Acculturation and Perceptions of Sources of Support to Help Smokers Quit in Immigrants to Canada

By

Rupinder K. Tatla

A thesis submitted in conformity with the requirements for the degree of Masters of Science
Graduate Department of Community Health
University of Toronto

©copyright by Rupinder K. Tatla 2000
The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author’s permission.

L’auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

L’auteur conserve la propriété du droit d’auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-53357-3
Abstract

In order to develop culturally appropriate programs and policies, there continues to be a need for basic research in ethnicity and smoking. Acculturation, a process that takes place when one adopts the values and beliefs of another culture, is related to smoking behavior. However, there is no Canadian literature about the relationship between level of acculturation and immigrant perceptions of the effectiveness of various sources of support used in smoking cessation. The purpose of the present study is to examine this relationship. **OBJECTIVES:** The objectives of the present study were to determine whether level of acculturation is associated with beliefs, among Arabic and Chinese immigrants to Canada, about the helpfulness of the following sources of support for quitting: (1) restrictions against smoking in public places, (2) support from family, (3) advice from a doctor or health professional, (4) support from the religious community, (5) advertising that shows smoking is unhealthy. **RESEARCH DESIGN:** This thesis is based upon secondary analyses of data collected from a cross-sectional telephone survey of Arabic and Chinese immigrants to Canada (Ferrence et al., 1996). 932 interviews were completed; 482 interviews involved Arabic participants, while 450 interviews involved Chinese participants. Participants with complete data on age, gender, smoking status, education, level of acculturation, and perceptions about the helpfulness of various sources of support were included in the data analyses. Univariate logistic regression was carried out to determine the relationship between beliefs about sources of support for quitting and level of acculturation. Subsequently, multivariate logistic regression was carried out to examine the relationship between level of acculturation and perceptions about various sources of support, while controlling for smoking status and demographic covariates. **RESULTS:** Upon controlling for smoking status and demographic covariates, level of acculturation among Arabic participants was associated with perceptions about the ability of restrictions against smoking in public places to help smokers quit (OR = 0.62; 95% C.I. 0.45, 0.87). Also, when smoking status and demographic covariates were controlled for, level of acculturation among female Chinese participants was related to perceptions about the helpfulness of the religious community to assist smokers in quitting (OR = 0.48; 95% C.I. 0.26, 0.91). **CONCLUSIONS:** The results indicate that level of acculturation is related to perceptions about the helpfulness of some sources of support for quitting smoking. Since the relationship between level of acculturation and beliefs differed for Arabic and Chinese participants, these results suggest that the effect acculturation has on beliefs is unique to a given ethnic group. Research and health programming implications are discussed.
Acknowledgements

This thesis is a product of my journey to Toronto. There are many people who helped me during this journey. I would like to express my gratitude towards them. First, I would like to thank my thesis supervisors, Dr. Roberta Ferrence and Dr. Joan Brewster, for their guidance and support throughout the thesis process. I am also grateful to Dr. Milada Disman, a committee member, for her advice about issues related to ethnicity. Also, I would like to thank Dr. Paul Corey for his help with my statistical analyses, and Professor Mary Chipman for her academic advice. This thesis is based on a study that was supported by the National Health Research and Development Program.

Thank you to Tien Phan who helped me adjust to life in a new city. I am also very grateful to Nancy Poole and Jennifer Soucie, for their advice and friendship during my graduate studies. Also, I want to express my appreciation for Laura Pontieri and Caterina A. Viscomi who made the Big City feel like home. I would like to thank my parents and my brother for continually encouraging me to follow my dreams, and providing me with much appreciated advice along the way. Lastly, I want to give a general thanks to the rest of my family and friends for their continuous guidance and support throughout my academic career and beyond.
Table of Contents

Abstract..................................................................................................................ii

Acknowledgements..................................................................................................iii

Table of Contents.......................................................................................................iv

List of Tables...............................................................................................................vi

CHAPTER I – INTRODUCTION.........................................................................................p. 1

CHAPTER II – REVIEW OF LITERATURE......................................................................p. 3
  1. The Acculturation Model......................................................................................p. 3
  2. Measuring Level of Acculturation......................................................................p. 4
  3. Definition of Ethnicity.......................................................................................p. 6
  4. Ethnic Programming.........................................................................................p. 6
  5. Immigration to Canada.....................................................................................p. 9
  6. Immigration & Health in Canada......................................................................p. 10
  7. Immigration & Canadian Healthcare Utilization.............................................p. 11
  8. Acculturation & Health Behavior.....................................................................p. 12
  9. Acculturation & Health-related Beliefs & Behavior........................................p. 13
 10. Acculturation & Smoking Behavior..............................................................p. 13
 11. Acculturation and Smoking-related Beliefs....................................................p. 17
 12. Predictors of Smoking-related Beliefs............................................................p. 20
 13. Summary of Literature.....................................................................................p. 21

CHAPTER III – PRESENT STUDY..................................................................................p. 22
  1. Choice of Ethnic Groups....................................................................................p. 22
  2. Sources of Support for Quitting Smoking.......................................................p. 23
  3. Objectives.........................................................................................................p. 23

CHAPTER IV – METHODS..........................................................................................p. 25
  1. Data Collection................................................................................................p. 25
  2. Data Analyses Strategy....................................................................................p. 27

CHAPTER V – RESULTS............................................................................................p. 31
  1. Overall Demographic Description of Arabic & Chinese Samples..................p. 32
  2. Descriptive Statistics.......................................................................................p. 33
  3. Logistic Regression Analyses..........................................................................p. 42
CHAPTER VI – DISCUSSION

1. Level of Acculturation & Perceptions about Restrictions against Smoking in Public Places to Help Smokers Quit ..................p. 60
2. Level of Acculturation and Perceptions about Support from the Family to Help Smokers Quit ...........................................p. 61
3. Level of Acculturation and Perceptions About Advice from a Doctor or Health Professional to Help Smokers Quit ................p. 63
4. Level of Acculturation and Perceptions about Support from the Religious Community to Help Smokers Quit ......................p. 64
5. Level of Acculturation and Perceptions about Advertising Dangers of Smoking to Help Smokers Quit ...........................p. 67
6. Limitations of Present Study ......................................................p. 68
7. Implications for Future Research ...............................................p. 72
8. Implications for Anti-tobacco Programming ..............................p. 75

REFERENCES...............................................................................p. 78

APPENDICES.............................................................................p. 85
Appendix 1. Ferrence et al.(1996) Questions about Perceptions of Sources of Support for Quitting Smoking ........................................p. 85
Appendix 3. Covariates in Multivariate Analyses ........................................p. 88
Appendix 4. Comparison of Participants Included in Analyses to Participants not Included in Analyses ...................................................p. 90
List of Tables

Table 1. Overall demographic description of Arabic and Chinese samples...........p.33

Table 2. Quartile values of Marin Acculturation Score distribution among Arabic & Chinese immigrants.................................p. 43

Table 3. Quartile values of age distribution among Arabic & Chinese immigrants.....p. 43

Table 4. Logistic regression analyses, involving Arabic and Chinese participants. of the relationship between level of acculturation and perceptions about the effectiveness of restrictions against smoking in public places to help smokers quit......................p. 46

Table 5. Logistic regression analyses, involving Arabic and Chinese participants, of the relationship between level of acculturation and perceptions about the effectiveness of support from the family to help smokers quit.................................................p. 48

Table 6. Logistic regression analyses, involving Arabic and Chinese participants, of the relationship between level of acculturation and perceptions about the effectiveness of advice from a doctor or health professional to help smokers quit.......................p. 51

Table 7. Logistic regression analyses, involving Arabic and Chinese participants, of the relationship between level of acculturation and perceptions about the effectiveness of support from the religious community to help smokers quit...............................p. 56

Table 8. Logistic regression analyses, involving Arabic and Chinese participants, of the relationship between level of acculturation and perceptions about the effectiveness of advertising about the dangers of smoking to help smokers quit.................................p. 60
Chapter 1
Introduction

Cigarette smoking is the major preventable cause of illness, disability, and death (US Department of Human Health Services, 1990). The success of public health efforts in reducing the smoking epidemic is exemplified in the decline of smoking in the past 30 years from nearly one half of the Canadian population to less than one third of the Canadian population (Ross & Perez, 1998). However, research has suggested that standard anti-smoking public health efforts have not effectively targeted multi-ethnic populations (Edwards & MacMillan, 1990; Jenkins et al., 1990; US Department of Human Health Services, 1998; Vander Martin et al., 1990). Compared to standard programs, ethnically targeted anti-smoking programs result in greater smoking cessation rates among some ethnic groups (Jenkins et al., 1997; Orleans et al., 1998). Edwards and MacMillan (1990) argue that lifestyle modification and tobacco cessation programs must be culturally relevant to ensure successful outcomes. Basic research in ethnicity and smoking is needed to develop culturally appropriate anti-smoking programs and policies (Edwards, 1995; Edwards & MacMillan, 1990). Acculturation, a process that takes place after immigration when immigrants adopt the language and are incorporated into the cultural life of the host society (Berry, 1980; Berry, 1984; Berry, 1997), may have implications for antismoking programming and policy formation aimed at ethnic communities (Edwards, 1995).

This thesis will examine the relationship between acculturation and beliefs about the effectiveness of various sources of support for quitting smoking using data from an
Ontario telephone survey of Arabic and Chinese immigrants (Ferrence et al., 1996). An understanding of the relationship between acculturation and immigrant perceptions of sources of support for quitting smoking is particularly important in tobacco education since tobacco control interventions distribute information by using a variety of sources (Marin, 1996). The sources of support examined in this thesis include restrictions against smoking in public places, advice from a doctor or health professional, advertising about the negative health consequences of smoking, support from family, and support from the religious community.

The proportion of immigrants who smoke increases with time lived in Canada (Chen et al., 1996). The association between acculturation and smoking behavior has been observed in many studies (Marin et al., 1989; Moeschberger et al., 1997; Palinkas et al., 1993; Reed et al., 1982; Wolff & Portis, 1996). A few studies have focussed on the relationship between acculturation and smoking-related beliefs (Palinkas et al., 1993; Marin et al., 1989; Marin, 1996; Ferrence et al., 1996). These investigations have shown that less acculturated ethnic group members are less aware of the presence of smoking cessation programs (Marin et al., 1989), the addictiveness of cigarettes (Palinkas et al., 1993), and the dangers of smoking (Ferrence et al., 1996). In a study conducted in the United States, Marin (1996) showed that the level of acculturation was associated with perceived quality of sources and channels of information regarding cigarette smoking. However, no Canadian investigations have examined the association between level of acculturation of immigrants and perceptions of sources of support to help people quit smoking. This thesis will contribute to reducing that knowledge gap.
Chapter II
Review of Literature

The Acculturation Model

Acculturation refers to the cultural learning that occurs when immigrants come into contact with a new group, nation, or culture (Redfield et al., 1936; Gordon, 1964). Although the acculturation process was conceived as an interactive process resulting in changes in both cultural systems (Redfield et al., 1936), it is usually confined to the experience of members of the minority group towards the majority group's culture (Palinkas et al., 1993). The process of acculturation is associated with increased stress, which can influence health behaviors and health status (Edwards, 1995). Because of this relationship, researchers use the acculturation model to explain the relationship between ethnicity and health-related behaviors (Edwards, 1995).

Acculturation requires the contact of at least two autonomous ethnic groups, and a change in at least one of the ethnic groups from the contact (Berry, 1980; Berry, 1984; Berry, 1997). It has three characteristic phases: contact, conflict, and adaptation (Berry, 1980; Berry, 1984; Berry, 1997). Contact is a prerequisite for acculturation, conflict takes place when there is some degree of resistance to cultural change, and adaptation is a mechanism used by individuals and groups to reduce conflict (Berry, 1980; Berry, 1984; Berry, 1997). Initially, acculturation was defined as a linear process; however, a compelling body of evidence shows a nonlinear process of change (Berry, 1984; Rumbaut, 1997). Berry's (1997) model assumes that acculturation is a nonlinear process.

According to Berry (1997), cultural relations can assume five forms: integration, assimilation, segregation, separation, and deculturation. As illustrated in Table 1,
integration occurs when there is maintenance of cultural integrity as well as the movement to become an integral part of the larger society (Berry, 1997). In contrast, assimilation is a phenomenon that takes place when one relinquishes one's own cultural identity and moves towards the cultural identity of the larger society (Table 1) (Berry, 1997). Separation and segregation reflect the situation that occurs when there is preservation of a traditional way of life outside full participation in the larger society (Table 1) (Berry, 1997). In particular, separation is a result of one's own desire to lead an independent existence outside the host society (Berry, 1997). In comparison, segregation is a pattern that is imposed by the host society (Berry, 1997). Lastly, deculturation is a complex phenomenon that takes place when one has a loss of cultural identity in association with striking out against the host society (Table 1) (Berry, 1997). The Marin et al. (1987) scale is used to measure the level of acculturation in this thesis.

<table>
<thead>
<tr>
<th>Question 2: Are positive relations with the larger society of value, and to be sought?</th>
<th>Question 1: Are cultural identity and customs of value, and to be retained?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>Integration</td>
</tr>
<tr>
<td>No</td>
<td>Assimilation</td>
</tr>
<tr>
<td>Yes</td>
<td>Segregation-separation</td>
</tr>
<tr>
<td>No</td>
<td>Deculturation</td>
</tr>
</tbody>
</table>

Measuring the Level of Acculturation

The Marin et al. (1987) scale, in Appendix 2, encompasses factors associated with acculturation including the language one reads and speaks and uses as a child, the language one thinks with, and the language one uses with friends (Marin et al., 1987). In addition, the acculturation scale includes ethnicity of close friends, ethnicity of friends
one prefers to attend events with, ethnicity of friends one visits and is visited by, and preferred ethnicity of child’s friends (Marin et al., 1987). In a population of Hispanics and non-Hispanics, the Marin et al. (1987) scale demonstrated strong reliability (alpha coefficient = 0.92). Also, the scale is negatively correlated with age at immigration (Ferrence et al., 1996) and time since immigration (Marin et al., 1987), suggesting this scale has good criterion validity.

Unlike other acculturation scales, the Marin et al. (1987) scale does not use sociodemographic characteristics to measure the level of acculturation. Thus, the high criterion validity of the Marin et al. (1987) scale is attributed to strong psychometric properties, rather than the inclusion of the validation criterion within the actual scale. For instance, acculturation level has been measured in terms of age at immigration (Goldlust & Richmond, 1977) and length of residence in the new culture (Danzinger, 1971; Goldlust & Richmond, 1978; Wolfgang & Josefowitz, 1979; Smith, 1980). By using this as the only measure of acculturation, one is assuming that the process of acculturation is uniform for all individuals, when this may not be the case (Hrboticky, 1981).

Researchers also use language orientation alone as a measure of the level of acculturation (Palinkas et al., 1993; Epstein et al., 1998; Gottlieb & Richmond, 1978; Campbell et al., 1997). This method assumes that the English language capacity of recent immigrants is zero, when many individuals already speak English before immigration (Rumbaut, 1997). In the Marin et al. (1987) scale used in this thesis, language spoken is one of many indicators of the level of acculturation. In addition to using a valid measure of the level of acculturation, providing a clear and concise definition of ethnicity is essential (Isajiw, 1980; Edwards, 1992).
Definition of Ethnicity

One of the most difficult tasks in conducting cultural factors research is deciding which operational definition of ethnicity to use for the purpose of study (Edwards, 1992). Some researchers fail to provide a working definition of ethnicity despite an obvious need for it (Edwards, 1992). The concept of ethnicity can be defined objectively and subjectively (Isajiw et al., 1980). For instance, country of origin is an objective definition since it is related to a common national or geographic origin (Isajiw et al., 1980). Because it focuses on the cultural identity of individuals, self-identification is a subjective method of defining ethnicity (Isajiw et al., 1980). The parent study of this thesis (Ferrence et al., 1996) employed a clear operational definition of ethnicity by defining Arabic and Chinese ethnic groups by country of origin, surnames, and self-identification. Furthermore, it used specific, rather than broad, ethnic categories (Ferrence et al., 1996). Studies that separate persons into more precise ethnic categories exhibit more strength than studies that do not (Edwards, 1992). When examining the relationship between acculturation and smoking, most investigations do not include the immigration status of participants (Marin et al., 1989; Moeschberger et al., 1997; Palinkas et al., 1993; Reed et al., 1982; Wolff & Portis, 1996). This study is unique because it only includes first generation immigrants. As a result, one can understand how the process of adapting to the values and customs of a new country is related to beliefs about the effectiveness of various sources of support to help smokers quit.
Ethnic Programming

According to Edwards and MacMillan (1990), most smoking prevention and cessation programs have been designed and implemented on the basis of needs assessments conducted among the dominant cultural group. However, assessments involving other ethnic groups show that there is a need for culturally targeted antismoking programming (US Department of Human Health Services, 1998; Jenkins et al., 1990; Vander Martin et al., 1990). In a review of smoking in adolescent ethnic populations, Yang (1997) concluded that minority ethnic populations are less likely to be smokers than their majority counterparts. Hence, Yang (1997) suggested that an increased understanding of smoking behavior among adolescents from different ethnic backgrounds would have implications for health promotion and educational programs.

