When Does Social Capital Matter For Health?
The Moderating Roles of Ethnicity, Income and Gender

by

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DEDICATION

To my wife, Rong Chen,
For her encouragement, support, love and sacrifice
To my Parents,
Li Daiying & Huang Chiqing
For their unreserved love and faith in me

Acknowledgements

Thirty years ago, few would expect that a boy whose daily business was to care cows and ducks in the nameless mountains would one day complete a dissertation ten thousand miles away at the other side of the earth. This is a wonder and a privilege. For this, I want to express my sincere appreciation to all who have provided support in this wonderful journey.

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Abstract

Many empirical studies have suggested that social capital is positively related to health. However, little research has been conducted into how social capital is distributed and whether social capital matters for health uniformly or differentially across socio-economic statuses or racial/ethnic groups in the United States. This research seeks to address the gaps by examining the distribution of social capital across racial/ethnic, income, education and gender groups in the general population as well as among three Asian American subpopulations. It investigates whether social capital is associated with Asian Americans' health, and, if so, whether such associations are moderated by ethnicity, income or gender.

The research draws data from two nationally representative surveys: the National Comorbidity Survey Replication (NCS-R), and the National Latino and Asian American Study (NLAAS). Exploratory factor analysis is used to generate social capital indicators from respondents' social networks and their subjective evaluations of family and neighborhood life. Dependent variables include both physical and mental health outcomes as well as health behavior.

Findings reveal that Whites, females and individuals with higher incomes and more education have higher levels of social capital. Logistic regression analysis shows that while social capital, in particular structural social capital, is generally associated with better health outcomes, some dimensions of social capital are associated with an increased risk of smoking. More importantly, the study finds that social capital and health

associations are moderated by ethnicity, income and gender, with Vietnamese and low-income individuals receiving higher returns from social capital. Additionally, the negative effect of social capital on smoking is much stronger for women than for men.

The findings of this study provide empirical evidence for a new line of reasoning which views the value of social capital for health as contingent on social context. Future research should take social context into account when examining the health effects of social capital. Additionally, social work practitioners should consider tailored interventions for targeted populations in order to maximize the benefits of social capital while minimizing its negative effects. As empirical investigations in this field are relatively new, additional research is needed to advance theory, research and practice.

Chapter 1

Introduction

The United States has gained significantly in terms of health since World War II, but these gains have not been distributed evenly among different social groups. People of minority status often have low birth weights, a shorter life expectancy and increased chances of illnesses such as heart disease, diabetes, obesity, and elevated lead blood level. Prior research indicates that neither individual lifestyles nor material deprivation (including relative deprivation) is adequate for explaining health inequalities across social groups (Lomas, 1998). Recent researchers, disillusioned with social dislocation and disharmony as well as the overwhelming dominance of neo-liberalism in public policy, have emphasized the role of social factors in determining health and well-being (Baum, 1999; 2000). During this process, the theory of social capital has gained considerable attention and increasing recognition as one of the social determinants of health (Carlson & Chamberlain, 2003; Turner, 2003).

Broadly understood as referring to social relationships resulting from reciprocal exchanges in associations or networks, social capital has been shown to enhance the likelihood of instrumental returns. Sociologist James Coleman (1988) suggests that social capital is analogous to physical and human capital in producing valuable economic and noneconomic outcomes. For example, he points out that the Jewish dominance of the diamond trade in New York City is facilitated by the free exchange of precious stone

inspections within the community, and the clandestine "study circles" formed by South Korean radical activists in the 1980s incubated political opposition within a system intolerant of dissent. Furthermore, social capital, like all forms of capital, can be invested with expectation of a future return and can be a substitute or a complement for other resources (Alder & Kwon, 2002). But unlike financial capital, social capital needs maintenance; some forms of social capital are collective in nature and do not reside in individuals but in their relationships with each other (Alder & Kwon, 2002). In sum, the core idea of social capital is that "social networks have values" (Putnam, 2004, p.1436), and can facilitate individuals to achieve what they cannot achieve in its absence. In this sense, the concept of social capital falls in the heterogeneous family of capital.

To date, many theoretical issues concerning this concept remain to be elucidated such as its definition and measurement; nevertheless, the concept has evolved rapidly to fit a wide variety of hypotheses and models in a number of disciplines. Empirical studies in education, economics and political science have increasingly adopted this new concept as an independent variable to explain differences in social outcomes. For example, it has been shown that social capital helps improve government performance (Putnam, 1993), lower teen pregnancy rates (Crosby & Holtgrave, 2006), reduce high school dropouts (Coleman, 1988, 1990), improve educational achievement (Dika & Singh, 2002), and promote economic development (Keefer & Knack, 1997). Indeed, there is such a wide range of research into social capital that some authors warned against its over-versatility (Field, 2003).

1.1. Social Capital and Health

As a concept originally conceived and developed by sociologists and political scientists for purposes other than studying health inequalities, the introduction of social capital theory into health research has been severely criticized (Hawe & Shiell, 2000; Lynch et al., 2000). Even Robert Putnam (1993), one of the pioneering social capital theorists, explicitly excluded health as an outcome of social capital. Thanks to Wilkinson's recasting of the theory by arguing that income inequality is a reflection of low social capital, the concept has been gradually accepted into the study of health inequalities (Wilkinson, 1996; Ferlander, 2007). Empirical studies by some prominent researchers, in particular Kawachi and his colleagues (1997, 1998, 1999, 2000), help bring the concept of social capital to the forefront of the public health research agenda. By early 21st century, social capital has become a new paradigm for the explanation of differences in health and illness between social groups (Turner, 2003).

Increasing empirical evidence has demonstrated that social capital is beneficial to physical and mental well-being. In Kawachi's serial studies (1997, 1998, 1999, 2000), social capital is found to be correlated with an array of health outcomes including mortality, self rated health, and rates of disability, with remarkable consistency. In fact, in a ground breaking paper, Kawachi and colleagues (1997) found that social capital was as important as socioeconomic status (SES) in determining population health. Rose (2000) showed that social capital contributed even more than human capital to better health among the Russian population. Many other studies also suggested that social capital significantly affect population health (Baum et al, 2000; Kawachi, Kennedy, Lochner & Prothrow-Stith, 1997; Kunitz, 2001; Putnam, 2000; Hyyppa & Maki, 2001; Lindstrom,

2004; Bolin et al, 2003) as well as health behaviors, such as smoking, physical activity and dietary habits (Poortinga, 2006; Lindström, 2004). Even Robert Putnam (2000), who initially excluded social capital for health research, later claimed that "[o]f all the domains in which I have traced the consequences of social capital, in none is the importance of social connectedness so well established as in the case of health and well-being…statistically speaking, the evidence for the health consequences of social connectedness is as strong today as was the first surgeon general's report on smoking" (p.326). In a recent review of social capital and health literature, Pridmore et al (2007) noted that a good number of studies from both more and less developed countries using a wide range of research designs provided reasonable evidence for a link between higher social capital and better health conditions before and after adjusting socio demographic and socioeconomic variables.

However, although the findings regarding social capital for health are intriguing and important, problems with social capital and health research are evident (Macinko & Starfield, 2001). First and most frequent, is the criticism that social capital as a concept is ambiguous. Fine (1999) called social capital a "catch-all, ambiguous if not incoherent, and yet analytically selective" concept (p.9). Second, the unit of analysis of social capital is inconsistent. The literature has at least three levels that have at one time or another been included in conceptualizing and measuring social capital. Some researchers regard social capital as a macro-level characteristic, such as rule of law, decentralization, regime type (Krishna & Shrader, 1999); many tend to treat it as a community attribute (Kawachi, 1997; Putnam, 2000); and still others see individual-level measures as more meaningful because of the unequal distribution of social capital within communities (Hyppa & Maki,

2001; Poortinga, 2006; Rose, 2000; Sundquist & Yang, 2006; Veenstra, 2000). Third, debate over how to measure social capital remains heated. Social capital measurement used in the health literature is not consistently based on any one major theoretical tradition. Some conceptualize social capital as a relational resource, while others argue that this construct embodies political or material resources (Hawe & Shiell, 2000). As a result, the items used to measure social capital remain contentious. However, despite all these shortcomings, the social capital concept represents a very important conceptual innovation, which can facilitate empirical investigations and interdisciplinary collaboration (Adam & Roncevic, 2003). And according to Szreter and Wookcock (2004), the concept of social capital 'matters' for health in some basic sense, and *more empirical evidence is needed to resolve the lingering disputes* (Italics mine).

1.2. Overview of the Current Study

Against this background, the current study will not focus on the theoretical debate; instead, this work is an empirical analysis of social capital and health that aims to examine some of the lingering uncertainties in the literature. First, this study explores how social capital is distributed among racial/ethnic, SES and gender groups. As suggested by Campbell and McLean (2002), racial and class identification may reduce the likelihood of participation in community organizations or networks beyond that of family and friends. It can be reasonably argued that, overall, individuals with higher SES may also command more social capital; however, even individuals with the same SES may not have the same stock of social capital due to structural factors (e.g., race, discrimination). Therefore, social capital needs to be examined not only in terms of SES,

but also in the context of racial/ethnic and gender differences. Existing research tends to indicate there are important differences in social capital across racial/ethnic groups, but how big and what kind the differences are remain unexplored. Furthermore, almost all of prior research on social capital and health has been conducted among White Caucasian populations[1], with occasional studies including African Americans and Hispanics. To the author's knowledge, no studies have been carried out to explore social capital among Asian Americans and whether it impacts Asian Americans' health. Therefore, studying the production and reproduction of social inequalities through the differences in social capital among Asian American population promises to be illuminating for the literature as well as for health policy making.

Another very important, but even less examined area, is whether social capital generates differential health returns for various social groups. In most of the current literature, it is assumed that social capital is "one size that fits all"; that is, social capital generates the same level of benefits for all people who have it. Yet, it is quite reasonable to hypothesize that the construct of social capital may operate differentially depending on social context; consequentially, it may not have the same strength of associations with health outcomes or capture the same aspects of health risks for different subgroups. For example, Paldam (2000) speculated that if members of a community have unrealistically high trust and participate in too many failed cooperation, they are the "suckers" other people take advantage of; if, on the other hand, they exhibit unrealistically low trust, they are the "misanthropes" who lose from not participating in cooperation.

