values, and F values for hierarchical regression analyses predicting fathers' and mothers' proportion of somatic symptoms on the CES-D. Among parents, Hypothesis 3a was not supported; neither the cultural variables (i.e., Asian values), nor the demographic variables (i.e., age, SES, neighbourhood contact with other Chinese individuals, length of residence in Canada), were related to the proportion of somatic symptoms reported by fathers or by mothers. Furthermore, the interaction

between Asian values and Western values did not significantly predict the proportion of somatic symptoms. There was a trend for mothers' endorsement of Western values to predict the proportion of somatic symptoms reported ($b^* = -.14, p = .09$); the direction of this relation was in the expected direction, in that greater maternal endorsement of Western values was related to a lower proportion of somatic symptoms. However, this trend disappeared when demographic variables were added in Step 3.

Adolescents. Table 16 displays the standardized regression coefficients, R^2 values, and F values for hierarchical regression analyses predicting adolescents' proportion of somatic symptoms on each measure of internalized distress. For the prediction of symptom responding on the CES-D, there was a trend towards a significant relation between Asian values and proportion of somatic symptoms reported, in the expected direction ($b^* = -.13, p = .09$), but only in the context of the full model, in which all demographic variables were included. In addition, there was a strong and consistent relationship between adolescents' endorsement of Western values and the proportion of somatic symptoms reported on the CES-D. However, contrary to expectations, greater endorsement of Western values was related to a higher proportion of somatic symptoms ($b^* = .30, p < .001$). In contrast, the interaction between Asian values and Western values was not significantly related to the proportion of somatic symptoms; neither were any of the demographic variables. On the YSR, the cultural variables and demographic variables were not significantly related to the proportion of somatic symptoms reported; neither was the interaction between Asian values and Western values. However, a trend emerged between generational status and proportion of somatic symptoms reported on the YSR; consistent with Hypothesis 3a, first generation adolescents reported a higher proportion of somatic symptoms ($b^* = -.13, p = .09$).

Post-hoc analyses. Two additional hierarchical regression analyses were conducted to test Hypothesis 3a among two different subsamples that combined fathers, mothers, and adolescents. First, to determine if the proportion of somatic symptoms reported was more strongly related to cultural and demographic factors among participants with clinically significant internalized distress, these analyses were repeated with the immigrant Chinese Canadian fathers, mothers, and adolescents classified as high scorers on the CES-D in the Research Question 2 analyses. Second, an independent sample of fathers, mothers, and adolescents from different families was created, with a specific focus on testing the relation between age and proportion of somatic symptoms across a broader developmental period. Table 17 displays the standardized regression coefficients, R^2 values, and F values for hierarchical regression analyses for these post-hoc analyses.

To assess time in Canada within these mixed samples of adults and adolescents, fathers' and mothers' length of residence was dichotomized into a binary variable (lived in Canada for more than 10 years; lived in Canada for less than 10 years). These values were then coded to correspond to adolescents' generational status, such that first generation adolescents were grouped with parents with shorter length of residence in Canada, and one-and-a-half and second generation adolescents were grouped with parents with greater length of residence in Canada.

Clinically significant distress. A total of 129 immigrant Chinese Canadian fathers, mothers, and adolescents had CES-D scores that fell at or above the cutoff for clinically significant internalized distress. This total included 124 from the Hypothesis 2 analyses, plus 5 marginalized participants who were previously excluded when acculturation was assessed categorically. Participants who did not complete the item measuring neighbourhood contact were excluded from this hierarchical regression analysis, leaving $n = 83$ participants. As with

previous analyses, the pattern of effects did not differ between analyses with and without the variable of neighbourhood contact.

Among family members with high scores on the CES-D, no relations between Asian values and proportion of somatic symptoms were found; there was also no relation found between Western values and proportion of somatic symptoms, or the interaction between Asian values and Western values (see Table 17). Among demographic variables, SES was significantly correlated with the proportion of somatic symptoms reported ($b^* = .27, p = .03$); however, contrary to Hypothesis 3a, higher SES was related to a higher proportion of somatic symptoms. No relations were found between the other demographic variables of interest (i.e., age, neighbourhood contact, time in Canada) and the proportion of somatic symptoms among fathers, mothers, and adolescents with clinically significant internalized distress.

Random sample. A limitation of the separate hierarchical regression analyses conducted for fathers, mothers, and adolescents was the restricted age range (from 30 to 65 among parents; from 10 to 18 among adolescents). In order to examine the role of age across a broader developmental period, within the entire sample, a data set was created containing one member of each family (father, mother, or adolescent, to remove issues of dependence). Random number generation syntax in SPSS was used to select which family member would be assigned to this combined sample. If the family member identified with the random number generator did not participate in the study, the family was eliminated from this analysis. Six families were excluded for this reason, when the father was randomly drawn from a family in which the father did not participate. In order to assess all predictor variables of interest, this random subsample was limited to those who were administered the item assessing neighbourhood composition. This resulted in a sample of $n = 175$, containing 64 fathers, 49 mothers, and 63 adolescents;

Among this combined sample (Table 17), Asian values were unrelated to proportion of somatic symptoms, however, there was a significant relation between Western values and proportion of somatic symptoms ($b^* = .16, p = .04$). Contrary to expectations, but consistent with Hypothesis 3a results among adolescents, greater endorsement of Western values were related to a higher proportion of somatic symptoms. The interaction between Asian values and Western values was not significant. Among demographic variables hypothesized to predict the proportion of somatic symptoms reported, both age ($b^* = -.34, p < .001$) and time in Canada ($b^* = .14, p = .05$) were significantly related to proportion of somatic symptoms, but in the opposite direction as predicted; younger age and greater length of time in Canada were related to a *higher* proportion of somatic symptoms. The other two demographic variables of interest, SES and neighbourhood contact, were not related to proportion of somatic symptoms among this random sample of participants.

Hypothesis 3b. Finally, it was hypothesized that possessing a greater *number of* hypothesized risk factors for experiencing stigma (i.e., high endorsement of Chinese values, lower SES, greater neighbourhood contact with other Chinese individuals, shorter time in Canada, older age) would predict the proportion of somatic symptoms reported. The five predictor sociodemographic variables were coded into dichotomous variables by assigning a score of 1 if a family member fell into the category believed to be associated with a higher proportion of somatic symptoms, and 0 if they did not.

For Asian values, scores of 4.0 or greater were classified as *high* endorsement. The composite SES variable was also dichotomized into high SES (above the mean composite value) and low SES (below the mean composite value); those who fell below the sample mean were classified as *low*. For neighbourhood contact, scores of 3.0 or greater were classified as *high*

contact. For time in Canada, parents who had lived in Canada for 10 years or less, and first generation adolescents were classified as having a *shorter* length of residence in Canada. The categorization of age was analysis-dependent. For analyses of cumulative risk among fathers and mothers separately, those with ages above the mean ($M = 46.00$ for fathers; $M = 43.74$ for mothers) were classified as older, and therefore more likely to report a higher proportion of somatic symptoms. For analyses of cumulative risk among adolescents, age was excluded, given the restricted range of this variable in this group. As in Hypothesis 3a, cumulative risk was also examined among the two combined samples of fathers, mothers, and adolescents (high distress and the random sample). In these cases, parents were classified as the *older* age group, and adolescents were classified as younger.

Overall, a continuous variable was created that measured the additive effects of various factors believed to be related to higher proportion of somatic symptoms, with a possible range of 0 to 5 (parents, combined samples) and 0 to 4 (adolescents). Among all individual family members, the full range of scores was present in the data ($M = 3.12$, $SD = .96$ for fathers; $M = 3.02$, $SD = .99$ for mothers; $M = 2.25$, $SD = .88$ for adolescents). Among the combined samples, scores ranged from 1 to 5 in the high distress sample ($M = 3.12$, $SD = 1.07$), and from 0 to 5 in the random sample ($M = 3.02$, $SD = 1.06$).

Once the cumulative risk variable was calculated, a series of Pearson correlations were computed between the cumulative risk variable and the proportion of somatic symptoms reported. Hypothesis 3b was not supported among parents; the cumulative risk variable was unrelated to proportion of somatic symptoms endorsed on the CES-D for both fathers ($b^* = -.03$, $p = .75$) and mothers ($b^* = -.03$, $p = .67$). Similarly, among adolescents, the cumulative risk variable was unrelated to the proportion of somatic symptoms reported on both the CES-D (b^*

=-.04, $p = .61$) and the YSR ($b^* = .08, p = .29$). Among the sample of participants endorsing high levels of distress on the CES-D ($n = 83$), the cumulative risk variable was unrelated to the proportion of somatic symptoms ($b^* = -.11, p = .34$). Among the random sample ($n = 175$), the cumulative risk variable was significantly related to a higher proportion of somatic symptoms on the CES-D, but in the opposite direction than was predicted ($b^* = -.27, p < .001$). A greater number of cultural and demographic risk variables was related a *lower* proportion of somatic symptoms.

Discussion

This dissertation investigated the relations between values-based acculturation and the *meaning* of internalized distress, as well as cultural and demographic factors that may influence the *expression* of internalized distress, among immigrant Chinese Canadian families. Each research question examined the phenomenon of somatization among Chinese individuals, which is defined as the channeling of affective distress into medically unexplained physical complaints. The experience of both somatic and affective symptoms of distress in both Chinese and Western cultures is acknowledged across diagnostic systems (i.e., *DSM-5*, *ICD-10*, *CCMD-3*) and supported by empirical research (e.g., Mak & Zane, 2004; Ryder et al., 2008). However, Chinese individuals may experience somatic and affective symptoms more holistically than Western individuals, who view these symptom types as distinct from one another (Kleinman, 1977; Ryder et al., 2002; Tsai et al., 2004). Chinese individuals may also emphasize the somatic aspects of their distress to a greater extent than the affective aspects (Ryder et al., 2008), or imply affective distress via descriptions of interpersonal struggle and somatic complaints (Lee, Kleinman, et al., 2007). It has also been suggested that Chinese individuals may emphasize somatic symptoms to reduce the stigma of mental illness, and the shame that mental illness could bring to their families (Ryder et al., 2008; Stewart et al., 2010).

Adding to the complexity of this issue is the acculturation process that individuals undergo following immigration. Acculturation refers to the process by which individuals retain behavioural, identity-based, and values-based aspects of their heritage culture, and/or adopt these same aspects of the new culture they encounter (Berry, 1997; Schwartz et al., 2010). Acculturation is an individual and dynamic process, and individuals vary with respect to the balance of heritage culture they retain and new culture they adopt. It cannot be assumed that all

individuals from the same culture hold similar cultural beliefs, particularly when individuals encounter multiple cultural influences in their environment, as is the case for immigrant Chinese Canadians. Within-culture variability in beliefs about mental health is present among all cultural groups; the additional variability that accompanies the immigration process means that it cannot be assumed that all immigrant Chinese Canadians will experience and express somatic and affective symptoms of distress in a similar manner. However, little research thus far has examined whether patterns of symptom expression are linked to endorsement of Chinese and Western values.

Chinese individuals who immigrate to Western countries interact with a medical system that places greater emphasis on affective symptoms of internalized distress relative to somatic symptoms, and also sharply differentiates between somatic and affective symptoms and illnesses. Therefore, it is critical to understand how acculturation profile relates to how they experience and express symptoms of internalized distress on Western measurement tools. In this dissertation, I conceptualized the balance of somatic and affective symptom reporting in two main ways: the extent to which these symptoms cluster together in a holistic manner (Research Question 1), and the proportional balance of somatic and affective symptoms endorsed (Research Question 2). Research Question 3 focused on the cultural and demographic factors believed to increase the risk that an individual would present distress in terms of a high proportion of somatic symptoms, the manner associated with the lowest risk of stigma in Chinese culture.

The results of this dissertation showed partial support for the main study hypotheses, with some surprising findings that contradicted expectations. Research Question 1 assessed the *meaning* of internalized distress by evaluating the underlying factor structure of the CES-D (Radloff, 1977, 1991). As expected, the four-factor Western model of internalized distress fit the

data best among *assimilated* participants (i.e., those who endorsed high levels of Western values and low levels of Chinese values). Model fit was consistently poor among *separated* participants (i.e., those who endorsed high levels of Chinese values and low levels of Western values), although the three-factor model of the CES-D, purported to be more consistent with Chinese values of physical and psychological holism (Ying, 1988), fit the data better than the four-factor model. Among *integrated* participants (i.e., those who endorsed high levels of both Chinese values and Western values), the three-factor and four-factor models fit the data equally well. It should be noted that with the exception of integrated fathers, acceptable values for certain fit statistics were only achieved via post-hoc model modifications; therefore, these results should be interpreted with caution and require further replication with independent samples.

Research Question 2 assessed patterns of symptom *expression* by examining whether the proportion of symptoms endorsed differed by acculturation profile. Contrary to expectations, non-immigrant Canadian fathers, mothers, and adolescents reported a higher proportion of somatic symptoms than their immigrant Chinese Canadian counterparts; this difference disappeared, however, when acculturation profile comparisons focused on individuals exhibiting clinically significant levels of distress. The proportion of positive affect was the only other type of symptom to show significant differences among acculturation profiles on the CES-D, in the expected direction. Non-immigrant Canadians reported a higher proportion of positive affect (displayed as a *low* proportion of *low* positive affect in Table 12, due to reverse scoring) than their immigrant Chinese Canadian counterparts. Among adolescents from immigrant Chinese Canadian families, differences in the proportion of somatic symptoms and positive affect were also found among acculturation profiles. Acculturation group differences were not found with respect to proportion of affective or interpersonal symptoms. Instead, the proportion of affective

symptoms was more related to gender and overall level of distress. Females reported a higher proportion compared to males regardless of acculturation profile, and high-distress individuals reported a higher proportion of affective symptoms than low-distress individuals.

Research Question 3 assessed whether cultural and demographic variables related to susceptibility to stigma were associated with a higher proportion of somatic symptoms, both individually and cumulatively. These variables were selected because they were believed to increase the risk that individuals would report a high proportion of somatic symptoms to avoid stigma. Reasons for increased susceptibility to stigma included generational differences in beliefs about mental health (i.e., older age), increased susceptibility to structural inequalities that limit access to care (i.e., lower SES, shorter time in Canada), and internal and external factors influencing culturally-congruent symptom reporting (i.e., strong endorsement of Chinese values, living in the context of a large Chinese community). However, evidence for a consistent pattern of individual or composite indicators of a higher proportion of somatic symptoms was not found. Similar to Research Question 2, the only significant associations were in the opposite direction than were predicted; taken together, these results raise questions about the suitability of the CES-D somatic symptom items for use with an immigrant Chinese Canadian population.

Furthermore, given the complex nature of stigma and the factors that predict susceptibility to stigma, it is possible that variables thought to be protective (e.g., higher SES, younger age, longer time in Canada) may create susceptibility to stigma through an alternate pathway. For example, higher SES individuals who report high levels of internalized distress may experience increased stress from employment demands. While they possess more financial resources, they may also perceive that they have more to lose if they disclose their distress or take time away from work for treatment, particularly if their family relies solely on their income. However, the

absence of a direct measure of susceptibility to stigma precludes drawing firm conclusions about this aspect of the research.

Dualistic and Holistic Models of Somatic and Affective Symptoms

The results of Research Question 1 collectively demonstrate the value of considering the impact of within-culture diversity when assessing how various types of symptoms of internalized distress cluster together, rather than assuming that individuals with a shared cultural background will respond similarly. As hypothesized, the four-factor model of the CES-D fit the data better than the three-factor model among participants classified as *assimilated*; acceptable fit of the four-factor model was achieved with model modification. Even without modification, fit statistics fell just below cutoffs for acceptable model fit; with a larger sample size, the four-factor model may meet criteria for acceptable fit without modifications. Among participants classified as *integrated*, the expected patterns in terms of *relative* model fit were not found; no differences existed for parents' three- and four- factor models, and the difference between adolescents' models disappeared once a problematic item was eliminated. Hypotheses about relative fit differences were made based on differences in cultural involvement based on developmental stage (i.e., integrated parents would be more oriented to Chinese culture, whereas integrated adolescents would be more oriented to Western culture). Nevertheless, according to Berry's (1997) framework for classifying acculturation styles, all individuals classified as *integrated* endorse values associated with both heritage and adopted cultures. Therefore, the equivalent fit of the three-factor and four factor models among integrated participants makes theoretical sense. Indicators of absolute model fit were also generally acceptable among fathers classified as *integrated*, although only one fit index met criteria for acceptable fit among mothers classified as

integrated. Among *integrated* adolescents, acceptable model fit was achieved through post-hoc deletion of a problematic item.

In contrast to the results among *assimilated* or *integrated* participants, none of the fit indices met criteria for acceptable model fit among *separated* participants, whether considering the combined samples or mothers only. In the case of the combined sample, the three-factor model fit the data better the four-factor model, which was consistent with hypotheses; however, the absence of acceptable model fit suggests that even the three-factor model does not adequately represent the construct of internalized distress among immigrant Chinese Canadians classified as *separated*. In many respects, this is not a surprising finding, as the factor structure of a Western measure was being tested among a subsample of immigrant Chinese Canadians who endorsed a low level of Western values. Previous studies that suggested the utility of a three-factor CES-D model among immigrant Chinese American adults were exploratory, and did not assess overall model fit (Kuo, 1984; Ying, 1988). In this dissertation, confirmatory factor analyses were used to test the absolute model fit of the three-factor and four factor models, as well as the relative model fit between these two competing models. Confirmatory analyses provide evidence for the validity of these models among a subset of immigrant Chinese Canadians. The results of this dissertation are consistent with Cheung and Bagley's (1998) confirmatory factor analyses of the CES-D among married Chinese couples, who also found that comparable fit indices were not indicative of acceptable model fit (i.e., CFI values of .80 to .85). The results of this dissertation call into question the validity of the CES-D in its current form among immigrant Chinese Canadians who strongly endorse Chinese values, paired with limited endorsement of Western values.