Members of some ethnic groups are less likely than the general population to indicate concern about the negative health consequences of smoking, and are less likely to believe that quitting leads to significant health benefits (US Department of Human Health Services, 1998; Ferrence et al., 1996; Jenkins et al., 1990; Vander Martin et al., 1990).

Ferrence et al. (1996) showed that ethnicity was related to beliefs about smoking. For instance, 52% of Arabic smokers indicated that they smoked to relax, compared to 65% of Chinese smokers (Ferrence et al., 1996). Also, Arabic respondents were more likely than Chinese respondents to feel that smoking caused more harm than good
(Ferrence et al., 1996). In addition, Chinese respondents were more likely than Arabic respondents to believe that smoking could cause problems for nonsmokers.

For the purpose of describing differences in the attitudes and behaviors of ‘white’, ‘black’, Hispanic, and Asian medical patients who smoke, Vander Martin and colleagues (1990) surveyed 2,835 patients of primary care physicians who were participating in a controlled trial for smoking cessation. In this study, ‘black’ smokers obtained less pleasure from smoking and expressed less concern about the negative health consequences of smoking, compared to ‘white’ smokers (Vander Martin et al., 1990). Also, Asian and Hispanic smokers were more likely than ‘white’ smokers to indicate concern over smoking in front of their children (Vander Martin et al., 1990). Jenkins and colleagues (1990) interviewed a random sample of 215 Vietnamese refugees to investigate their health knowledge and practices regarding cancer prevention. In this sample, 27% of Vietnamese participants did not know that cigarette smoking caused cancer (Jenkins et al., 1990). Vietnamese male cigarette smoking was significantly associated with not knowing that cigarette smoking causes cancer \( (p < 0.05) \) and with limited English proficiency \( (p < 0.01) \). Based upon their results, Vander Martin et al. (1990) and Jenkins et al. (1990) concluded that antismoking approaches tailored to ethnic differences among patients could potentially be more effective than generic programming.

Smoking cessation programs targeted to ethnic populations are more effective than non-targeted programs (Orleans et al., 1998; Jenkins et al., 1997). For example, Orleans and colleagues (1998) compared the effectiveness of tailored cancer information service counseling with standard counseling for African American smokers. A
significantly higher proportion of participants quit smoking in the tailored intervention group than in the standard intervention group (25.0 % vs. 15.4 %, p < 0.05). Jenkins et al. (1997) investigated the effectiveness of a 2-year media intervention specifically targeting Vietnamese American men in San Francisco. The odds of being a smoker post intervention were significantly lower (OR = 0.82, p <0.05), and the odds of being a quitter were significantly higher (OR = 1.65, p < 0.05) in San Francisco than in a comparison community (Jenkins et al., 1997). These findings suggest that programs that specifically target a multi-ethnic population are more effective than general programs.

Since acculturation is related to the degree to which a person is integrated into mainstream culture, research examining the relationship between acculturation and smoking related beliefs could have implications for the development of anti-smoking programs specifically targeting immigrants to Canada.

**Immigration to Canada**

Research focusing on immigrant perceptions of health promotion interventions is important because, throughout Canada’s history, immigrants have composed an important component of the population. The immigrant population represented 16 % (4.3 million persons) of Canada’s population in 1991 (Badets & Chui, 1994). Canada has experienced a shift in source countries in the last few decades (Chui & Devereaux, 1995). European countries were the leading source of immigrants before the 1970s (Chui & Devereaux, 1995), but since that time period, Asia, Central and South America, the Caribbean, and Africa accounted for the majority of immigrant countries of origin (Chui & Devereaux, 1995). Among immigrants who did not report British or French origins in the 1991 census, 38 % were of European origin, 22 % were of Asian ancestry, 4 % were
of West Asian or Arab origin, and 3% were of 'Black' ancestry (Badets & Chui, 1994). It is clear that immigrants comprise an important segment in Canada’s multicultural mosaic. Even though health planners stress the importance of determining the impact of multiculturism on health behaviors, there is little research examining the factors involved in tobacco use among immigrants to Canada (Edwards, 1990).

**Immigration & Health in Canada**

A study was carried out to compare the health behaviors of immigrants to the Canadian-born population (Chen et al., 1996). According to Chen and colleagues (1996), the "healthy immigrant effect" that is present in other countries is also present in Canada. Immigrants to Canada are generally healthier than Canadian-born residents (Chen et al., 1996). Recent immigrants are less likely than the Canadian-born population to have chronic conditions or disabilities (Chen et al., 1996). In particular, never smoking is more common among immigrants compared to the Canadian-born population. Nevertheless, since the proportion of immigrants who smoke generally increases with time in Canada (Chen et al., 1996), it is imperative to target antismoking interventions to the immigrant population.

Chen and colleagues (1996) postulated three reasons for the occurrence of the "healthy immigrant" phenomenon in Canada. Firstly, people in good health are more inclined to emigrate than people in poor health (Chen et al., 1996). Secondly, employability, a factor assessed in granting permission to immigrate to Canada, requires a certain level of health (Chen et al., 1996). Lastly, potential immigrants to Canada participate in a screening that ensures they do not suffer from serious medical conditions (Chen et al., 1996).
Immigration & Canadian Healthcare Utilization

In their analyses of reported data from the 1994-95 National Population Health Survey, Chen et al. (1996) showed that long-term immigrant use of health services do not differ greatly from the Canadian born population. These results have been replicated in other investigations.

In a comparison between immigrants and native Quebecers use of medical services over a one year period, researchers found neither the average number of medical services used over a year by the two groups nor the number of users differed (Blais & Maiga, 1999). However, analyses of data from the Quebec Health Survey (1987) showed that immigrants visited specialists more often than native Quebecers. Specifically, 8% of ethnic group members visited a specialist six or more times, compared to 3% of native Quebecers (p = 0.001) (Blais & Maiga, 1999). Even though they did not measure cultural factors in their study, Blais and Maiga (1999) hypothesize that the higher use of specialist services by ethnic immigrants is related to cultural factors. For instance, cultural or communication barriers may cause difficulty in properly assessing the health concerns of a patient by a general practitioner (Blais & Maiga, 1999). This may cause a physician to refer the patient more quickly to a specialist for further investigation and treatment (Blais & Maiga, 1999). Blais and Maiga (1999) concluded that health care professionals should be sensitive to the particular needs of ethnic groups in order to provide them with accessible and appropriate services. A Report of the British Columbia Royal Commission on Health Care and Costs (1991) also suggests that immigrants are not obtaining the assistance they need when they use healthcare services. This report cites language and lack of cultural knowledge as barriers for effective healthcare utilization.
By examining the relationship between level of acculturation and immigrant perceptions of the helpfulness of sources of support for quitting smoking, one can suggest possible avenues for targeting immigrants with a low level of acculturation compared to immigrants with a high level of acculturation. This may increase immigrant utilization of health promotion and cessation services related to cigarette smoking.

**Acculturation & Health Behavior**

Research on the acculturation phenomena originated in cultural anthropology literature, and gained prominence in the field of epidemiology (Palinkas et al., 1995) when an association between acculturation and hypertension was demonstrated (Henry & Cassel, 1969). Since this seminal work, researchers have found acculturation to be associated with many health-related conditions including cancer (Polednak, 1992), diabetes (Hazuda et al., 1988), hypertension and coronary heart disease (Reed et al., 1982; Salmond et al., 1985), and mental illness (Berry & Kim, 1988; Roger et al., 1991; Shapiro et al., 1999; Weiss et al., 1999). Some of these associations can be attributed to the relationship between acculturation and health related behaviors such as alcohol consumption (Graves, 1967; Caetano, 1987; Adrian et al., 1995; Markides et al., 1996) and cigarette smoking (Klonoff & Landrine, 1999; Moeschberger et al., 1999; Epstein et al., 1998; Galanis et al., 1997; Campbell & Kaplan, 1997; Klonoff & Landrine, 1996; Wolff & Portis, 1996; Navarro, 1996; Markides & Black, 1996; Balcazar et al., 1995; Palinkas et al., 1993; Marin et al., 1989; Reed et al., 1982). Research focussing on acculturation and health-related behaviors shows that there is a need for clinical interventions and community-based programs to prevent the occurrence of disease in acculturating populations (Bell & Alcalay, 1997; Palinkas et al., 1993; Perez-Stable et al.,
Research has also shown that there is a relationship between health related beliefs and behavior with respect to level of acculturation.

**Acculturation & Health Related Beliefs & Behavior**

Prislin and colleagues (1998) examined the empirical relationship between the level of acculturation of Mexican American mothers in Texas and immunization status of their children between 3 and 24 months of age. They showed that acculturation contributed to inadequate immunization through less positive attitudes toward immunization, a diminished sense of parental responsibility for children's immunization, and more perceived barriers to immunization (Prislin et al. 1998). Therefore, research examining the relationship between level of acculturation and health related beliefs has implications for how the level of acculturation is associated with health related behavior. The present thesis will contribute to literature that health programmers can use to develop antismoking programs targeting acculturating populations in Canada.

**Acculturation & Smoking Behavior**

Even though the process of acculturation is significantly associated with smoking behavior (Klonoff & Landrine, 1999; Moeschberger et al., 1999; Epstein et al., 1998; Galanis et al., 1997; Campbell & Kaplan, 1997; Klonoff & Landrine, 1996; Wolff & Portis, 1996; Navarro, 1996; Markides & Black, 1996; Balcazar et al., 1995; Palinkas et al., 1993; Marin et al., 1989), the direction of the relationship is not consistent. The relationship between acculturation and smoking may vary by gender and ethnic group.

For instance, Marin and colleagues (1989) showed, in a cross-sectional study involving Hispanics in San Francisco, that there was a greater percentage of current and past smokers among highly acculturated women (37.5%) compared to less acculturated
women (26.7%). Similarly, in a cross-sectional study of Hispanics and non-Hispanics in California, Palinkas et al. (1993) demonstrated a positive association between level of acculturation and presence of smoking behavior in women. These results were further replicated when Wolff and Portis (1996), in a study involving pregnant Hispanic participants of the Hispanic Health and Nutrition Examination Survey, showed that American oriented women have a significantly higher prevalence of smoking during pregnancy compared to Mexican oriented women (26.6% versus 19.7%, p < 0.05).

The relationship between acculturation and smoking behavior differs in Hispanic men. In the Marin et al. (1989) study, there were a higher percentage of current and past smokers among men with a low level of acculturation (22.6%) compared to highly acculturated men (13.6%). Unlike Marin et al. (1989), Palinkas et al. (1993) did not find an association between acculturation and smoking behavior in Hispanic men. However, the Palinkas et al. (1993) study uses a language based measure of acculturation; language alone is a weak measure of acculturation (Marin et al., 1987). Overall, the investigations examining acculturation and smoking behavior among Hispanics suggest that the process of acculturation may be mediated by gender. Furthermore, the process of acculturation may be unique to different ethnic groups.

Reed et al. (1982) examined the relationship between acculturation and smoking behavior among males of Japanese ancestry who were part of the Honolulu Heart program cohort. Contrary to the relationship between acculturation and smoking behavior among Hispanic male participants in the Marin et al. (1989) study, Japanese male participants who were more “Western” smoked more cigarettes per day than male participants who were less assimilated (Reed et al., 1982). Similarly, using data from the
California Baseline Tobacco Survey, Navarro (1996) found that there was a positive association between smoking prevalence and the level of acculturation among Latino participants. Unlike Marin et al. (1989) and Palinkas et al. (1993), the same association between smoking behavior and acculturation was demonstrated among men and women.

The association between acculturation and smoking behavior irrespective of gender has also been demonstrated in African American populations (Klonoff & Landrine, 1996; Klonoff & Landrine, 1999). However, in this ethnic group, there is a negative association between the level of acculturation and smoking behavior (Klonoff & Landrine, 1996; Klonoff & Landrine, 1999). In a study involving African American adults on two large university campuses (Klonoff & Landrine, 1996), researchers found that the prevalence of smoking among traditional African Americans (33.2%) was significantly higher than the prevalence of smoking among acculturated African Americans (15.2%). These results were replicated in an investigation conducted three years later (Klonoff & Landrine, 1999).

It is clear that the role of acculturation in smoking behavior is a complicated one. The inconsistent relationship between level of acculturation and smoking behavior could be the result of the effects of acculturation being confounded with the effects of powerful competing factors, such as socioeconomic status, education, income and age that are associated with lifestyle behaviors (Balcazar et al., 1995). The investigations presented here did not control for the same confounding factors, and one investigation (Wolff & Portis 1996) did not control for any confounding factors. Marin et al. (1989) and Palinkas et al. (1993) controlled for potential confounding by gender through the method of stratification. Other potential confounders, such as age, education, income, and
marital status, were accounted for in the analysis (Marin et al., 1989; Moeschberger et al., 1997; Palinkas et al., 1993; Reed et al., 1982; Klonoff & Landrine, 1996; Klonoff & Landrine, 1999). Also, the studies presented in this review use different scales to measure level of acculturation. Contradictory relationships between level of acculturation and smoking might result from the utilization of different scales by various investigators.

The use of broad versus specific ethnic categories could also account for inconsistencies across studies, with respect to the direction of the association between level of acculturation and smoking behavior. Studies that use specific ethnic categories have a higher level of internal validity compared to investigations that use general ethnic categories. For instance, the general category of “Hispanics” includes Mexican-Americans, Puerto-Rican Americans and Cuban Americans. If all studies used specific ethnic categories, the relationship between level of acculturation and smoking behavior might have been more consistent. Lastly, none of the investigations described provided information about the immigration status or country of origin of participants. The process of acculturation may differ according to the immigration status and country of origin of participants. As a result, the relationship between level of acculturation and smoking behavior might vary according to the proportion of participants who are first generation immigrants.

Despite the inconsistency of the direction of the relationship between acculturation and smoking behavior across the different studies, research on acculturation and smoking behavior does pose some important implications for health practice since most studies found a significant relationship between acculturation and smoking
behavior. In planning culturally appropriate tobacco cessation and prevention programs, health care providers should take into consideration key factors such as acculturation (Klonoff & Landrine, 1999; Moeschberger et al., 1999; Epstein et al., 1998; Galanis et al., 1997; Campbell & Kaplan, 1997; Klonoff & Landrine, 1996; Wolff & Portis, 1996; Navarro, 1996; Markides & Black, 1996; Balcazar et al., 1995; Palinkas et al., 1993; Marin et al., 1989). Palinkas et al. (1993) indicate that there is a need for specific forms of clinical interventions and community based programs to prevent the occurrence of chronic smoking behavior in acculturating populations. In order to plan these programs, research about the relationship between acculturation and smoking related beliefs is important.

**Acculturation and Smoking-Related Beliefs**

Information obtained from outside sources and direct observation form the foundation of one’s beliefs (Fishbein & Ajzen, 1975). An individual’s beliefs ultimately are the basis of his or her attitudes, intentions, and behaviors (Fishbein & Ajzen, 1975). Current data from China indicate that 61 percent of Chinese men are smokers, while 7 percent of Chinese women smoke (Brooks, 1995). Investigators have shown that foreign cigarettes have become a status symbol in China, since a package of Malboros can cost the equivalent of a day’s salary for some workers (Brooks, 1995). Furthermore, exchange of cigarettes is embedded within business contacts and the initiation and maintenance of interpersonal relationships (Edwards & MacMillan, 1990). The smoking epidemic in China may be partly related to the belief that tobacco use is a status symbol and a form of “social cement” (Edwards & MacMillan, 1990; Brooks, 1995). Recently,
scientists have focused on the relationship between acculturation and beliefs about smoking.

Ferrence et al. (1996) found that, among Arabic participants, those who believe that smoking can cause problems for nonsmokers are more acculturated than those who do not hold this belief. In addition to investigating the relationship between acculturation and smoking-related behavior, Palinkas et al. (1993) examined the relationship between acculturation and smoking-related beliefs among Hispanic and non-Hispanic ‘white’ respondents. In this study, Spanish-speaking Hispanics who were considered to have a low level of acculturation were most likely to believe in the harmful effects of smoking (Palinkas et al., 1993). However, Spanish-speaking Hispanics were also most likely to believe that smoking was not addictive, they were not addicted to cigarettes, and smoking is something one should try at least once (Palinkas et al., 1993). Campbell and colleagues (1997) examined the relationship between acculturation, as measured by a language-based indicator, and the cigarette smoking beliefs of young Latinas (aged 14-24 years) who were clients at two family planning clinics in Los Angeles County. Compared to Latinas with a Spanish-language orientation, Latinas with an English-language orientation were less likely to believe that it is safe to smoke for 1-2 years (OR = 0.57, p < 0.05) (Campbell et al., 1997). Also, Latinas with an English-language orientation were less likely to be disturbed by secondhand smoke (OR = 0.55, p < 0.01). Taken together, these studies show that smoking-related beliefs vary by level of acculturation (Palinkas et al., 1993; Ferrence et al., 1996; Campbell et al., 1997).