Some empirical studies have shown that while higher level of social capital helped reduce the overall mortality rates in the population, it worked significantly better

[1] The term "Whites" here is used in line with U.S. Census terminology, referring to Caucasian Whites.

for Whites than for African Americans (Lochner et al, 2003). Also, high trusting individuals reported worse health when residing in low-trust communities while low trusting individuals did not report better health in high trusting communities (Kim & Kawachi, 2002). Significant gender differences in the association between neighborhood social capital and health are also observed (Stafford et al, 2005). But, overall, little is known about the magnitude of the association and how it varies across populations with different cultural norms, values, and levels of socioeconomic development. Therefore, there is a need to further examine social capital-health associations among different racial/ethnic and cultural subgroups in the U.S. in order to test the universality of to the concept to refine theoretical perspectives. Accordingly, the current study will investigate how social capital might be differentially associated with the health status among Asian Americans subgroups.

In summary, the empirical social capital and health literature is limited in at least three aspects: little exploration of how social capital is distributed among social groups in the United States; lack of investigation of whether social capital generates differential health returns for people with different social identities; and no examination of whether social capital functions similarly or differently for Asian Americans as compared to the general population. The current empirical study builds on earlier theoretical discussions of social capital and health to fill gaps by explicitly investigating the relationship between social capital and health among Asian Americans as well as the potentially differential returns of social capital for health among people with different ethnic backgrounds, income levels and gender. Specifically, by conceptualizing social capital as an individual-level construct, the present study first examines the distribution of social capital across

racial/ethnic, income and gender groups in the general population of the United States as well as in the Asian American populations. It then investigates the potential associations between social capital and health outcomes among the Asian American populations, as well as whether such associations are moderated by ethnic identity, income and gender.

1.3. Research Objectives and Data

After more than a decade of theoretical debate and empirical studies, most researchers have agreed that social capital and health are closely related. Further, researchers agree that although every social group within a population possesses some sort of social capital as a resource, the distribution of social capital is far from even, varying by age, race/ethnicity, gender, SES and neighborhood (Boisjoly et al, 1995; Veenstra, 2002). However, the question of whether social capital functions the same way across different social groups is rarely explored. Thus, the central purpose of this exploratory study is to investigate the dimensions of social capital that are significant in understanding variations in health outcomes among Asian Americans. A more nuanced examination of social capital and health will provide a better understanding of some of the social, economic and cultural factors that affect this population. Hence, the main research question addressed in the study is: *Does social capital yield differential returns on health across social groups?* The study is based on the hypothesis that a higher level of social capital yields better health among the Asian American populations, but the returns are not homogenous among the subgroups.

Specifically, the major objectives of this project are to:

1) Assess differences in social capital distribution based on race/ethnicity, SES and gender.
2) Test the hypothesis that social capital is related with individual health and health behaviors after controlling for key confounders;.
3) Investigate whether social capital exerts differential effects on health and health behaviors across Asian American subgroups;
4) Examine whether the effects of social capital on individual-level health and health behavior vary according to other criteria, such as income, education and gender.

To fulfill these objectives, this study will use data from the Collaborative Psychiatric Epidemiology Surveys (CPES). The CPES data were collected by the Survey Research Center at the University of Michigan with support from the National Institute of Mental Health (NIMH) to gauge "the prevalence of mental disorders, impairments associated with these disorders and the treatment patterns from representative samples of majority and minority adult populations in the United States". Structurally, CPES is composed of three independent, nationally representative surveys: the National Comorbidity Survey Replication (NCS-R, 2001-2003), the National Survey of American Life (NSAL, 2001-2003), and the National Latino and Asian American Study (NLAAS, 2002-2003). The common theme of the three CPES surveys is to study mental health in the United States, but each focuses on a different population. NCS-R, an expanded replication of the 1990 National Comorbidity Survey (NCS), aims at investigating the prevalence of mental disorders and its correlates among the general American (majority Whites) population. In contrast, NSAL is designed to explore racial and ethnic

differences in mental health and service mainly in the African-Americans and Afro-Caribbean populations as compared with Whites living in the same communities. NLAAS, which was originally meant, like NSAL, to compare Latinos/as and Asian Americans with the White population in mental health and service use, ended up mainly surveying Latinos/as and Asian Americans due to various complications during its implementation.

Since the three surveys were conducted using similar instruments, with proper weighting, researchers can combine any of the three surveys into a single, nationally representative dataset for analysis. Given the objectives of this study, I merged the NCS-R and NLAAS datasets for the analysis of social capital distribution in the general population of the United States. In total, NCS-R interviewed 9,852 adults and NLAAS surveyed 4,665 Latinos and Asian American adults in 48 states (2,095 Asian Americans). Statistically, the sample size has sufficient power to investigate the relationship between social capital and health outcomes. Details of the datasets and the samples for this study are described later in the methodology sections.

1.4. Rationale for Analyses

In accordance with the research objectives, the data analysis progresses in two steps. Step one focuses on the descriptive analysis of social capital distribution across social groups in the United States. More specifically, descriptive analysis will be conducted regarding the distribution of social capital by race/ethnicity (Whites, Blacks, Latinos and Asian Americans), SES and gender in the general population. This analysis will speak to how social capital is distributed in the United States. However, due to the

limitation of the combined data, the analysis can only be used to examine one dimension of social capital—the structural aspect of social capital.

To test whether social capital exerts differential effects on health, the second step of data analysis will use the Asian American component of NLAAS (N=2,095) instead of the combined dataset. The major reason for this is that while the combined data has only one indicator of social capital (social network), NLAAS has a more comprehensive measure that includes perception of neighborhood and family cohesion. This measure will offer a broader and deeper understanding of how social capital and health are related in the Asian American population which is both appropriate and necessary. Compared with other racial groups, the Asian American populations are extremely heterogeneous: within-group differences may be larger than between-group differences, thus warranting a closer examination of the relationship between social capital and health. In addition, as mentioned earlier, there has been little research on this subject among Asian Americans compared to other U.S. racial/ethnic minorities. Furthermore, socioeconomic indicators vary substantially within and between Asian American ethnic groups and are often concentrated on both the high end and low ends, providing an ideal backdrop to test the hypotheses of whether social capital functions differentially based on SES.

The Asian American population is projected to be one of the fastest growing minority groups in the U.S. over the next two decades. In this context, the lack of empirical attention to and consequent limitations in the ability to design effective health interventions for Asian Americans is a significant emergent public health issue. The findings of this study can begin to move the field beyond assumptions and stereotypes of Asian Americans as a homogeneous "model minority", and can contribute to our

understanding of whether and how social capital affects the health status of Asian Americans compared to other populations and if certain mechanisms are more salient for this population. This information can ultimately inform policy makers and program planners in their efforts to create more culturally responsive health care and social service systems.

1.5. Research Significance

This study hinges on the proposition that social capital as a resource exists and operates differently among social groups stratified by race/ethnicity, SES and gender and that the health returns of social capital also differ. In almost all the prior studies, race/ethnicity, SES and gender were treated only as covariates; to my knowledge, this research is among the first to account for the possibility that the influences of social capital on health are contingent on race/ethnicity, SES and/or gender. In other words, the same amount of social capital might not generate the same returns for people of different gender or from different SES or racial/ethnic groups. This empirical exploration will add to the understanding of the construction of social capital and how it works within different social contexts. This research will provide a contribution to the scholarship on social capital and health and will also be useful for designing effective interventions aimed at decreasing inequalities among groups.

This study is also significant in that it is different from many prior studies in two aspects. First, the larger set of dependent variables included in this study helps gain a more comprehensive understanding of how social capital may affect the different components of physical and mental health. Unlike many studies which use only one or

two dependent variables (usually self-rated health and/or mortality), this research employs five health outcome dependent variables: self-rated physical health; self-rated mental health; a 14-item Somatic symptoms; a 12-item chronic health conditions; and smoking status. Second, studies reported in the social capital literature often have a measurement limitation; in many studies, only one or two proxy items were used to measure the complex concept of social capital. In contrast, this study employs multiple items to measure both the structural and cognitive dimensions of social capital through exploratory factor analysis. The structural and cognitive distinction of social capital has gained acceptance in the recent literature (Yip et al, 2007).

The policy significance and timeliness of this study also adhere to the particular sample being studied (the under-investigated Asian American population and its subgroups). Consistent with the broad conception of racial/ethnic studies, prior paired comparisons have mostly been made between Whites and African Americans or Latin Americans. To the author's knowledge, this is the first in-depth and comprehensive study of Asian Americans in terms of social capital and health by using a nationally representative sample. The subgroup analysis of Asian American population, an extremely heterogeneous group, will provide detailed information about intra-group gaps in social capital, education, income, acculturation, and health status. Scholars have argued that, in studying the health of the Asian American population, aggregating distinctively different Asian subgroups into one classification is misleading because it masks the diversity of the ethnic groups and has serious implications for program planning (Uehara, Takeuchi, & Smukler, 1994). Subgroup analysis of Asian Americans will offer more accurate information to help move past the stereotyped "homogenous"

group of Asian Americans. The more complex understandings of social capital and health among Asian Americans will be highly relevant for developing tailored interventions to improve health and promote positive health behaviors within specific subgroups. Many theorists argue that a better understanding of the complexity of intersecting identities is crucial for social justice, which is addressed by this project; this should improve the odds of success for broader movements for social justice.

In sum, the two-part analysis will contribute to the social capital literature by noting points of convergence and discrepancy in how social capital is distributed unevenly in American society and how social capital operates similarly or differentially among ethnic groups within the Asian American population. It also has valuable policy implications for social work practice in helping the practitioners and policy makers design programs and policies suitable for particular subpopulations.

1.6. Dissertation Organization

The remainder of the dissertation is divided into four chapters. Chapter Two comprehensively reviews the concept of social capital and synthesizes the relevant literature on social capital and health. Chapter Three specifies the research questions, conceptual model and hypotheses, describes the data source, and delineates the design and methodology of the study. Chapter Four presents the descriptive statistics of social capital distribution in the general population and the results of regression analyses among Asian subgroups. Finally, the study concludes with Chapter Five, a description of study limitations, suggestions for future research in this area and potential implications for policy and practice.