Interestingly, the absence of acceptable model fit among participants who endorse high levels of Chinese values differs from Wang and colleagues' (2013) research, which demonstrated good model fit of both the three-factor and four-factor models among adolescents in China. Developmental and contextual differences between the participants in this dissertation and Wang and colleagues' study may account for the differing results. First, this dissertation incorporated data from both adolescents and adults. Had sample size permitted the analysis of immigrant adolescents classified as *separated*, independent of parent data, it would have been interesting to determine whether this group of adolescents responded to the CES-D similarly to the Chinese adolescents in Wang and colleagues' study. Second, the endorsement of traditional Chinese cultural values was not assessed in Wang and colleagues' study; it cannot be assumed that values endorsed by adolescents in China would directly mirror those of *separated* immigrant Chinese Canadians (i.e., who retain strong Chinese values but do not adopt Western values even when immersed in a Canadian cultural context). From a life course perspective (U.S. Department of Health and Human Services, 2010), immigration represents a major shift in an individual's life trajectory. Culture is dynamic, and the values of individuals who do not immigrate may shift over time along with the larger culture of their birthplace, while their same-age counterparts who emigrate may hold onto the values that were predominant when they left their country of origin. Therefore, it is possible that immigrant Chinese Canadians (particularly those classified as *separated*) hold stronger traditional Chinese values compared to adolescents living in contemporary Mainland China. Given the impact of globalization, it is also possible that Chinese adolescents would endorse Western values to a greater extent than *separated* immigrant Chinese Canadians. Therefore, cultural differences on both Chinese and Western dimensions

could explain the good fit of the CES-D among Chinese adolescents in Wang and colleagues' study, relative to *separated* participants in this dissertation.

Despite the poor overall model fit for *separated* participants, the vast majority of individual items loaded significantly on their assigned latent first-order factors in the expected direction, which in turn loaded significantly and in the expected direction on the second-order factor representing the global concept of internalized distress (with a few exceptions, when the models were tested with *separated* mothers). This pattern of results suggests that perhaps the validity of the CES-D could be improved for immigrant Chinese Canadians who do not strongly endorse Western values (compared to integrated and assimilated individuals) by including culturally relevant indicators of internalized distress. The concept of *xin* is one such example. It represents a blended somatic-affective symptom in Chinese culture that approximately translates as "heart-mind" (Lee, Kleinman, et al., 2007, p. 4) in the English language. *Xin* is often combined with various other terms to describe various types of affective symptoms experienced in a bodily manner, such as *xinjing* (translated as heart dread or heart frightened) and *xinyi* (translated as heart dysphoric or heart compressed). The additional six items used to create the CDS-22 could also be used more consistently to increase the cultural relevance of the CES-D, although more psychometric research is needed to investigate the most optimal factor structure of these items.

Assessing Somatization with the CES-D: Cultural Considerations

The proportion of somatic symptoms was used as the key indicator of somatization in Research Questions 2 and 3, with the rationale that a higher proportion of somatic symptoms would mean that an individual was less likely to present with the symptoms that are most characteristic of Western models of depression. However, the proportion of somatic symptoms

on the CES-D was consistently related to measures of cultural values and demographic variables in unexpected ways. Parents and adolescents from *non-immigrant* families reported a significantly higher proportion of somatic symptoms than their immigrant counterparts, when the opposite pattern was hypothesized. Furthermore, among adolescents from immigrant families, adolescents classified as *integrated* or *assimilated* reported a significantly higher proportion of somatic symptoms compared to their *separated* counterparts. The absence of a significant interaction between Chinese and Western values in Research Question 3 suggests that the absence of expected between-group differences among immigrant Chinese Canadian families was not exclusively due to the somewhat artificial cut points created by transforming continuous measures into a categorical indicator of acculturation groups. Instead, the use of continuous measures of culture values showed that greater endorsement of Western values was associated with a higher proportion of somatic symptoms on the CES-D for adolescents, but not for parents. This relationship accounts for the finding that adolescents classified as *integrated* or *assimilated* reported higher proportions of somatic symptoms than those classified as *separated*. In contrast, no differences in the proportion of somatic symptoms were found among immigrant parents.

Although the results of the proportion of CES-D somatic symptoms were contrary to expectations, they were consistent with a previous study (Yen et al., 2000) that investigated group differences in the proportion of somatic and affective symptoms reported by Chinese, Chinese American, and Caucasian American university students. Yen and colleagues (2000) found that Chinese university students endorsed a lower proportion of somatic symptoms on the CES-D than both Chinese American and Caucasian American students; no cultural differences emerged with respect to proportion of affective symptoms. This convergence of results across three different populations (adolescents and their parents in this dissertation; university students

in Yen and colleagues' study) suggests that the unusual pattern of proportion of somatic symptoms likely does not simply reflect a non-representative non-immigrant Canadian comparison sample in this dissertation.

The unexpected results related to the proportion of somatic symptoms on the CES-D raise interesting questions about the types of somatic symptoms that are most meaningful when assessing internalized distress among immigrant Chinese Canadian adults and adolescents. Instead of conceptualizing somatization as a culture-specific phenomenon, it may be more accurate to conceptualize somatization as a cross-cultural occurrence that manifests differently in different cultures. Those who strongly endorsed values associated with Western culture reported the highest proportion of somatic symptoms, which suggests that these items on the CES-D may reflect Western forms of somatization. The CES-D has been criticized for containing a less comprehensive range of somatic symptom items compared to measures such as the Symptom Checklist-90 (Kuo, 1984). The CES-D somatic symptom items reflect a general sense of physical or mental discomfort (e.g., feeling bothered, having difficulty concentrating, restlessness) or interrupted functions of daily living such as eating or talking. In contrast, the Somatization scale on the SCL-90-R (Derogatis & Lazarus, 1994) contains items that reflect physical pain in various locations, dizziness, breathlessness, and sensations of numbness, cold or hot. It is possible that the hypothesized results would be found if more culture-specific somatic symptoms were assessed. Notably, unusual results were not found with respect to the proportion of somatic symptoms on the YSR, which contains several items that overlap with the SCL-90-R (e.g., various types of unexplained physical pain). Although acculturation profile differences did not emerge in relation to proportion of YSR somatic symptoms, the divergence in findings from the CES-D suggests that the unexpected results on the CES-D may be measure-specific.

Additionally, the significant demographic correlates of a higher proportion of somatic symptoms on the CES-D (e.g., higher SES among the high distress subsample; younger age and longer time in Canada among the random sample) were contrary to hypotheses. Individuals who are less vulnerable to stigma reported a higher proportion of CES-D somatic symptoms; therefore, these items may not represent "safe" expressions of distress for the individuals who are most vulnerable to stigma. Many of the CES-D somatic symptoms are not specific to the construct of depression. For example, one might feel bothered or have difficulty concentrating because of general life stressors, such as financial difficulty or marital problems. Stigma is not restricted to mental illness, and immigrant Chinese Canadians may be reluctant to endorse stressors that reflect lack of harmony in the family, or inability to provide for one's family financially. Individuals who are less demographically vulnerable to stigma, as well as those who are more oriented towards Western culture (in which concerns about one's family are shared to a relatively greater extent than Chinese culture), may be more comfortable expressing the somatic symptoms included in the CES-D.

Cultural Differences in the Endorsement of Positive Affect

The group differences in the proportion of positive affect fit into a broader narrative about cultural differences in the expression of positive emotions. *Non-immigrant* parents reported higher proportions of positive affect (displayed as a low proportion of low positive affect in Table 12, due to reverse scoring) compared to immigrant Chinese Canadian parents, regardless of acculturation profile. Similarly, Yen and colleagues (2000) found that Caucasian American students reported higher levels of positive affect on the CES-D, compared to their counterparts of Chinese descent. Furthermore, the expected progression of acculturation profile differences was found among adolescents in this dissertation; adolescents from *non-immigrant*

families reported the highest proportion of positive affect and *separated* adolescents reported the lowest proportion of positive affect, with *integrated* and *assimilated* adolescents falling in the middle.

Group differences in positive affect may be explained by the broader construct of cultural variations in self-construal. Alignment with an independent self-construal suggests support for both individual autonomy (which is relevant to the adolescent independent values used to assess orientation to Western culture) and emotional expression (relevant to the CES-D positive affect items). The items on the Adolescent Independence Values scale pertain to independent decision-making among adolescents and young adults, including choosing who to date or marry, moving away from home, and choosing a job or career. These items are particularly salient for adolescents, which explains why they may have differentiated between groups of immigrant adolescents more effectively than groups of immigrant parents. Making these decisions without input from parents is consistent with beliefs about individual autonomy that accompany a worldview shaped by an independent self-construal. Beliefs about expressing positive, ego-focused emotions, such as those contained on the CES-D, are also consistent with an independent self-construal (Markus & Kitayama, 1991). In Seo's (2011) study of South Korean college students, greater endorsement of an independent self-construal was related to greater acceptance of ego-focused emotions. Both Chinese and South Korean cultures share a focus on an interdependent rather than an independent self-construal. Therefore, adolescents of Chinese descent who endorse facets of independent self-construal, such as independent decision-making, may also be more comfortable endorsing positive emotions.

The results of the confirmatory factor analyses are also consistent with previous research that has demonstrated the cultural, linguistic and psychometric issues that arise when items

assessing Western conceptions of positive emotions are administered to individuals with non-Western cultural orientations. In addition to acculturation profile differences in the proportion of positive affect, this dissertation demonstrated that the positive affect items did not function in the same manner across acculturation profiles in confirmatory factor analyses of the CES-D. Among *separated* mothers, the first-order factor representing *positive affect* was unrelated to the second-order factor representing *internalized distress*, within the three-factor model (Figure 4). Among other models tested with *separated* participants (Figures 5, 8, & 9), this same relation was significant, but notably smaller in magnitude compared to models with *integrated* and *assimilated* participants. The weaker relations between positive affect and internalized distress among *separated* participants relative to *assimilated* and *integrated* participants may partially explain the poor fit of these models among *separated* participants. Furthermore, the suggested modification that linked item 4 (“I felt that I was just as good as other people”) to the factor representing *affective* symptoms within *separated* mothers’ models was in the opposite direction than expected. The more individuals felt as good as others, the higher their reports of symptoms of internalized distress, at the latent factor level. The counterintuitive direction of the relation between item 4 and the *affective* and *affective-somatic* factors within *separated* mothers’ models should not be overinterpreted, since this was a post-hoc model modification, and may only represent characteristics specific to the families in this particular study. However, it is possible that the wording of item 4, which forces the individual to make an evaluative social comparison (“I felt that I was just as good as other people”) may function as a negative cognition among individuals who place a high value on group harmony and modesty about one's achievements, rather than the glorification of the individual relative to others. Item 4 has undertones of individual comparison among group members, which reflects a Western understanding of

relationships (Kuo, 1984; Lee et al., 2008; Li & Hicks, 2009; Lin, 1989). The remaining three positive affect items on the CES-D assess relatively ego-focused emotions, which are also more congruent with Western culture.

Previous research has also found acculturation-based differences in the association between positive affect and internalized distress. In their study of Chinese American women, Li and Hicks (2009) used language preference and generational status as proxy measures of acculturation, and found that individuals who preferred to speak Chinese, or were first generation immigrants, endorsed less positive affect than their counterparts who preferred to speak English, or were second generation immigrants. The results of this dissertation are consistent with this finding, in that the link between positive affect and overall levels of internalized distress was attenuated among individuals who endorsed high levels of Chinese values and low levels of Western values. This pattern was particularly prominent among mothers, relative to models that combined family members classified as *separated*.

The inclusion of the positive affect items among Chinese populations has been debated in the literature; while some studies show good model fit of the CES-D when positive affect items are included (e.g., Wang et al., 2013), other research with Chinese individuals has shown that some positive affect items (item 4 in particular) do not significantly load onto any factor (Kuo, 1984) and exhibit low item-total correlations (Lee et al., 2008). Lin (1989) found unusually low positive affect scores among a population of Chinese adults. Including these items reduced overall scale reliability, which led to their exclusion from the CDS-22. It has been suggested that including the positive affect items contained within the CES-D artificially inflates overall scores of depressive symptoms, due to cultural values that discourage extremes in emotional expression (Lee et al., 2008; Li & Hicks, 2009; Lin, 1989) and promote modesty of expression and

behaviour (Kim et al., 1999; Lee et al., 2008). Taken together, the results of this dissertation demonstrate that within-group variation exists with respect to the endorsement of positive affect among immigrant Chinese Canadians; not surprisingly, items assessing Western expressions of positive affect appeared to be less relevant for immigrant Chinese Canadians who did not strongly endorse Western cultural values.

Developmental Differences

Some divergent patterns of results emerged between parents and adolescents. First, item 7 on the CES-D (“I felt that everything I did was an effort”) loaded significantly on its specified first-order factor for *integrated* parents, but not *integrated* adolescents. Although this may represent a chance variation in this specific sample, existing literature suggests that cultural variations in the endorsement of cognitive symptoms warrants further research. Second, post-hoc analyses showed that high-distress parents reported a higher proportion of CES-D somatic symptoms than their low-distress counterparts, while high-distress adolescents reported a lower proportion of CES-D somatic symptoms than their low-distress counterparts.

Perceptions of extra effort as a symptom of distress. Past research has revealed psychometric issues with item 7 (“I felt that everything I did was an effort”) on the CES-D in some samples of Chinese individuals. This item did not significantly load on any CES-D factor among Chinese individuals living in Hong Kong (Cheung & Bagley, 1998) or among immigrant Chinese American adults (Ying, 1988). Among individuals diagnosed with depression, Western individuals endorse poor concentration to a greater extent than Chinese individuals (Parker et al., 2001). Poor concentration is related to perceptions of excessive effort, as it captures the subjective sense that extra mental effort is required to complete activities of daily living. If one has difficulty concentrating, they may perceive greater effort when carrying out tasks. Ryder and

colleagues (2008) also found that an item assessing poor concentration loaded on the factor representing affective symptoms among Chinese individuals, and on the factor representing somatic symptoms for Western individuals. This pattern was observed on both structured interviews and self-report questionnaires, and led the authors to conclude that symptoms pertaining to thinking difficulties are conceptualized differently across these two cultures. Both of these studies assessed adults rather than adolescents; however, item 7 loaded significantly onto its specified factors for all models containing parent data, and was only problematic for *integrated* adolescents, regardless of whether it was loaded onto the *somatic* factor in the four-factor model, or the *somatic-affective* factor in the three-factor model. It is possible that perceptions of increased effort demands are most salient in middle adulthood, and less relevant during adolescence and early adulthood. While individually-focused studies of depressive symptomatology include participants as young as 18 in their samples, the adults who participated in this dissertation were all old enough to be parents of adolescents, as required by inclusion criteria. Additional research is needed to test specific, a priori hypotheses about differences in cognitive symptom responding due to developmental or cultural differences.

Proportion of somatic symptoms among high distress participants. Previous research conducted in Mainland China found that somatization was most salient when levels of depressive symptomatology were severe enough to require treatment (Yen et al., 2000). Similarly, in this dissertation, fathers and mothers classified as high-distress reported a significantly higher proportion of somatic symptoms compared to their low-distress counterparts. However, the opposite pattern was found among adolescents with respect to somatic symptoms on the CES-D; low-distress adolescents reported a higher proportion of somatic symptoms than high-distress adolescents on this measure. An examination of the mean proportion of CES-D somatic

symptoms among fathers, mothers, and adolescents shows similar proportions among high-distress individuals. It is the markedly higher proportion of somatic symptoms among low-distress adolescents compared to low-distress parents that appears to drive the developmental differences. As previously discussed, the CES-D somatic symptom items appear to reflect Western forms of somatization more so than Chinese forms of somatization, and may not necessarily represent "stigma-free" symptoms. In the random sample of participants analyzed in Research Question 3, younger participants (i.e., adolescents) endorsed a significantly higher proportion of CES-D somatic symptoms than older participants (i.e., parents). If parents fear that stigma may result from endorsing somatic symptoms of general life stress, they could be less likely to disclose somatic complaints than their children, so long as their overall level of distress was low.

Gender Differences

Two key gender differences emerged in this dissertation, independent of acculturation profile. First, the confirmatory factor models of the CES-D fit *integrated* fathers' data better than *integrated* mothers' data. Second, mothers and adolescent females reported a higher proportion of affective symptoms than fathers and adolescent males.

Parental gender differences in CES-D model fit. Acceptable model fit was achieved for both models for *integrated* fathers. In contrast, the CES-D model fit criteria fell just below cutoffs for acceptable fit for *integrated* mothers. The difference in model fit between fathers and mothers differs from past research, which has shown that both the four-factor and three-factor models of the CES-D fit similarly between husbands and wives of Chinese ethnicity (Cheung & Bagley, 1998). Analyses of exploratory factor analyses of the CDS-22 revealed that symptoms of distress appeared less differentiated for *integrated* mothers (for whom a one factor model was

suggested) than *integrated* fathers (for whom a two factor model was suggested). Somatic, affective, interpersonal, and culture-specific symptoms clustered together in a single factor to explain the variance among *integrated* mothers, whereas somatic, interpersonal, and culture-specific CDS-22 symptoms (i.e., those most consistent with Chinese values) explained the largest proportion of variance among *integrated* fathers. The second factor in fathers' models explained a much smaller proportion of the variance and was comprised primarily of affective items (with some somatic items and cross-loadings of CDS-22 symptoms). The higher level of differentiation between symptoms for fathers compared to mothers may explain the differences in model fit of the CES-D between *integrated* fathers and mothers. Although item content differs slightly between the CDS-22 and the CES-D (the CDS-22 excludes positive affect items, the CES-D excludes culturally-based symptoms from the CDS-22), there is sufficient overlap in the remaining somatic, affective, and interpersonal items to conclude that differences in item clustering may provide a statistical explanation for the differences in model fit.