Palinkas et al. (1993) and Campbell et al. (1997) suggest that smoking prevention and cessation programs should target individuals with a low level of acculturation; however,
they do not specify how to do this. This is possible by examining the relationship between level of acculturation and perceptions of sources of support to help smokers quit. Studies analyzing the relationship between acculturation and smoking-related behavior and beliefs have seldom examined the relationship between level of acculturation and beliefs about sources of support to assist smokers in quitting. Nevertheless, some data are available on acculturation and perceptions of channels and sources of health messages regarding cigarette smoking (Marin, 1996). Marin (1996) interviewed a random sample of participants from two communities of urban Hispanics in San Francisco and Houston about various sources and channels of information regarding cigarette smoking, and compared their perceptions with those of non-Hispanic ‘whites’. Greater proportions of low-acculturated Hispanic respondents rated various channels, including printed media and television news, as credible and as having behavior change power than did the more acculturated (Marin, 1996). When focusing on perceptions of sources of information on cigarette smoking, a greater proportion of low-acculturated Hispanics, compared to high-acculturated Hispanics and non-Hispanic ‘whites’, considered a priest or minister and a friend or peer to have credibility, expertise, trustworthiness, and behavior motivating power (Marin, 1996). Based upon these results, Marin (1996) suggests that friends and peers of smokers should be trained in culturally appropriate approaches to provide motivating messages encouraging smokers to obtain information about quitting. Marin (1996) also suggests that priests and ministers serving Hispanic communities should be trained to shape positive health behaviors to help smokers quit.
Predictors of Smoking-related Beliefs

In order to investigate the relationship between acculturation and perceptions of the helpfulness of various sources of support for quitting smoking, the effects of other variables associated with smoking related beliefs have to be controlled. Klesges et al. (1988) investigated smoking-related knowledge and beliefs and their relationship to smoking status in a random-digit dialing telephone survey of smokers and nonsmokers in Fargo, North Dakota and Memphis, Tennessee. Using a Smoking Attitudes Survey that assesses generalized health beliefs and health-related problems associated with smoking, Klesges et al. (1988) found that education, race, gender, smoking status, and income were independent predictors of beliefs related to smoking. Compared to nonsmokers, smokers had less knowledge and were less concerned about the health consequences of smoking (Klesges et al., 1988). In a population survey to restrict smoking in Ontario, Pederson and colleagues (1987) found that never and former smokers were more restrictive in their attitudes than current smokers.

Marin and colleagues (1992) also examined the association between beliefs about smoking and health attitudes toward tobacco control measures in a representative sample of adult South Africans. They found that a high percentage (21.6 %) of the youngest age group (18-25 years old) and 24.3 % of participants over the age of 65 were unsure about the health effects of active and passive smoking respectively. In addition, knowledge of the effects of smoking on health was inversely related to participants’ education level (Marin et al., 1992).
Summary of Literature

In conclusion, research conducted in the United States has shown that acculturation is related to smoking-related behavior and beliefs. Public health researchers have suggested that antismoking programming needs to be culturally meaningful. There is no Canadian literature focusing on acculturation and beliefs about sources of support to help smokers quit. Research examining this relationship may be useful for the development of antismoking interventions specifically targeting immigrants to Canada. Immigrants with a low level of acculturation may need to be targeted differently than immigrants with a high level of acculturation or the general population. In order to determine how to optimally target low-acculturated immigrants, it is important to assess whether perceptions of sources of support for smoking cessation are related to the level of acculturation of immigrants to Canada. Consequently, it is appropriate for a comprehensive investigation of the relationship between the level of acculturation of immigrants to Canada and beliefs about the effectiveness of various sources of support to help smokers quit.
Chapter III
Present Study

Ferrence, Brewster, Edwards, Joseph, & Northrup (1996), at the Ontario Tobacco Research Unit of the Centre for Addiction and Mental Health, carried out the parent study of this thesis. The investigation involved a telephone survey of Arabic and Chinese communities in Toronto (Ferrence et al., 1996).

Choice of Ethnic Groups

These two ethnic groups were chosen because of high rates of recent immigration, disparate prevalence of smoking, disparate gender smoking rates, and differences in established communities in Canada (Millar, 1992; Ferrence et al., 1996). Millar (1992) obtained information on the smoking behavior of foreign-born populations compared to native populations. Before Millar (1992), there was very little information available about the smoking patterns of immigrants to Canada. After this paper, there has been no Canadian literature published that specifically determines the smoking patterns of the foreign-born population. Using data from the Survey of Smoking Patterns which was conducted by Statistics Canada in 1990, Millar (1992) showed that 33% of Canadian residents from Arabic countries smoke, compared to 11% of Canadian residents from Chinese countries. Also, 40% of Arabic men and 25% of Arabic women smoke, while 20% of Chinese men and only 2% of Chinese women smoke (Millar, 1992). In general, there are several well established Chinese communities in Toronto, while the Arabic communities are more dispersed (Ferrence et al., 1996).
Sources of Support for Quitting Smoking

The sources of support for quitting smoking examined in this thesis include restrictions against smoking in public places, family support, advice from a doctor or health professional, religious community support, and advertising that shows that smoking is unhealthy. All of these sources of support have previously been shown to help smokers quit (Kottkete et al. 1988; Brier & Rigotti, 1992; MMWR, 1993; Beardall & Edwards, 1994; Hurt et al. 1994, Marin & Gamba, 1997). Since religious community support and family support focus on relationships within the ethnic community, Berry’s model (1980, 1984, 1997) predicts that these sources of support for smoking cessation will be more culturally meaningful to immigrants who are less integrated into the larger host society. In contrast, restrictions against smoking in public places, advice from a doctor or health professional, and advertising about the dangers of smoking is not expected to be culturally meaningful to immigrants with a low level of acculturation.

Objectives

General Objective

To determine whether level of acculturation, among Arab and Chinese immigrants, is associated with beliefs about the effectiveness of various sources of support to help smokers quit.

Specific Objectives

Determine whether level of acculturation, among Arab and Chinese immigrants, is associated with beliefs about the following sources of support (Appendix 2):

1. restrictions against smoking in public places
2. support from family
3. advice from a doctor/health professional
4. support from the religious community
5. advertising that shows smoking is unhealthy

Hypotheses

Based upon current knowledge described in the literature review, it is hypothesized that level of acculturation is associated with beliefs about the effectiveness of various sources of support to help smokers quit. For example:

1. There is a positive association between level of acculturation and the belief that restrictions against smoking in public places, advice from public health practitioners, and health campaigns support smoking cessation.

2. There is a negative association between level of acculturation and indicating that support from family and the religious community are effective in helping smokers quit.
Chapter IV
Methods

Data Collection

This thesis uses data from an earlier cross-sectional telephone survey of Arabic and Chinese immigrants in Toronto. A copy of thesis-relevant questions is provided in Appendix 1 (Ferrence et al., 1996). Participants were immigrants to Canada from Arabic and Chinese ethnic groups defined by self-identification and country of origin:

Arabic: Algeria, Bahrain, Egypt, Gaza Strip, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisian, United Arab Emirates, West Bank, Yemen.

Chinese: Hong Kong, Macau, Mainland China, Taiwan.

All participants were at least 18 years of age at the time of the survey, and at least 12 years old when they immigrated to Canada.

Surnames were used to identify members of Arabic and Chinese ethnic groups. Public health researchers have previously successfully used surnames to identify members of ethnic groups (Cook et al., 1971; Clodman et al., 1988). This method of selecting a sampling frame excludes persons who have uncommon names, and persons who have changed their names including women who have married (Ferrence et al., 1996). However, surnames provide a more complete coverage of the population than convenience samples and are more financially feasible than true probability samples (Ferrence et al., 1996). For both groups, surname dictionaries were used to identify surnames (Du Ruofu, 1986; Kormos et al., 1992). Also, surname directories (e.g. 1994-95 “Arabic Yellow Pages” for Toronto and 1994-95 Syrian Community Directory for
Toronto) were utilized for the Arabic sample. In the end, 30 Chinese surnames and 140 Arabic surnames were used as a sampling frame.

The Greater Toronto Area was searched for telephone numbers corresponding to the surnames by using a CDROM listing of phone numbers. Subsequently, interviewers called the numbers to determine if any household members were eligible to participate in the cross-sectional survey. For the purpose of maximizing the number of smokers in the sample, an eligible household member who smoked was selected as a participant. If there were no smoking household members, the eligible household member with the next birthday was selected as a participant. Selecting the household member with the next birthday as a participant prevented over-representation, in the study sample, of individuals who spent a greater amount of time at home. All interviews were conducted in Toronto by using Computer Assisted Telephone Interviewing techniques. The Computer-Assisted Survey Methods Program software, developed at the University of California, was used.

Refusals were called a second time in order to maximize response rate. As a result, 24% of the refusals completed the interview after declining to participate in a previous contact. Initial refusals constituted 10% of the data set. Response rate, calculated as completions over the known number of eligible households, was 85%.

932 interviews were completed, 482 interviews involved Arabic participants and 450 interviews involved Chinese participants. The majority of interviews were completed in English (70%); however, a large proportion of interviews involving Chinese participants (43%) were completed in Cantonese or Mandarin while 18% of interviews involving Arabic participants were completed in Arabic.
Data Analyses Strategy

Overall Description of Arabic and Chinese Samples

The Arabic and Chinese ethnic groups were compared with regards to gender, smoking status, education, and age. These calculations were conducted using SPSS Version 8.0 (SPSS Inc., 1997).

Comparison of Participants Included to Not Included in Regression Analyses

Only participants with complete information on gender, smoking status, education, age, level of acculturation, and perceptions about the helpfulness of various sources of support for quitting smoking were included in the data analyses. Also, participants who respond “don’t know” to questions about the helpfulness of various sources of support for quitting smoking were excluded from the final analyses for that source of support. Analyses were conducted separately for Arabic and Chinese ethnic groups. Gender, smoking status, and education level of participants included in the analyses was compared with participants not included by performing Mantel-Haenzel Chi-square tests. Age and Marin acculturation score of participants included in the analyses was compared to participants not included by conducting modified t-tests, which assume unequal variance. These tests were conducted using SAS Version 7.0 (SAS Inc., 1998).

Descriptive Statistics

Descriptive statistics were calculated using SAS Version 7.0 (SAS Inc., 1998). For each analyses corresponding to a particular source of support for quitting, samples included in the analysis were described with respect to proportion of participants who are males and females, proportion of participants who are current nonsmokers and smokers,
mean age, mean Marin acculturation score, and proportion of participants who perceive the various sources of support for quitting smoking to be helpful and not helpful. With respect to restrictions against smoking in public places and advice from a doctor or health professional, the proportion of Arabic and Chinese participants who found these particular sources of support to be helpful was compared to results from Ashley et al. (1996). In Ashley et al. (1996), current smokers, instead of smokers and nonsmokers, were asked whether a particular method such as doctor’s advice on quitting and restrictions against smoking would make it easier to quit. This comparison is used to determine how similar Arabic and Chinese samples in this thesis are to the general Ontario population.

Regression Analyses

Regression analyses was performed using SAS Version 7.0 (SAS Inc., 1998).

Outcomes

The outcomes correspond to questions about perceptions of the helpfulness of sources of support for quitting smoking including restrictions against smoking in public places, support from family, advice from a doctor or health professional, support from the religious community, and advertising showing that smoking is bad for your health (Appendix 1). The responses to the questions are ordinal: “1. Very helpful”, “2. Somewhat helpful”, “3. Not very helpful, “4. Not at all helpful”. However for the purpose of analyses, the outcomes are binary where “1” and “2” were combined for a “helpful” response, and “3” and “4” were combined for a “not helpful” response.
**Covariates**

The main covariate in the analyses is the level of acculturation measured by the Marin et al. 1987 scale (Appendix 2). The alpha model of reliability was used to assess the internal consistency of the Marin et al. (1987) scale among Arabic and Chinese participants in this study. This model is based on the average inter-item correlation. SPSS Version 8.0 (SPSS Inc., 1997) was employed in calculating the alpha coefficient. This analysis was performed separately for Arabic and Chinese samples. Additional covariates include smoking status and demographic covariates, which are gender, age, and education level. A detailed description of these covariates is provided in Appendix 3.

**Testing for Multicollinearity**

Correlation analyses was used to determine if covariates were related to each other; therefore, testing for multicollinearity. Multicollinearity leads to unstable models caused by increased standard errors associated with parameter coefficients (Corey, 1999). Large standard errors due to multicollinearity result in a decreased probability of rejecting the null hypothesis and wide confidence intervals (Corey, 1999). Indeed, it is suggested that variables with a bivariate correlation of greater than 0.80 in the same analyses be avoided (Wulder, 2000).

**Logistic Regression**

Since the outcomes in this thesis are binary and covariates are both continuous and categorical, logistic regression is the appropriate model to determine the relationship between the level of acculturation and perceptions about the helpfulness of various source of support for quitting smoking (Pagano & Gauvreu, 1993; Norman & Streiner, 1994). For each outcome corresponding to a given source of support for quitting smoking,
Univariate logistic regression was performed to determine the relationship between the level of acculturation and beliefs about a particular source of support, while not controlling for smoking status and demographic covariates. Univariate logistic regression was also performed to determine the relationship between perceptions about various sources of support and smoking status, gender, age, and education level, separately. Subsequently, multivariate logistic regression was performed to determine the relationship between the level of acculturation and beliefs about the helpfulness of various sources of support, while adjusting for smoking status and demographic covariates.

Effect modification, also referred to as interaction, is a concern in this thesis. Effect modification could result when the relationship between the level of acculturation and perceptions about various sources of support changes because of the presence of another covariate (Norman & Streiner, 1998). The following interactions were tested: acculturation X smoking status; acculturation X age; acculturation X gender; acculturation X education. Each of these interactions were tested individually in the multivariate models corresponding to each outcome. When effect modification occurred, analyses were conducted separately for a sub-sample of participants, corresponding to each level of the effect modifier.
Chapter V
Results

As indicated in the previous chapter, only participants with complete data were included in the logistic regression analyses. Out of 482 Arabic participants involved in the cross-sectional survey, 6 % (n = 27) were excluded because of incomplete data on age, 2 % (n = 11) were excluded because of incomplete data on education, and 1 % (n = 5) were excluded because of incomplete data on level of acculturation. Out of 450 Chinese participants, 8 % (n = 36) were excluded because of incomplete data on age, 6 % (n = 26) were excluded because of incomplete data on education, and 0.4 % (n = 2) were excluded because of incomplete data on level of acculturation. No participants were excluded because of incomplete data on smoking status. Appendix 4 includes tables that compare participants included in the logistic regression analyses and participants not included in the logistic regression analyses. Participants included are compared to participants not included with respect to gender distribution, smoking status distribution, education level distribution, mean age, and mean acculturation score. Only differences which are significant (p < 0.05) are outlined in this chapter. Also, correlation coefficients between each of the covariates included in the multivariate models were calculated (data not presented here). Since none of the correlations exceeded 0.8, multicollinearity is not a concern in this thesis (Wulder, 2000).

The internal reliability of the Marin et al. 1987 acculturation scale, as reflected in the alpha coefficient, was very high in both the Arabic (alpha = 0.84) and Chinese (alpha = 0.89) ethnic groups in this study.
Overall Demographic Description of Arabic & Chinese Samples

Since smokers were over-sampled and men were more likely to smoke than women, men were over-represented in the sample, where 56 % of Arabic participants were male (n = 269) and 53 % of Chinese participants were male (n = 239). The average age of the Arabic respondents was 42.25 (SD = 13.27), while the average age of Chinese respondents was 45.40 (SD = 16.25). 12 % (n = 58) of Arabic participants did not complete high school, while 19 % (n = 86) of Chinese participants did not complete high school. 19 % (n = 92) of Arabic participants completed high school as their highest level of education, and 26 % (n = 115) of Chinese participants completed high school as their highest level of education. 23 % (n = 110) of Arabic participants had a college or technical degree, and 17 % (n = 77) of Chinese participants had a college or technical degree. 44 % (n = 211) of Arabic respondents completed a university degree, while 32 % (n = 146) of Chinese respondents completed a university degree. 50 % (n = 248) of Arabic participants were never smokers, 22 % (n = 104) were former smokers, and 29 % (n = 138) were current smokers. 78 % (n = 351) of Chinese participants were never smokers, 8 % (n = 36) were former smokers, and 14 % (n = 63) were current smokers. This is summarized in Table 1.
Table 1. Overall demographic description of Arabic (n = 482) and Chinese (n = 450) samples.