Chapter 2

Social Capital Theory and Health Research

A central component to this dissertation study is the concept of social capital. Developed originally in sociology and political science, the translation of social health capital into public health research is challenging and requires further refinement. Therefore, the first part of this chapter will focus on the historical development of social capital, its conceptualization and measurement as well as its strengths and weaknesses in social research. The second part of the chapter is a review of the empirical literature regarding the associations between social capital and health along with the limitations of the literature.

2.1. Theoretical Background of Social Capital

Although the surge of interest in social capital is very recent, many social capital theorists argue that the theoretical precursors of the concept of social capital can be traced back to the eighteenth or nineteenth century, possibly even earlier (Halpern, 2005). Scholars such as Adam Smith, Alexis De Tocqueville and Emile Durkheim discussed the importance of social capital in their writings (Yen & Syme, 1999; Ferlander, 2007). Emile Durkheim is one of the first to link social integration with health, noting that social ties and community relations work against anomie and therefore reduced suicide rates (Halpern, 2005).

However, the first use of the concept in 1916 was credited to Lyda Hanifan by Robert Putnam and others (Portes, 1998; Putnam, 1993). Being a superintendent for education in West Virginia, Hanifan used the term to describe the assets that were most vital to the day-to-day emotional lives of individuals:

> "The individual is helpless socially, if left to himself. If he comes into contact with his neighbor, and they with other neighbors, there will be an accumulation of social capital, which may immediately satisfy his social needs and which may bear a social potentiality sufficient to the substantial improvement of living conditions in the whole community…" (Quoted from Putnam, 2000, p.19)

Obviously, for Hanifan if people interact beyond families, in the neighborhood and local community, interpersonal relationships build, and, over time, such relationships become important assets for enhancing their quality of life and can foster important educational achievements for all of those in the community.

No doubt Hanifan's call for building social capital to better educational outcomes is important and innovative for the time; nevertheless, his idea turns out to have had little impact either on government policy or on academic research in the ensuing decades. It was only in the 1970s that the notion of social capital was re-discovered and popularized through the seminal work of three key researchers: Pierre Bourdieu, James Coleman and Robert Putnam. The contemporary understanding of social capital owes mainly to the writings and research of these three prominent researchers, each of whom represents an important and distinct tributary of social capital theory in the literature.

Pierre Bourdieu is credited with transforming social capital from a metaphor into a concept (Field, 2003). From a sociological perspective, he is mainly concerned with how social class and inequality are socially reproduced (Field, 2003; Bourdieu, & Passeron, 1990). Bourdieu pointed out that there were three types of capital ─ economic,

cultural, and social capital ─ that are important in the competition for power and position among the social classes (Bourdieu, 1986; Bourdieu & Wacquant, 1992). While economic capital is at the root of other types of capital, those other forms of capital are never entirely reducible to economic capital. Moreover, all three types of capital mutually reinforce each other to ensure transmission of capital within wealthy groups. Specifically, he defines social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognitions" (Bourdieu 1986, p. 248) that has a "multiplication effect" on the influence of other forms of capital. In this definition, social capital consists both of the benefits to which individuals have access to by virtue of their participation in groups and the relationships within the groups themselves. Like other forms of capital (e.g., money, education, taste) critical for maintaining social class and position, social capital can be used to obtain resources in tandem with, or in the absence of, other forms of capital (Bourdieu, 1986). It provides tangible advantages to privileged individuals, families and groups since the volume of social capital possessed by an individual depends on the size of the network and the volume of other forms of capital (economic, cultural or symbolic) (Bourdieu, 1986). In other words, social capital is never an independent form of capital; instead, people with better access to economic and cultural capital will generally possess larger amounts of social capital as well.

Different from Bourdieu, education sociologist James Coleman (1988) is mostly concerned with the formation of human capital—students' educational achievements. He argued that social capital in the family and community plays a crucial role in creating human capital for the next generation, since it constrains inappropriate behaviors and

facilitates academic achievement. For example, students with more social capital—the physical presence of parents and the attention they receive from them—are less likely to drop out of school. Similarly, social capital formed outside of the family by, for example, the religious community (i.e., "intergenerational closure"), explains why the dropout rate in Catholic schools is only one fourth that of public schools and one third that of private schools. Closure, which could be understood as close contacts with others in a community, identifies and sanctions violations of norms and breaches of trust. Coleman's conceptualization of the relationship between social capital and the creation of human capital is an important theoretical step in understanding the accumulation of human capital in childhood.

The effect of social capital is not limited to school achievement. To Coleman, social capital is as productive as other forms of capital: It reduces transaction costs in the market and can also facilitate collective action for noneconomic purposes, such as the underground pro-democracy political groups in South Korea in the 1980s. It is a resource which "exists in the relations among persons" (1988, p. 100), particularly in the structure of family relationships which enables people to increase their human capital and reap economic rewards. Therefore, Coleman defines social capital by its function:

> "It is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure, and they facilitate certain actions of individual who are within the structure" (Coleman, 1990, p.302).

More specifically, Coleman (1990) theorized that social capital comprises three forms: *reciprocity* (*obligations, expectations, and trustworthiness of structures); information channels; and norms and effective sanctions*. These three forms of social capital are not independent; rather, they are closely inter-dependent and mutually

reinforcing. When an individual does something for someone else, he can reasonably expect that person will reciprocate at some time in the future. With a generalized background of trust, people can rely on others for accurate information to inform action. Norms and effective sanctions are necessary to sustain the generalized environment of trust and further consolidate the existing social capital. Unlike Bourdieu, Coleman argued that social capital is not a privilege for the top echelon, but a resource available for all social actors (Field, 2003).

If Bourdieu and Coleman contributed to the resurgence of the social capital concept by laying down a theoretical foundation, political scientist Robert Putnam should be credited as the first researcher to comprehensively test and eventually publicizes the concept (Field, 2003). In a widely read book, *Making Democracy Work,* Putnam (1993) argued that the fact local governments in northern Italy were much more effective, responsive and efficient than those in the south cannot be explained by budget or policy differences, but by the unequal levels of social capital between North and the South. The northern region, with a republic tradition dating back to medieval times, is endowed with higher levels of trust and denser networks of horizontal associations, which encourage leaders and citizens to be trustworthy and obey laws. In sharp contrast, the society of southern Italy was historically organized hierarchically under the Norman autocracy, immersed in a culture of suspicion and fear. Southern citizens felt powerless and exploited and consequentially participated little in civic affairs. Hence, they lack the skills and inclinations necessary to work together on public economic and political projects, and therefore, have not been able to make democracy work well. Later, in another study of "civic America," *Bowling Alone* (2000), Putnam suggests that America's

social capital is declining as evidenced by a decrease in voter participation, declining membership in groups, declining levels of trust, and neighbors not knowing neighbors. His concern is that declining social capital poses a major threat to the continued maintenance of democracy, since more social capital is good for democracy while less of it may spell trouble.

In the above two empirical studies on social capital, Putnam (1993) obviously interpreted the concept differently from his predecessors and measured social capital with proxies never used before, such as interpersonal trust, newspaper reading, group membership and civic participation. Accordingly, he defined social capital as *"…*features of social organizations, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions" (Putnam, 1993, p. 167). This definition is similar to Coleman's in that social capital has beneficial effects on social groups, and its positive externalities often go beyond group boundaries to benefit the whole community. Putnam believes that the three major components of social capital ─ trust, social norms and obligations, and social networks ─ do not stand alone, but are mutually self-reinforcing and cumulative. Generalized trust creates the basis for reciprocity, and social networks and civil associations in turn generate trust. Virtuous circles can "result in social equilibriums with high levels of cooperation, trust, reciprocity, civic engagement and collective well-being," while vicious circles intensify "defection, distrust, shirking, exploitation, isolation, disorder, and stagnation" (p. 177). In Putnam's argument, voluntary associations, especially those with face-to-face, horizontal relations among individuals, generate trust, norms of reciprocity, and a capacity for civic engagement which are essential to the functioning of a modern democracy. The logic is, as Briggs

(1998) succinctly put, that the more people connect with one another, the more they trust each other, and the social and economic system as a whole functions better. But Putnam (1993, 1995) also noted that neither informal networks nor large, national level membership groups could substitute for the powerful effects emanating from the face-to-face associations.

To sum up, the three pioneering authors differ philosophically in their approaches toward the concept of social capital, each representing a relatively distinct tributary in the social capital literature. Bourdieu's interest is to exam social conflicts/struggles, forms of power/violence, and forms of domination and deprivation. To him, social capital is a resource for the privileged to get access to the highly sought economic and cultural resources in capitalist societies. Social capital is a force that "plays a key part in shaping and perpetuating patterns of economic inequity and in re-enforcing the material disadvantaged suffered by many within advanced capitalist societies" (Baum, 2000, p.410). Such an approach is located within an explanatory framework that recognizes class division, economic exploitation and the constitutive role of politics (Fine, 2001). Bourdieu's work helped to bring social capital to the forefront of many scholarly and political discussions related to society.

Coleman's approach brings a concern with social structure into the framework of individual rational or purposive actors such as to facilitate cooperation and coordination for mutually beneficial ends (Sandefur & Laumann, 1998). His operationalization of the social capital concept for his research in education fosters its later use in other arenas and brings debates about its definition to a more practical level than Bourdieu's. Coleman's writings are cited by Robert Putnam in his study of government performance in Italy

(Putnam, 1993). But obviously, Putnam has a different vision of social capital than either Bourdieu or Coleman. Putnam treats social capital as an agent that strengthens the integration of the values of society ─ solidarity and togetherness ─ to create consensus and sustain the stable development of society (Siisiäinen, 2000). In particular, social trust, "the lubricant of the inevitable frictions of social life", is crucial to Putnam's idea of social capital, but "not a concept in Bourdieu's sociological vocabulary" (Siisiäinen, 2000, p.13).