Several factors may account for differing conceptualizations of internalized distress symptoms between fathers and mothers. Mothers may endorse a more holistic view of distress symptoms compared to fathers, which could reflect both pre-immigration and post-immigration factors. For example, Rochelle and Yim (2014) found that Chinese females in Hong Kong (where both traditional Chinese and Western medical services are available) were more likely to use traditional Chinese medicine than their male counterparts. This may reflect a more holistic view of somatic and affective symptoms of distress, which better fits with Chinese models of care compared to Western models. Furthermore, traditional social roles (in both Chinese and Western cultures) tend to place fathers in the role of economic provider, while mothers maintain leadership in everyday childrearing decisions (Chuang & Su, 2008, 2009). This general pattern

was reflected in the labour force patterns among participants in this dissertation. A substantially higher number of fathers were employed in full-time work compared to mothers, and substantially higher number of mothers voluntarily did not participate in the labour force. If fathers are more exposed to Western beliefs about health and wellness via their work environment, this may lead to a more dualistic view of somatic and affective symptoms. The finding that mothers report a higher proportion of affective symptoms than fathers, in combination with the low proportion of variance explained by affective symptoms for fathers, also suggests that fathers may be less likely to endorse affective symptoms of distress. This pattern of gender differences was also found among adolescents, indicating that gender differences are also rooted in factors beyond exposure to employment status and exposure to Western views of health.

Proportion of affective symptoms. Immigrant Chinese Canadian females reported a higher proportion of affective symptoms than their male counterparts, in adolescence as well as in adulthood. In a study of predominantly first generation Chinese Americans, Mak and Zane (2004) also found that females reported a higher proportion of affective symptoms. However, many other studies have found no gender differences in depressive symptoms (Juang & Cookston, 2009; Zhang & Norvilitis, 2002) or rates of clinical depression (Takeuchi et al., 1998) among Chinese Americans. The proportional nature of the outcome measure used in this study is somewhat unique relative to most studies of gender differences, which focus on either overall level of depressive symptoms (i.e., total CES-D scores) or diagnostic status (i.e., meeting the DSM criteria for Major Depressive Disorder on a semi-structured interview). Yen and colleagues (2000) also assessed gender differences with respect to proportion of affective symptoms on the CES-D, and found no main effects of gender among Chinese, Chinese

American, or Caucasian American participants. Research with Western populations generally shows that females report higher rates of clinical depression than males, a pattern that emerges in early adolescence (Hankin et al., 1998). This suggests the potential for a gender by culture interaction; one might expect to see a higher proportion of affective symptoms (i.e., the core symptoms of the Western construct of depression) among immigrant Chinese Canadians classified as *integrated* or *assimilated*, but not among those classified as *separated*. However, no such interaction was evident in this dissertation with respect to affective symptoms on the CES-D or the YSR, nor any other symptom types.

Explanations of gender differences in depressive symptoms within Western culture include the interaction of numerous factors, such as genetic vulnerability, pubertal timing, stressful or traumatic life events, body image concerns, temperament, and pessimistic or ruminative cognitive style (Hyde, Mezulis & Abramson, 2008). Given the Western assumption that affective symptoms are a necessary condition for the diagnosis of depression, this body of research typically does not assess affective symptoms separately from somatic or interpersonal features. However, there is enough overlap between proportion of affective symptoms assessed in this dissertation and the broader body of research on gender differences in depressive symptoms for the explanations to be relevant. For example, many studies of gender differences use semi-structured interviews to diagnose clinical depression. These interviews typically screen for depression first by asking about affective symptoms; only individuals who endorse these symptoms are queried further about the somatic and cognitive symptoms of depression. In this respect, there is conceptual overlap in the proportional assessment of affective symptoms and the general assessment of depressive symptoms in research with Western populations.

With inconsistent evidence of gender differences in depressive symptoms among Chinese populations, little research has focused on culture-specific explanations when gender differences do occur. However, many of the risk factors for depression identified with Western populations are relevant for immigrant Chinese Canadians too. The process of immigration to Canada and associated stressors over time may function as a risk factor for onset of depression, albeit non-specific to females. Furthermore, evidence for the cognitive model of depressive symptoms (i.e., negative life events interact with dysfunctional beliefs to predict negative automatic thoughts and subsequent symptoms of depression) has been supported among non-Western populations (i.e., Chinese adolescents, Cue, Shi, Zhang & Yu, 2012; Korean Australian immigrants; Oei & Kwon, 2007). Females from immigrant Chinese Canadian families are susceptible to many of the same gender-specific sociocultural risks for depressed mood as their non-immigrant counterparts. For example, immigrant Asian American college students report body image concerns that are similar to their Caucasian American counterparts (Sanders & Heiss, 1998). Chinese women are susceptible to many of the same restrictive traditional female gender roles (e.g., physical attractiveness determines one's worth, prioritizing others' needs above one's own, incompatibility of career goals and mothering) as Western women, and the internalization of such beliefs is linked to greater depressive symptomatology among women in Hong Kong (Tang & Tang, 2001). Given the commonalities of societal expectations placed on women across cultures, it is not surprising that females from immigrant Chinese Canadian families report higher proportions of affective symptoms than their male counterparts.

Interpersonal Symptoms: A Cross-Cultural Indicator of Distress?

Contrary to hypotheses, no acculturation profile differences emerged with respect to interpersonal symptoms, on either the CES-D or YSR. With respect to interpersonal symptoms,

the absence of results on the CES-D is not entirely unexpected, given that only two items were classified as interpersonal. However, significant group differences were also not found with respect to the proportion of interpersonal symptoms reported by adolescents on the YSR. The classification system used to identify interpersonal symptoms on the YSR was unique to this study; it is possible that group differences might be found using a measure assessing a greater number of interpersonal symptoms of depression, with additional validation of the measure used.

However, it is also plausible that cross-cultural differences do not exist in the reporting of interpersonal symptoms (e.g., perceptions that others are unfriendly, perceptions that one is disliked, withdrawal from interacting with others). Close relationships are highly valued in both Chinese and Western cultures. Therefore, interpersonal symptoms of internalized distress are likely highly salient in both cultures, although for different reasons. Within Chinese culture, social withdrawal and negative interpretations of interactions with others could interfere with family cohesion and disrupt one's sense of fulfilling their social role. Within Western culture, these same symptoms could interfere with one's sense of self-worth. If one responds to loneliness or perceptions of being disliked by withdrawing further, a reinforcing cycle emerges that enhances core negative beliefs that they are unlikable or worthless, or not meeting their family's expectations.

Theoretical Issues, Limitations and Directions for Future Research

There are limitations in this dissertation with respect to the definition and measurement of culture, cultural values, and culturally relevant descriptions of distress. At the broadest level, the conceptual definition of culture has been debated in the literature, particularly in the context of acculturation theory and Berry's (1997) general framework of acculturation styles. Many researchers take issue with the implication that "cultures" exist with discrete boundaries, in a

similar manner as nations or other geopolitical entities (Bhatia & Ram, 2001; Waldram, 2009). Cultural boundaries are not clearly delineated in the manner of geographical boundaries; within geographical regions as large and diverse as Mainland China and Canada, regional variation exists with respect to culture. Furthermore, immigrant Chinese Canadians are likely influenced by cultures other than the dominant Western culture in Canada, especially families living in large, diverse cities, and adolescents who attend school with peers from a range of cultural backgrounds. Although Berry's framework allows for more complexity than one-dimensional models of acculturation, it does not assess the influence of other ethnocultural groups or cultural communities defined by religion, political beliefs, and/or sexual and gender orientation. Berry's framework has the advantage of providing general guidelines to assist with group-based analyses; however, cultural complexity is lost through categorization.

The loss of complexity is particularly salient in the case of immigrants classified as "integrated," who represented the majority of participants in this dissertation. There are many different ways that individuals classified as integrated could blend Chinese and Western values. Berry's model assesses the *alternation* model of integration, which refers to the ability to alternate between cultural orientations depending on one's immediate context (LaFramboise et al., 1993). However, cultures may be synthesized or fused to produce a unique hybrid culture specific to a given location (Abraído-Lanza et al., 2006; LaFramboise et al., 1993). It is possible that additional within-group differences in symptom reporting would emerge among immigrant Chinese Canadians if qualitative descriptions of cultural values were obtained, alongside participants' explanations of the relation between self-identified cultural values and how they experience internalized distress. Such research could also qualitatively examine the range of

cultures and communities who influence the lives of immigrant Canadians, and how these influences impact conceptualizations of mental health.

Another limitation of this dissertation is the relatively narrow range of values used to assess orientation to Chinese and Western values. Although the Asian Values Scale used in this study is a well-validated measure designed to assess values relevant to personal qualities and interpersonal relationships in a variety of Asian cultures, it does not assess all values that would be relevant to these research questions. For example, it does not provide a sense of participants' health-related beliefs, which is an important aspect of values that might influence symptom reporting. It is possible that group differences with respect to acculturation profiles may emerge if additional aspects of Chinese values were incorporated. For example, a measure of cultural beliefs about mental health (e.g., the etiology of internalized distress, beliefs about mind-body holism) that is more directly related to the outcomes of interest might more effectively differentiate modes of symptom expression. Furthermore, there are a limited number of measures available to assess Western cultural values, especially relative to the range of measures developed to assess cultural values in non-Western cultures. The scale used in this dissertation measures beliefs about adolescent independence, which is undoubtedly an important aspect of Western value systems, and quite relevant to the families who participated in this study. However, the construct of adolescent independence only reflects a narrow aspect of Western values, especially in contrast to the broader measure of Asian values used in this study.

Cultural psychology often focuses on how individuals from non-Western cultures differ from those from Western culture, without clearly defining Western cultural behaviours, identity, and values in their own right. Widely used measures of behavioural acculturation (i.e., the Acculturation Rating Scale for Mexican Americans – II, Cuellar et al., 1995) and identity-based

acculturation (i.e. the Multigroup Ethnic Identity Measure; Phinney, 1990) are flexible enough to be translated into measures of Western culture, since cultural labels within the items can be easily modified. However, measures of cultural values must be newly created for each culture of interest. This process requires careful thought, consultation, and research about key values that define a culture, and differentiate it from other cultures. The creation of a Western values scale similar in format to the Asian Values would help move away from simply using Western culture as the baseline culture to which others are compared, and clearly identifying it as a culture in its own right. In addition, it is possible that different results may be found if measures of behavioural or identity-based domains of acculturation were used to classify participants. Although values were proposed to be most relevant in the context of mental health beliefs, acculturation in the domains of behaviour (which represents the extent to which individuals engage in behaviours associated with specific cultures) and identity (which represents the sense of belonging individuals feel within a given culture) may also play an important role in mental health beliefs. A developmental process could be expected to unfold; behavioural engagement likely represents a necessary first step in order for exposure to cultural values to take place, which in turn is a precursor to identifying with a given culture. Symptoms of mental health may be expressed differently at each stage of the process.

Future research should also focus on the experiences of individuals who would be classified as marginalized (i.e., low endorsement of both Chinese and Western values) according to Berry's (1997, 2003) acculturation framework. Research shows that those who do not identify strongly with a particular culture are most at risk of poor psychological and social outcomes (Berry, Phinney, Sam, & Vedder, 2006). Marginalized individuals tend to represent the least frequent acculturation profile, but also may be less likely to participate in research if they are

experiencing more psychological or social stressors. From a strengths-based perspective, it is also possible that individuals classified as marginalized may strongly identify with a community or cultural group other than Chinese or Western cultures. More research focused on individuals from immigrant families who do not strongly endorse either heritage or Western cultural values would provide more information about this group.

Finally, it is important to acknowledge that the measures used in this study are etic measures of internalized distress. This research provides focused on how acculturation profile influences the manner in which immigrant Chinese Canadians experience and describe their symptoms of distress in the context of a Western healthcare system. However, it is also critical to understand the culture-specific manifestations that may not be captured by Western interviewers or Western questionnaires. Extant research suggests that there is wealth of symptom descriptions and experiences of distress that exist outside of the Western cultural and linguistic frame (i.e., Lee, Kleinman et al., 2007). Assessment of these symptoms should be incorporated into research with non-Western populations.

Future research should also further investigate the factor structure of the CDS-22 (Lin, 1989), which contains several emic items relevant to individuals raised in China during the Cultural Revolution. Although the CDS-22 was first published 25 years ago, very little research has attempted to replicate its the factor structure. To my knowledge, this is the first investigation of its factor structure among an immigrant population. Both fathers' and mothers' factor solutions differed from Lin's (1989) original study, who found evidence of three factors in his sample of Chinese adults: a somatic factor that also incorporated elements of psychomotor slowing, an affective factor, and an interpersonal factor that incorporated five of the six culture-specific CDS-22 items, all of which either referenced interpersonal trust or social withdrawal. A

variety of reasons exist for the discrepancy between the factor structure in this dissertation and Lin's original study, including immigrant status and exposure to Western values (individuals in Lin's study lived in China while this dissertation focused on immigrant Chinese Canadians classified as integrated), generational differences (while both groups lived through the Cultural Revolution, the participants in Lin's study would have been older compared to those who participated in this dissertation), and gender (independent samples of males and females were analyzed together in Lin's study). Further research is needed to determine whether the factor structure of the CDS-22 can be replicated. Given the specificity of the additional CDS-22 items to experiences during the Cultural Revolution, it is plausible that these items may become less relevant as younger cohorts reach adulthood.

Unexpectedly, the fit of the YSR was poorer than expected among the immigrant Chinese Canadian adolescents who endorsed high levels of Canadian/adolescent independence values (i.e., *integrated* and *assimilated*). Only one fit index (the RMSEA) met criteria for acceptable fit when testing the YSR model with these groups of adolescents combined. However, the poor fit of other model fit indices may be accounted for by the 3-point response scale of the YSR. One previous study (Ivanova et al., 2007) investigated the factor structure of the entire YSR scale among Chinese adolescents living in Hong Kong, and obtained comparable fit statistics (i.e., CFI = .79, RMSEA = .04) to the final modified model of the YSR Internalizing scale in this dissertation (see Table 9). Ivanova and colleagues converted the three-point response scale of the YSR into a dichotomous, yes-or-no, response format, and noted that the RMSEA was the most appropriate fit index for binary responses. Although the three-point YSR response scale was retained in this dissertation, it is possible that the relatively limited number of response options on the YSR impacted the CFI values obtained. Therefore, the results of this dissertation

should not be interpreted as evidence that the YSR should not be used with adolescents from immigrant Chinese Canadian families.

Strengths and Implications for Clinical Practice with Immigrant Chinese Canadian Families

This dissertation investigated the relations between culture and experiences of distress, and questioned assumptions about the nature of somatization within Chinese populations. This was the first study to investigate the factor structure of Western measures of internalized distress among groups distinguished by endorsement of cultural values. Past research on this topic has instead defined groups by ethnocultural background (i.e., grouping all immigrant Chinese Canadians together, regardless of acculturation profile). The use of cultural values to define groups proved useful; differences in the factor structure of the CES-D emerged based on acculturation profile, as did differences in the reporting of somatic symptoms and positive affect among adolescents. Some patterns seen in Western samples were replicated in this study (i.e., gender differences in the reporting of affective symptoms). The use of family data meant that these processes could be explored across two developmental periods. Additionally, the use of a community sample meant that high-distress individuals who may not seek out treatment were included; these same individuals would be excluded from studies that recruit from outpatient clinics.

Past research that has demonstrated greater affective symptom reporting among Western samples compared to Chinese samples has focused on samples of individuals seeking help for psychological distress, rather than community samples (Ryder et al., 2008). The results of this dissertation suggest that high-distress immigrant Chinese Canadians express both somatic and affective symptoms to a greater extent than their low-distress counterparts; however, group

differences in affective symptom reporting may not emerge in nonclinical samples. The finding that high-distress individuals report a higher percentage of affective symptoms means that their symptoms are less likely to be missed during the screening process. It should be noted that the majority of participants in the high-distress subgroup were classified as integrated or assimilated, or came from non-immigrant Canadian families, meaning that they endorsed high levels of Western cultural values. High-distress individuals who endorse few Western cultural values may be less likely to report a high proportion of affective symptoms, meaning they would be at risk of being screened out during the assessment process. Yen and colleagues (2000) found high-distress Chinese college students reported a significantly lower proportion of affective symptoms and a significantly higher proportion of somatic symptoms than their low-distress counterparts. The participants in Yen and colleagues' study may be most comparable to the *separated* participants in this dissertation, given low endorsement of Western values. Among *separated* individuals, the risk of somatization, and the associated risk of being missed during the screening process, is highest among individuals experiencing clinically significant internalized distress, a time when the timely provision of culturally-informed health services is crucial.

Although distressed participants endorsed a high proportion of affective symptoms in this dissertation, it is unknown whether they would seek out psychological treatment for their distress, or if they would report their symptoms in a similar manner in a treatment setting as they did in a research context. Assessment methodology has been identified as an important factor influencing symptom reporting. Higher rates of Major Depressive Disorder among Chinese individuals have been obtained from studies that utilize telephone interviews rather than face-to-face encounters (Lee, Tsang, & Kwok, 2007). Chinese individuals also tend to endorse more somatic symptoms than Western individuals, in response to structured clinical interviews and

when asked to identify presenting problems in an open-ended manner (Ryder et al., 2008). Based on this research, the individually-completed self-report questionnaires used in this study created optimal conditions for the disclosure of symptoms; it is unknown whether the higher proportion of affective symptoms among more distressed individuals would translate into help-seeking behaviour.

The existing literature suggests a number of guidelines for assessing individuals from immigrant Chinese Canadian families who present to the healthcare system in distress. The combination of standardized self-report questionnaires and clinical interview is considered good clinical practice regardless of the client's cultural background. However, the use of questionnaires may be particularly important for immigrant Chinese Canadians, since research has shown that it may reduce the impact of stigma (Lee, Kleinman et al., 2007). Virtually all assessment tools are based on a Western frame of reference, however; it is also necessary to ask open-ended questions to leave space for individuals to express distress in terms not captured by Western questionnaires. Building on this literature, the results of this dissertation suggest that an informal assessment of acculturation over the course of the clinical interview may help guide expectations as to how symptoms may be presented. Observations of a client's statements about what they value or the situations that create distress may provide some clues as to their value system; the use of open-ended interview questions may also elicit relevant answers. The results of the factor analyses suggest that Western measures of distress are less appropriate for individuals who are oriented primarily towards Chinese culture (i.e., *separated*), compared to individuals who endorse Western values (i.e., *integrated* or *assimilated*). *Separated* individuals may report low levels of symptomatology if Western measures of distress are administered; therefore, an individual's acculturation profile should be broadly assessed prior to administering,

given the issues with the CES-D within separated groups. This could be achieved by eliciting information about the family and beliefs they value, as well as proxy measures (e.g., English ability, length of time in Canada as very general measures). There is an excellent range of literature about culture specific manifestations of distress (Lee, Kleinman et al. 2007 provide a particularly comprehensive overview) and such sources should be consulted if working with clients who are not oriented towards Western culture. Even those with high involvement in Western culture may retain some aspects of Chinese symptom presentation, so it is important to listen for culturally relevant symptoms of distress or ask culture-specific questions with working with individuals from immigrant families. The finding that immigrant Chinese Canadians differed from their counterparts from non-immigrant families in terms of their endorsement of positive affect highlights the fact that aspects of presentation other than distress symptoms may differ. It would be important not to interpret less pronounced positive affect as an indicator of depression.