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>Arabic Ethnic Group</th>
<th>Chinese Ethnic Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56 % (n = 269)</td>
<td>53 % (n = 239)</td>
</tr>
<tr>
<td>Female</td>
<td>44 % (n = 213)</td>
<td>47 % (n = 211)</td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never smokers</td>
<td>50 % (n = 248)</td>
<td>78 % (n = 351)</td>
</tr>
<tr>
<td>Former smokers</td>
<td>22 % (n = 104)</td>
<td>8 % (n = 36)</td>
</tr>
<tr>
<td>Current smokers</td>
<td>29 % (n = 138)</td>
<td>14 % (n = 63)</td>
</tr>
<tr>
<td>Highest Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; high school</td>
<td>12 % (n = 58)</td>
<td>19 % (n = 86)</td>
</tr>
<tr>
<td>= high school</td>
<td>19 % (n = 92)</td>
<td>26 % (n = 115)</td>
</tr>
<tr>
<td>= college/technical degree</td>
<td>23 % (n = 110)</td>
<td>17 % (n = 77)</td>
</tr>
<tr>
<td>= university degree</td>
<td>44 % (n = 211)</td>
<td>32 % (n = 146)</td>
</tr>
<tr>
<td>Mean age</td>
<td>42.25 (SD = 13.27)</td>
<td>45.40 (SD = 16.25)</td>
</tr>
</tbody>
</table>

Descriptive Statistics

Level of Acculturation & Perceptions of Effectiveness of Restrictions Against Smoking in Public Places to Help Smokers Quit

Arabic Ethnic Group

Out of 482 participants involved in the cross-sectional survey, 426 participants (88 %) had complete data on perceptions of helpfulness of restrictions against smoking in public places, gender, smoking status, education, age, and level of acculturation. In comparison, 56 participants (12 %) had incomplete data for at least one of these variables. 57 % (n = 244) of participants included in the logistic regression analyses were male, while 43 % (n = 182) were female. 71 % (n = 303) of these participants were currently nonsmokers, compared to 29 % (n = 123) who were currently smokers. 12 % (n = 51) of participants with complete data had less than a high school education, compared
to 88 % (n = 375) who had a high school education or greater. The mean age of these participants was 41.18 years (SD = 13.48), and the mean Marin acculturation score was 24.01 (SD = 7.67). 75 % (n = 319) of Arabic participants found restrictions against smoking in public places to be helpful for quitting smoking, while 25 % (n = 107) found these restrictions to not be helpful. 61 % (n = 84) of Arabic current smokers thought restrictions against smoking to be helpful for quitting, compared to 32 % of the Ontario population (Ashley et al. 1996).

Chinese Ethnic Group

Out of 450 participants involved in the cross-sectional survey, 374 participants (83 %) had complete date perceptions of helpfulness of restrictions against smoking in public places, gender, smoking status, education, age, and level of acculturation. In comparison, 76 participants (17 %) had incomplete data for at least one of these variables. 54 % (n = 201) of participants included in the logistic regression analyses were male, while 46 % (n = 173) were female. 85 % (n = 317) of these participants were currently nonsmokers, compared to 15 % (n = 56) who were currently smokers. 19 % (n = 374) of participants with complete data had less than a high school education, compared to 81 % (n = 304) who had a high school education or greater. The mean age of these participants was 43.52 (SD = 16.04), and the mean Marin acculturation score was 18.04 (SD = 5.95). 79 % (n = 297) of Chinese participants found restrictions against smoking in public places to be helpful for quitting smoking, while 21 % (n = 77) found these restrictions to not be helpful. 52 % (n = 33) of Chinese current smokers thought restrictions against smoking to be helpful for quitting smoking, compared to 32 % of the Ontario population (Ashley et al. 1996).
There was a significantly higher proportion of Chinese participants with a high school education or greater included in the regression analyses, involving perceptions of the effectiveness of restrictions against smoking in public places for helping smokers quit, than participants with a high school education or greater not included ($\chi^2 = 4.80, p < 0.05$). Furthermore, participants included in the logistic analyses were significantly younger than participants not included (t-value = 3.37, $p < 0.01$).

**Level of Acculturation & Perceptions of Effectiveness of Support from Family to Help Smokers Quit**

*Arabic Ethnic Group*

Out of 482 participants involved in the cross-sectional survey, 431 participants (89%) had complete data on perceptions of helpfulness of support from the family, gender, smoking status, education, age, and level of acculturation. In comparison, 51 participants (11%) had incomplete data for at least one of these variables. 56% ($n = 243$) of participants in the logistic regression analyses were male, and 44% ($n = 188$) were female. 71% ($n = 307$) of these participants were currently nonsmokers, compared to 29% ($n = 124$) who were currently smokers. 13% ($n = 54$) of participants with complete data had less than a high school education, and 87% ($n = 377$) had a high school education or greater. The mean age of these participants was 41.31 (SD = 13.29), and the mean Marin acculturation score was 23.86 (SD = 7.72). 77% ($n = 333$) of Arabic participants perceived support from family to be helpful for quitting smoking, compared to 23% ($n = 98$) of participants who found this source of support for quitting to not be helpful.
Chinese Ethnic Group

Out of 450 participants involved in the cross-sectional survey, 373 participants (83%) had complete data on perceptions of helpfulness of support from the family, gender, smoking status, education, age, and level of acculturation. In comparison, 77 participants (17%) had incomplete data for at least one of these variables. 53 % (n = 199) of participants included in the logistic regression analyses were male, and 47 % (n = 174) were female. 84 % (n = 315) of these participants were currently nonsmokers, compared to 16 % (n = 58) who were currently smokers. 19 % (n = 70) of participants with complete data had less than a high school education, and 81 % (n = 303) had a high school education or greater. The mean age of these participants was 43.63 (SD = 15.98), and the mean Marin acculturation score was 18.04 (SD = 5.98). 88 % (n = 327) of Chinese participants perceived support from family to be helpful for quitting smoking, compared to 12 % (n = 46) of participants who found this source of support to not be helpful.

There was a significantly higher proportion of Chinese smokers included in the regression analyses, involving perceptions about the effectiveness of family support for helping smokers quit, than smokers not included (χ² = 4.34, p < 0.05). Also, there was a significantly higher proportion of participants with a high school education or greater included in the logistic analyses than participants with a high school education or greater not included (χ² = 4.40, p < 0.05). Furthermore, participants included in the data analyses were significantly younger than participants not included (t-value = 2.74, p <0.01).
Level of Acculturation & Perceptions of Effectiveness of Advice from a Doctor or Health Professional to Help Smokers Quit

Arabic Ethnic Group

Out of 482 participants involved in the cross-sectional survey, 433 participants (90%) had complete data on perceptions of helpfulness of advice from a doctor or health professional, gender, smoking status, education, age, and level of acculturation. In comparison, 49 participants (10%) had incomplete data for at least one of these variables. 57% (n = 247) of participants included in the logistic regression analyses were male, and 43% (n = 186) were female. 71% (n = 306) of these participants were currently nonsmokers, compared to 29% (n = 12) who were currently smokers. 12% (n = 54) of participants with complete data had less than a high school education, and 88% (n = 379) had a high school education or greater. The mean age of these participants was 41.21 (SD = 13.40), and the mean Marin acculturation score was 23.92 (SD = 7.67). 78% (n = 338) of Arabic participants believed that advice from a doctor or health professional is helpful for quitting smoking, while 22% (n = 75) of participants did not believe that this advice could be helpful. 67% (n = 92) of Arabic current smokers thought advice from a doctor was helpful for quitting smoking, compared to 54% of the Ontario population.

Chinese Ethnic Group

Out of 450 participants involved in the cross-sectional survey, 371 participants (82%) had complete data on perceptions of helpfulness of advice from a doctor or health professional, gender, smoking status, education, age, and level of acculturation. In comparison, 79 participants (18%) had incomplete data for at least one of these
variables. 54% (n = 199) of participants included in the logistic regression analyses were male, and 46% (n = 172) were female. 84% (n = 313) of these participants were currently nonsmokers, compared to 16% (n = 58) who were currently smokers. 19% (n = 72) of participants with complete data had less than a high school education, and 81% (n = 299) had a high school education or greater. The mean age of these participants was 43.60 (SD = 16.01), and the mean Marin acculturation score was 18.05 (SD = 5.99). 80% (n = 296) of Chinese participants believed that advice from a doctor or health professional is helpful for quitting smoking, while 20% (n = 75) of participants did not believe that this advice could be helpful. 56% of Chinese current smokers thought advice from a doctor was helpful for quitting smoking, compared to 54% of the general population.

There was a significantly higher proportion of Chinese smokers included in the regression analyses, involving perceptions of the effectiveness of advice from a doctor or health professional for helping smokers quit, than participants not included ($\chi^2 = 3.94, p < 0.05$). Also, participants included in the data analyses were significantly younger than participants not included (t-value = 2.85, $p < 0.01$). Finally, participants included in the analyses had a significantly higher Marin acculturation score than participants not included (t-value = 1.99, $p < 0.05$).

**Level of Acculturation & Perceptions of Effectiveness of Support from the Religious Community to Help Smokers Quit**

**Arabic Ethnic Group**

Out of 482 participants involved in the cross-sectional survey, 411 participants (85%) had complete data on perceptions of helpfulness of support from the religious
community, gender, smoking status, education, age, and level of acculturation. In comparison, 71 participants (15%) had incomplete data for at least one of these variables. 57% (n = 234) of participants included in the logistic regression analyses were male, compared to 43% (n = 177) who were female. 71% (n = 293) of these participants were currently nonsmokers, compared to 29% (n = 118) who were currently smokers. 12% (n = 50) of participants with complete data had less than a high school education, and 88% (n = 361) had a high school education or greater. The mean age of these participants was 41.29 (SD = 13.43), and the mean Marin acculturation score was 23.55 (SD = 7.73). 50% (n = 207) of Arabic participants perceived support from the religious community to be helpful for quitting smoking, while 50% (n = 204) of participants did not believe that this support could be helpful.

Arabic participants included in the data analyses, involving perceptions about the effectiveness of support from the religious community to help smokers quit, had a significantly lower Marin acculturation score than participants not included (t-value = 3.16, p < 0.01).

*Chinese Ethnic Group*

Out of 450 participants involved in the cross-sectional survey, 337 participants (75%) had complete data on perceptions of helpfulness of support from the religious community, gender, smoking status, education, age, and level of acculturation. In comparison, 113 participants (25%) had incomplete data for at least one of these variables. 53% (n = 179) of participants in the logistic regression analyses were male, and 47% (n = 158) were female. 85% (n = 286) of these participants were currently nonsmokers, compared to 15% (n = 51) who were currently smokers. 17% (n = 58) of
participants with complete data had less than a high school education, and 83 % (n = 279) had a high school education or greater. The mean age of these participants was 43.84 (SD = 16.12), and the mean Marin acculturation score was 18.22 (SD = 6.02). 65 % (n = 220) of Chinese participants perceived support from the religious community to be helpful for quitting smoking, while 35 % (n = 117) of participants did not believe that this support could be helpful.

There was a significantly greater proportion of Chinese participants with a high school education or greater included in the analyses, involving perceptions about the effectiveness of religious community support for helping smokers quit, than participants with a high school education or greater not included (χ² = 9.57, p < 0.01). Furthermore, participants included in the logistic analyses had a significantly higher Marin acculturation score than participants not included (t-value = 2.64, p < 0.01).

**Level of Acculturation & Perceptions of Effectiveness of Advertising About the Dangers of Smoking to Help Smokers Quit**

**Arabic Ethnic Group**

Out of 482 participants involved in the cross-sectional survey, 433 participants (90 %) had complete data on perceptions of helpfulness of advertising about the dangers of smoking, gender, smoking status, education, age, and level of acculturation. In comparison, 49 participants (10 %) had incomplete data for at least one of these variables. 57 % (n = 246) of participants included in the logistic regression analyses were male, and 43 % (n = 187) were female. 71 % (n = 306) of these participants were currently nonsmokers, compared to 29 % (n = 127) who were currently smokers. 13 % (n = 56) of participants with complete data had less than a high school education, and 87 %
(n = 377) had a high school education or greater. The mean age of these participants was 41.17 (SD = 13.32), and the mean Marin acculturation score was 23.83 (SD = 7.76). 63 \% (n = 274) of Arabic participants perceived that advertising about the dangers of smoking is helpful for quitting smoking, while 37 \% (n = 159) of participants did not believe that this is helpful.

**Chinese Ethnic Group**

Out of 450 participants involved in the cross-sectional survey, 381 participants (85 \%) had complete data on perceptions of helpfulness of advertising about the dangers of smoking, gender, smoking status, education, age, and level of acculturation. In comparison, 69 participants (15 \%) had incomplete data for at least one of these variables. 53 \% (n = 201) of participants included in the logistic regression analyses were male, and 47 \% (n = 180) were female. 85 \% (n = 323) of these participants were currently nonsmokers, compared to 15 \% (n = 58) who were currently smokers. 20 \% (n = 75) of participants with complete data had less than a high school education, and 80 \% (n = 306) had a high school education or greater. The mean age of these participants was 43.90 (SD = 16.13), and the mean Marin acculturation score was 17.99 (SD = 5.98). 56 \% (n = 214) of Chinese participants perceived that advertising about the dangers of smoking is helpful for quitting smoking, while 44 \% (n = 167) of participants did not believe that this is helpful.

Chinese participants included in the logistic analyses, involving perceptions about the effectiveness of advertising about the dangers of smoking for helping smokers quit, were significantly younger than participants not included (t-value = 2.05, p < 0.05).
Logistic Regression Analyses

Logistic regression was the appropriate statistical procedure for the present model which attempted to predict a dichotomous variable, perceptions about the helpfulness of various sources of support for quitting smoking, by using both continuous and categorical predictor variables (Norman & Streiner, 1994). PROC LOGISTIC in SAS was used to perform logistic regression (SAS Institute Inc., 1998). Within PROC LOGISTIC, the units statement enables one to specify units of change for the explanatory variables so that customized odds ratios can be estimated (SAS Institute Inc., 1998). In order to estimate the customized odds ratio for Arabic participants, 10 units of change was specified for the level of acculturation covariate and 17 units of change was specified for the age covariate. In order to estimate the customized odds ratios for Chinese participants, 9.75 units of change was specified for the level of acculturation covariate and 22 units of change was specified for age covariate. These units of change were calculated by examining the distributions of acculturation scores and age of Arabic and Chinese participants, and subsequently subtracting the values at the 25 % quartile point from the values at the 75 % quartile point. This is shown in Tables 2 and 3.

Table 2. Quartile values of Marin Acculturation Score distribution among Arabic & Chinese immigrants.

<table>
<thead>
<tr>
<th>Quartile</th>
<th>Arabic Participants</th>
<th>Chinese Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 % Quartile</td>
<td>19.00</td>
<td>12.25</td>
</tr>
<tr>
<td>50 % Quartile</td>
<td>25.00</td>
<td>18.00</td>
</tr>
<tr>
<td>75 % Quartile</td>
<td>29.00</td>
<td>22.00</td>
</tr>
<tr>
<td>Units Used in Proc Logistic of SAS</td>
<td>10.00</td>
<td>9.75</td>
</tr>
</tbody>
</table>

Table 3. Quartile values of age distribution among Arabic & Chinese immigrants.

<table>
<thead>
<tr>
<th>Quartile</th>
<th>Arabic Participants</th>
<th>Chinese Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 % Quartile</td>
<td>33.00</td>
<td>34.00</td>
</tr>
<tr>
<td>50 % Quartile</td>
<td>40.00</td>
<td>43.00</td>
</tr>
<tr>
<td>75 % Quartile</td>
<td>50.00</td>
<td>56.00</td>
</tr>
<tr>
<td>Units Used in Proc Logistic of SAS</td>
<td>17.00</td>
<td>22.00</td>
</tr>
</tbody>
</table>
For the multivariate model, where acculturation is the main covariate and the effects of smoking status and demographic covariates is controlled for, all interactions between the level of acculturation and other covariates were tested. These interactions include: acculturation X smoking status; acculturation X age; acculturation X gender; acculturation X education. Only the significant interactions are reported in this chapter. For each of the five objectives, the subsequent tables (4-8) show the likelihood ratios, odds ratios, confidence intervals, and Hosmer and Lemeshow Goodness of Fit statistics, where appropriate, for the logistic models.

Objective 1

The first objective of the present study was to determine whether the level of acculturation is associated with beliefs about the effectiveness of restrictions against smoking in public places to help smokers quit. Univariate logistic regression was performed involving the level of acculturation, smoking status and demographic variables including age, gender, and education to predict perceptions about the effectiveness of restrictions against smoking in public places to help smokers quit. Subsequently, multivariate logistic regression was performed where the level of acculturation was the main covariate and the effects of smoking status and demographic covariates were controlled for.