Foley and Edward (1998) posited that where Bourdieu's macro-sociology owed its greatest debt to Marx; Coleman remained within the functionalist tradition of Durkheim and Parsons while Putnam's vision of social capital was more congruent with the Weberian assumptions of the political culture, in which attitudes, norms (e.g., trust and reciprocity) alongside social networks could enable a society to undertake collective action. While Bourdieu and Coleman's conceptions of social capital are analogous to financial capital, seeing it as instrumental in the flow of goods and services to individuals and groups, Putnam, by contrast, popularized social capital in its production of collective goods such as "civic engagement" or a spirit of cooperation available to a community or nation at large. And while Bourdieu regards social capital as an asset that delivers benefits to its individual owners in the form of reliable expectations about the behavior of others (Field, 2003), both Coleman and Putnam emphasized the public aspects of social capital. Coleman (1988) explicitly argued that social capital is a public good, but he also argued that its benefits might accrue to individuals or groups as a result of their participation in a set of social relationships. For Putnam, as Putzel (1997) notes, social

capital is not only a "public good," but "intrinsically *for the public good"* (p.941) (emphasis in original).

Field (2003) commented that the original conceptualization of social capital by the three foundational authors is limited, sketchy and loose. Given the controversial findings and the wide publicity, Putnam's notion of social capital and empirical studies have been subjected to more detailed scrutiny than others. For example, Whiteley (2000) pointed out that Putnam's definition of social capital confused three distinct concepts: "citizen's feelings of trust in other members of society, social norms supportive of cooperation, and networks of civic engagement". The first two, he argued, were "psychological phenomena" while the third was "a behavioral relationship between individuals." Foley and Edward (1999) listed a number of attacks on Putnam's arguments, such as neglecting the "dark" side of social capital, avoiding politics and political structure, and under-emphasizing the role of large-scale economic changes in undermining civic engagement in the United States. Szreter (1998) also questioned whether membership in voluntary associations was enough to engender social capital, arguing that "it is the quality of the relationships which these associations engender among their members and in their relations with the wider society which is critical in determining whether or not they truly promote social capital in the sense…of additional productive benefits to the society (as opposed to sectional privileges and advantages for the favored few who are members" (Szreter, 1998, p. 5).

Subsequently, a number of theorists and researchers came up with various definitions of social capital. For instance, sociologist Portes (1998) suggested that social capital had come to stand for "the ability to secure benefits through membership in

networks and other social structures" (p.6) distinguishing a relational element from a material one that an individual can benefit from membership in a social group and treating social capital as an individual characteristic. Among the beneficial consequences of social capital, Portes listed social control, the provision of parental or kinship support and benefits derived from network membership. In particular, he emphasized that social capital was not without its downside. It might be used to constrain opportunities to non-network members, to place excessive demands on network members, to restrict individual freedom and to reinforce delinquent behavior when that is the norm within the group.

Similarly, Woolcock (1998, p.153) saw social capital as "the information, trust, and norms of reciprocity inherent in one's social networks", but theorized social capital alone is not enough to bring about productive outcomes. Based on others' work, Szreter and Woolcock (2004) further refined the classification of social capital, identifying three types of social capital at contextual level: bonding, bridging and linking. Bonding social capital refers to trusting and co-operative relationships between people who see themselves as similar in one or more key characteristics including race, age, and/or SES. Bridging social capital, by contrast, comprises relations of respect and mutuality between people who know they are not alike in these aspects. Linking social capital includes norms of respect and networks of trusting relationships between people across explicit, formal or institutionalized power or authority gradients. They argued that the balance among the three types of capital can be crucial for population health. For example, during the unprecedented commercial and financial success and economic growth between the 1820s and the 1870s in Britain, the industrial urban workers and their families witnessed

a catastrophic crisis in health. At that time, there was plenty of denominational, sect-based, and trade associated with bonding social capital, but very little bridging and even less linking social capital due to a highly negative attitude towards government at all levels and suspicion among different social groups. The lack of bridging and linking social capital resulted in the failure to amass the political will necessary for collective action to address public health issues (e.g., water and sanitation, integrated sewages system) and helped explain the negative heath outcomes. Like Portes, Szreter and Woolcock (2004) cautioned that all three types of social capital could have negative consequences—e.g., nepotism, corruption, and suppression.

Another important theorist, Francis Fukuyama, defines social capital as "the existence of a certain set of informal values or norms shared among members of a group that permits cooperation among them" (Fukuyama, 1997, p.378). However, he goes on to state: "The sharing of values and norms does not in itself produce social capital, because the values may be the wrong ones" (p. 378); for example, Mafia-dominated Southern Italy is characterized by an extremely strong internal code of behavior, but such norms do not promote social cohesion, generalized trust or social capital outside the small Mafiosi. According to Fukuyama, the norms that produce social capital, by contrast, must substantively include virtues like truth-telling, the meeting of obligations, and reciprocity. He further emphasized two important points about social capital. First, social capital is not a subset of human capital because it is a property of groups and not individuals. "The norms underlying social capital…must be shared by more than one individual to have any meaning" (1997, p.380). Second, like Portes, Fukuyama emphasizes that social capital is not necessarily a good thing with regard to either politics or economics. The Mafia and

the Ku Klux Klan, constituent parts of American civil society, do not produce beneficial social capital for the society. Bonds of social reciprocity formed in industrial production at an earlier stage may be an impediment to production later as technology or the market change. Guilds, trade unions and regional organizations may have benign functions for their members, but these special interest oligarchies will impede overall economic growth (Olson, 1982). Table 1 presents some of the frequently cited social capital definitions:

Table 1: Definitions of Social Capital

Author	Social Capital Definition
Hanifan (1920) in Putnam (1993)	"…refers [not] to real estate or personal property or to caste, but rather to that in life which tends to make those tangible substances count for the most in the daily lives of people: namely goodwill, fellowship, sympathy, and social intercourse among the individuals and families who make up a social unit"
Bourdieu (1986)	"…the aggregate of the resources, actual or virtual, that accrue to an individual or group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" .
Coleman (1990)	"It is not a single entity but a variety of different entities having two characteristics in common: they all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure. Like other forms of capital, social capital is productive, making possible the achievement of certain ends that would not be attainable in its absence".
Fukuyama (1997)	"Social capital can be defined simply as the existence of a certain set of informal rules or norms shared among members of a group that permits cooperation among them. The sharing of values and norms does not in itself produce social capital, because the values may be the wrong ones. The norms that produce social capital must substantively include virtues like truth-telling, the meeting of obligations, and reciprocity."
Ostrom (2000)	"Social capital is the shared knowledge, understandings, norms, rules and expectations about patterns of interactions that groups of individuals bring to a recurrent activity".
Bowles and Gintis (2002)	"Social capital generally refers to trust, concern for one's associates, a willingness to live by the norms of one's community and to punish those who do not" (p. 419).

Table 1 (Cont.)

Lin (2001)	"…social capital may be defined operationally as *resources embedded in social networks and accessed and used by actors for actions.* Thus, the concept has two important components: (1) it represents resources embedded in social relations rather than individuals, and (2) access and use of such resources reside with actors" (pp. 24-25)
Putnam (2000)	"...connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them" (p. 19).
Lochner, Kawachi, et al (1999)	"…social capital is a feature of the social structure, not of the individual actors within the social structure; it is an ecologic characteristic. In this way, social capital can be distinguished from the concepts of social network and support, which are attributes of the individual".
Woolcock & Narayan, 2000	"For us, social capital refers to the norms and networks that enable people to act collectively".

Overall, the field of social capital is so diverse, complex and specific to context that any single definition of the concept is not possible. However, after a decade-long refinement of the concept there is now some consensus over the definition of social capital.

First, there is some general agreement that social capital is as productive as other forms of capital, making possible that achievement of certain ends that in its absence would not be possible. But social capital is different in that it involves social relationships, whether formal or informal, and is less tangible than economic and human capital, which are essentially the property of individuals and easily observable in terms of money or education. Furthermore, social capital increases with use, while economic capital is worn out or consumed.

Second, social capital involves social ties, through certain formal structures such as family and membership associations, or informal ties, such as in a network of friends,

sports clubs, etc. In addition, social capital requires a sense of reciprocal trust, reciprocity and obligation to be used as a capital resource. Individuals can access and make use of various resources and anticipate reciprocal and trustful support upon association with others.

Third, social capital may generate positive effects for members of a group through trust and shared norms and values, but it may also produce negative externalities for people within or outside their group. Social capital has not always played a positive role in human society; in many cases, some forms of social capital have reinforced social inequality. Strong exclusive social capital can be harmful for the social and economic development of the broader community.

For the purpose of this study, social capital is defined as an individual's formal or informal social interactions with their surrounding environment (e.g., friends, family, and neighborhood) as well as the norms and reciprocity that emanate from this social interaction process. Consistent with prior researchers, the idea here is that individuals' social networks and norms arising from these social networks have value for health (Field, 2003; Helliwell & Putnam, 2004, p.1436). Consequently, social capital in this study is conceptualized as a multi-dimensional construct that includes social networks, family and neighborhood characteristics, which may improve an individual's access to resources and reduce psychological stresses contributing to better health outcomes. Defining and conceptualizing social capital in this manner is appropriate because it gives full consideration to both the structural and the cognitive aspects of social capital which have recently been receiving increased attention in health research. Moreover, this definition makes social capital a more useful concept for empirical health research because it is

easier to identify proxies for use in statistical analysis. It also helps extend social capital-health effects research, which has often heavily focused either on the structural or cognitive aspect while failing to consider them as coherent and integral parts of a single concept. Focusing on the individual's level of social capital recognizes individual differences in personality, relationships, power and privilege, and therefore their ability to acquire and maintain social capital. It is well-known that social structures play a role in equal or unequal distribution of social capital; levels of individual social capital can mirror inequity.

2.2. Social Capital and Health: Literature Review

Portes (2000) noted that "[t]he concept of social capital is arguably one of the most successful 'exports' from sociology to other social sciences and to public discourse during the last two decades" (p. 1). As a concept initially developed and publicized by sociologists and political scientists, the public health field has been slow to catch on to the potential use of social capital for explaining inequalities in health and wellbeing. Even some key social capital advocates, like Putnam(1993), explicitly excluded health as an outcome of social capital: "In the language of policy analysis, we want to measure 'outputs' rather than 'outcomes'—health care rather than mortality rates. . . Health depends on factors like diet and lifestyle that are beyond the control of any democratic government." (p.65-66) The comparative role of material factors and social capital in determining health outcomes has been extensively debated. A number of neo-materialists argued strongly against the use of social capital in public health research fearing that focusing on social capital and health may, even if inadvertently, downplayed the crucial

importance of material factors on health inequities (Lynch et al., 2000). They argued that levels of income inequality, social capital, and health in a community might all be consequences of macro-level social and economic processes that influence health across the life course, and, therefore, health researchers should consider the health effects of macro-level policies rather than community or individual effects (Pearce & Smith, 2003).