It is also critical to consider how these results can be used to guide policy and practice so that the needs of diverse communities within Canada are met within our healthcare system. Careful, culturally sensitive questioning of symptoms of distress is only useful if individuals are seeking out services, and immigrant communities tend to access healthcare at a lower rate than their non-immigrant counterparts. Medical doctors are often the first point of contact for individuals experiencing internalized distress, regardless of cultural background. For immigrant families, walk-in clinics may be a particularly common point of contact, as well as hospital emergency rooms in the case of serious mental illness. If distressed individuals present with primarily somatic symptoms, they are less likely to be routed to mental health services from their primary care providers. The provision of training about cultural variations in the presentation of

depression, anxiety, and other common psychological disorders should be provided to doctors, nurses, and other front-line staff working in primary care settings. For even more integrative services, primary care settings would benefit from an inter-professional teams that include clinical psychologists with training in the provision of culturally-informed mental health services. Knowledge about how stigma operates within specific cultural communities is also important. A more extended and specific discussion about limits of confidentiality within the relationship between health care provider and client may be necessary. Challenges may arise if translation services are required; within smaller cultural communities, the chances that a client has a dual relationship with the translator is higher, which may also function as a barrier to services.

The results of this dissertation have implications for Canadian immigration and labour policy. In recent years, concerns have been raised about shifts in Canada's immigration policy, away from a system that emphasizes transparency, pathways to citizenship, and family reunification, towards a system that focuses on individual self-sufficiency and matching immigrant selection to employment needs, with added barriers to the sponsorship of family members (Bauder & Beiser, 2014). Such changes reflect a broader political shift in Canadian society towards neoliberal values such as self-sufficiency and the prioritizing of Western values, which translates into policy changes such as reduced funding for health and social service programs that provide support during the immigration process (Root, Gates-Gase, Shields, & Bauder, 2014). In terms of Berry's (1997, 2003) acculturation framework, this approach to immigration emphasizes the adoption of Western values at the individual level, with little effort to adapt Canadian systems and policy to the cultural needs and values of immigrants (Root et al., 2014). Based on current policy, the "ideal immigrant" (Root et al., 2014, p. 5) fills quantifiable

Canadian employment needs, can fully support all accompanying family members, and has limited reliance on social programs. In this dissertation, attributes of this "ideal immigrant" (e.g., Western cultural values, higher SES) were related to a higher proportion of somatic symptoms. These unexpected relations could reflect internalized pressure to embody qualities that will increase the likelihood of long-term residency and eventual citizenship; if individuals are told, implicitly or explicitly via public policies, that reliance on social programs is discouraged, they may engage in self-stigma and be hesitant to seek out services for internalized distress. Further research is needed to determine if these relations are replicated in other samples, particularly as changes in immigration policy take hold.

Although this dissertation focused on cultural differences, it is important to also focus on the similarities found among immigrant Chinese Canadians of various cultural orientations, as well as between immigrant Chinese Canadians and their non-immigrant counterparts. For example, similar proportions of affective and interpersonal symptoms were reported, and the pattern of gender differences in depression seen in Western populations was also found with respect to affective symptom reporting. Many elements of distress are common across cultures; with knowledge of how and when variations are likely to occur, and how such variations impact how distress is experienced and described, one can work effectively with a diverse range of clients. Ultimately, cultural factors/markers are only a few of the many dimensions of diversity (i.e., age, gender, sexual orientation, gender identity, SES, disability) that health care providers must understand to provide the most appropriate services to their clients. An awareness of how these differences alone and in intersection can affect one's worldview is an important way to avoid making assumptions or projecting one's own worldview onto one's clients, and a good first step towards the development of culturally-competent clinical practice.

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Table 1

Summary of participant samples and measures of internalized distress administered to each sample.

	Sample Size	CES-D	CDS-22	YSR
Adults				
Sample 1: Immigrant Chinese Canadians	$n = 165$ (fathers)	✓	✓	
	$n = 179$ (mothers)			
Sample 2: Immigrant Chinese Canadians	$n = 88$ (fathers)	✓		
	$n = 94$ (mothers)			
Sample 3: Non-Immigrant Canadians	$n = 37$ (fathers)	✓		
	$n = 53$ (mothers)			
Adolescents				
Sample 1: Immigrant Chinese Canadians	$n = 181$	✓		✓
Sample 2: Immigrant Chinese Canadians	$n = 95$ (Time 1)	✓		
	$n = 51$ (Time 2)			✓
Sample 3: Non-Immigrant Canadians	$n = 54$	✓		

Table 2

Mean distance scores, standard deviations, and ranges of acculturation distance scores.

	Integration	Separation	Assimilation	Marginalization
Fathers	4.12 (.1.03)	5.05 (.98)	6.12 (.95)	6.77 (1.02)
	1.36 – 7.69	2.09 – 7.68	3.25 – 9.26	3.27 – 9.69
Mothers	4.26 (.96)	4.78 (1.04)	5.77 (1.02)	6.19 (.94)
	1.47 – 7.19	1.75 – 8.54	2.49 – 8.92	4.03 – 9.17
Adolescents	3.16 (1.00)	5.18 (.96)	4.81 (.99)	6.31 (1.00)
	.42 – 5.84	1.57 – 7.26	2.52 – 7.79	3.53 – 8.78

Note. Smaller values represent a closer match to the acculturation profile.

Table 3

Categorization of acculturation profiles by three-group method and by proximity procedure.

Three-group method	Proximity procedure			
	INT (181)	SEP (45)	ASM (16)	MAR (5)
Fathers				
Unclassified (148)	104	25	15	4
INT (77)	77	0	0	0
SEP (20)	0	20	0	0
ASM (1)	0	0	1	0
MAR (1)	0	0	0	1
Mothers				
	INT (163)	SEP (65)	ASM (29)	MAR (13)
Unclassified (170)	98	39	20	13
INT (65)	65	0	0	0
SEP (26)	0	26	0	0
ASM (9)	0	0	9	0
Adolescents				
	INT (208)	SEP (24)	ASM (34)	MAR (5)
Unclassified (117)	74	16	22	5
INT (134)	134	0	0	0
SEP (8)	0	8	0	0
ASM (12)	0	0	12	0

Note. INT = integrated acculturation profile; SEP = separated acculturation profile; ASM = assimilated acculturation profile; MAR = marginalized acculturation profile. Marginalized groups did not emerge using the three-group method for mothers and adolescents.

Table 4

Validation of acculturation profiles.

	<u>Fathers</u>				<u>Mothers</u>				<u>Adolescents</u>			
	SEP <i>n</i> = 45	INT <i>n</i> = 181	ASM <i>n</i> = 16	<i>F</i>	SEP <i>n</i> = 65	INT <i>n</i> = 163	ASM <i>n</i> = 29	<i>F</i>	SEP <i>n</i> = 24	INT <i>n</i> = 208	ASM <i>n</i> = 33	<i>F</i>
Respect family	3.79 _a	3.53 _b	3.22 _b	7.48**	3.89 _a	3.48 _b	3.16 _c	24.62***	4.13 _a	3.76 _b	3.45 _c	8.34***
Future support	3.03 _a	2.77 _{ab}	2.42 _b	4.75*	3.14 _a	2.71 _b	2.41 _b	15.52***	4.15 _a	3.34 _b	3.08 _b	16.11***
Follow Chinese values (self)	3.45 _a	3.19 _a	2.94 _a	1.56	3.31 _a	2.99 _a	2.93 _a	2.08	3.64 _a	3.10 _{ab}	2.74 _b	3.86*
Follow Chinese values	3.06 _a	3.13 _a	2.69 _a	1.25	3.33 _a	2.99 _a	2.78 _a	3.09*	–	–	–	–

(child)												
Adopt	3.33 _a	3.47 _a	3.00 _a	2.14	3.23 _a	3.29 _a	3.25 _a	.09	3.36 _a	3.24 _a	3.16 _a	.23
Canadian												
values (self)												
Adopt	3.67 _a	3.75 _a	3.44 _a	.99	3.53 _a	3.62 _a	3.50 _a	.35	–	–	–	–
Canadian												
values												
(child)												
CES-D	5.40 _a	7.36 _a	5.29 _a	1.13	10.78 _a	9.74 _a	7.25 _a	2.72 [†]	12.80 _a	12.99 _a	15.69 _a	1.27
YSR	–	–	–	–	–	–	–	–	10.26 _a	12.63 _a	12.08 _a	.55

Note. Within rows, means with same subscript do not significantly differ. SEP = separated, INT = integrated, ASM = assimilated.

Sample sizes refer to the sample used in analyses of family obligation values; reduced sample sizes used in the analyses of acculturation goals and the YSR are provided in the text.

* $p < .05$, ** $p < .01$, *** $p < .001$, † denotes trend

Table 5

Goodness-of-fit indices and model comparisons among mothers classified as separated.

	Model	X^2	df	ΔX^2	CFI	RMSEA [90% CI]	BIC
3-factor	Unmodified	312.94***	168	–	.74	.12 [.10, .14]	488.26
	Item 4 → Affective-Somatic	301.92***	167	11.02***	.75	.11 [.09, .13]	481.42
	Item 12 → Affective-Somatic	291.01***	166	10.91***	.77	.11 [.09, .13]	474.68
4-factor	Unmodified	313.88***	167	–	.73	.12 [.10, .14]	493.37
	Item 4 → Affective	302.48***	166	11.40***	.75	.11 [.09, .13]	486.16

Note. → denotes a cross-loading on one additional factor. Modifications are cumulative (i.e., each previous modification is included), and significant ΔX^2 values suggested improved model fit relative to the preceding model. Conversely, significant X^2 values indicate poor fit between the data and the model.

*** $p < .001$.

Table 6

Goodness-of-fit indices and model comparisons among family members classified as assimilated or separated.

	Model	χ^2	<i>df</i>	$\Delta\chi^2$	CFI	RMSEA [90% CI]	BIC
<i>Assimilated (n = 79)</i>							
3-factor	Unmodified	275.20***	168	–	.87	.09 [.07, .11]	458.71
	Correlating error terms (items 5 & 7)	258.33***	167	16.87***	.89	.08 [.06, .10]	446.22
4-factor	Unmodified	260.75***	167	–	.89	.08 [.06, .10]	448.64
	Correlating error terms (items 5 & 7)	247.46***	166	13.29***	.90	.08 [.06, .10]	439.72
<i>Separated (n = 134)</i>							
3-factor	Unmodified	360.39***	168	–	.80	.09 [.08, .11]	566.10
4-factor	Unmodified	367.22***	168	–	.79	.09 [.08, .11]	572.93

Note. Significant $\Delta\chi^2$ values suggested improved model fit relative to the preceding model. Conversely, significant χ^2 values indicate poor fit between the data and the model.

*** $p < .001$.

Table 7

Goodness-of-fit indices and model comparisons among family members classified as integrated.

	Model	χ^2	<i>df</i>	CFI	RMSEA (90% CI)	BIC
Fathers						
3-factor	Unmodified	288.88***	168	.92	.06[.05, .08]	507.22
4-factor	Unmodified	280.95***	166	.92	.06[.05, .07]	509.68
Mothers						
3-factor	Unmodified	322.81***	168	.87	.08[.06, .09]	536.75
4-factor	Unmodified	312.66***	166	.88	.07[.06, .09]	536.79
Adolescents						
3-factor	Unmodified	372.53***	168	.87	.09[.08, .10]	564.85
	Item 7 deleted	306.99***	150	.90	.07[.06-.08]	520.30
4-factor	Unmodified	368.38***	167	.87	.08[.07, .09]	597.69
	Item 7 deleted	302.98***	149	.90	.07[.06, .08]	521.62

Note. $\Delta\chi^2$ values could not be calculated for integrated adolescents' models, since the deletion of item 7 resulted in non-nested models. Significant χ^2 values indicate poor fit between the data and the model.

*** $p < .001$.

Table 8

Factor loadings of fathers' and mothers' CDS-22 items.

	Fathers		Mothers
	1	2	1
1 (bothered – SOM)	.55	.10	.47
2 (eating – SOM)	.47	.02	.53
3 (blues – AFF)	.65	.23	.67
5 (concentrate – SOM)	.87	-.21	.56
6 (depressed – AFF)	.72	.15	.77
7 (effort – SOM)	.75	-.12	.54
9 (failure – AFF)	.29	.51	.66
10 (fearful – AFF)	.08	.58	.68
11 (restless – SOM)	.11	.47	.51
13 (talked less – SOM)	.12	.48	.56
14 (lonely – AFF)	.15	.61	.81
15 (unfriendly – INT)	.50	.17	.42
17 (crying – AFF)	-.20	.73	.58
18 (sad – AFF)	.09	.71	.59
19 (disliked – INT)	.73	.05	.54
20 (unmotivated – SOM)	.39	.23	.67
21 (no opportunity to talk)	.68	.14	.65

	Fathers		Mothers
	1	2	1
22 (suffocated)	.15	.67	.62
23 (suspicious)	.49	.31	.58
24 (others don't trust me)	.70	.01	.58
25 (couldn't trust others)	.50	.38	.47
26 (remembered unpleasant things)	.41	.40	.56
Eigenvalue	8.49	7.29	7.89
Variance Accounted for	43.23%	5.28%	35.84%
by Factor			

Note: SOM denotes a somatic item; AFF denotes an affective item; INT denotes an interpersonal item. Items 21 through 26 are the culture-specific items added to the original CES-D to create the CDS-22. Items 4, 8, 12, 16 (the positive affect items from the original CES-D) were removed to create the CDS-22.

Table 9

Goodness-of-fit indices and model comparisons among adolescents classified as integrated or assimilated on the YSR.

Model	χ^2	<i>df</i>	$\Delta\chi^2$	CFI	RMSEA (90% CI)
Unmodified	860.63***	462	–	.76	.06[.05, .07]
Correlating error terms:					
Items 6 & 28	840.40***	461	20.23***	.77	.06[.05, .07]
Items 15 & 29	814.98***	460	25.42***	.79	.06[.05-.07]

Modifications are cumulative (i.e., each previous modification is included in subsequent rows).

Significant $\Delta\chi^2$ values suggested improved model fit relative to the preceding model. Significant χ^2 values indicate poor fit between the data and the model.

*** $p < .001$

Table 10

Correlations among CES-D proportional scores among parents.

	Somatic Symptoms	Affective Symptoms	Interpersonal Symptoms	Failure to Endorse Positive Affect
Somatic Symptoms	–	.02	-.02	-.79***
Affective Symptoms	.05	–	.23**	-.58***
Interpersonal Symptoms	.08	.24***	–	-.31***
Failure to Endorse Positive Affect	-.82***	-.56***	-.38***	–

Note. Correlations among fathers' proportional scores are shown below the diagonal; correlations among mothers' proportional scores are shown above the diagonal.

** $p < .01$, *** $p < .001$

Table 11

Correlations between proportional scores among adolescents.

	Somatic Symptoms	Affective Symptoms	Interpersonal Symptoms
Somatic Symptoms	–	-.53**	-.42**
Affective Symptoms	-.37**	–	-.55**
Interpersonal Symptoms	-.28**	.28**	–
Failure to Endorse Positive Affect	-.69**	-.37**	-.18**

Note. Correlations among CES-D proportional scores are shown below the diagonal; correlations among YSR proportional scores are shown above the diagonal.

** All correlations are significant at the $p < .01$ level.

Table 12

Main effects of acculturation profile and gender on CES-D and YSR proportion scores.

	Somatic				Affective				Interpersonal				Low Positive Affect			
	S	I	A	N	S	I	A	N	S	I	A	N	S	I	A	N
<i>CES-D</i>																
Parents	.34 _a	.30 _a	.24 _a	.47 _b	.16 _c	.15 _c	.14 _c	.19 _c	.02 _e	.03 _e	.02 _e	.03 _e	.48 _g	.52 _g	.60 _g	.31 _h
Fathers	.36 _a	.31 _a	.23 _a	.45 _b	.14 _c	.12 _c	.11 _c	.20 _c	.03 _e	.03 _e	.03 _e	.03 _e	.47 _g	.54 _g	.63 _g	.32 _h
Mothers	.32 _a	.30 _a	.25 _a	.50 _b	.17 _c	.17 _c	.17 _c	.18 _c	.01 _e	.02 _e	.01 _e	.03 _e	.49 _g	.50 _g	.56 _g	.30 _h
Adolescents	.33 _a	.47 _b	.47 _{ab}	.52 _b	.20 _c	.18 _c	.17 _c	.17 _c	.04 _e	.04 _e	.04 _e	.04 _e	.45 _g	.31 _{gh}	.31 _{gh}	.26 _h
Males	.34 _a	.49 _b	.48 _{ab}	.49 _b	.22 _c	.15 _c	.15 _c	.17 _c	.04 _e	.04 _e	.04 _e	.05 _e	.42 _g	.32 _{gh}	.32 _{gh}	.30 _h
Females	.32 _a	.45 _b	.45 _{ab}	.57 _b	.18 _d	.21 _d	.19 _d	.17 _d	.05 _e	.04 _e	.04 _e	.04 _e	.47 _g	.31 _{gh}	.31 _{gh}	.22 _h
<i>YSR</i>																
Adolescents	.20 _a	.25 _a	.25 _a	–	.46 _c	.41 _c	.40 _c	–	.34 _e	.33 _e	.35 _e	–	–	–	–	–
Males	.16 _a	.23 _a	.24 _a	–	.44 _c	.41 _c	.43 _c	–	.40 _e	.35 _e	.32 _e	–	–	–	–	–
Females	.27 _a	.27 _a	.25 _a	–	.50 _c	.41 _c	.37 _c	–	.23 _e	.32 _e	.37 _e	–	–	–	–	–

Note. S = separated ($n = 45$ fathers, $n = 65$ mothers, $n = 24$ adolescents), I = integrated ($n = 181$ fathers, $n = 163$ mothers, $n = 208$ adolescents), A = assimilated ($n = 16$ fathers, $n = 29$ mothers, $n = 33$ adolescents), N = non-immigrant Canadian ($n = 34$ fathers, $n = 49$ mothers, $n = 51$ adolescents). Age, education, and family income were included as covariates in analyses of parents' data; age and family income were included as covariates in adolescents' data. Different subscripts within the same line of data indicate significant mean differences for the dependent variable of interest.