Arabic Ethnic Group

Table 4 shows that when not controlling for other covariates, the level of acculturation, among Arabic participants, was significantly associated with perceptions about the effectiveness of restrictions against smoking in public places to help smokers
quit (OR = 0.62; 95% C.I. 0.46, 0.84). Arabic participants with a lower level of acculturation were more likely to perceive restrictions against smoking in public places to be helpful for quitting. This is contrary to what was hypothesized. Compared to smokers, current Arabic nonsmokers were more likely to perceive restrictions against smoking in public places to be helpful for quitting smoking (OR = 0.47; 95% C.I. 0.30, 0.75). Upon controlling for smoking status and demographic covariates, the level of acculturation was still significantly associated with perceptions about the ability of restrictions against smoking in public places to help smokers quit (OR = 0.62; 95% C.I. 0.45, 0.87).

**Chinese Ethnic Group**

Table 4 shows that when not controlling for other covariates, the level of acculturation, among Chinese participants, was not significantly associated with perceptions about the effectiveness of restrictions against smoking in public places to help smokers quit (OR = 0.91; 95% C.I. 0.62, 1.34). Compared to smokers, current Chinese nonsmokers were more likely to perceive restrictions against smoking in public places to be helpful for quitting smoking (OR = 0.25, 95% C.I. 0.14, 0.46). Older participants, compared to younger participants, were more likely to perceive restrictions against smoking in public places to be helpful for quitting smoking (OR = 2.18, 95% C.I. 1.45, 3.26). Upon controlling for smoking status and demographic covariates, the level of acculturation was not significantly associated with perceptions about the ability of restrictions against smoking in public places to help smokers quit (OR = 0.93; C.I. 0.58, 1.51). Table 4 shows that the multivariate model with the level of acculturation as the main covariate has a better fit than the univariate model with only the level of acculturation as the main covariate.
Table 4. Logistic regression analyses, involving Arabic and Chinese participants, of the relationship between the level of acculturation and perceptions about the effectiveness of restrictions against smoking in public places to help smokers quit.

<table>
<thead>
<tr>
<th>Model Covariate(s)</th>
<th>Arabic Participants (n = 426)</th>
<th>Chinese Participants (n = 374)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Likelihood Ratio ($\chi^2$) (Comparing to model with only intercept term)</td>
<td>Likelihood Ratio ($\chi^2$) (Comparing to model with only intercept term)</td>
</tr>
<tr>
<td></td>
<td>Odds Ratio</td>
<td>95% Confidence Interval</td>
</tr>
<tr>
<td>Level of Acculturation</td>
<td>9.92**</td>
<td>(units = 10)</td>
</tr>
<tr>
<td>Smoking Status</td>
<td>10.01**</td>
<td>(units = 10)</td>
</tr>
<tr>
<td>Age</td>
<td>1.30</td>
<td>(units = 17)</td>
</tr>
<tr>
<td>Gender</td>
<td>0.38</td>
<td>(units = 17)</td>
</tr>
<tr>
<td>Education Level</td>
<td>1.84</td>
<td>(units = 17)</td>
</tr>
<tr>
<td>All Covariates</td>
<td>20.01**</td>
<td>(units = 10)</td>
</tr>
</tbody>
</table>

*p < 0.05  
**p < 0.01  
***p < 0.001

1. current smokers compared to current nonsmokers  
2. females compared to males  
3. high school diploma or greater compared to no high school diploma  
4. odds ratio for the level of acculturation, while controlling for other covariates
Objective 2

The second objective of the present study was to determine whether the level of acculturation is associated with beliefs about the effectiveness of support from the family to help smokers quit. Univariate logistic regression was performed involving the level of acculturation, smoking status, and demographic variables including age, gender, and education to predict perceptions about the effectiveness of family support to help smokers quit. Subsequently, multivariate logistic regression was performed where the level of acculturation was the main covariate and the effects of smoking status and demographic covariates were controlled for.

Arabic Ethnic Group

Table 5 shows that when not controlling for other covariates, the level of acculturation among Arabic participants was significantly associated with perceptions about the effectiveness of support from the family to help smokers quit (OR = 1.76; 95 % C.I. 1.30, 2.38). Arabic participants with a higher level of acculturation are more likely to perceive support from the family to be helpful for quitting smoking. This was contrary to the hypothesis. Compared to smokers, current Arabic nonsmokers were more likely to perceive support from the family to be helpful for quitting smoking (OR = 0.37; 95 % C.I. 0.23, 0.59). Also, compared to older participants, younger participants were more likely to perceive that support from the family was helpful for quitting smoking (OR = 0.70; 95 % C.I. 0.51, 0.95). Compared to Arabic females, Arabic males were more likely to perceive support from the family to be helpful for quitting smoking (OR = 0.84; 95 % C.I. 0.75, 0.94). Furthermore, compared to Arabic participants without a high school education, participants with a high school education or greater were more likely to perceive support
from the family to be helpful for quitting smoking (OR = 2.99; 95 % C.I. 1.65, 5.42). When controlling for smoking status and demographic variables, the level of acculturation is marginally not significantly associated with perceptions about the ability of family support to help smokers quit (OR = 1.41; 95 % C.I. 0.98, 2.02; p = 0.06). Table 5 shows that the multivariate model with the level of acculturation as the main covariate had a better fit than the univariate model with only the level of acculturation as the covariate.

*Chinese Ethnic Group*

Table 5 shows that when not controlling for other covariates, the level of acculturation, among Chinese participants, was not significantly associated with perceptions about the effectiveness of support from the family to help smokers quit (OR = 1.23; 95 % C.I. 0.76, 2.01). Compared to smokers, current Chinese nonsmokers were more likely to perceive support from the family to be helpful for quitting smoking (OR = 0.15; 95 % C.I. 0.08, 0.30). Older participants, compared to younger participants, were more likely to perceive support from the family to be helpful for quitting smoking (OR = 1.61; 95 % C.I. 1.01, 2.57). After controlling for smoking status and demographic variables, the level of acculturation was still not associated with perceptions about the ability of family support to help smokers quit (OR = 1.23; 95 % C.I. 0.67, 2.27).
Table 5. Logistic regression analyses, involving Arabic and Chinese participants, of the relationship between the level of acculturation and perceptions about the effectiveness of support from the family to help smokers quit.

<table>
<thead>
<tr>
<th>Model Covariate(s)</th>
<th>Arabic Participants (n = 431)</th>
<th>Chinese Participants (n = 373)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Likelihood Ratio ($\chi^2$) (Comparing to model with only intercept term)</td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>Level of Acculturation</td>
<td>14.10*** (units = 10)</td>
<td>1.76*** (units = 10)</td>
</tr>
<tr>
<td>Smoking Status$^1$</td>
<td>17.18***</td>
<td>0.37*** (units = 10)</td>
</tr>
<tr>
<td>Age</td>
<td>5.06* (units = 17)</td>
<td>0.72* (units = 17)</td>
</tr>
<tr>
<td>Gender$^2$</td>
<td>9.37 ** (units = 17)</td>
<td>0.84** (units = 17)</td>
</tr>
<tr>
<td>Education Level$^3$</td>
<td>12.25***</td>
<td>2.99*** (units = 17)</td>
</tr>
<tr>
<td>All Covariates$^4$</td>
<td>45.38 *** (units = 10)</td>
<td>1.41 (units = 10)</td>
</tr>
</tbody>
</table>

*p < 0.05  
**p < 0.01  
***p < 0.001

1. current smokers compared to current nonsmokers  
2. females compared to males  
3. high school diploma or greater compared to no high school diploma  
4. odds ratio for the level of acculturation, while controlling for other covariates
Objective 3

The third objective of the present study was to determine whether the level of acculturation is associated with beliefs about the effectiveness of advice from a doctor or health professional to help smokers quit. Univariate logistic regression was performed involving the level of acculturation, smoking status and demographic variables including age, gender, and education to predict perceptions about the effectiveness of advice from a doctor or health professional to help smokers quit. Subsequently, multivariate logistic regression was performed where the level of acculturation was the main covariate and the effects of smoking status and demographic covariates were controlled for.

Arabic Ethnic Group

Table 6 shows that when not controlling for other covariates, the level of acculturation among Arabic participants was significantly associated with perceptions about the effectiveness of advice from a doctor or health professional to help smokers quit (OR = 4.20; 95 % C.I. 1.01, 1.84). Arabic participants with a higher level of acculturation were more likely, than those with a low level of acculturation, to perceive advice from a doctor or health professional to be helpful for quitting smoking, compared to Arabic participants with a lower level of acculturation. This is what was hypothesized. Compared to smokers, current Arabic nonsmokers were more likely to perceive advice from a doctor or health professional to be helpful for quitting smoking (OR = 0.57; 95 % C.I. 0.35, 0.92). Upon controlling for smoking status and demographic covariates, the level of acculturation was not significantly associated with perceptions about advice from a doctor or health professional to help smokers quit (OR = 1.32; 95 % C.I. 0.93, 1.87).
Chinese Ethnic Group

Table 6 shows that when not controlling for other covariates, the level of acculturation among Chinese participants was not significantly associated with perceptions about the effectiveness of advice from a doctor or health professional to help smokers quit (OR = 1.22; 95% C.I. 0.82, 1.83). Compared to smokers, current Chinese nonsmokers were more likely to perceive advice from a doctor or health professional to be helpful for quitting smoking (OR = 0.28; 95% C.I. 0.15, 0.50). Upon controlling for smoking status and demographic covariates, the level of acculturation was still not significantly associated with perceptions about advice from a doctor or health professional to help smokers quit (OR = 1.18; 95% C.I. 0.72, 1.91)
Table 6. Logistic regression analyses, involving Arabic and Chinese participants, of the relationship between the level of acculturation and perceptions about the effectiveness advice from a doctor or health professional to help smokers quit.

<table>
<thead>
<tr>
<th>Model Covariate(s)</th>
<th>Arabic Participants (n = 433)</th>
<th>Chinese Participants (n = 371)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Likelihood Ratio ($\chi^2$)</td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>Level of Acculturation</td>
<td>4.20* (1.01, 1.84)</td>
<td>9.52 (p = 0.31)</td>
</tr>
<tr>
<td>Smoking Status</td>
<td>5.23* (0.35, 0.92)</td>
<td>NA</td>
</tr>
<tr>
<td>Age</td>
<td>0.35</td>
<td>0.92 (0.69, 1.22)</td>
</tr>
<tr>
<td>Gender</td>
<td>0.08</td>
<td>0.98 (0.88, 1.10)</td>
</tr>
<tr>
<td>Education Level</td>
<td>2.00</td>
<td>1.60 (0.85, 3.02)</td>
</tr>
<tr>
<td>All Covariates</td>
<td>9.96</td>
<td>1.31 (units = 10)</td>
</tr>
</tbody>
</table>

*p < 0.05
**p < 0.01
***p < 0.001
1. current smokers compared to current nonsmokers
2. females compared to males
3. high school diploma or greater compared to no high school diploma
4. odds ratio for the level of acculturation, while controlling for other covariates
Objective 4

The fourth objective of the present study was to determine whether the level of acculturation is associated with beliefs about the effectiveness of support from the religious community to help smokers quit. Univariate logistic regression was performed involving the level of acculturation, smoking status and demographic variables including age, gender, and education to predict perceptions about the effectiveness of support from the religious community to help smokers quit. Subsequently, multivariate logistic regression was performed where the level of acculturation was the main covariate and the effects of smoking status and demographic covariates were controlled for.

Arabic Ethnic Group

Table 7 shows that when not controlling for other covariates, the level of acculturation, among Arabic participants, was not significantly associated with perceptions about the effectiveness of support from the religious community to help smokers quit (OR = 1.00; 95 % C.I. 0.78, 1.29). Compared to smokers, current nonsmokers were more likely to perceive support from the religious community to be helpful for quitting smoking (OR = 0.43; 95 % C.I. 0.28, 0.67). Upon controlling for smoking status and demographic covariates, the level of acculturation was still not significantly associated with perceptions about the ability of religious community support to help smokers quit (OR = 0.84, 95 % C.I. 0.63, 1.14).
Table 7 shows that when not controlling for other covariates the level of acculturation among Chinese participants, was not significantly associated with perceptions about the effectiveness of support from the religious community to help smokers quit (OR = 0.83; 95% C.I. 0.58, 1.16). Compared to smokers, current Chinese nonsmokers were more likely to perceive support from the religious community to be helpful for quitting smoking (OR = 0.18; 95% C.I. 0.10, 0.35). Females, compared to males, were more likely to perceive support from the religious community to be helpful for quitting smoking (OR = 1.19; 95% C.I. 1.06, 1.33). After controlling for smoking status and demographic variables, the level of acculturation was still not significantly associated with perceptions about the ability of religious community support to help smokers quit (OR = 0.75; 95% C.I. 0.49, 1.15).

The interaction between the level of acculturation and gender was found to be significant (Wald Chi-square = 3.99, p < 0.05). Thus, the relationship between the level of acculturation and perceptions about the effectiveness of support from the religious community to help smokers quit changed by level of the gender variable. Hence, it was appropriate to conduct the analyses in Chinese males and females separately. After including only Chinese males and controlling for demographic covariates, the level of acculturation was not significantly associated with perceptions about the effectiveness of support from the religious community to help smokers quit (OR = 1.13; 95% C.I. 0.63, 2.03). After including only Chinese females and controlling for demographic covariates, the level of acculturation was significantly associated with perceptions about the
helpfulness of the religious community to assist smokers in quitting (OR = 0.48; 95 % C.I. 0.26, 0.91). Chinese women with a lower level of acculturation were more likely to perceive support from the religious community to be helpful for quitting smoking. With respect to Chinese females, these results conform to what was hypothesized.
Table 7. Logistic regression analyses, involving Arabic and Chinese participants, of the relationship between the level of acculturation and perceptions about the effectiveness of support from the religious community to help smokers quit.

<table>
<thead>
<tr>
<th>Model Covariate(s)</th>
<th>Arabic Participants (n = 411)</th>
<th>Chinese Participants (n = 317)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Likelihood Ratio ($\chi^2$) (Comparing to model with only intercept term)</td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>Level of Acculturation</td>
<td>0.0004</td>
<td>1.00 (units = 10)</td>
</tr>
<tr>
<td>Smoking Status¹</td>
<td>14.60***</td>
<td>0.43***</td>
</tr>
<tr>
<td>Age</td>
<td>0.59</td>
<td>0.91 (units = 17)</td>
</tr>
<tr>
<td>Gender²</td>
<td>0.03</td>
<td>1.01</td>
</tr>
<tr>
<td>Education Level³</td>
<td>3.51</td>
<td>1.77</td>
</tr>
<tr>
<td>All Covariates³</td>
<td>20.98***</td>
<td>0.84 (units = 10)</td>
</tr>
</tbody>
</table>

*p < 0.05
**p < 0.01
***p < 0.001

1. current smokers compared to current nonsmokers
2. females compared to males
3. high school diploma or greater compared to no high school diploma
4. odds ratio for the level of acculturation, while controlling for other covariates
Objective 5

The fifth objective of the present study was to determine whether the level of acculturation is associated with beliefs about the effectiveness of advertising about the dangers of smoking to help smokers quit. Univariate logistic regression was performed involving the level of acculturation, smoking status and demographic variables including age, gender, and education to predict perceptions about the effectiveness of advertising about the dangers of smoking to help smokers quit. Subsequently, multivariate logistic regression was performed where the level of acculturation was the main covariate and the effects of smoking status and demographic covariates were controlled for.

Arabic Ethnic Group

Table 8 shows that when not controlling for other covariates, the level of acculturation among Arabic participants was not significantly associated with perceptions about the effectiveness of advertising about the dangers of smoking (OR = 0.99; 95% C.I. 0.77, 1.28). Compared to smokers, current Arabic nonsmokers were more likely to perceive advertising about the dangers of smoking to be helpful for quitting smoking (OR = 0.52; 95% C.I. 0.33, 0.78). Upon controlling for smoking status and demographic covariates, the level of acculturation was not significantly associated with perceptions about the ability of advertising about the dangers of smoking to help smokers quit (OR = 0.97; 95% C.I. 0.72, 1.30).