However, the concept has made unique contributions to the health inequity literature, which is replete with studies of the impact of income, poverty, and social policies. One important finding is that better health outcomes appear to be positively correlated not only with absolute levels of income, but in some cases even more strongly correlated with the distribution of income within society (Wilkinson, 1996). To this, social capital offers an intriguing explanation for one of the pathways linking income inequalities and health status. Income inequalities may disrupt social relations, norms, and trust, but poor health and social inequalities can also result in poor social relationships. If carefully conceptualized and measured, social capital has the potential as a means of discovering new information that can be used to decrease inequities in health and other social outcomes (Macinko & Starfield, 2001).

In addition, social capital offers a new perspective that includes a focus on social relationships, as it shifts the focus of analysis from the behavior of individual agents to the patterns for relations between agents, social units and institutions (Schuller et al, 2000). Unlike social support, social capital is a concept that forces one to examine interactions. It represents an important link between individual, family and community level analysis, enabling the examination of individuals and families within their contexts without simply aggregating data. Furthermore, the concept of social capital can

contribute to true interdisciplinary research and practice with its utility strengthened by knowledge from many perspectives. For example, Gillies (1998) once suggested that social capital offer new insights into how to measure the success of community-based, multidisciplinary approaches to health promotion.

Despite there are many issues to be resolved, the claim that social capital contributes to health inequalities within and between populations has been adopted by social scientists, national policy makers and international institutions, including the World Bank and the World Health Organization (Silva et al, 2005). Even Putnam, seven years after excluding health as an outcome, in his book "*Bowling Alone*" (2000), claimed that "[o]f all the domains in which I have traced the consequences of social capital, in none is the importance of social connectedness so well established as in the case of health and well-being," and "statistically speaking, the evidence for the health consequences of social connectedness is as strong today as was the first surgeon general's report on smoking" (p. 327) These are strong assertions from a researcher who previously thought social capital should not be studied as a cause of health outcomes.

2.2.1. Introduction

Despite lingering debate and uncertainties about the social capital concept, there has been increased interest in social capital in public health research in the past decade (Kawachi & Berkman, 2000; Kawarchi, Kennedy, et al, 1999; Kawachi, Kennedy, et al, 1997; Putnam, 2000; Wilkinson, 1996). In a bibliographic essay, Islam et al. (2006) found over 650 relevant peer-reviewed articles in English, many in the public health field, between January 1995 and June 2005. To date, health researchers have reached a general consensus that elements of social capital play a non-trivial role in determining people's

health and well being; nevertheless, as Woolcock (2004) argued that more theoretical and empirical studies were required advance the concept for studying population health and health disparities.

Since Kawachi's (1997)ground-breaking empirical study on social capital and health , two streams of scholarship, divided by treating social capital as an ecological or individual construct, have appeared in the literature (Silva et al, 2005; Ziersch, 2005). The ecological stream draws input from Putnam's seminal work (1993; 1995), regarding social capital as a collective attribute, a property of groups of people and a public good. It can be measured at community/neighborhood, county, state, or even at the national level. So, it is also called a "communitarian or contextual" approach, whose main argument is that social networks, norms and trust at community, state or national levels are vital in the creation and maintenance of the collective well-being (Putnam, 1993; Fukuyama, 1995; Kawachi et al., 1997).

Studies conceptualizing social capital at the individual level for health research have received increasing attention in recent years, and their findings are robust and consistent. Most commonly measured by asking measured by asking individuals about their participation in social relationships and their perceptions of the quality of those relationships (Silva, 2005), this stream of scholarship has been strongly influenced by the work of Pierre Bourdieu (1986) and James Coleman (1988, 1990), whose focus was on the personal network-based benefits that accrue to individuals as a result of their membership in social networks.

The debate over which approach is more theoretically appropriate continues to be debated, but remains unresolved (Silva, 2005). However, as some well regarded

researchers recently commented, social capital should not be considered as a dichotomy (contextual or individual), (Kawachi, 2004); rather, it is both, a phenomenon that can affect health simultaneously at micro and macro levels (Macinko & Starfield, 2001; Pridmore et al, 2007). Hence, the literature review in the following sections reflects the findings from both streams of scholarship. It should be noted that, given the very different operation of the social capital variable, findings across studies should be compared with caution.

2.2.2. Ecological Social Capital and Health

It is fairly common in the public health literature to use social capital as an ecological construct. According to Lochner et al. (1999), social capital is different from social networks and social support in that social capital is part of a societal structure, a feature of social structure rather than the individual actors within this structure; in contrast social networks and social support refer to the social embeddedness of individuals. Similarly, Kawachi (2004) commented that "equating social capital with social network and support would be simply re-labeling terminology, or pouring old wine into new bottles" (p.683). His suggestion that the social capital concept be reserved *exclusively* for ecological and macro-level phenomena has led to a number of ecological analyses about social capital and health both at the state and community levels.

Kawachi represents one of the most important voices in studying ecological social capital and health. In an article that was the basis for the current public health interest in social capital and health (Carlson & Chamberlain, 2003), Kawachi, Kennedy, Lochner and Prothrow-Stith (1997) linked variations in social capital at the state level to mortality

rates across 39 U.S. states. Based on Putnam's definition, they obtained indicators of social capital—perceptions of trust, fairness and helpfulness and group memberships in a wide range of clubs and voluntary organizations—from the General Social Surveys (GSS) and aggregated them to state level. Analyses showed that states with higher levels of perceived trust and reciprocity had lower age-adjusted rates of mortality, malignant neoplasms, infant mortality and stroke after accounting for the compositional differences in income and education. In addition, the per capita group membership at state level was inversely associated with all-cause mortality, with a one-unit increment of membership density resulting in 83.2 fewer deaths per 100 thousand. They therefore argued provocatively that income inequality acted through the disinvestment in social capital to influence health outcomes; or in other words, it is social capital rather than income inequality that caused variations in mortality rates across states.

In an expanded multilevel analysis, Kawachi, Kennedy and Glass (1999) again revealed significant associations between state-level social capital and individual self-rated health. After taking into account key individual characteristics, they found that, compared to people residing in states with the highest level of social capital, those from states with the lowest level of social capital had 45%-73% excess risk in rating their health as poor or fair as. Similarly, Putnam (2000) demonstrated that states scoring high on a social capital index he created (trust of other people, membership of voluntary organizations, voting turnout, etc.) also scored higher on a public health index and experienced lower age-adjusted all-cause mortality rates. Later, Blakely et al. (2001) found that the states where people tend to join organizations and vote more frequently consistently scored higher on public health index and enjoyed lower mortality rates.

Using a single trust measure, Subramanian, Kawachi and Kennedy (2001) again found that the probability of self-reported poor health increased significantly from high to low social capital states. A subsequent multilevel study which considered the effects of both individual and state level social capital, revealed similar patterns of associations between social capital and health (Subramanian et al., 2002).

Parallel findings have been reported outside the United States. For example, Kennedy et al. (1998) found that social capital at the regional level in Russia, measured by trust in local government, political participation, crime and divorce rates, and conflicts in the work place, accounted for an important proportion of variation in mortality and life expectancy. In Hungary, Skrabski, Kopp and Kawachi (2003) found that social capital aggregated to the county level, measured by weighted average of social trust, perceptions of reciprocity, and support received from civic associations and religious organizations, was strongly correlated with middle-aged (45-64 years) male and female mortality. In a subsequent extension of this study, social capital was aggregated to 150 smaller sub-regions of Hungary and again the results showed that higher level of social capital is significantly associated with less middle age mortality (Skrabski et al, 2004).

Some others studied social capital at neighborhood or community level. For example, McCulloch (2001) indicated that variations in neighborhood social capital and social disorganization worked together to produce community variations in health in England. In Western Scotland, Ellaway and Macintyre (2000) reported that aggregated associational membership to the postal code sector level was associated with better self-rated health. In a multilevel analysis data from neighborhoods in Chicago, Wen et al. (2003) found that neighborhood social capital ─ reciprocity, density of local networking,

social cohesion and informal social control ─ exerted an independent contextual effect on individual self-rated health, which were even more powerful than the availability of health-enhancing services and homicide exposure. In a comprehensive analysis of three datasets collected respectively from the United States, Canada, and throughout the world, Helliwell and Putnam (2004) found that social capital, as measured by ties to friends, families and neighbors, civic engagement, trustworthiness and trust, is independently and robustly related to self-rated physical health and subjective well-being.

While most of the ecological studies found that social capital is beneficial for health one way or another, a few found that it has limited, insignificant or even negative effects on health. For example, Chavez et al. (2004) found that, except for the feelings of trust and reciprocity, no other social capital component, such as neighborhood attachment, support networks, local engagement, feelings about safety and pro-activity, made significant contributions to explaining health variance in two disadvantaged neighborhoods near Sydney, Australia. Poortinga (2007) reported a modest effect of neighborhood characteristics on self-rated health in England after controlling for socio-demographic differences and neighborhood deprivation. He also found earlier that social capital aggregated to the national level in Europe had a non-significant effect on health outcomes after taking into account individual level of trust and participation (Poortinga, 2006). Similarly, at the level of British electoral wards, Mohan et al. (2005) found no significant associations between social capital and health outcomes. In the United States, the adjustment of for individual-level trust rendered the main effect of community social trust became statistically insignificant (Subramanian, Kim and Kawachi, 2002). In addition, some recent empirical studies confirmed the negative impacts of social capital

on health, as social capital theorists have long hypothesized (Portes, 1998; Fukuyama, 1997; Putnam, 2000). For example, Carpiano (2007) revealed that while higher levels of neighborhood social leverage and informal social control were associated with lower odds of daily smoking and binge drinking, higher levels of neighborhood social support were associated with more smoking and binge drinking.