Table 13

Sample sizes of high and low symptom responders on the CES-D.

	Separated	Integrated	Assimilated	Non-Immigrant	Total
<i>Fathers</i>					
High distress	6	30	3	10	49
	12.2%	61.2%	6.1%	20.4%	
Low distress	38	150	13	27	228
	16.7%	65.8%	5.7%	11.8%	
<i>Mothers</i>					
High distress	11	24	3	6	44
	25.0%	54.5%	6.8%	13.6%	
Low distress	54	137	26	46	263
	20.5%	52.1%	9.9%	17.5%	
<i>Adolescents</i>					
High distress	5	32	10	4	51
	9.8%	62.7%	19.6%	7.8%	
Low distress	19	175	24	50	268
	7.1%	65.2%	9.0%	18.7%	

Note. Percentage values denote the acculturation profile composition within the high distress and low distress groups.

Table 14

Mean values and standard deviations of proportion of somatic and affective symptoms among high and low symptom responders on the CES-D and the YSR.

	Somatic Symptoms	Affective Symptoms
Fathers		
CES-D: high distress	.35 (.08)	.28 (.08)
CES-D: low distress	.29 (.25)	.09 (.12)
Mothers		
CES-D: high distress	.34 (.10)	.29 (.09)
CES-D: low distress	.30 (.24)	.15 (.16)
Adolescents		
CES-D: high distress	.33 (.09)	.34 (.09)
CES-D: low distress	.48 (.26)	.15 (.16)
YSR: high distress	.31 (.11)	.45 (.08)
YSR: low distress	.23 (.22)	.40 (.24)

Table 15

Hierarchical regression model for relations between cultural and demographic variables, and proportion of somatic symptoms endorsed by parents.

	<u>Fathers</u>			<u>Mothers</u>		
	<i>n</i> = 142			<i>n</i> = 164		
Variables	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
Step 1: Asian Values	.06	.05	.04	-.04	-.04	-.05
Western Values	-.07	-.06	-.07	-.14 ^a	-.14 ^a	-.13
<i>R</i> ²		.01			.02	
<i>F</i>		.56			1.63	
Step 2: Asian Values x		-.06	-.06		-.01	-.02
Western Values						
<i>R</i> ²			.01			.02
<i>F</i>			.52			1.08
Step 3: Age			-.09			-.09
SES			.06			.03
Neighbourhood contact			.10			.13
Length of residence			-.06			.13
<i>R</i> ²			.04			.05
<i>F</i>			.81			1.20

* $p < .05$, ** $p < .01$, *** $p < .001$

^a denotes a trend $< .10$

Table 16

Hierarchical regression model for relations between cultural and demographic variables, and proportion of somatic symptoms endorsed by adolescents.

	<u>CES-D</u>			<u>YSR</u>		
	<i>n</i> = 179			<i>n</i> = 181		
Variables	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
Step 1: Asian Values	.12	.11	.13 ^a	.11	.11	.11
Western Values	.28***	.29***	.30***	.10	.10	.10
<i>R</i> ²		.10			.03	
<i>F</i>		9.56***			2.26	
Step 2: Asian Values x Western Values		.08	.08		-.02	-.01
<i>R</i> ²			.10			.03
<i>F</i>			6.73***			1.53
Step 3: Age			-.06			.02
SES			.10			.02
Neighbourhood contact			.09			.02
Generational status			.06			-.13 ^a
<i>R</i> ²			.13			.04
<i>F</i>			3.61***			1.11

Note. Generational status was coded as 0 (1st generation) and 1 (1.5 and 2nd generation).

* $p < .05$, ** $p < .01$, *** $p < .001$. ^a denotes a trend $< .10$

Table 17

Hierarchical regression model between cultural and demographic variables, and proportion of somatic symptoms among combined samples.

Variables	<u>High CES-D Scores</u>			<u>Random Sample</u>		
	<i>n</i> = 83			<i>n</i> = 175		
	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
Step 1: Asian Values	-.03	-.03	.01	-.01	-.02	.06
Western Values	-.05	-.05	-.08	.32***	.33***	.16*
<i>R</i> ²		.00			.10	
<i>F</i>		.13			9.93***	
Step 2: Asian Values x Western Values		-.04	-.04		-.06	-.02
<i>R</i> ²			.01			.11
<i>F</i>			.12			6.80***
Step 3:	Age		.01			-.34***
	SES		.27*			.08
Neighbourhood contact			-.10			.01
Time in Canada			.10			.14*
<i>R</i> ²			.09			.21
<i>F</i>			1.00			6.45***

Note. Time in Canada was coded as 0 (1st generation adolescents /length of residence less than 10 years for parents) and 1 (1.5 and 2nd generation adolescents/length of residence greater than 10 years for parents).

* $p < .05$, ** $p < .01$, *** $p < .001$. ^a denotes a trend $< .10$

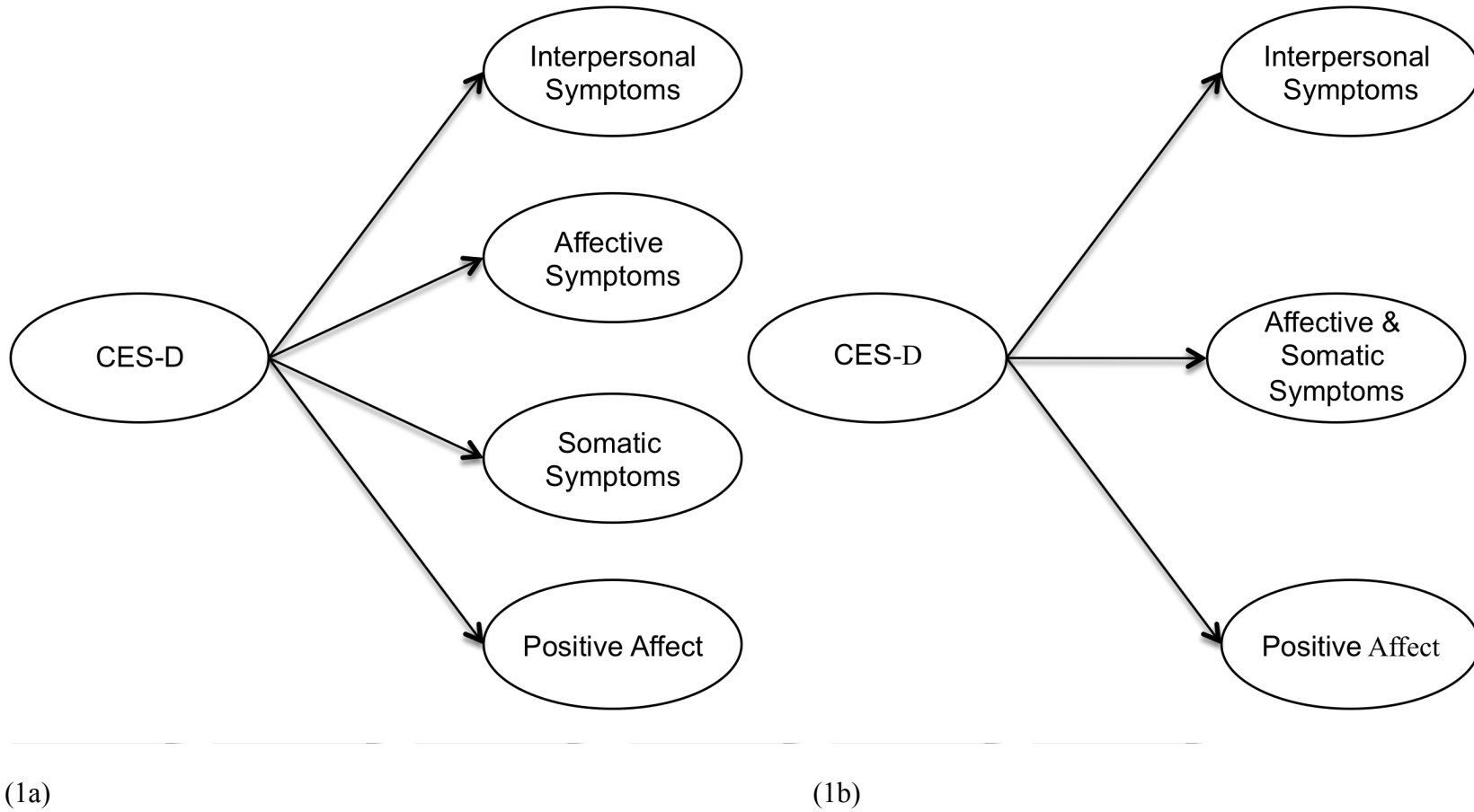


Figure 1. Four-factor and three-factor models of the Center for Epidemiologic Studies Depression Scale (CES-D).

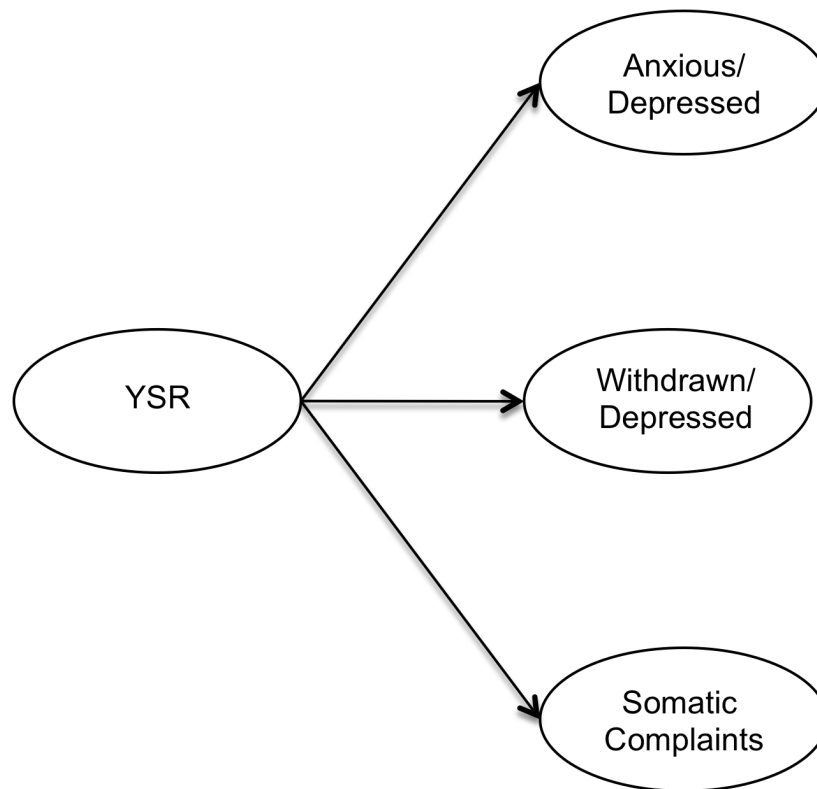


Figure 2. Three-factor model of the Achenbach Youth Self-Report (YSR).

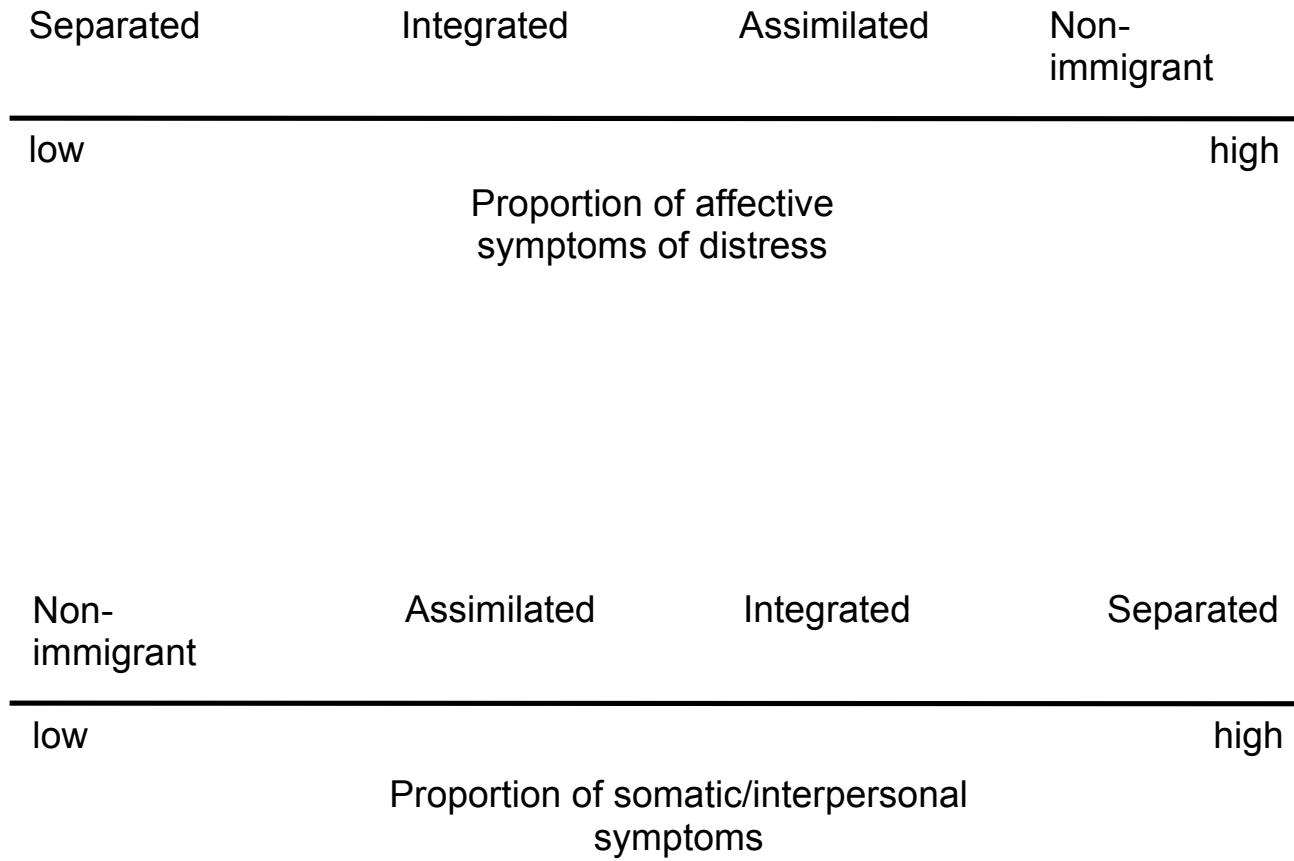


Figure 3. Conceptual model of hypothesized relations between values acculturation profiles and symptom expression.

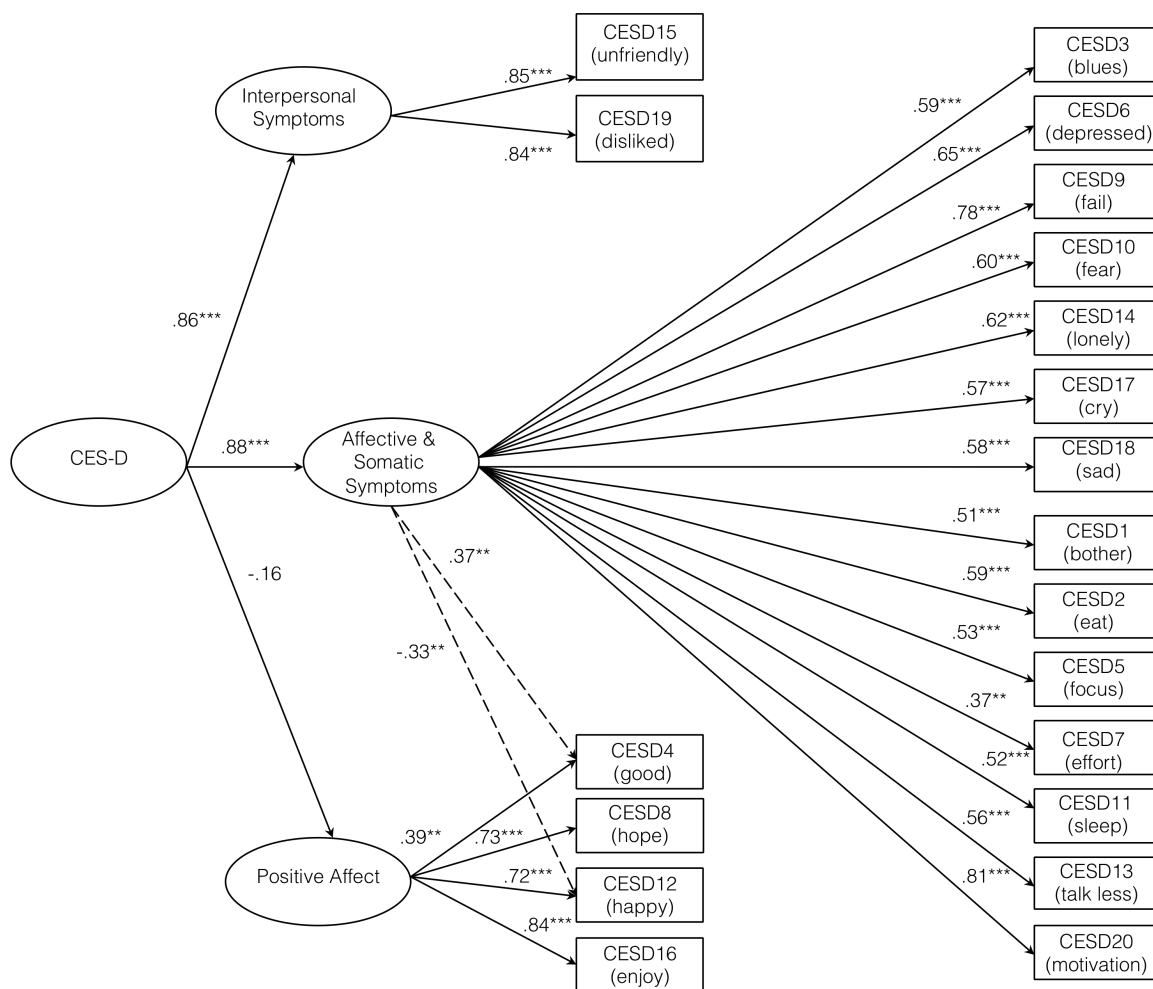


Figure 4. Three-factor model of the CES-D (mothers, separated acculturation profile).