Chinese Ethnic Group

Table 8 shows that when not controlling for other covariates, the level of acculturation among Chinese participants was not significantly associated with perceptions about the effectiveness of advertising about the dangers of smoking to be
helpful for quitting (OR = 0.78; 95 % C.I. 0.57, 1.06). Compared to smokers, current Chinese nonsmokers were more likely to perceive advertising about the dangers of smoking to be helpful for quitting smoking (OR = 0.38; 95 % C.I. 0.21, 0.68). Older participants, compared to younger participants, were more likely to believe that advertising about the dangers of smoking would be helpful for quitting smoking (OR = 2.18; 95 % C.I. 1.60, 2.98). Chinese participants with less than a high school education were more likely to believe that advertising about the dangers of smoking would be helpful for quitting, compared to participants with a high school education or greater (OR = 0.58; 95 % C.I. 0.34, 0.98). After controlling for smoking status and demographic covariates, the level of acculturation was not significantly related to perceptions about the ability of advertising the dangers of smoking to help smokers quit (OR = 1.08, 95 % C.I. 0.74, 1.59).
Table 8. Logistic regression analyses, involving Arabic and Chinese participants, of the relationship between the level of acculturation and perceptions about the effectiveness of advertising about the dangers of smoking to help smokers quit.

<table>
<thead>
<tr>
<th>Model Covariate(s)</th>
<th>Arabic Participants (n = 433)</th>
<th>Chinese Participants (n = 381)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Likelihood Ratio ($\chi^2$) (Comparing to model with only intercept term)</td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>Level of Acculturation</td>
<td>0.0018</td>
<td>0.99 (units = 10)</td>
</tr>
<tr>
<td>Smoking Status*</td>
<td>9.73**</td>
<td>0.51** (0.33, 0.78)</td>
</tr>
<tr>
<td>Age</td>
<td>0.0078</td>
<td>1.01 (units = 17)</td>
</tr>
<tr>
<td>Gender²</td>
<td>0.45</td>
<td>0.97 (0.88, 1.07)</td>
</tr>
<tr>
<td>Education Level²</td>
<td>0.02</td>
<td>1.04 (0.58, 1.86)</td>
</tr>
<tr>
<td>All Covariates³</td>
<td>10.25</td>
<td>0.97 (units = 10)</td>
</tr>
</tbody>
</table>

*p < 0.05  
**p < 0.01  
***p < 0.001  
1. current smokers compared to current nonsmokers  
2. females compared to males  
3. high school diploma or greater compared to no high school diploma  
4. odds ratio for the level of acculturation, while controlling for other covariates
Chapter VI
Discussion

This study is one of the first investigations in Canada to explore the association between level of acculturation and perceptions about sources of support for quitting smoking. The data presented in this thesis show statistically significant associations between level of acculturation and perceptions about some sources of support to help smokers quit. The relationship between level of acculturation and perceptions about the effectiveness of sources of support differed, in some cases, for Arabic and Chinese ethnic groups, suggesting that the relationship between acculturation and beliefs is unique to a given ethnic group. This agrees with Berry’s (1997) conclusion that the psychological consequences of acculturation are highly dependent upon social and personal variables that reside in the country of origin and the society where an immigrant has settled.

Level of Acculturation & Perceptions about Restrictions against Smoking in Public Places to Help Smokers Quit

Mounting scientific evidence about the health risks of involuntary tobacco smoke exposure and growing antismoking sentiment provides an impetus for an increase in social actions against smoking in public places (Brier & Rigotti, 1992). Borland and colleagues (1990) investigated perceptions of workplace smoking bans in Australian government offices. They found that, overall, bans against smoking were perceived positively by both smokers and nonsmokers who were employees of the Australian Public Service (Borland et al., 1990). Ashley et al. (1998) showed that, compared to five years ago, the Ontario population is more in favor of restrictions against smoking. In this thesis, Arabic participants with a low level of acculturation were more likely to perceive
restrictions against smoking in public places as helpful in assisting smokers to quit, compared to participants with a high level of acculturation. This association remained after adjusting for smoking status and demographic variables. Therefore, Arabic individuals less integrated into Canadian society believe that smoking bans can help smokers stop smoking. These results did not support the hypothesis. It was expected that restrictions against smoking in public places would not be culturally meaningful to individuals with a low level of acculturation. Traditional Arab culture emphasizes the importance of the collective over the individual (Dwairy, 1998). Thus, compared to Arabic participants with a high level of acculturation, participants with a low level of acculturation may have had a more positive view of public smoking restrictions because it is an intervention that focuses on collective smoking behavior instead of individual smoking behavior.

For Chinese participants, there was no association between level of acculturation and perceptions about ability of restrictions against smoking in public places to help smokers quit. According to Chen and colleagues (1999), cigarette smoking in China is treated as a culturally appropriate behavior and is viewed as a social lubricant. Hence, smoking bans in public places are not related to cultural perceptions about smoking. This could explain why there is no relationship between degree of integration into Canadian culture and beliefs about the effectiveness of restrictions against smoking in public places among Chinese participants.

Level of Acculturation and Perceptions about Support from the Family to Help Smokers Quit

In a qualitative study of social and cultural determinants of smoking behavior among immigrants to Canada, Beardall & Edwards (1994) found that family and children
played a prominent role in the lives of many immigrants. They suggested that
antismoking strategies that emphasize the family would prove to be more effective in an
immigrant population, than strategies focused on the individual (Beardall & Edwards,
1994). In a study of health behaviors in minority families, Koepke et al. (1990)
concluded that family involvement is important for smoking prevention efforts.

The results of the present study suggest that Arabic participants with a high level
of acculturation are more likely to perceive support from the family as helpful for quitting
smoking, than participants with a low level of acculturation. After controlling for
smoking status and demographic variables, these results were marginally not significant.
Since family interventions were expected to be more culturally sensitive for individuals
less integrated into the mainstream community (Beardall & Edwards, 1994), these results
were unexpected. Arabic participants with a high level of acculturation might have been
from families who were also highly acculturated. Previous research has shown that the
level of acculturation is positively associated with knowledge about the dangers of
smoking and the presence of nicotine patches to help smokers quit (Palinkas et al., 1993;
Ferrence et al., 1996; Campbell & Kaplan, 1997). Thus, Arabic participants with a high
level of acculturation might have perceived their families to be equipped with more
knowledge to assist them in quitting, compared to Arabic participants with a low level of
acculturation.

Among Chinese participants, there was no association between level of
acculturation and beliefs about the helpfulness of family support to assist smokers in
quitting. In Chinese culture, the exchange of cigarettes in one’s home is used to initiate
and maintain interpersonal relationships (Edwards & MacMillan, 1990); hence, seeking
antismoking help from one's family may have been incongruent with the belief system of Chinese respondents with a low level of acculturation. Furthermore, Chinese participants with a high level of acculturation tend to have a focus outside of the family where they seek relationships within the larger society (Berry, 1980; Berry, 1984; Berry, 1997). As a result, Chinese participants with a high level of acculturation may have considered sources of support outside of family support to be more helpful. This supports the finding that beliefs about the effectiveness of family support for quitting smoking did not vary by level of acculturation.

The Marin (1996) investigation, which examined the relationship between level of acculturation and perceptions of various sources and channels of information regarding cigarette smoking, did not support the results of this study. Marin (1996) found there was a greater proportion Hispanic participants with a low level of acculturation who perceived information from parents to be credible, trustworthy, and behavior motivating than the proportion of participants with a high level of acculturation. Inclusion of a different ethnic group and nonimmigrant participants in Marin's (1997) study could explain the conflicting results. Also, the Marin (1997) investigation was conducted in the United States, while the present study is based in Toronto, Canada.

**Level of Acculturation and Perceptions About Advice from a Doctor or Health Professional to Help Smokers Quit**

When combined with additional supports such as nicotine replacement therapy, reminder systems, and follow-up counseling sessions, physician advice significantly increases smoking cessation rates over minimal contacts (Kottke et al., 1988; Hurt et al., 1994; Ockene et al., 1991). In an investigation that evaluated patients' perceptions of the role of a family practice physician in providing health promotion services, Price and
showed that 70% of respondents believed physicians should counsel all patients on smoking cessation.

In the present study there was no association among both Arabic and Chinese participants, between level of acculturation and perceptions about the helpfulness of advice from physicians or health professionals to assist in smoking cessation. These results support Marin (1996). When evaluating physicians as a source of information on cigarette smoking, there was no difference in the proportion of high and low acculturated Hispanic participants who evaluated physicians as credible, trustworthy, and behavior motivating (Marin, 1996). Participants with a low level of acculturation in the present study and Marin (1996) investigation might not have found advice from physicians or health professionals to be more culturally meaningful than participants with high levels of acculturation. Advice provided by a health professional of the same ethnic group, who could speak the same language, could have been perceived to be more helpful by participants with a low level of acculturation. For instance, Ference and colleagues (1996) found that respondents from both Arabic and Chinese ethnic groups whose family doctor was from the same ethnic group, or who attended an ethnic health clinic, were less acculturated than those who sought health care from health practitioners of another ethnic group.

**Level of Acculturation and Perceptions about Support from the Religious Community to Help Smokers Quit**

Research suggests that religious leaders have the potential to play an important role in smoking cessation (MMWR, 1993). For example, a Buddhist abbot in Thailand initiated health promotion activities by prohibiting smoking in the temple area, mandating that all new monks abstain from smoking, and counseling smokers about the negative
health consequences of smoking (MMWR, 1993). Beliefs about the helpfulness of religious support for smoking cessation in this rural community was compared to an adjacent village where no such activities were instigated (MMWR, 1993). A significantly greater proportion of former smokers attributed their smoking cessation to support from religious leaders in the intervention village than in the reference village (80.3% vs. 25.6%; p < 0.001) (MMWR, 1993). Thus, health promotion activities involving the religious community may assist smokers in their attempts to quit.

Upon examining the relationship between level of acculturation and perceptions about support from the religious community to help smokers quit among Arabic immigrants, the present study found that there was no association between level of acculturation and beliefs about the helpfulness of religious community support for smoking cessation. Given that Islam considers smoking unlawful and unhealthy (Bener & Al-Ketbi, 1999), Arabic participants with a low level of acculturation may have considered the religious community to be an inappropriate source of help for quitting smoking because of the stigmatization associated with this behavior. According to Berry's model of acculturation (1980, 1984, 1997), immigrants who are more assimilated may not wish to maintain their cultural identity and instead prefer to seek daily interaction with other cultures. Hence, Arabic participants with a high level of acculturation may feel more comfortable seeking antismoking help outside the religious community. Therefore, overall, perceptions about the effectiveness of religious community support for quitting smoking did not vary by level of acculturation of Arabic participants. Furthermore, religion was not controlled for in the present study. Indeed, affiliation with the religion of Islam is a major force for maintaining traditionalism within
Arabic cultures (Faragallah et al., 1997). However, not all Arabs follow Islam. For example, Christian Arabs may find adaptation to North American society less difficult because they hold the same religious views as the majority of society (Faragallah et al., 1997). The lack of association between level of acculturation and beliefs about the helpfulness of religious community support might be due to not controlling for religion which could be a confounding factor that is related to perceptions about religious community support and the level of acculturation.

Among Chinese male participants, the present study found no association between level of acculturation and perceptions about the helpfulness of religious community support for smoking cessation. However, Chinese female participants with a low level of acculturation were more likely to perceive religious community support to be helpful for quitting smoking. Moriearty and colleagues (1997) suggest that health issues are different for women than for men either because of their biological attributes or because of issues associated with gender, which includes personality traits, attitudes, feelings, values and activities that Chinese society ascribes to women. In a longitudinal study of the association between frequent religious attendance and mortality, Strawbridge et al. (1997) found that the association was stronger for women than for men. They explained these results by suggesting that women use religion as a coping mechanism for dealing with stress. Indeed, acculturation is essentially a very stressful process (Edwards, 1995; Berry, 1997); therefore Chinese women with a low level of acculturation may turn to the religious community to cope with integrating into a new country more than Chinese women with a high level of acculturation. Logically, Chinese women with a low level of
acculturation would then perceive the religious community to be helpful for quitting smoking in contrast to Chinese women with a high level of acculturation.

In the Marin (1996) investigation, a greater proportion of Hispanic participants with a low level of acculturation, than Hispanic participants with a high level of acculturation, believed that priests or ministers were credible, had expertise, were trustworthy, and were behavior motivating as a source of information on cigarette smoking. Again, the incongruent results of the present investigation can be attributed to uniqueness of the ethnic groups under investigation, inclusion of non-immigrants in the Marin (1997) study, and differences between acculturation processes in the United States and Canada.

**Level of Acculturation and Perceptions about Advertising Dangers of Smoking to Help Smokers Quit**

Marin and Gamba (1997) demonstrated that campaigns informing individuals of the dangers associated with cigarette consumption are effective in raising awareness of dangers of smoking among Hispanic and non-Hispanic 'white' populations. A first step in the health education approach is being aware of the negative health consequences and addictiveness of smoking (Marin & Gamba, 1997). Research focusing on the relationship between acculturation and smoking-related beliefs in ethnic populations has pointed to the need for smoking cessation health campaigns to target less acculturated persons (Palinkas et al., 1993; Campbell & Kaplan, 1997). These programs should emphasize the addictive properties of cigarettes and reinforce their beliefs regarding the health risks associated with smoking (Palinkas et al., 1993; Campbell & Kaplan, 1997).

The results of this thesis show no association among Arabic and Chinese immigrants between level of acculturation and beliefs about the ability of advertising
about the dangers of smoking to help smokers quit. Marin and Gamba (1997) suggest that health campaigns be addressed in culturally sensitive ways to specifically target individuals with a low level of acculturation. One such method is to use the language preferred by individuals who are the main focus of the campaign (Marin & Gamba, 1997). Thus, Arabic and Chinese immigrants with a low level of acculturation in this investigation may not have found the advertising of information about the dangers of tobacco consumption to be culturally meaningful, compared to immigrants who were more integrated into the community. Information about the dangers of smoking presented in Arabic or Chinese could have been more culturally meaningful to participants with a low level of acculturation.

**Limitations of Present Study**

In interpreting these results, one has to consider some limitations inherent in this investigation. Since Ferrence et al. (1996) interviewed Arabic and Chinese participants to obtain data about cultural factors related to tobacco use, response bias is a concern. Warnecke and colleagues (1997) studied sources of potential response bias resulting from racial or ethnic cultural experience to survey questions dealing with health behavior. They found that race and ethnicity was associated with desire to disclose socially appropriate behavior, particularly to interviews from persons who differed from the respondents with regards to ethnic group (Warnecke et al., 1997). The need to appear socially desirable may have influenced the responses of Arabic and Chinese participants in this thesis. This may explain why, compared to the Ontario population (Ashley et al. 1996), Arabic and Chinese participants who were current smokers were more likely to
perceive restrictions against smoking in public places and advice from a doctor or health professional to be helpful for quitting smoking.

This study uses a cross-sectional design; therefore, it is difficult for one to make judgements about causation (Elwood, 1998). By definition, causation includes a time component, either retrospectively or prospectively (Elwood, 1998). With a cross-sectional survey, we can only show associations between level of acculturation and perceptions about sources of support for quitting without making definite assessments about whether a change in acculturation level precedes a change in beliefs about methods to help smokers quit. However, logically, it is highly plausible for a change in acculturation to take place before a change in smoking related beliefs, instead of vice versa.

Elwood (1998) stresses that in cross-sectional surveys the method of selecting participants is crucial. For the purpose of maximizing the number of smokers in the sample, eligible household members who smoked were selected as respondents, and nonsmokers were only selected when there were no smokers in the household. As a result, there is an over-representation of smokers in the data, causing the external validity of the present study to be reduced. Another factor reducing the external validity of this investigation is refusal to participate. Arabic and Chinese immigrants who did not participate may differ from immigrants who refused to participate. The response rate, calculated by determining the number who agreed to complete the questionnaire over the number of eligible households, is 85%. Participants who did not have complete data on perceptions about the various sources of support for quitting smoking, level of acculturation, smoking status, education, gender, and age were excluded from this study.
This could also reduce the external validity of this thesis, particularly for the Chinese ethnic group. Overall, Chinese participants included in the analyses relating the level of acculturation to the various sources of support had a significantly higher level of acculturation, were significantly younger, and had a significantly higher level of education. Lower levels of acculturation, older age, and lower levels of education are all factors that may have limited the ability of participants to comprehend the questions asked about the helpfulness of various methods to help smokers quit. However, the relationship between perceptions about sources of support for smoking cessation and level of acculturation status remains the same despite the reduced external validity of the sample.

The findings of this thesis may also be limited by how the process of acculturation is operationalized by the Marin et al. (1987) scale used to measure the level of acculturation in Arabic and Chinese immigrants. Recent literature focusing on the process of acculturation (Berry, 1980; Berry, 1984; Berry, 1997) uses an orthogonal model to conceptualize acculturation. This model allows for four types of acculturation, including assimilation, separation or segregation, integration, and deculturation, which were described in the literature review (Berry, 1980; Berry, 1984; Berry, 1997). However, the Marin et al. (1987) scale measures a linear process of acculturation where it assumes that as people take on the values, customs, and language of a new culture, they drop the values, customs, and beliefs of the old culture. Most immigrants prefer an orthogonal model of acculturation (Azar, 1999). Marin et al. (1987) assumes a linear model of assimilation when this may not be the case. Because most standard acculturation measures are themselves linear, most studies continue to approach
acculturation from a linear perspective (Azar, 1999). By doing this, researchers do not allow for the possibility that a person can simultaneously retain elements of his or her own culture and learn about a new culture.