As reviewed above, many of the empirical studies of ecological social capital and health found positive associations, but the findings are not always consistent, in particular at the neighborhood/community level. Recently, Islam et al. (2006) conducted an extensive review of 42 social capital studies, and they indicated that area-level or contextual social capital might be less salient for explaining health differences in egalitarian countries than in more unequal countries. Generally speaking, there are several limitations unique to the conceptualization of social capital at the ecological level for health research.

First, the results of ecological studies are open to individual as well as collective interpretations (Kawachi et al., 2004). Variations between geographical settings could indicate a genuine collective effect, but could also reflect differences in composition. Conceptualizing social capital at the ecological level risks discounting important individual characteristics, which may lead to the inflation of the importance of ecological-level social capital. Without properly accounting for individual characteristics, contextual-level social capital may act partially or entirely as proxies for individual-level social capital. Thus, ecological analyses of social capital and health may exaggerate the substantive importance of social capital (Mellor & Milyo, 2005), rendering its findings less convincing. In addition, the failure to account for individuals' social networks to a

sufficient extent, as in most of Kawachi and his co-workers' work, made it impossible to identify in detail which civic activities were important for self-rated health (Hyyppaa & Maki, 2001).

Second, an unresolved problem for ecological social capital study is methodological. Due to data constraints, almost all of the existing research on ecological social capital rests on aggregating data collected at the individual level in population surveys (Islam, 2006). No measurement has been developed to measure "objective" social capital at the ecological level. It may be true that aggregation measures some dimensions of ecological social capital, but it is also true that ecological-level social capital must differ from a simple sum of individual social capital. In particular, aggregating individual data to a city, a state or a nation have frequently been criticized as unrealistically attributing uniform levels of social capital to people simply because of their geographical proximity to one another. As Paldam (2000) pointed out, society may consist of many sub-populations with different levels of social capital; under such circumstances, aggregation of social capital from individual data to grandiose levels becomes almost meaningless. For example, to measure social capital at a state level is like to suppose that people living in Flint, Ann Arbor, inner-city Detroit and all other Michigan residents enjoy the same level of social capital, although compositional factors, such as racial demographics, employment, income, and educational achievement, however, differ radically in these places. Therefore, analysis of social capital above individual level runs the risk of being an ecological fallacy, with the results providing little guidance on the mechanisms through which social capital affects health.

Moreover, critics debated that an aggregation of individual measures of social capital to community or higher levels may not be a true reflection of social capital at these levels. For example, Lynch et al. (2001) argued that national variations in social trust and self-rated health could reflect differences in social stability and the functioning of political, economic and psychosocial institutions. Thus, given all these inconsistent findings and the methodological concerns, some researchers recommend recently that it be more meaningful to study social capital at individual level (Veenstra, 2000). A review of the recent social capital and health studies shows a trend in approaching the concept at the individual level or taking into account individual-level social capital when conducting ecological analysis.

2.2.3. Individual Level Social Capital and Health

Bolin and his colleague (2003) noted that most studies had used theoretical frameworks and corresponding statistical models derived from a ‘‘macro’’ perspective on the study of social capital, i.e. the focus has been the level of social capital in countries, states (in USA) or larger geographical areas, but this should not exclude social capital from being studied from ‘‘micro’’ perspective, i.e. the levels of social interactions and trust among individuals and groups (Coleman, 1990; Manski, 2000). In fact, viewing social capital as an individual asset is not new. According to the pioneering social capital theorist Pierre Bourdieu (1986), social capital is a private good that disproportionately benefits those who are economically and culturally advantaged. American sociologist Alejandro Portes (1998) strongly criticized stretching social capital from an individual asset to a community or national resource by arguing that such a stretch could easily give

rise to logical circularity. Lin and others also argued that there were significant intra-community variations in social capital, in which individuals had varying degrees of social capital by virtue of their social connections and participation in community social network and structures (Lin, 2001; Rojas & Carlson, 2006). Hyyppa & Maki (2007) explicitly stated that social capital should be a resource available to, and chosen by, individuals, which allows them to gain and to anticipate reciprocal and trustful relationships. In other words, many recent researchers proposed that social capital should be conceptualized as an individual-level construct, or should at least control for individual level social capital when analyzing ecological social capital.

As stated earlier, studies of social capital at the individual level were not the fashion when this concept was first introduced into public health research; however, conceptualizing social capital as an individual attribute has increasingly gained recognition. Around the world, recent empirical studies have revealed that individual-level social capital indicators are significantly associated with a number of health outcomes. For example, Canadian scholars found that individual association membership, an important social capital indicator, worked to reduce depressive symptoms for adult men and women in southwestern Ontario (Rietschlin, 1998) even in the presence of increasing stress burdens. Another Canadian study revealed that both the depth and breadth of individual involvement in voluntary associations were positively and significantly related to an individual's well being, such as level of emotional distress, over-weight status, and self-rated health, across advantaged and disadvantaged neighborhoods (Veenstra et al, 2005).

In the United States, earlier work discussed the potential of participation in local organizations for benefiting health and well being through developing networks, empowering, and fostering values of cooperation, tolerance and solidarity (Cattell, 1995). Helliwell and Putnam (2004) confirmed that individual-level social capital, as measured by the strength of family, neighborhood, religious and community ties, was strongly linked with subjective well-being. "Marriage and family, ties to friends and neighbors, workplace ties, civic engagement (both individually and collectively), trustworthiness and trust: all appear independently and robustly related to happiness and life satisfaction, both directly and through their impact on health" (p. 1444). Kim et al. (2006) reported a strong inverse association between poor health and being highly involved in formal and religious groups, giving and volunteering and electoral participation.

Many of the individual-level studies of social capital have been done outside North America. In Finland, Hyyppa and Maki (2001) found that the Swedish-speaking community had more social capital at the individual level than their Finnish-speaking neighbors, and that explained the lower mortality and disability rates among the Swedish speaking communities. In a more recent study, the same authors (2007) found that mortality was inversely associated with individual social capital as measured by residential stability, leisure participation and interpersonal trust. In particular, they found that, adjusted for demographics, life style and biological risk factors and for health and SES, higher levels of the social capital were still significantly associated with reduced all-cause mortality and cardiovascular mortality, though the strength of the associations varied slightly by gender.

Swedish scholar Lindstrom (2004) organized the two key components of social capital ─ trust and social participation ─ into four categories. High trust and high participation indicate a group of individuals with high social capital, whereas low trust and low participation characterize a group with low social capital. High trust combined with low participation is an indication of "traditionalism," whereas high participation/low trust indicates "the miniaturization of community". Analysis of survey data from Scania, Swede, showed that both an individual's generalized trust and social participation are positively associated with self-reported global and psychological health. Compared with the high-social capital category, the prevalence of reporting poor health was significantly higher among the miniaturized community, traditionalist and low social capital categories; the highest prevalence of poor self-reported global health was observed in the low-social capital category. Using the same theoretical framework of trust and participation developed by Lindstrom, but different data, Nummela et al. (2008) compared social capital in urban, semi-urban and rural areas in Finland. Their findings were congruent with Lindstrom in that good self-rated health was most common among individuals in the high social capital category; in contrast, those with low social capital had the lowest self-rated health.

Another Swedish scholar Bolin and his colleagues (2003) created a complex theoretical model which predicted that the amount of an individual's social capital would be positively related to their level of health: People with higher level of social capital would be healthier than those with less social capital, ceteris paribus. Using this model, they analyzed a set of individual panel data from three different time periods in Sweden, and the findings showed that the level of social capital indeed had a positive effect on self

assessed health. For example, having or not having a close friend outside the family had a significant impact on health. They also found that the level of social capital declined with age, was lower for people who were married or cohabiting, and lower for men than women.

Several other studies in Europe also strengthened the argument that a higher level of individual social capital correlated positively with better health. For example, among the Russian population, Rose (2000) found that social capital, measured by trust of others, social networks, and social support, was positively and independently associated with improved self-reported physical and emotional health. In fact, the cumulative impact of social capital on improving physical and mental health was huge, even more than human capital. And when social capital was combined with human capital, an individual could easily raise his self-reported health from just below average on a five-point scale to approaching good health. In a cross-national study of central and eastern Europe, Carlson (2004) revealed that, social capital indicators, such as organizational activity, trust in people, and confidence in the legal system, reduced the odds of "less than good health." Similarly, Poortinga (2006) demonstrated that social trust and civic participation at individual level were strongly associated with self-rated health in Europe, but the effects disappeared when social trust and civic participation were aggregated to the national level. Thus, the beneficial properties of social capital lie at the individual level.

A recent analysis of the large national survey of population health in England demonstrated that low individual social capital, measured by trust and reciprocity, perceived social support and civic participation, was significantly associated with poor measures of health status (Petrou & Kupek, 2008). In particular, a comparison between

the a best case (highest level of social capital for each measure) versus worst case scenario (lowest level of social capital for each measure) found that the worst case scenario was associated with a 10.3% reduction in EQ-5D (a standardized measure of health outcomes) after accounting for all covariates, far in excess of the 3% minimally important difference in utility score postulated in the literature. In terms of self-rated health, the worst case scenario was associated with a 29% reduction in the likelihood of reporting very good or good health status (Petrou & Kupek, 2008).

While most of the current social capital literature focuses on developed countries in North America and Europe, it is important to recognize that the concept has also been applied for health studies elsewhere. For example, some researchers tried to apply the notion of social capital to explain health disparities in Asia. One study carried out by Yip et al. (2007) in rural China found that the trust index, constructed from questions related to trust, reciprocity and mutual help, was positively associated with self-reported general health, psychological health, and subjective well-being, but organizational membership was not, suggesting that aspects of social capital were context dependent. The findings were corroborated by Yamaoka's study (2008) of social capital and health in the urban areas of East Asia countries. Using data from a cross-sectional interview survey in Japan, South Korea, Singapore, five big cities in Mainland China, and Taiwan during 2002-2004, she found that norms of reciprocity and interpersonal trust were both associated with self-reported somatic symptoms, subjective health satisfaction and life satisfaction, but organizational membership was not, except slightly for self-reported somatic symptoms. In comparison with studies conducted among Western populations where association membership was often related to health, the studies in East Asia highlight a

possibility that some aspects of social capital might be culture dependent and context specific.