Dotted lines indicate model modifications.

* $p < .05$, ** $p < .01$, *** $p < .001$

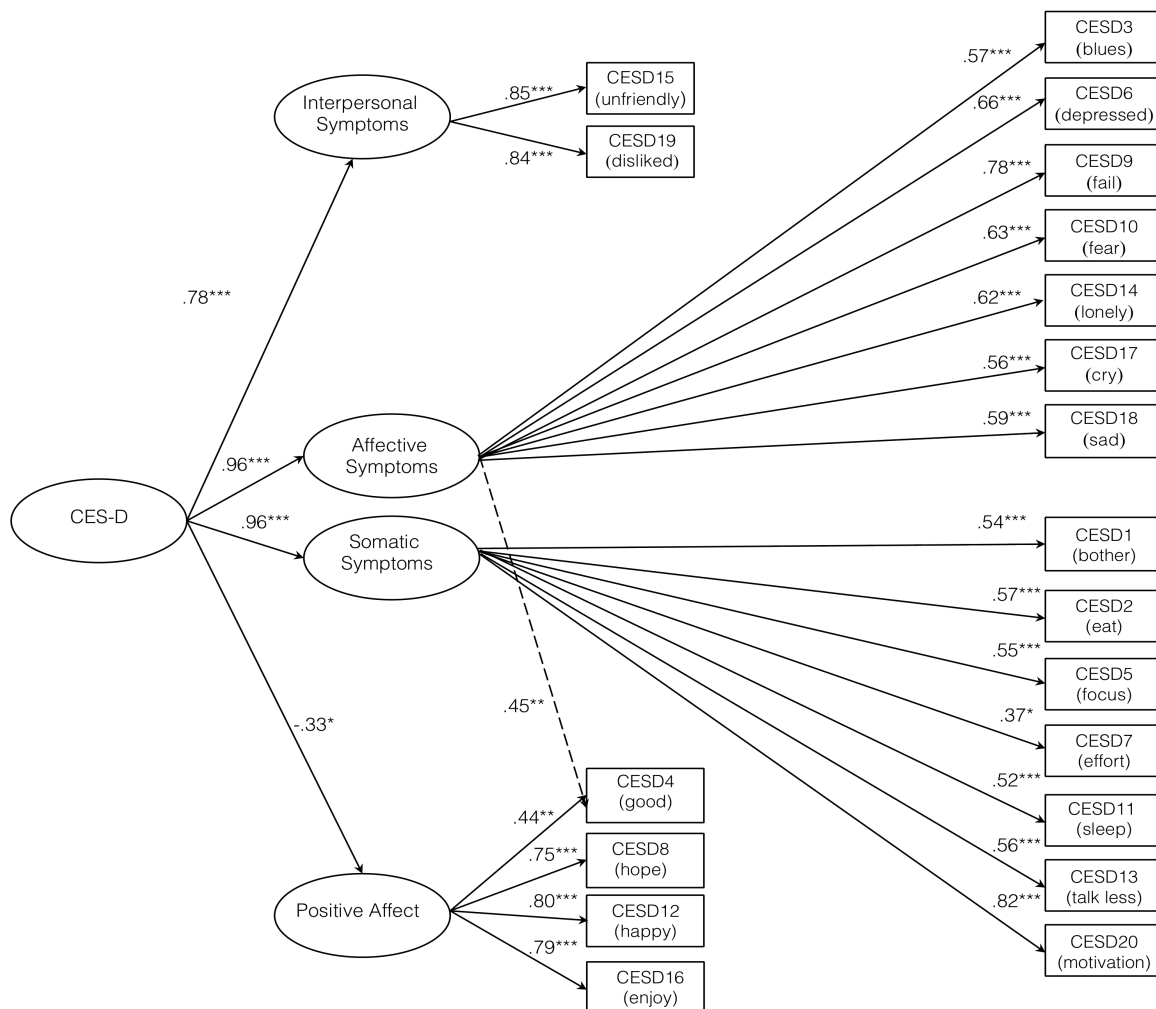


Figure 5. Four-factor model of the CES-D (mothers, separated acculturation profile).

Dotted lines indicate model modifications.

* $p < .05$, ** $p < .01$, *** $p < .001$

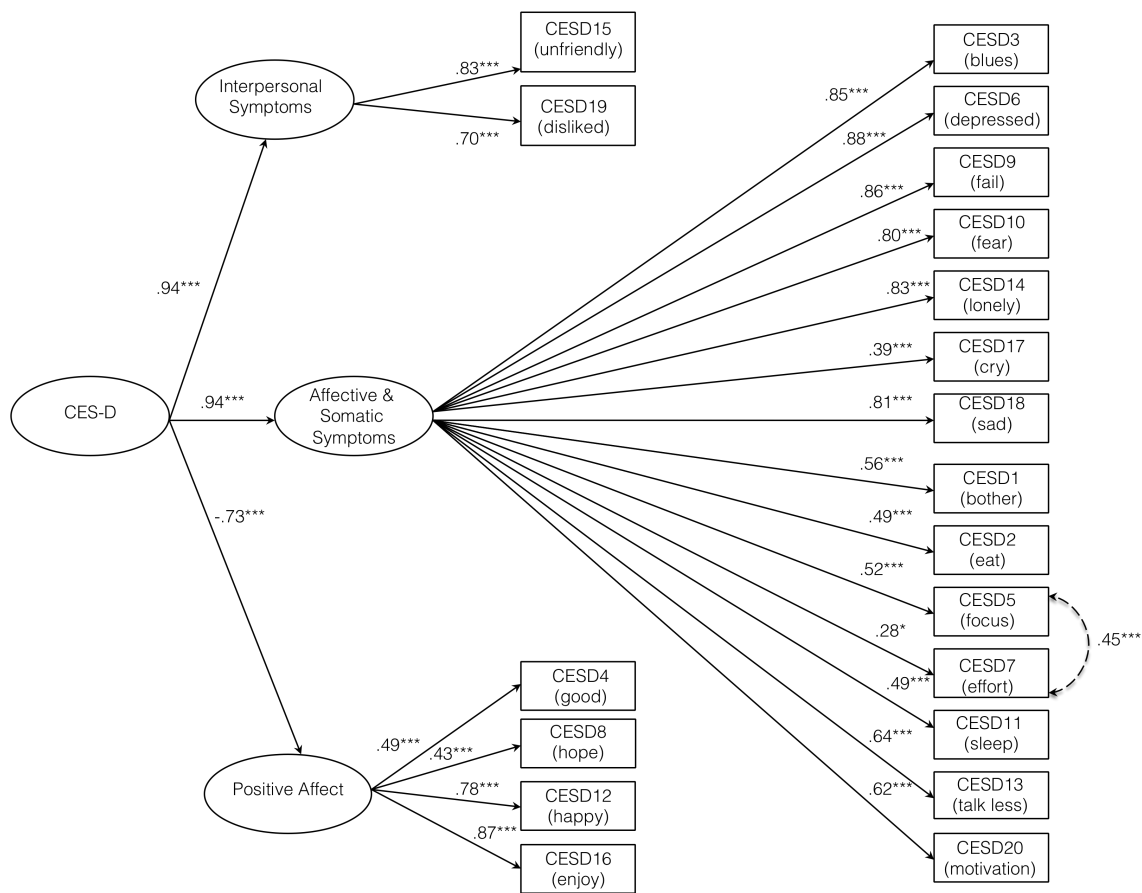


Figure 6. Three-factor model of the CES-D (all family members combined, assimilated acculturation profile). Dotted lines indicate model modifications.

* $p < .05$, ** $p < .01$, *** $p < .001$

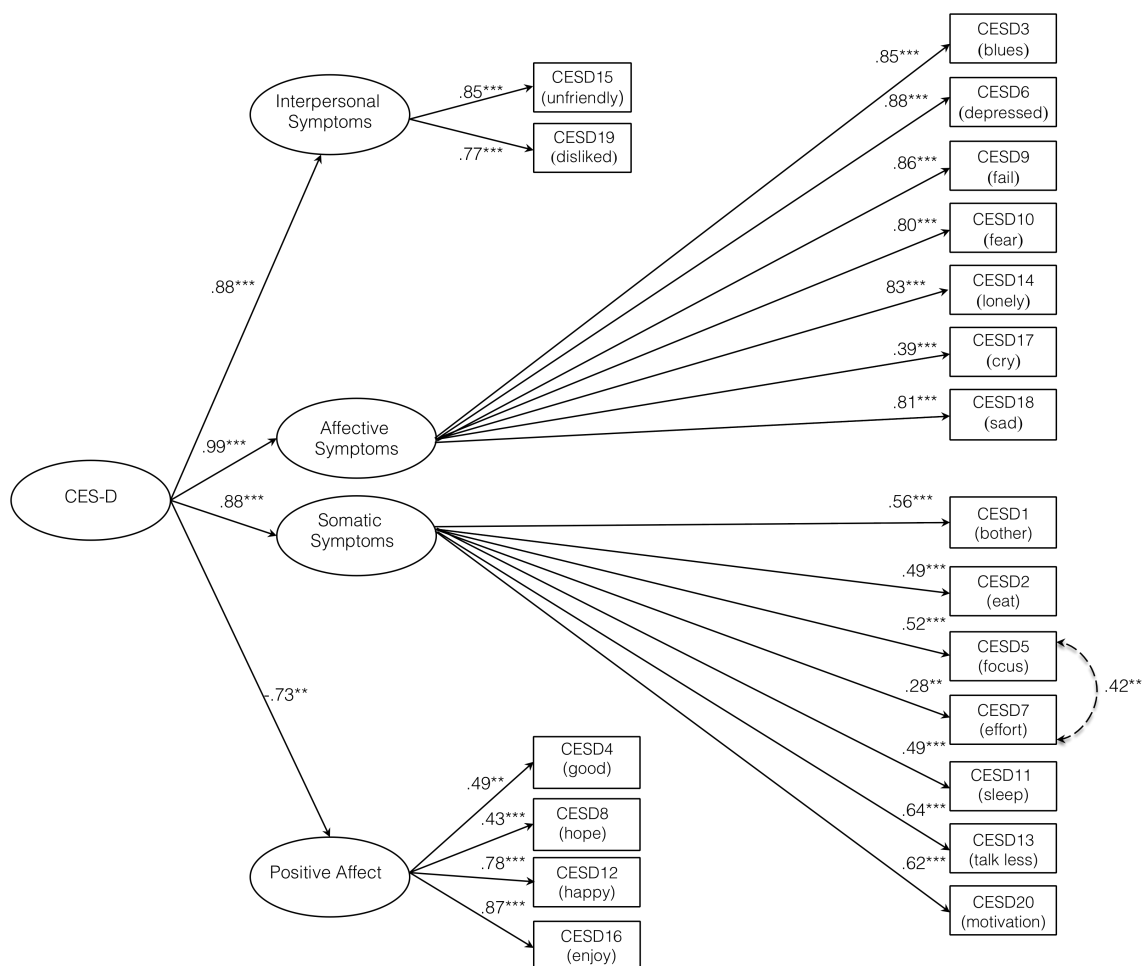


Figure 7. Four-factor model of the CES-D (all family members combined, assimilated acculturation profile). Dotted lines indicate model modifications.

* $p < .05$, ** $p < .01$, *** $p < .001$

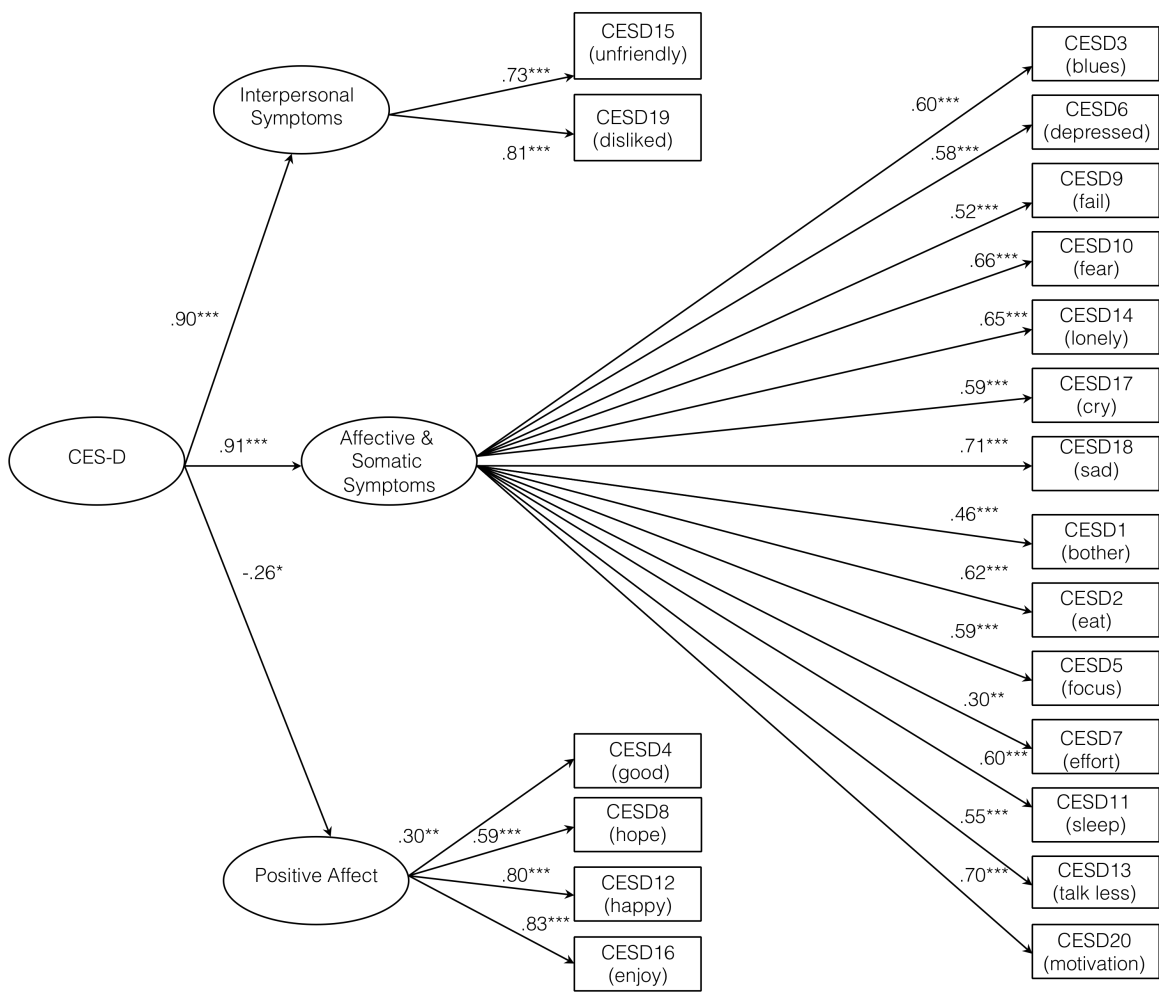


Figure 8. Three-factor model of the CES-D (all family members combined, separated acculturation profile).