In conjunction with the measurement of level of acculturation, the measurement of socioeconomic status (SES) is a concern. Socioeconomic status is difficult to measure comprehensively because it comprises many factors such as educational attainment, income, employment, access to goods, services and labour markets, access to healthy foods, and educational, political, and cultural discrimination (O’loughlin, 1999). In this thesis, the level of education approximated SES. However, educational attainment does not necessarily reflect SES. This may especially be the case for immigrants. For instance, Eden and colleagues (1994) performed an investigation, in a Swedish municipality, of the relationship between immigration and predictors of early retirement. They found that the early retired immigrants were comparatively young, and some were over qualified for their jobs (Eden et al., 1994). Thus, even though SES is taken into account in the present study, confounding is still a concern given that the measurement of SES is incomplete.

Lastly, it is important to stress that this is an exploratory investigation where several analyses were carried out for the purpose of examining the relationship between level of acculturation and perceptions about effectiveness of various sources of support for smoking cessation. Some of the associations between level of acculturation and beliefs about various smoking cessation interventions were significant; however, if one tests many null hypotheses, the chances of observing one or more “significant” p-values is higher than 5 % (Mutulsky, 1995). Therefore, it is important to look at the overall
patterns of results and not interpret any individual p-values too strongly (Mutulsky, 1995).

Despite these limitations, this thesis provides important new information about the relationship between level of acculturation and perceptions about sources of support for quitting smoking among Arabic and Chinese immigrants to Canada. As a result, it has implications for future avenues of research and antismoking health programming involving these immigrant populations.

**Implications for Future Research**

The prevention of tobacco use among immigrants to Canada should remain a priority for researchers, as well as healthcare providers. Indeed, the results of this thesis suggest that the consequences of the process of acculturation are unique to a given ethnic group. In particular, the relationship between the process of acculturation and perceptions of sources of support for quitting in one ethnic group cannot be generalized to another ethnic group. Therefore, it is suggested that future research on the relationship between level of acculturation and smoking related beliefs be conducted involving immigrants of all ethnic groups within Canada.

It is also recommended that research examining the relationship between level of acculturation and smoking-related beliefs use a more comprehensive measure of socioeconomic status. This will ensure that confounding by socioeconomic status is not responsible for the observed relationship between level of acculturation and perceptions about various sources of support for quitting smoking.

Longitudinal studies that track immigrants over a period of time as they adapt to new cultures may shed some light on how the process of acculturation actually affects
perceptions about sources of support over time. Adding a time component to the study will provide us with an opportunity to make judgements about causality (Elwood, 1998). Also, with the time component, we can adequately capture the acculturation experience in immigrants and determine how it may relate to their smoking-related beliefs.

Another method of adequately capturing the acculturation experience among immigrants is to use a multi-faceted approach to measuring level of acculturation. For example, when Ayzan and Kanungo (1998) examined the effect of acculturation on the socialization beliefs and behavioral occurrences of first and second generation Indo-Canadians, they measured acculturation attitudes on four indexes, including assimilation, integration, marginalization, and separation, which reflected Berry’s (1980, 1984, 1997) acculturation framework. Assessing acculturation in this way will give us a deeper understanding of how adapting to the values and beliefs of a new country affects perceptions about sources of support for stopping smoking.

The negative relationship between level of acculturation and perceptions about restrictions against smoking in public places, among Arabic participants, is very interesting. Future research should specifically determine whether Arabic participants with a low level of acculturation generally prefer health promotion interventions at the community level instead of the individual level. It would also be helpful to highlight the mechanisms that are responsible for the negative association between level of acculturation and beliefs about the helpfulness of religious community support among Chinese women. Strawbridge et al. (1997) postulate that religious communities influence good health practices through peer influence, increased self-esteem, increased sense of perceived control, and a general philosophical outlook that values social ties and treating
one's body with self-respect. Further investigations are needed to specifically determine if the influence of these factors is amplified in Chinese women who are less integrated into Canadian culture.

Another fruitful avenue of research is to examine the relationship between level of acculturation of immigrants and their perceptions about the helpfulness of doctors or health professionals of the same ethnic group who can speak their native language. Research conducted in Saudi Arabia has shown that Arabic speaking physicians are less active than non-Arabs in counseling against smoking (Al-Shahri & Al-Almaie, 1997). Before determining if this is also the case in Canada, it is important to determine if low-acculturated Arabic immigrants find physicians of the same ethnic group to be helpful in assisting smokers to quit.

It is essential to devise ways of distributing information about the negative health repercussions of smoking in a culturally meaningful way. A first step is to investigate the relationship between immigrant perceptions of culturally relevant materials about the dangers of smoking and acculturation level. For instance, researchers could focus on immigrant perceptions of anti-tobacco material disseminated in the native language of immigrants and relate this to their level of acculturation.

Since acculturation is a very general construct that is unique to particular ethnic groups, it may be elucidating for future research to focus on ethnic specific cultural values and beliefs as they relate to perceptions of sources of support for smoking cessation. This type of research would have more direct implications for anti-smoking programming, compared to research that addresses the general concept of acculturation.
As a result, researchers can determine the influence of specific cultural values and beliefs on perceptions of sources of support for quitting.

A particularly interesting secondary finding in this thesis is the relationship between smoking status and perceptions about the helpfulness of various sources of support for quitting smoking among both Arabic and Chinese participants. For both ethnic groups, smoking status is strongly related to beliefs about sources of support for quitting smoking. Arabic and Chinese smokers were less likely to perceive sources of supports to be helpful for quitting smoking. More research is needed regarding the cultural values that influence these negative perceptions about sources of support for smoking cessation among Arabic and Chinese smokers.

**Implications for Anti-smoking Programming**

The results of this study provide a new framework on how to specifically target Arabic and Chinese immigrants with a low level of acculturation compared to immigrants with a high level of acculturation, or the general population. Measuring an immigrant’s level of acculturation, and subsequently targeting him/her with an appropriate antismoking intervention is a plausible application of this thesis. However, it is more pragmatic to apply this knowledge towards community, instead of individual, interventions. The traditional clinical model targets only individuals who are at high risk (Sorensen et al., 1998). This model neglects the potential for prevention of disease by not recognizing underlying factors that contribute to elevated risk (Sorensen et al., 1998). By identifying high risk individuals one by one, we are making it unlikely for the entire population to be reached (Sorensen et al., 1998). We are also overlooking ways in which individual behaviors are culturally maintained (Sorensen et al., 1998). It is therefore
suggested that the unit of intervention based upon level of acculturation should be communities, instead of individuals.

This thesis suggests that Arabic communities with a low level of acculturation may be effectively targeted with bans against smoking in public places. In Toronto, the institution of bans against smoking in restaurants and bars could be an effective antismoking prevention and cessation measure for Arabic residents who are less integrated into mainstream Canadian culture. However, more research focusing on behavior, instead of only beliefs, as it relates to public smoking restrictions is needed.

This thesis also provides arguments for religious leaders to promote community wide informational campaigns to change awareness, increase information, and ultimately change behavior, especially in Chinese women who are less integrated in the Canadian cultural milieu. Religious organizations are often involved in public health campaigns and supportive programs to assist marginal members of their communities (Strawbridge et al., 1997). Provision of anti-smoking information packages to religious leaders, within the Chinese community, may help them counsel less acculturated female members of their community to quit smoking.

Since Arabic participants with a low level of acculturation are generally less likely to perceive interventions involving family members to be helpful, health campaigns, aimed at immigrants less integrated into Canadian culture, should focus on increasing family knowledge about the dangers of smoking and the various means employed to help smokers quit. Indeed, continued exposure to a certain message produces marked increases in awareness among a targeted population (Marin, 1992). Health campaigns targeting recent immigrants to Canada, who usually have a low level of
acculturation, should stress the importance of families in helping smokers quit. A study based upon a smoking cessation project aimed at both parents and adolescents, provided researchers insights into smoking related health attitudes and behaviors in minority families (Koepke et al., 1990). Koepke et al. (1990) found that most parents, from Hispanic, ‘black’, and Asian ethnic groups were aware of the Television, School, and Family Smoking-Prevention and Cessation project that was designed to prevent both parents and their children from smoking. Furthermore, parents from every ethnic group overwhelmingly desired to prevent their children from starting to smoke (Koepke et al., 1990). Koepke et al. (1990) concluded that smoking programs should target both adults and their children. These programs might be particularly effective in immigrant families with a low level of acculturation.

Even though this thesis speaks to the importance of studying smoking-related beliefs among immigrants to Canada, very few significant associations between level of acculturation and perceptions about sources of support for smoking cessation were found. The results of this thesis should not be interpreted to suggest that level of integration into the Canadian cultural milieu is not an important influence in beliefs about sources of support for quitting smoking. Indeed, acculturation is a very difficult concept to define and measure. As a result, it is very difficult for acculturation research to have direct implications for anti-smoking programming. It is time to go beyond the study of acculturation as a general concept. This can be accomplished by focusing on the specific cultural values and beliefs that may influence perceptions about sources of support for quitting smoking. The information generated through this avenue is more directly relevant to the needs of policy makers and program planners. By doing this, we can
continue the effort to involve immigrants in health promotion activities in order to prevent smoking behavior from further increasing in the immigrant population.
References


Blais R, Maiga A. Do ethnic groups use health services like the majority of the population? A study from Quebec, Canada. Social Science and Medicine 48: 1237-1245, 1999.


Ref Type: Computer Program


Ref Type: Report


Ref Type: Generic


Ref Type: Thesis/Dissertation


Ref Type: Report


Marin G. Perceptions by Hispanics of channels and sources of health messages regarding cigarette smoking. Tobacco Control 5: 30-36, 1996.


83


Ref Type: Electronic Citation
Appendix 1

Ferrence et al. (1996) Questions about Perceptions of Sources of Support for Quitting Smoking
(All Respondents)

I am going to read you a list of things that might help people quit smoking. For each, please tell me if you think it would be very helpful, somewhat helpful, not very helpful or not helpful at all.

<q1> First, what about restrictions against smoking in public places? Do you think that this would be VERY helpful, SOMEWHAT helpful, NOT VERY helpful, or NOT at all helpful for people who are trying to quit smoking?
   <1> very helpful
   <3> somewhat helpful
   <5> not very helpful
   <7> not at all helpful

<q2> What about support from family? Do you think this would be VERY helpful, SOMEWHAT helpful, NOT VERY helpful, or NOT at all helpful for people who are trying to quit smoking?
   <1> very helpful
   <3> somewhat helpful
   <5> not very helpful
   <7> not at all helpful

<q3> What about advice from a doctor or health professional? Do you think this would be VERY helpful, SOMEWHAT helpful, NOT VERY helpful, or NOT at all helpful for people who are trying to quit smoking?
   <1> very helpful
   <3> somewhat helpful
   <5> not very helpful
   <7> not at all helpful

<q5> What about...support from the religious community? Do you think this would be VERY helpful, SOMEWHAT helpful, NOT VERY helpful, or NOT at all helpful for people who are trying to quit smoking?
   <1> very helpful
   <3> somewhat helpful
   <5> not very helpful
   <7> not at all helpful

<q7> What about...advertising that shows smoking is bad for your health? Do you think this would be VERY helpful, SOMEWHAT helpful, NOT VERY helpful, or NOT at all helpful for people who are trying to quit smoking?
   <1> very helpful
<3> somewhat helpful
<5> not very helpful
<7> not at all helpful
Appendix 2

Marin et al. (1987) Acculturation Scale

A. In general, what language do you read and speak?
   1. <fill language> only
   2. more <fill language> than English
   3. both equally
   4. more English than <fill language>
   5. English only

B. What is the language you used as a child?
   1. <fill language> only
   2. more <fill language> than English
   3. both equally
   4. more English than <fill language>
   5. English only

C. What language do you usually speak at home?
   1. <fill language> only
   2. more <fill language> than English
   3. both equally
   4. more English than <fill language>
   5. English only

D. In which language do you usually think?
   1. <fill language> only
   2. more <fill language> than English
   3. both equally
   4. more English than <fill language>
   5. English only

E. What language do you usually speak with your friends?
   1. <fill language> only
   2. more <fill language> than English
   3. both equally
   4. more English than <fill language>
   5. English only

F. Are your close friends <fill group> only, more <fill group> than non-<fill group>,
   both equally, more non-<fill group> than <fill group>, or non-<fill group> only?
   1. <fill group> only
   2. more <fill group> than non-<fill group>
   3. both equally
   4. more non-<fill group> than <fill group>
   5. non-<fill group> only
G. Do you prefer going to social gatherings and parties at which the people are <fill group> only, more <fill group> than non-<fill group>, both equally, more non-<fill group> than <fill group>, or non-<fill group> only?
   1. <fill group> only
   2. more <fill group> than non-<fill group>
   3. both equally
   4. more non-<fill group> than <fill group>
   5. non-<fill group> only

H. The friends you visit or who visit you are <fill group> only, more <fill group> than non-<fill group>, both equally, more non-<fill group> than <fill group>, or non-<fill group> only?
   1. <fill group> only
   2. more <fill group> than non-<fill group>
   3. both equally
   4. more non-<fill group> than <fill group>
   5. non-<fill group> only

I. If you could choose your children’s friends, would you want them to be <fill group> only, more <fill group> than non-<fill group>, both equally, more non-<fill group> than <fill group>, or non-<fill group> only?
   1. <fill group> only
   2. more <fill group> than non-<fill group>
   3. both equally
   4. more non-<fill group> than <fill group>
   5. non-<fill group> only

Note: The acculturation score is calculated by summing the responses to the Marin et al. (1987) questions.
Appendix 3
Covariates in Multivariate Analyses

Table 1. Covariates to adjust for in multivariate analyses examining association between level of acculturation and perceptions about various sources of support for quitting smoking.

<table>
<thead>
<tr>
<th>Potential Covariate</th>
<th>Type</th>
<th>Question in Ferrence et al. (1996) Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking status (current nonsmoker*, current smoker*)</td>
<td>Binary</td>
<td>Ss1 &amp; ss5</td>
</tr>
<tr>
<td>Gender (male, female)</td>
<td>Binary</td>
<td>Gend</td>
</tr>
<tr>
<td>Age</td>
<td>Discrete</td>
<td>D1</td>
</tr>
<tr>
<td>Education (did not complete highschool, completed high school or higher)</td>
<td>Binary</td>
<td>D11</td>
</tr>
</tbody>
</table>

1. Current nonsmoker = never smoker (smoked less than 100 cigarettes in lifetime) or former smoker (smoked more than 100 cigarettes in lifetime and not smoking presently)
2. Current smoker = currently smoking cigarettes everyday or less than everyday.
Appendix 4
Comparison of Participants Included in Analyses to Participants not Included in Analyses

Table 1. The relationship between the level of acculturation and perceptions about the effectiveness of restrictions against smoking in public places to help smokers quit: Comparison of Arabic participants included in logistic analyses versus Arabic participants not included in the logistic analyses.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Participants involved in analyses (mean or percentage)</th>
<th>Participants not involved in analyses (mean or percentage)</th>
<th>Test for difference</th>
<th>p-value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>57.28 % (n = 244)</td>
<td>44.64 (n = 25)</td>
<td>$\chi^2 = 3.20$</td>
<td>p = 0.07</td>
</tr>
<tr>
<td>Female</td>
<td>42.72 % (n = 182)</td>
<td>55.36 (n = 31)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Smoking status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>71.13 % (n = 303)</td>
<td>73.21 % (n = 41)</td>
<td>$\chi^2 = 0.11$</td>
<td>p = 0.75</td>
</tr>
<tr>
<td>Smokers</td>
<td>28.87 % (n = 123)</td>
<td>26.79 % (n = 15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; highschool</td>
<td>11.96 % (n = 51)</td>
<td>15.56 % (n = 7)</td>
<td>$\chi^2 = 0.48$</td>
<td>p = 0.49</td>
</tr>
<tr>
<td>&gt;= highschool</td>
<td>88.03 % (n = 375)</td>
<td>84.44 % (n = 38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean age (years)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>39.90 (SD = 13.48)</td>
<td>38.49 (SD = 9.85)</td>
<td>t-value = 0.55</td>
<td>p = 0.59</td>
</tr>
<tr>
<td><strong>Mean Acculturation Score (Marin)</strong></td>
<td>23.28 (SD = 7.66)</td>
<td>21.22 (SD = 7.87)</td>
<td>t-value = -0.50</td>
<td>p = 0.62</td>
</tr>
</tbody>
</table>