In summary, studies conceptualizing social capital at the individual level generally confirmed the potential benefits of social capital for improving health among people of different racial and ethnic identities within and across countries. For example, in a recent systematic review of empirical literature on social capital and health across countries, Islam et al. (2007) summarized that the positive association between social capital and health is robust at the individual level. However, because the measurement of social capital is often different across studies, a really meaningful comparison of social capital-health associations in the literature is extremely difficult, if not impossible. Yet, from the literature reviewed above, we can reasonably speculate that, while some components of social capital might benefit all individuals regardless of their backgrounds, the effects of other dimensions of social capital might well be moderated by individuals' social and economic backgrounds. And similar to ecological studies of social capital, which is critiqued for the neglect of individual compositional effects, individual level studies are also open to the criticism that they ignore the social environment, and thus may obscure very real context effects.

2.2.4. Limitations of the Literature

As reviewed above, the literature on social capital and its utility for health promotion is burgeoning, but as a general field of research, the volume and diversity of this line of research is still at the development stage. Several common limitations are present in the current literature.

Ambiguity of the Definition

As elsewhere, the most common weakness of the social capital in health research is its conceptual ambiguity. A decade after the introduction of the concept into health research, researchers continue to debate "what social capital is, how it can be measured, where it comes from, and particularly how to get more of it" (Fukuyama, 1997, p. 377). Although there has been important conceptual revision of theories of social capital, ambiguity about the definition pervades both theoretical debates and empirical studies, such as whether social capital is a public or private good. Robert Putnam (1993, 1995, 2000) and James Coleman (1988, 1990) explicitly regard social capital as a public good that benefits everyone, but Bourdieu (1986) considers it as a disguised transformation of economic capital, a private asset. Still others take a middle way, arguing that social capital has some characteristics of both a public good and private good (Howe & Shiell, 2000). To date, there is still a lack of a single unified or generally accepted theory.

Because of the conceptual ambiguity, some critics debate the use of "social capital" as a new research paradigm. They argued that social capital was little more than a new term for an old idea, namely that civic and community involvement can have positive consequences for individuals and society (Portes, 1998, p. 2). In a similar vein, Pearce and Smith (2003) regarded "social capital" as largely a repackaging of "community capacity," "empowerment," and "social support" and this field of research had not resolved the interpretation problem as to whether the observed associations were causal or were due to reverse causality or confounding. In the empirical study of health, social capital has indeed been often treated as a broad concept that subsumes social support. For example, Carpiano (2007) treated social support as an important component

of neighborhood social capital, together with informal social control, social leverage, and neighborhood organization participation. Similarly, Petrou & Kupek (2008) also regarded perceived social support from family and friends as part of social capital in analyzing health in England.

Measurement Inconsistency

The lack of conceptual clarity together with its inherent abstractness creates a formidable task when trying to measure social capital (Woolcock, 1998). To date, there is no unified operational measurement of social capital, and two major measurement problems persist. The first one is concerned what are the components of social capital, and the second one is about at what level should social capital be measured. In the health literature, social capital has been measured quite haphazardly depending on the data available and the purpose of study. In late 1990s, the General Social Survey was a frequent data source (Kawachi, et al, 1997; Kennedy, et al, 1998; Subramanian, et al, 2001). Items concerning interpersonal trust, norms of reciprocity; and membership in voluntary organizations have been widely used in studies of health outcomes. Some researchers criticize that heavy reliance on associational membership, in particular in large or formal institutions, tends to downplay the importance of informal and ad hoc groups (Fukuyama, 1995). However, many other indicators are also often used as proxies of social capital, including, but are not limited to, trust in the legal system, number of friends, contact with family members, volunteering, and newspaper readership, confidence in government, leisure participation, residential safety, and even electoral participation. Several authors have operationalized the concept and identified dimensions,

resulting in a number of scales or indices of social capital; however, the products of these attempts vary in content, quality, and form (Krishna & Uphoff, 1999; Veenstra & Lomas, 1999). Almedom (2005) noted that measurement scales for social capital differed from each study in a review of twelve social capital and mental health articles. The heterogeneity of social capital measurement reflects the recency of the concept as well as the reliance on secondary sources of data by investigators (Kawachi, et al, 2004).

Along with the debate over social capital components, considerable disagreement remains with regard to what level social capital should be measured, or the unit of analysis problem. Earlier researchers conceptualized social capital as a contextual attribute, a characteristic of communities or societies (Putnam, 1993; Kawarchi, 1997). However, many recent researchers debate such a narrow conceptualization, arguing for a more individualistic approach (Veenstra, 2000; Hyyppaa, 2007; Ziersch, 2005; Lindstrom, 2004). Others argue that understanding the concept exclusively at contextual or individual level does not capture the true underlying meaning, as social capital might operate simultaneously at individual and ecological levels. For example, Szreter and Woolcock (2004) advocated for a position somewhere in between the micro and macro ends of the spectrum. They recognize that individuals can draw upon resources through their connections to others, but at the same time they argue for the need to include the nature and extent of state–society relations as a necessary part of the theory and definition of social capital. Kawachi (2004), who had strongly embraced the idea of social capital as a collective property, recently argued that the concept should be analyzed in a multi-level analytic framework. Most recently, Pridmore et al (2007) commented that social capital's effect on health may operate at four possible levels: the micro (individual/family) level,

the meso (neighborhood) level, the city level, and the macro (national/global) level. In summary, the confusion regarding the nature of social capital leads to the concept being operationalized differently across health research studies, rendering their findings difficult to compare.

Causal Mechanisms Unidentified

Pearce and Smith (2003) stated that the ultimate goal of epidemiologic research is to identify causal pathways or mechanisms of disease. Given the fact that nearly all empirical studies on social capital and health are based on cross-sectional data, the current investigation of the mechanisms linking social capital and health must be based on speculation rather than strict scientific examination of causal links which might be possible with a longitudinal dataset.

Several pathways were posited about how social capital might affect population or individual health. At the state level, Kawachi et al. (1999) conjectured that social capital may affect health via political process. The more cohesive states tend to have more egalitarian patterns of political participation, higher levels of trust and confidence in public institutions, and thus are more likely to adopt generous social policies in ways that might have consequences for population health and well-being. In contrast, states with low levels of interpersonal trust are less likely to invest in human security and less likely to be generous with their provisions for social safety nets (Kawachi, et al, 1997; 1999; Veenstra et al., 2005). Putnam (2000) argued similarly that more cohesive communities are the most capable of getting organized politically to ensure high quality medical services.

At the neighborhood or community level, Kawachi (1999) suggested that social capital might influence individual health via at least three pathways. First, neighborhood social capital may influence the health behaviors of its residents by diffusing health information, promoting health norms, and controlling deviant behaviors. Second, neighborhood social capital may increase access to local services and amenities since socially cohesive neighborhoods are more successful and less likely to require budget cuts, more likely to provide access to health related services, such as community health clinics, and recreational facilities. Third, neighborhood social capital may provide effective support and enhance self-esteem and mutual respect.

Wilkinson(1996) suggested that social capital might act on health via a psychosocial pathway in which relative deprivation could lead to declining levels of social cohesion and trust, engendering negative emotions such as shame and distrust, which are then translated into poor health through psycho-neuro-endocrine mechanisms as well as through stress-induced behaviors such as smoking. Meanwhile, social capital could be a source of informational or other tangible assistance which protects people from the detrimental effects of stress (Wilkinson, 1996). Particularly, people who face poverty, chronic illness, and a lack of health insurance might have better gains from social capital because, in the absence of other instruments, the use of social connections can be a primary means of protection against risk and vulnerability (Woolcock & Narayan, 2000). Besides, social capital can also boost self esteem, help people access better resources, and act as a buffer against stressful life events (Campbell & Wood, 1999; Woolcock & Narayan, 2000). Socially isolated people are more likely to engage in health-damaging behaviors (e.g., smoking, drinking), and social networks may reinforce

healthy norms and behaviors (Putnam, 2000). Social capital may also serve as a "trigger mechanism" to stimulate the human immune system to prevent disease or buffer stress; research among both human and animals suggests isolation decreases the immune response system and increases blood pressure (Putnam, 2000).

However, as social capital critics Pearce and Smith (2003) argued that the psychosocial interpretation of social capital was supported with little evidence, and was based on wrong assumption that the poor in the developed countries had enough for the daily necessities of life. They further argued that it was unclear whether the observed associations between social capital and health were causal or were due to reverse causality. Communities with have high levels of participation and trust may be healthier, but it was also possible that healthier people were more likely to concentrate in high social capital communities. Similarly, it could be argued that lower levels of individual social capital led to worse health status, but it could also be argued that the bad health situation caused low levels of social capital. The lack of convincing evidence to establish the casual pathways reinforces the need for serious investigation into the causal pathways that link social capital and health.

Neglect of Racial/ethnic Minorities

Although the findings regarding social capital and health vary in strength as reviewed above, and ambiguities regarding conceptualizations and measurement of social capital remain, overall, there is some consensus that social capital is related to health in general populations (Kawachi & Berkman, 2000; Szreter & Woolcock, 2004). Yet, it is less known whether social capital works the same way among minority groups, given the

different context of culture and tradition. A review of literature by Kawachi, Kim, Coutts, and Subramanian (2004) showed that, to date, the bunk of studies of social capital were based on data from the general population from the US and European countries. Of all the studies conducted, the majority focused primarily on the White population, with a few among the African American and/or Latino/as population. Only until recently, some attention has been paid to the racial/ethnic factors in the field of social capital and health study. For example, Lochner et al. , (2003) showed that higher levels of social capital ─ measured by reciprocity, trust and civic participation—were consistently and significantly associated with lower rates of all-causes mortality and heart disease among Whites in Chicago, but to a much lesser extent among Blacks. Kim et al. (2006) found similar results that the negative association between community bonding social capital and fair/poor health were significantly weaker among African Americans than Whites. And to the author's knowledge, there are no published studies exclusively on social capital and health among the Asian Americans and its sub-populations. This lack of attention is problematic, as researchers need to understand the health experiences of all groups, which are likely to differ.