* $p < .05$, ** $p < .01$, *** $p < .001$

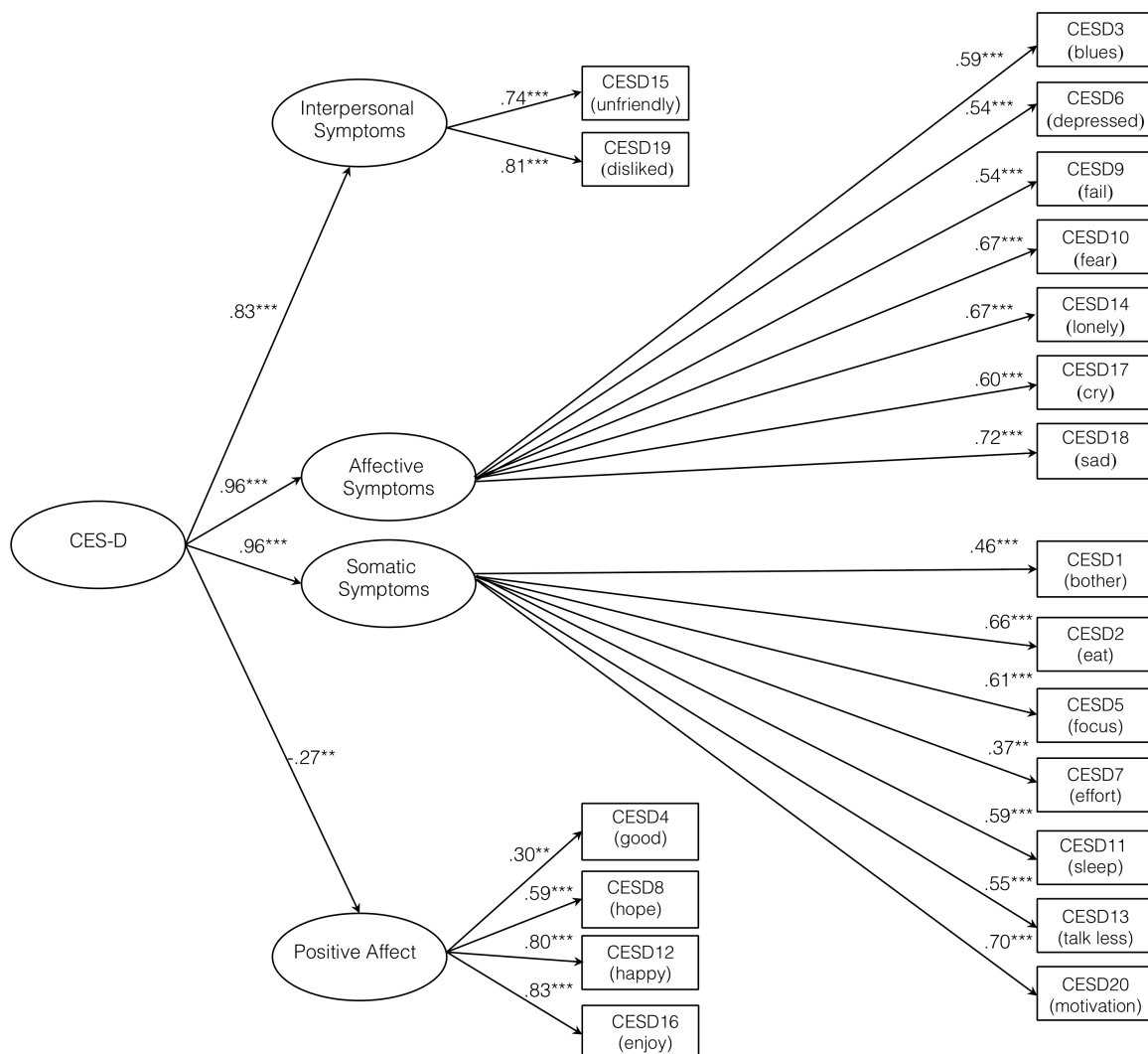


Figure 9. Four-factor model of the CES-D (all family members combined, separated acculturation profile).

* $p < .05$, ** $p < .01$, *** $p < .001$

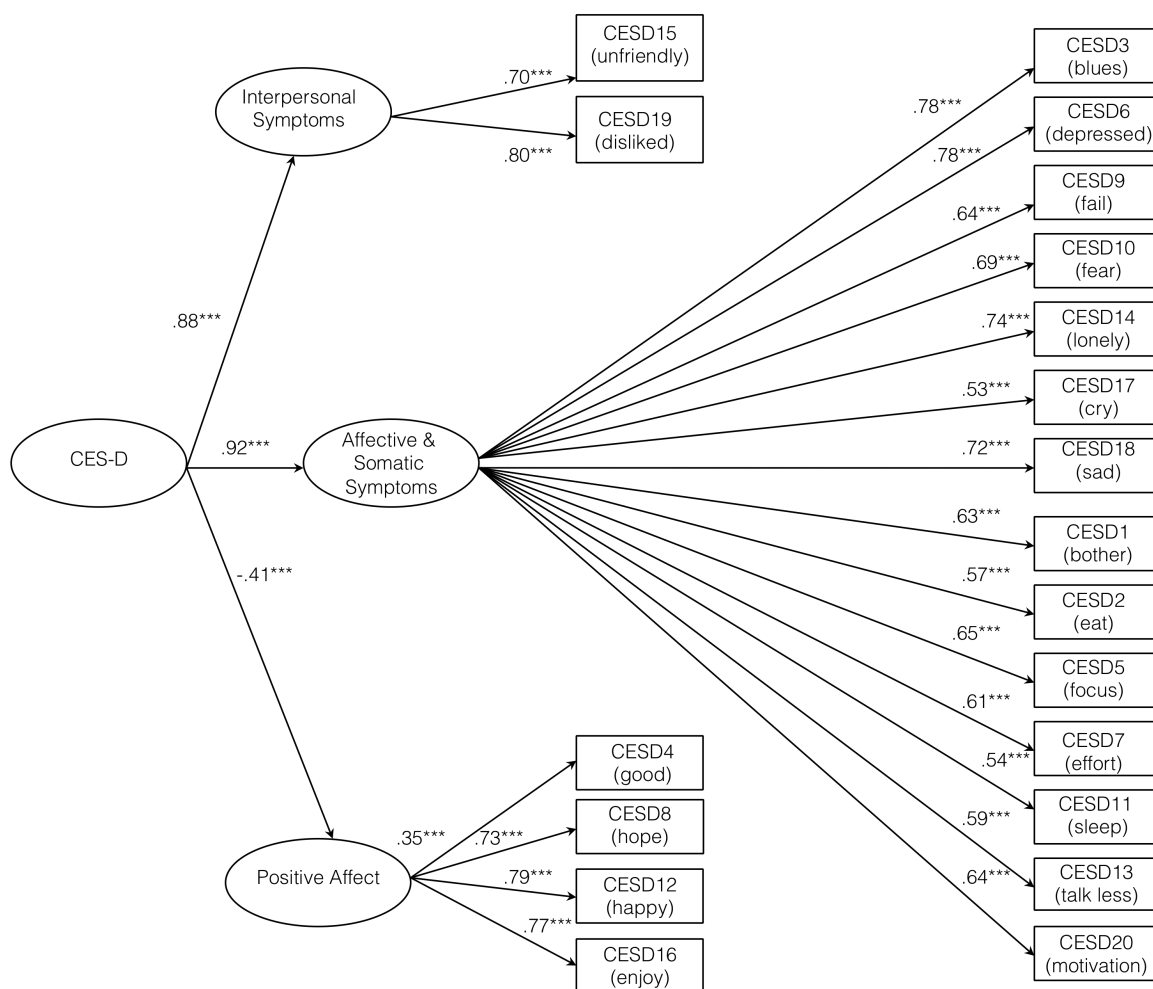


Figure 10. Three-factor model of the CES-D (fathers, integrated acculturation profile).

* $p < .05$, ** $p < .01$, *** $p < .001$

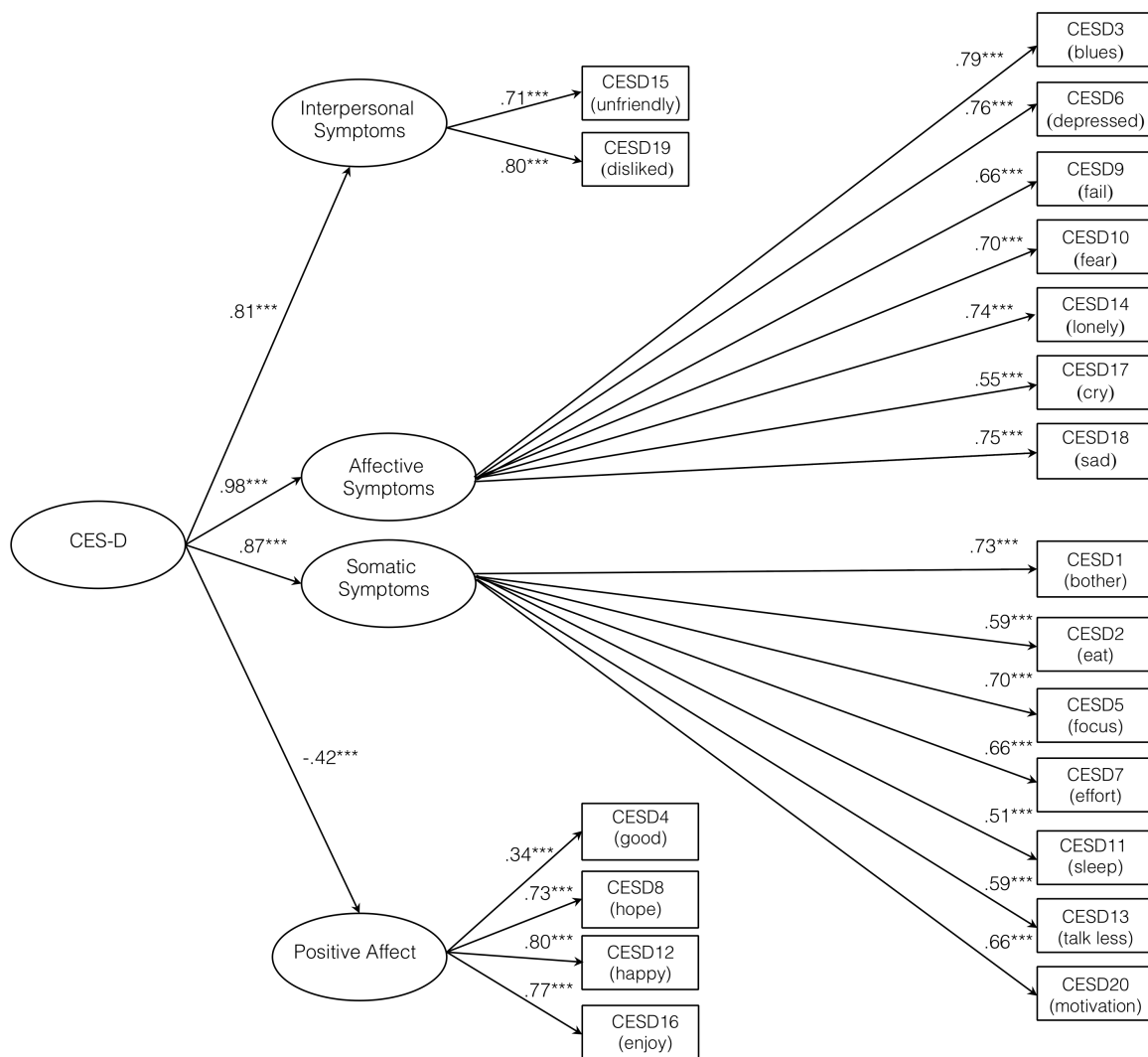


Figure 11. Four-factor model of the CES-D (fathers, integrated acculturation profile).

* $p < .05$, ** $p < .01$, *** $p < .001$

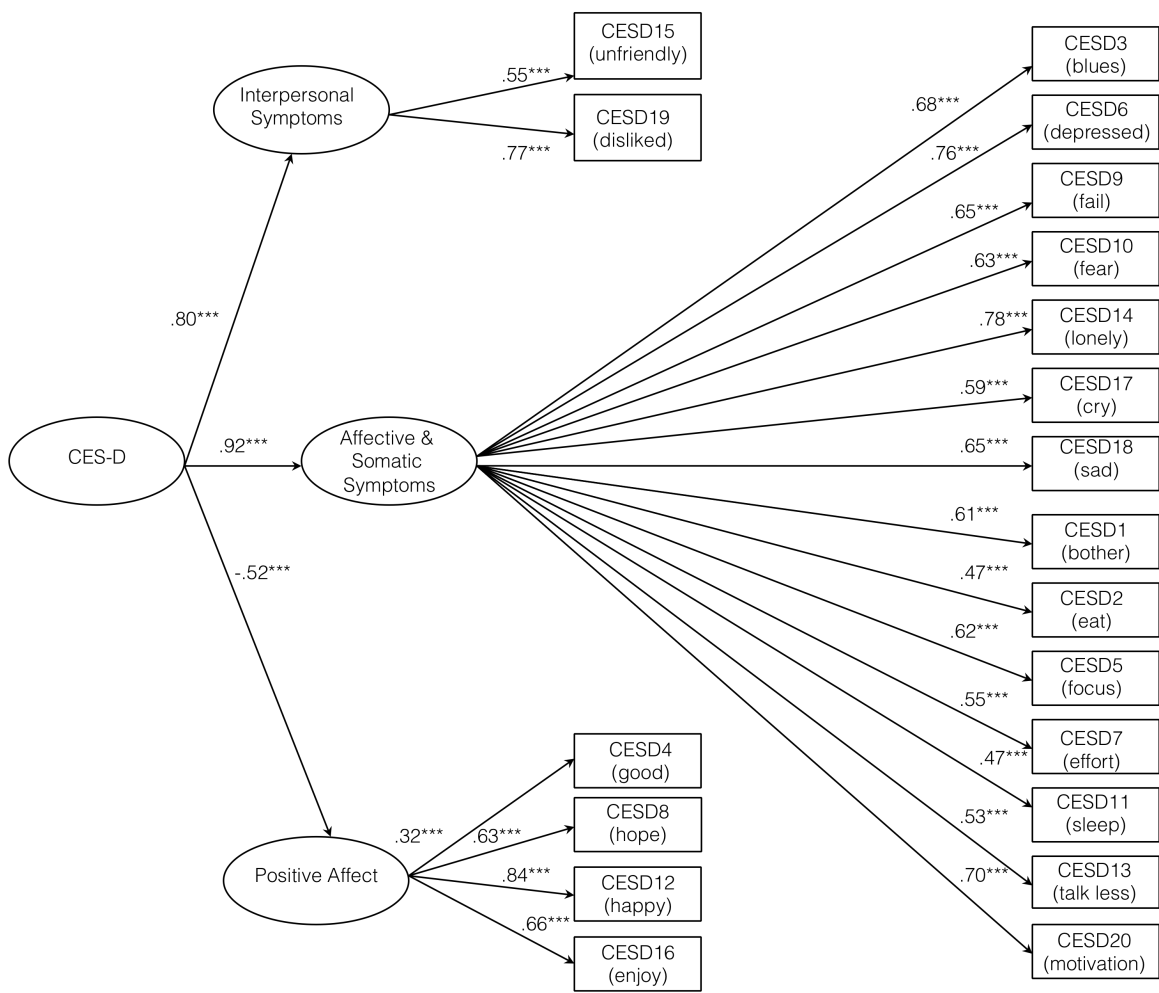


Figure 12. Three-factor model of the CES-D (mothers, integrated acculturation profile).

* $p < .05$, ** $p < .01$, *** $p < .001$

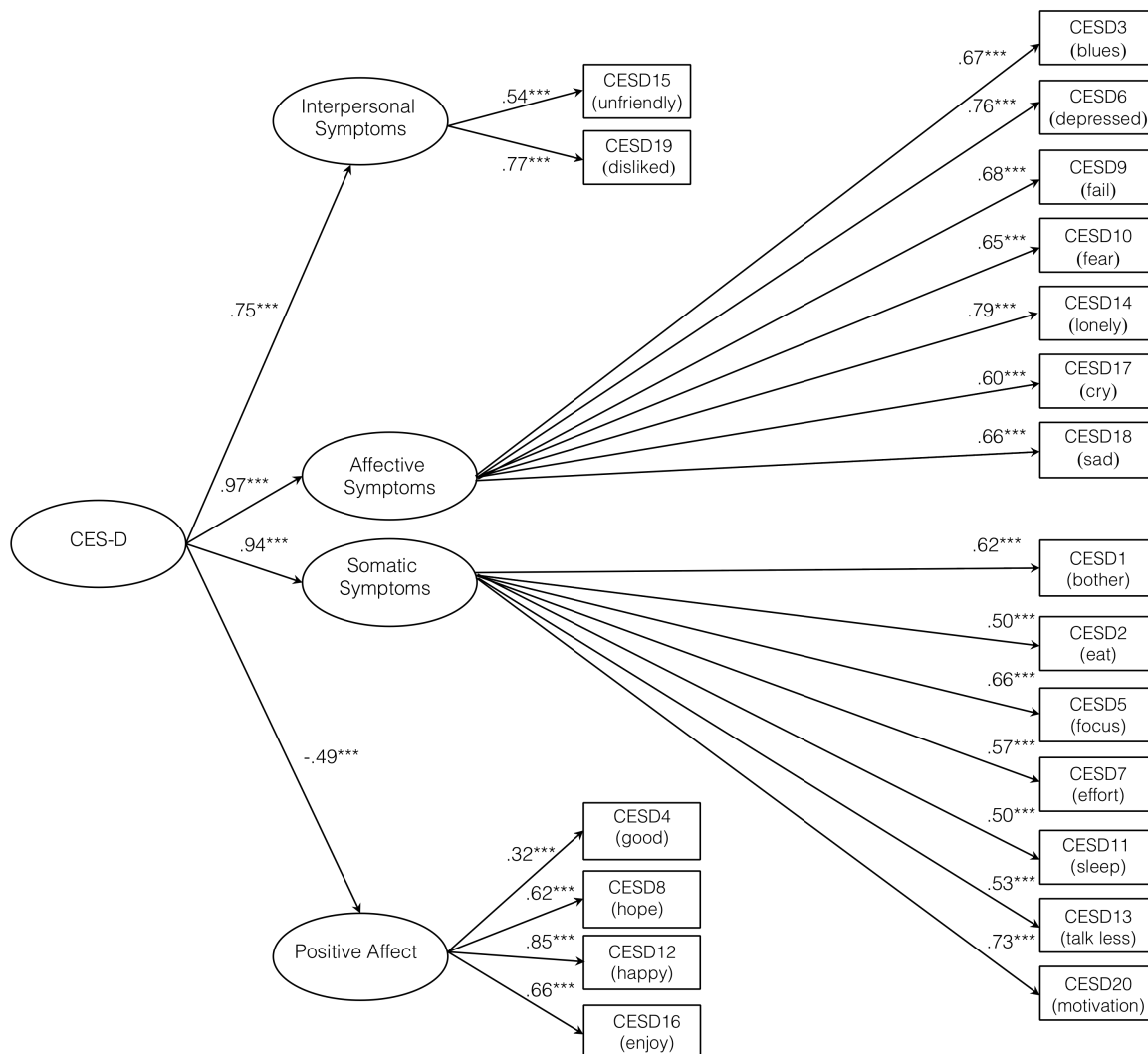


Figure 13. Four-factor model of the CES-D (mothers, integrated acculturation profile).