1. Comparing participants included in the analyses to participants not included in the analyses: Mantel-Haenszel Chi-square test if covariate is categorical; T-test for unequal variances if covariate is continuous.
Table 2. The relationship between the level of acculturation and perceptions about the effectiveness of restrictions against smoking in public places to help smokers quit: Comparison of Chinese participants included in logistic analyses versus Chinese participants not included in the logistic analyses.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Participants involved in analyses (mean or percentage)</th>
<th>Participants not involved in analyses (mean or percentage)</th>
<th>Test for difference</th>
<th>p-value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53.74 % (n = 201)</td>
<td>50.00 (n = 38)</td>
<td>$\chi^2 = 0.35$</td>
<td>p = 0.55</td>
</tr>
<tr>
<td>Female</td>
<td>46.26 % (n = 173)</td>
<td>50.00 (n = 38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>84.76 % (n = 317)</td>
<td>92.11 % (n = 70)</td>
<td>$\chi^2 = 2.83$</td>
<td>p = 0.09</td>
</tr>
<tr>
<td>Smokers</td>
<td>15.24 % (n = 57)</td>
<td>7.89 % (n = 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; high school</td>
<td>18.72 % (n = 70)</td>
<td>32.00 % (n = 16)</td>
<td>$\chi^2 = 4.80$</td>
<td>p = 0.03</td>
</tr>
<tr>
<td>&gt;= high school</td>
<td>81.28 % (n = 304)</td>
<td>68.00 % (n = 34)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(years)</td>
<td>41.89 (SD = 16.04)</td>
<td>47.41 (SD = 16.08)</td>
<td>t-value = 3.37</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>Mean Acculturation Score</td>
<td></td>
<td></td>
<td>t-value = -1.93</td>
<td>p = 0.06</td>
</tr>
<tr>
<td>(Marin)</td>
<td>18.05 (SD = 5.95)</td>
<td>16.38 (SD = 6.93)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Comparing participants included in the analyses to participants not included in the analyses: Mantel-Haenszel Chi-square test if covariate is categorical; T-test for unequal variances if covariate is continuous.
Table 3. The relationship between the level of acculturation and perceptions about the effectiveness of support from the family to help smokers quit: Comparison of Arabic participants included in logistic analyses versus Arabic participants not included in the logistic analyses.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Participants involved in analyses (mean or percentage)</th>
<th>Participants not involved in analyses (mean or percentage)</th>
<th>Test for difference (^1)</th>
<th>p-value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56.38 % (n = 243)</td>
<td>50.98 (n = 26)</td>
<td>(\chi^2 = 0.54)</td>
<td>p = 0.46</td>
</tr>
<tr>
<td>Female</td>
<td>43.62 % (n = 188)</td>
<td>49.02 (n = 25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>71.23% (n = 307)</td>
<td>72.55 % (n = 37)</td>
<td>(\chi^2 = 0.04)</td>
<td>p = 0.84</td>
</tr>
<tr>
<td>Smokers</td>
<td>28.77% (n = 124)</td>
<td>27.45 % (n = 14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; high school</td>
<td>12.53 % (n = 54)</td>
<td>10.00 % (n = 4)</td>
<td>(\chi^2 = 0.22)</td>
<td>p = 0.64</td>
</tr>
<tr>
<td>&gt;= high school</td>
<td>87.47% (n = 377)</td>
<td>90.00 % (n = 36)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>40.05 (SD = 13.29)</td>
<td>40.13 (SD = 13.06)</td>
<td>t-value = -0.43</td>
<td>p = 0.67</td>
</tr>
<tr>
<td>Mean Acculturation Score (Marin)</td>
<td>23.13 (SD = 7.72)</td>
<td>22.68 (SD = 7.24)</td>
<td>t-value = 0.86</td>
<td>p = 0.39</td>
</tr>
</tbody>
</table>

1. Comparing participants included in the analyses to participants not included in the analyses: Mantel-Haenszel Chi-square test if covariate is categorical; T-test for unequal variances if covariate is continuous.
Table 4. The relationship between the level of acculturation and perceptions about the effectiveness of support from the family to help smokers quit: Comparison of Chinese participants included in logistic analyses versus Chinese participants not included in the logistic analyses.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Participants involved in analyses (mean or percentage)</th>
<th>Participants not involved in analyses (mean or percentage)</th>
<th>Test for difference&lt;sup&gt;1&lt;/sup&gt;</th>
<th>p-value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53.35 % (n = 199)</td>
<td>51.95 (n = 40)</td>
<td>$\chi^2 = 0.05$</td>
<td>p = 0.82</td>
</tr>
<tr>
<td>Female</td>
<td>46.65 % (n = 174)</td>
<td>48.05 (n = 37)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>84.45 % (n = 315)</td>
<td>93.51 % (n = 72)</td>
<td>$\chi^2 = 4.34$</td>
<td>p = 0.04</td>
</tr>
<tr>
<td>Smokers</td>
<td>15.55 % (n = 58)</td>
<td>6.49 % (n = 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; high school</td>
<td>18.77 % (n = 70)</td>
<td>31.37 % (n = 16)</td>
<td>$\chi^2 = 4.40$</td>
<td>p = 0.04</td>
</tr>
<tr>
<td>&gt;= high school</td>
<td>81.23 % (n = 303)</td>
<td>68.63 % (n = 35)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>43.63 (SD = 15.98)</td>
<td>51.34 (SD = 17.23)</td>
<td>t-value = 2.74</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acculturation Score (Marin)</td>
<td>18.04 (SD = 5.98)</td>
<td>16.44 (SD = 6.80)</td>
<td>t-value = -1.90</td>
<td>p = 0.06</td>
</tr>
</tbody>
</table>

1. Comparing participants included in the analyses to participants not included in the analyses: Mantel-Haenszel Chi-square test if covariate is categorical; T-test for unequal variances if covariate is continuous.
Table 5. The relationship between the level of acculturation and perceptions about the effectiveness of advice from a doctor or health professional to help smokers quit: Comparison of Arabic participants included in logistic analyses versus Arabic participants not included in the logistic analyses.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Participants involved in analyses (mean or percentage)</th>
<th>Participants not involved in analyses (mean or percentage)</th>
<th>Test for difference¹</th>
<th>p-value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>57.04 % (n = 247)</td>
<td>44.90 (n = 22)</td>
<td>$\chi^2 = 2.63$</td>
<td>p = 0.11</td>
</tr>
<tr>
<td>Female</td>
<td>42.96 % (n = 186)</td>
<td>55.10 (n = 27)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>70.67 % (n = 306)</td>
<td>77.55 % (n = 38)</td>
<td>$\chi^2 = 1.02$</td>
<td>p = 0.31</td>
</tr>
<tr>
<td>Smokers</td>
<td>29.33 % (n = 127)</td>
<td>22.45 % (n = 11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; high school</td>
<td>12.47 % (n = 54)</td>
<td>10.53 % (n = 4)</td>
<td>$\chi^2 = 0.13$</td>
<td>p = 0.73</td>
</tr>
<tr>
<td>&gt;= high school</td>
<td>87.47 % (n = 377)</td>
<td>90.00 % (n = 36)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>42.48 (SD = 13.40)</td>
<td>46.69 (SD = 10.68)</td>
<td>t-value = 0.31</td>
<td>p = 0.76</td>
</tr>
<tr>
<td>Mean Acculturation Score (Marin)</td>
<td>23.92 (SD = 7.19)</td>
<td>24.28 (SD = 6.40)</td>
<td>t-value = 0.30</td>
<td>p = 0.77</td>
</tr>
</tbody>
</table>

1. Comparing participants included in the analyses to participants not included in the analyses: Mantel-Haenszel Chi-square test if covariate is categorical; T-test for unequal variances if covariate is continuous.
Table 6. The relationship between the level of acculturation and perceptions about the effectiveness of advice from a doctor or health professional to help smokers quit: Comparison of Chinese participants included in logistic analyses versus Chinese participants not included in the logistic analyses.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Participants involved in analyses (mean or percentage)</th>
<th>Participants not involved in analyses (mean or percentage)</th>
<th>Test for difference</th>
<th>p-value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53.64 % (n = 199)</td>
<td>50.63 (n = 40)</td>
<td>$\chi^2 = 0.24$</td>
<td>p = 0.63</td>
</tr>
<tr>
<td>Female</td>
<td>46.36 % (n = 172)</td>
<td>49.37 (n = 39)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>84.37 % (n = 313)</td>
<td>93.57 % (n = 74)</td>
<td>$\chi^2 = 3.94$</td>
<td>p &lt; 0.05</td>
</tr>
<tr>
<td>Smokers</td>
<td>15.63 % (n = 58)</td>
<td>6.33 % (n = 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; high school</td>
<td>19.41 % (n = 72)</td>
<td>26.42 % (n = 14)</td>
<td>$\chi^2 = 1.41$</td>
<td>p = 0.24</td>
</tr>
<tr>
<td>&gt;= high school</td>
<td>80.59 % (n = 299)</td>
<td>73.58 % (n = 39)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>43.60 ($SD = 16.01$)</td>
<td>51.30 ($SD = 16.85$)</td>
<td>t-value = 2.85</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>Mean Acculturation Score</td>
<td>18.05 ($SD = 5.99$)</td>
<td>16.41 ($SD = 6.72$)</td>
<td>t-value = -1.99</td>
<td>p &lt; 0.05</td>
</tr>
</tbody>
</table>

1. Comparing participants included in the analyses to participants not included in the analyses: Mantel-Haenszel Chi-square test if covariate is categorical; T-test for unequal variances if covariate is continuous.
Table 7. The relationship between the level of acculturation and perceptions about the effectiveness of support from the religious community to help smokers quit: Comparison of Arabic participants included in logistic analyses versus Arabic participants not included in the logistic analyses.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Participants involved in analyses (mean or percentage)</th>
<th>Participants not involved in analyses (mean or percentage)</th>
<th>Test for difference$^1$</th>
<th>p-value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56.93% ($n = 234$)</td>
<td>49.30 ($n = 35$)</td>
<td>$\chi^2 = 1.43$</td>
<td>$p = 0.23$</td>
</tr>
<tr>
<td>Female</td>
<td>46.36% ($n = 172$)</td>
<td>49.37 ($n = 39$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>71.29% ($n = 293$)</td>
<td>71.83% ($n = 51$)</td>
<td>$\chi^2 = 0.01$</td>
<td>$p = 0.93$</td>
</tr>
<tr>
<td>Smokers</td>
<td>28.71% ($n = 118$)</td>
<td>28.17% ($n = 20$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; high school</td>
<td>12.17% ($n = 50$)</td>
<td>13.33% ($n = 8$)</td>
<td>$\chi^2 = 0.07$</td>
<td>$p = 0.80$</td>
</tr>
<tr>
<td>&gt;= high school</td>
<td>87.83% ($n = 361$)</td>
<td>86.67% ($n = 52$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>41.29 ($SD = 13.43$)</td>
<td>40.89 ($SD = 11.76$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Acculturation Score (Martin)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>23.55 ($SD = 7.73$)</td>
<td>26.47 ($SD = 6.84$)</td>
<td></td>
<td>$p &lt; 0.01$</td>
</tr>
</tbody>
</table>

1. Comparing participants included in the analyses to participants not included in the analyses: Mantel-Haenszel Chi-square test if covariate is categorical; T-test for unequal variances if covariate is continuous.
Table 8. The relationship between the level of acculturation and perceptions about the effectiveness of support from the religious community to help smokers quit: Comparison of Chinese participants included in logistic analyses versus Chinese participants not included in the logistic analyses.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Participants involved in analyses (mean or percentage)</th>
<th>Participants not involved in analyses (mean or percentage)</th>
<th>Test for difference</th>
<th>p-value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53.12 % (n = 179)</td>
<td>53.10 (n = 60)</td>
<td>$\chi^2 = 0.01$</td>
<td>p = 0.99</td>
</tr>
<tr>
<td>Female</td>
<td>46.88 % (n = 158)</td>
<td>46.90 (n = 53)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>84.87 % (n = 286)</td>
<td>89.38 % (n = 101)</td>
<td>$\chi^2 = 1.43$</td>
<td>p = 0.23</td>
</tr>
<tr>
<td>Smokers</td>
<td>15.13 % (n = 51)</td>
<td>10.62 % (n = 12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; high school</td>
<td>17.21 % (n = 58)</td>
<td>32.18 % (n = 28)</td>
<td>$\chi^2 = 9.57$</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>&gt;= high school</td>
<td>82.79 % (n = 279)</td>
<td>67.82 % (n = 59)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>43.87 ($SD = 16.12$)</td>
<td>46.84 ($SD = 16.68$)</td>
<td>t-value = 1.44</td>
<td>p = 0.15</td>
</tr>
<tr>
<td>Acculturation Score</td>
<td>18.22 ($SD = 6.02$)</td>
<td>16.41 ($SD = 6.35$)</td>
<td>t-value = -2.64</td>
<td>p = 0.01</td>
</tr>
</tbody>
</table>

1. Comparing participants included in the analyses to participants not included in the analyses: Mantel-Haenszel Chi-square test if covariate is categorical; T-test for unequal variances if covariate is continuous.
Table 9. The relationship between the level of acculturation and perceptions about the effectiveness of advertising about the dangers of smoking to help smokers quit: Comparison of Arabic participants included in logistic analyses versus Arabic participants not included in the logistic analyses.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Participants involved in analyses (mean or percentage)</th>
<th>Participants not involved in analyses (mean or percentage)</th>
<th>Test for difference</th>
<th>p-value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56.81 % (n = 246)</td>
<td>46.94 (n = 23)</td>
<td>$\chi^2 = 1.36$</td>
<td>p = 0.24</td>
</tr>
<tr>
<td>Female</td>
<td>43.19 % (n = 187)</td>
<td>53.06 (n = 26)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Smoking status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>70.67 % (n = 306)</td>
<td>77.55 % (n = 38)</td>
<td>$\chi^2 = 1.02$</td>
<td>p = 0.31</td>
</tr>
<tr>
<td>Smokers</td>
<td>15.13 % (n = 51)</td>
<td>10.62 % (n = 12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; high school</td>
<td>12.93 % (n = 56)</td>
<td>5.26 % (n = 2)</td>
<td>$\chi^2 = 1.26$</td>
<td>p = 0.26</td>
</tr>
<tr>
<td>&gt;= high school</td>
<td>87.07 % (n = 377)</td>
<td>94.74 % (n = 36)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean age (years)</strong></td>
<td>41.17 ($SD = 13.32$)</td>
<td>42.82 ($SD = 12.46$)</td>
<td>$t$-value = 0.60</td>
<td>p = 0.55</td>
</tr>
<tr>
<td><strong>Mean Acculturation Score (Marin)</strong></td>
<td>23.83 ($SD = 7.76$)</td>
<td>25.14 ($SD = 6.72$)</td>
<td>$t$-value = 1.21</td>
<td>p = 0.23</td>
</tr>
</tbody>
</table>

1. Comparing participants included in the analyses to participants not included in the analyses: Mantel-Haenszel Chi-square test if covariate is categorical; T-test for unequal variances if covariate is continuous.
Table 10. The relationship between the level of acculturation and perceptions about the effectiveness of advertising about the dangers of smoking to help smokers quit: Comparison of Chinese participants included in logistic analyses versus Chinese participants not included in the logistic analyses.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Participants involved in analyses (mean or percentage)</th>
<th>Participants not involved in analyses (mean or percentage)</th>
<th>Test for difference (^1)</th>
<th>p-value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>52.76 % (n = 201)</td>
<td>55.07 (n = 38)</td>
<td>( \chi^2 = 0.13 )</td>
<td>p = 0.72</td>
</tr>
<tr>
<td>Female</td>
<td>47.24 % (n = 180)</td>
<td>44.93 (n = 31)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>84.78 % (n = 323)</td>
<td>92.75 % (n = 64)</td>
<td>( \chi^2 = 3.08 )</td>
<td>p = 0.08</td>
</tr>
<tr>
<td>Smokers</td>
<td>15.22 % (n = 58)</td>
<td>7.25 % (n = 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; high school</td>
<td>19.69 % (n = 75)</td>
<td>25.58 % (n = 11)</td>
<td>( \chi^2 = 0.83 )</td>
<td>p = 0.36</td>
</tr>
<tr>
<td>&gt;= high school</td>
<td>80.31 % (n = 306)</td>
<td>74.42 % (n = 32)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>43.90 (SD = 16.13)</td>
<td>50.12 (SD = 16.82)</td>
<td>t-value = 2.05</td>
<td>p &lt; 0.05</td>
</tr>
<tr>
<td>Mean Acculturation Score (Marin)</td>
<td>17.99 (SD = 5.98)</td>
<td>16.53 (SD = 6.92)</td>
<td>t-value = -1.80</td>
<td>p = 0.07</td>
</tr>
</tbody>
</table>

1. Comparing participants included in the analyses to participants not included in the analyses: Mantel-Haenszel Chi-square test if covariate is categorical; T-test for unequal variances if covariate is continuous