* $p < .05$, ** $p < .01$, *** $p < .001$

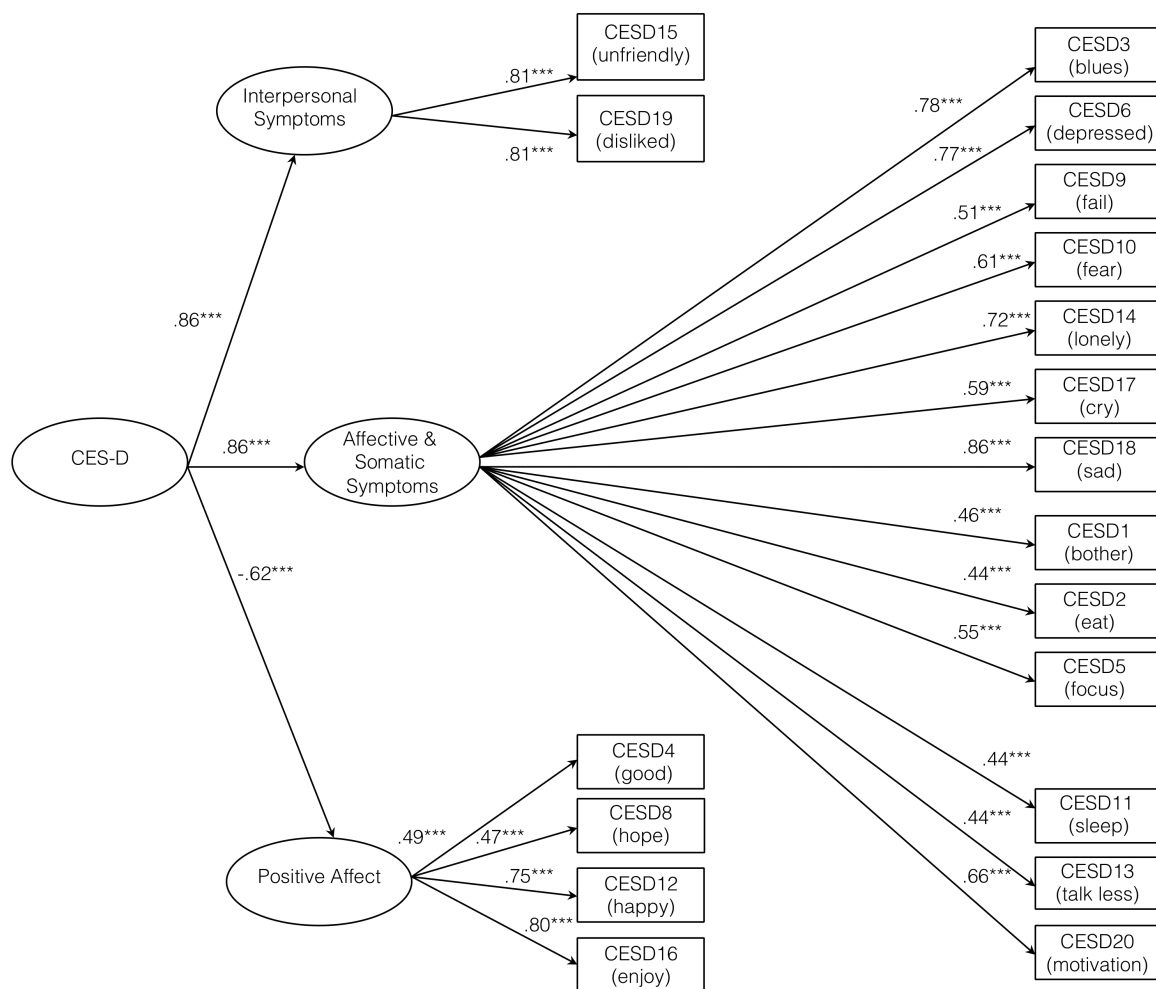


Figure 14. Three-factor model of the CES-D, with item 7 deleted (adolescents, integrated acculturation profile).

* $p < .05$, ** $p < .01$, *** $p < .001$

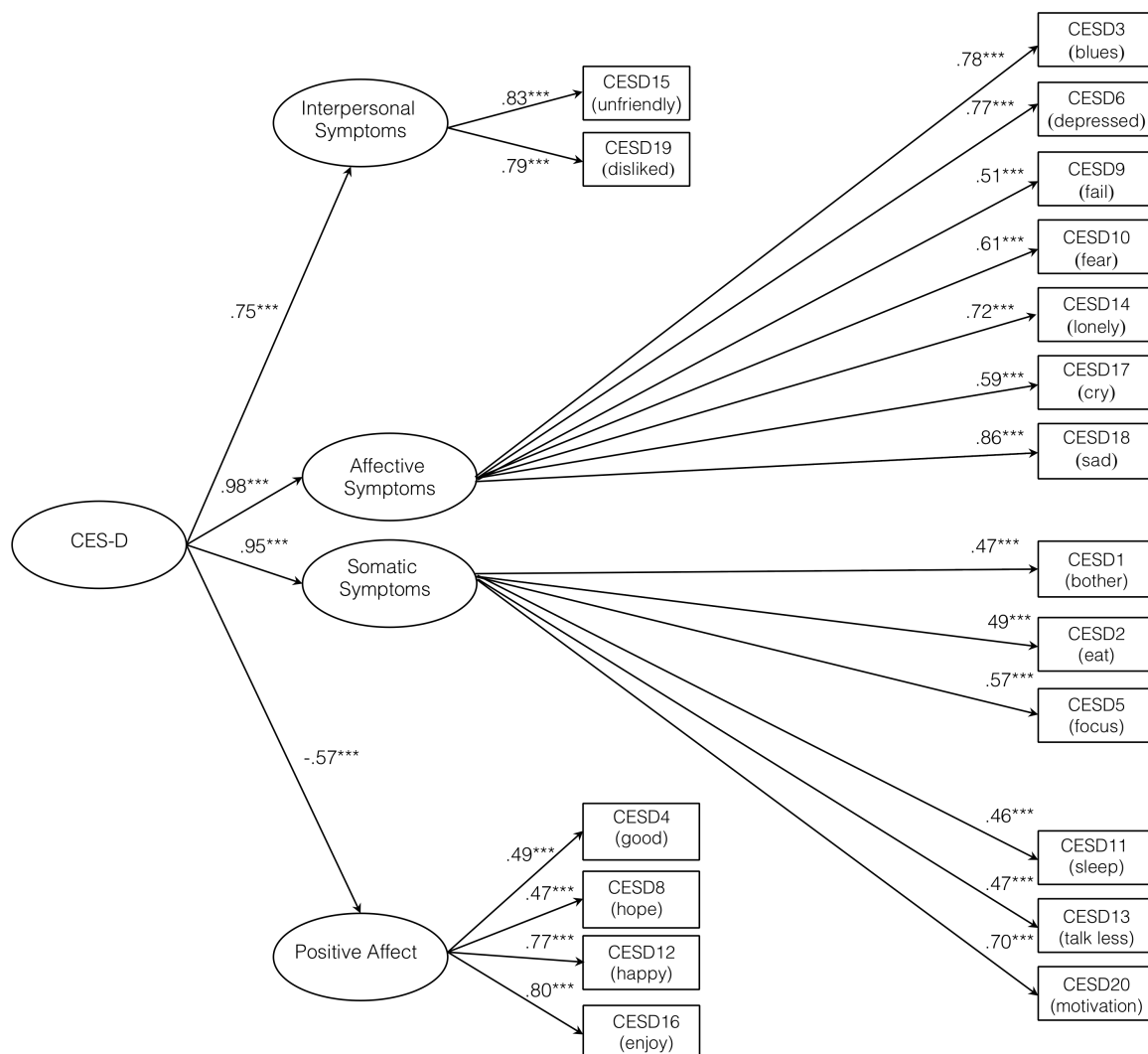


Figure 15. Four-factor model of the CES-D, with item 7 deleted (adolescents, integrated acculturation profile).

* $p < .05$, ** $p < .01$, *** $p < .001$

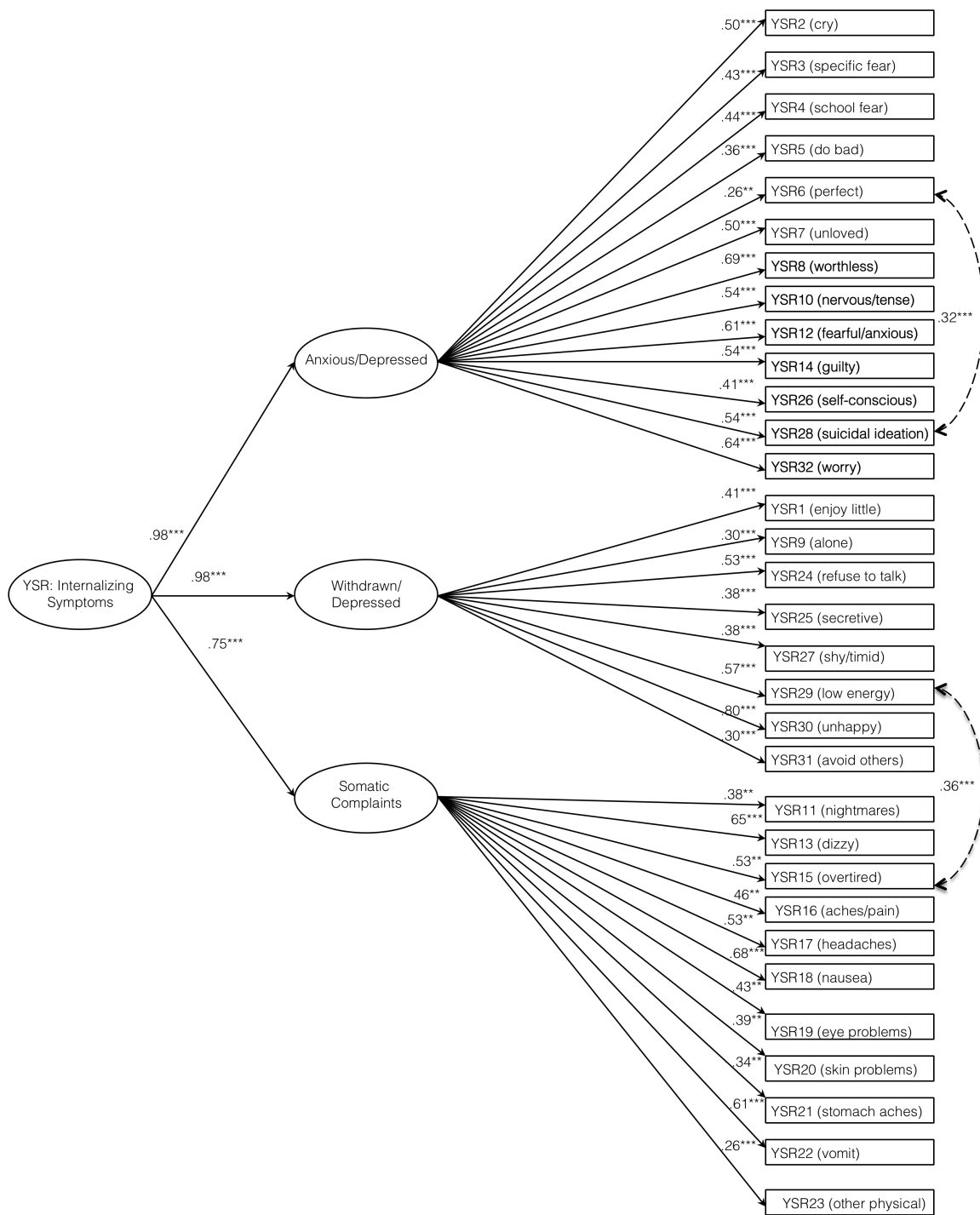


Figure 16. Three-factor model of the YSR Internalizing scale (adolescents classified as integrated or assimilated).

* $p < .05$, ** $p < .01$, *** $p < .001$

Appendix A: Asian Values Scale

Please indicate how much you agree or disagree with the following statements.

	Strongly Disagree	Disagree	Mildly Disagree	Neither Agree Nor Disagree	Mildly Agree	Agree	Strongly Agree
1. Occupational failure brings shame to the family.	1	2	3	4	5	6	7
2. People should think about their group before themselves.	1	2	3	4	5	6	7
3. Modesty is an important quality for a person.	1	2	3	4	5	6	7
4. Educational failure brings shame to the family.	1	2	3	4	5	6	7
5. People should consider the needs of others before considering their own needs.	1	2	3	4	5	6	7
6. People should be humble and modest.	1	2	3	4	5	6	7
7. People should achieve academically to make their parents proud.	1	2	3	4	5	6	7
8. People's achievements should be viewed as their family's achievement.	1	2	3	4	5	6	7
9. Following family and social expectations is important.	1	2	3	4	5	6	7
10. When people receive a gift, they should reciprocate with a gift of equal or greater value.	1	2	3	4	5	6	7
11. A family's reputation is an important social concern.	1	2	3	4	5	6	7

Appendix B: Adolescent Independence Values

(Titled “Beliefs About Families” in questionnaire package.)

Please indicate how much you agree with the following statements.

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1. It is all right for <u>girls</u> over the age of 18 to decide when to marry and whom to marry.	0	1	2	3	4
2. It is all right for <u>boys</u> over the age of 18 to decide when to marry and whom to marry.	0	1	2	3	4
3. When a <u>girl</u> reaches the age of 16 it is all right for her to decide whom to date and when to date.	0	1	2	3	4
4. When a <u>boy</u> reaches the age of 16 it is all right for him to decide whom to date and when to date.	0	1	2	3	4
5. <u>Girls</u> over the age of 18 should be allowed to move away from home to go to college or to take a job.	0	1	2	3	4
6. <u>Boys</u> over the age of 18 should be allowed to move away from home to go to college or to take a job.	0	1	2	3	4
7. It is all right for <u>girls</u> to choose their own career.	0	1	2	3	4
8. It is all right for <u>boys</u> to choose their own career.	0	1	2	3	4

Appendix C: Centre for Epidemiological Studies Depression Scale/

Chinese Depression Scale

(Titled “How I Feel” in questionnaire package.)

Please circle the number for each statement which best describes how often you felt or behaved this way during the past week. During the **past week** ...

	Rarely or none of the time (<1 day)	Some or a little of the time (1-2 days)	A lot of the time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that usually don't bother me.	0	1	2	3
2. I did not feel like eating; my appetite was poor.	0	1	2	3
3. I felt that I could not shake off the blues even with help from my family or friends.	0	1	2	3
4. I felt that I was just as good as other people.	0	1	2	3
5. I had trouble keeping my mind on what I was doing.	0	1	2	3
6. I felt depressed.	0	1	2	3
7. I felt that everything I did was an effort.	0	1	2	3
8. I felt hopeful about the future.	0	1	2	3
9. I thought my life has been a failure.	0	1	2	3
10. I felt fearful.	0	1	2	3
11. My sleep was restless.	0	1	2	3
12. I was happy.	0	1	2	3
13. I talked less than usual.	0	1	2	3
14. I felt lonely.	0	1	2	3
15. People were unfriendly.	0	1	2	3
16. I enjoyed life.	0	1	2	3
17. I had crying spells.	0	1	2	3
18. I felt sad.	0	1	2	3
19. I felt that people disliked me.	0	1	2	3
20. I could not get “going” (or motivated).	0	1	2	3

	Rarely or none of the time (<1 day)	Some or a little of the time (1-2 days)	A lot of the time (3-4 days)	Most or all of the time (5-7 days)
*21. I felt I have a lot of talk about, but can't find the opportunity to say it.	0	1	2	3
*22. I feel suffocated.	0	1	2	3
*23. I feel suspicious of others.	0	1	2	3
*24. I don't think others trust me.	0	1	2	3
*25. I don't think I can trust others.	0	1	2	3
*26. I remember unpleasant things from the past.	0	1	2	3

* Additional items administered to parents only to create Chinese Depression Scale.

Appendix D: Achenbach Youth Self Report Internalizing Items

Below is a list of items that describe kids. For each item that describes you **now or within the past 6 months**, please circle the **2** if the item is **very true or often true** of you. Circle **1** if the item is **somewhat or sometimes true** of you. If the item is **not true** of you, circle the **0**.

0 = Not True 1 = Somewhat or Sometimes True 2 = Very True or Often True

WD	1. There is little that I enjoy	0	1	2
AD	2. I cry a lot	0	1	2
AD	3. I am afraid of certain animals, situations, or places, other than school	0	1	2
AD	4. I am afraid of going to school	0	1	2
AD	5. I am afraid I might think of do something bad	0	1	2
AD	6. I feel that I have to be perfect	0	1	2
AD	7. I feel that no one loves me	0	1	2
AD	8. I feel worthless or inferior	0	1	2
WD	9. I would rather be alone than with others	0	1	2
AD	10. I am nervous or tense	0	1	2
AD	11. I am too fearful or anxious	0	1	2
SC	12. I feel dizzy or lightheaded	0	1	2
AD	13. I feel too guilty	0	1	2
SC	14. I feel overtired without good reason	0	1	2
SC	15. <i>Physical problems without known medical cause: Aches or pains (not stomach or headaches)</i>	0	1	2
SC	16. <i>Physical problems without known medical cause: Headaches</i>	0	1	2
SC	17. <i>Physical problems without known medical cause: Nausea, feel sick</i>	0	1	2
SC	18. <i>Physical problems without known medical cause: Problems with eyes (not if corrected by glasses)</i>	0	1	2
SC	19. <i>Physical problems without known medical cause: Rashes or other skin problems</i>	0	1	2
SC	20. <i>Physical problems without known medical cause: Stomachaches</i>	0	1	2
SC	21. <i>Physical problems without known medical cause: Vomiting, throwing up</i>	0	1	2
SC	22. <i>Physical problems without known medical cause: Other</i>	0	1	2
WD	23. I refuse to talk	0	1	2
WD	24. I am secretive or keep things to myself	0	1	2
AD	25. I am self-conscious or easily embarrassed	0	1	2
WD	26. I am too shy or timid	0	1	2
AD	27. I think about killing myself	0	1	2
WD	28. I don't have much energy	0	1	2
WD	29. I am unhappy, sad, or depressed	0	1	2
WD	30. I keep from getting involved with others	0	1	2
AD	31. I worry a lot	0	1	2

Note: AD = Anxious/Depressed; WD = Withdrawn/Depressed; SC = Somatic Complaints