Differential Effects Less Explored

It is well known that social capital is not distributed evenly across social groups, but it is much less understood whether social capital has differential returns for people with different social identities or social status. A given form of social capital may very likely confer more benefits for one group, less for another, or even liabilities for some particular groups, i.e., social capital can be both beneficial and detrimental on health for

people with different social identities. Social capital theorist Nan Lin (2001) pointed out that people of inferior standing may face two problems ─ *capital deficit* (e.g. lower level of social capital) and *return deficit* (relative less beneficial return of social capital). Similarly, Baum (1999) warned against an unquestioning acceptance of social capital, in particular, a view of social capital that does not consider its interaction with other factors. In fact, studies revealed that incongruence with the values of the majority may lead to worse health among low social capital individuals residing in high social capital communities (Kim & Kawachi, 2006). Trusting and socially active individuals more often report good or very good health in countries with high levels of social capital than individuals with lower levels of trust and civic participation, but are less likely to do so in countries with low levels of social capital (Poortinga, 2006).

Unfortunately, most of current empirical studies assume that social capital operates uniformly for various social groups who differ in cultural norms, values, and levels of income. In many cases, these socio-demographic variables are only regarded as control variables, overlooking or underestimating how much these variables might interact with social capital to produce very different outcomes. Recently, a very few empirical studies started to look into the complex interplay of social capital, SES, race/ethnicity and gender. For example, compared with the black population, the whites seem to harvest more from social capital than the black (Kim et al, 2006). This might be related to the racial identity, which is more important for Blacks than for Whites who are rarely confronted with racial discrimination. Others studies showed similar results. For example, while entertainment TV viewing is negatively associated with social capital, the relationship is more negative for Blacks than for Whites. And although there is positive

association between news media use and social capital, it is less positive for Blacks than for Whites (Beaudoin & Thorson, 2006). Thus, it would be expected that race/ethnicity would play a role in social capital and health.

In addition, there is a dearth of studies investigating the effects of social capital across income groups. Recently, a very few studies were initiated to explore whether wealth moderates the association between social capital and health, but the results are inconsistent. For example, the strength of social capital-health correlation is much stronger in the wealthier Western European countries than the poorer Central and Eastern European nations (Carlson, 2004). A significant association between individual level social capital and health was found among the Jewish community, but not the Arab community, which is often less well off than the Jewish (Baron-Epel, 2007). However, a most recent study conducted in China found otherwise. While higher levels of social capital, measured by neighborhood cohesion, reciprocity and social support, were significantly associated with lower probability of poor self-reported health for the total sample, such associations didn't hold for the non-poor, suggesting that there social capital works better for poor people (Sun et al, 2009).

Researchers also started to pay attention to the role of gender in the study of social capital; however, it is still unclear how gender may intervene into the relationship between social capital and health. For example, in Hungary, perceived help from civic associations proved protective in men's health, whereas in women protective effects were not significant (Skrabski A, Kopp M, Kawachi, 2003). Hyyppaa et al. (2007) reported the associations between individual-level social capital and mortality are gender- and age-related. In men, social participation only predicted all-cause mortality but not

cardiovascular mortality, but it predicted both types of mortality for women. More research needs to be done to uncover the ways and mechanisms by which social capital works differently for men and women.

2.3. The Current Study Proposal

One study will not be able to address all the limitations detailed above; rather, in the present dissertation project, I intend to address part of the last two limitations. Generally, the study explores whether social capital is associated with health among Asian American populations, and whether such associations are moderated by ethnicity, income and gender. Below are the rationale for studying Asian American populations and the proposed theoretical framework of the study.

2.3.1. Rationale for Studying Asian American Populations

In this study, I choose Asian Americans to test the social capital hypotheses outlined earlier because of several strong reasons. First and foremost, although the social capital literature has risen quickly during the past decade in the United States and worldwide, there have virtually been no studies on how social capital is related to Asian Americans' health using nationally representative data, resulting in a field that is one of the most poorly understood. As a fast growing population in the United States, the Asian American population had increased by 72%, in contrast with a 13% growth of the total population in the United States (Barnes & Bennett, 2002). By 2000 census, the total Asian American and Pacific Islanders (AAPI) stands at about 10.6 million, accounting for approximately 4% of the U.S. population. According to population projection, AAPI will

reach more than 41 million by 2050, equivalent to 11% of the total population at that time (Ghosh, 2003). Neglecting such as a large and contributing population is unthinkable for building a racially cohesive society.

Secondly, the image of Asian Americans as "model minorities" gives the false impression that all Asian Americans have higher SES, enjoy better health and do not engage in high-risk behavior. Indeed, as a whole, Asian Americans enjoy a SES that is similar to or in some area, even superior to that of the White populations. However, the Asian American population is extremely heterogeneous, emigrating from at least 29 Asian countries of origin or cultures (Kuo & Porter, 1998). They differ enormously in immigration patterns, such as nativity, duration of stay in America, and reasons for immigration. And the socioeconomic indicators for Asian Americans fall on both the high and low ends of the spectrum. For example, although overall Asian Americans have higher percentage of university degrees, 8.5% of Asian Americans also have less than a ninth grade level of education as compared to 4.2% in the Whites (US Bureau of Census, 2001). The overall median household income for Asian American is higher than the White, but the household poverty rates for Asian Americans (10.2%) are higher than the non-Hispanic White (8.2%), and even much higher poverty rates for some Southeast Asian ethnic groups. The percent of noninsured non-Hispanic Whites is 10.6%, compared to 16.8% of Asians (DeNavas-Walt, et al, 2008).

In addition, within the Asian American population, socioeconomic indicators also vary largely. Kuo and Poter (1998) reported a greater proportion Chinese (19.1%) and Vietnamese (29%) had less than a high school education than other Asian national origin groups (ranging from 9.3–12.7%). A higher percent of Asian Indians (58.8%) had at least

a college degree compared with 21.1– 47.1% of adults among others. With regard to family income, Frisbie et al (2001) found that Japanese respondents had the highest among all the groups, including Whites, but Vietnamese and "Other Asians" were among those with the least income in America. Compared with only 5.3% of Japanese Americans were below the poverty level, between 11.1% and 27.9% of Chinese, Asian Indians, and Vietnamese live in poverty. Notably, Vietnamese have a much greater proportion living at or below the poverty level than any other Asian ethnic groups (Kuo & Porter, 1998).

In terms of health, on average, Asian Americans are a relatively healthy group and some indicators are even better than that of Whites. For example, McGee et al (1999) found that among all the racial/ethnic groups, the Asian Americans and Pacific Islanders were least likely to report fair/poor health. Hummer et al (1999) found that, controlling for age and sex, Asian Americans exhibit 31% lower odds of mortality as compared to non-Hispanic Whites. Asians had an overall lower infant mortality risks than Whites as well as less teenage births (4.3% vs. 8.8%) (Morrow et al, 1994). And compared with Caucasians, African Americans, Mexican Americans and Native Americans, Asians enjoyed the lowest mortality, which could be partly due to the most advantaged socioeconomic status and partly due to the favorable health behavior patterns, such as least likely to smoke (Rogers et al, 1996).

However, given the vast heterogeneity within the Asian American population, the average measurement of health status often masks the significant discrepancies across the ethnic groups and therefore makes little sense. As many researchers argued that the conclusion that Asian Americans were healthier than other racial or ethnic groups was

not tenable, because the data sets often used did not contain sufficient information about the heterogeneity of the population (Cho & Hummer, 2000; Frisbie, Cho, & Hummer, 2001). In one study of Asian immigration status and health, the age-adjusted percentages of reporting fair/poor health were 24.2% for Vietnamese, much higher than 13% of Whites and other Asian American ethnic groups (Frisbie, Cho, & Hummer, 2001). The incidence of liver cancer in Chinese Americans is more than four times that of the White population (Lin-Fu, 1988). Vietnamese American women have cervical cancer rates that are five times greater than those of White women, and Vietnamese Americans have liver cancer rates that are more than eleven times greater than those of Whites (Miller et al., 1996). Southeast Asians (Cambodian, Laotian, and Hmong) had the highest rates of disability, followed by Vietnamese and Pacific Islanders (Cho & Hummer, 2000). A 2005 screening of Hepatitis B among Asian immigrant population found that approximately 15% of newly tested persons living in New York City had chronic HBV infection. The prevalence was approximately 35 times that of the overall U.S. population (Pollack et al, 2005).

Thirdly, as social capital has been argued to be a social factor contributing to health inequalities among the general population, an attempt to understand the association between social capital, race/ethnicity and health should be an important field for future research. Theoretically, if the concept of social capital is applicable in different racial/ethnic groups, we would expect that the differences in tradition, psychology, culture, and access to power have an influence on both the development of social capital and its impact on health. The complex social context of the Asian American population offers an excellent opportunity to analyze the possible contingent effects of social capital

on health. The analysis of social capital among Asian American ethnic groups is an important step toward understanding the universality of social capital for health inequalities and also toward further developing theoretical perspectives on social capital and health across racial/ethnic lines. Such a cross-ethnic and cross-socioeconomic examination of social capital will extend our knowledge about variations in social capital or their associations with health in different socio-cultural contexts in the United States, and aid in extending the power and scope of interpretations developed from social capital theory. Moreover, the results may also be useful for designing effective health intervention programs for Asian Americans with different ethnic identities in the coming decades. Therefore, the comparison among Asian American ethnic groups is timely, appropriate and very useful to reveal to what extent the stock of social capital the ethnic groups may differ and whether the association between social capital and health varies with social identities.

In summary, Asian Americans as a whole enjoy fairly good health status, but given the dramatic heterogeneity within the population, treating it as an undiffereciated group as Asian Americans risks eliminating the dramatic diversities underlying these subgroups and may lead to unqualified conclusions, which would prevent policy makers and practitioners from identifying accurately the true life conditions of many subgroups. Therefore, a better approach is not only to analyze the differences in health outcomes between them and the White majority, but also to understand the disparities of health within the Asian Americans with data disaggregated by ethnicity, income and gender. In this study, I choose to examine the relationship between social capital and health among three of the largest Asian ethnic groups, i.e., Chinese, Filipinos, and Vietnamese. The

three populations represent general differences in tradition, culture norms, and levels of SES in the United States. Using the same measures of social capital, this study will reveal how social capital is distributed across ethnic, gender and socioeconomic lines, and how it may perform similarly or differently across these subpopulations. As discussed above, the study has both theoretical and policy implications for social capital research and interventions.

2.3.2. Conceptual Framework

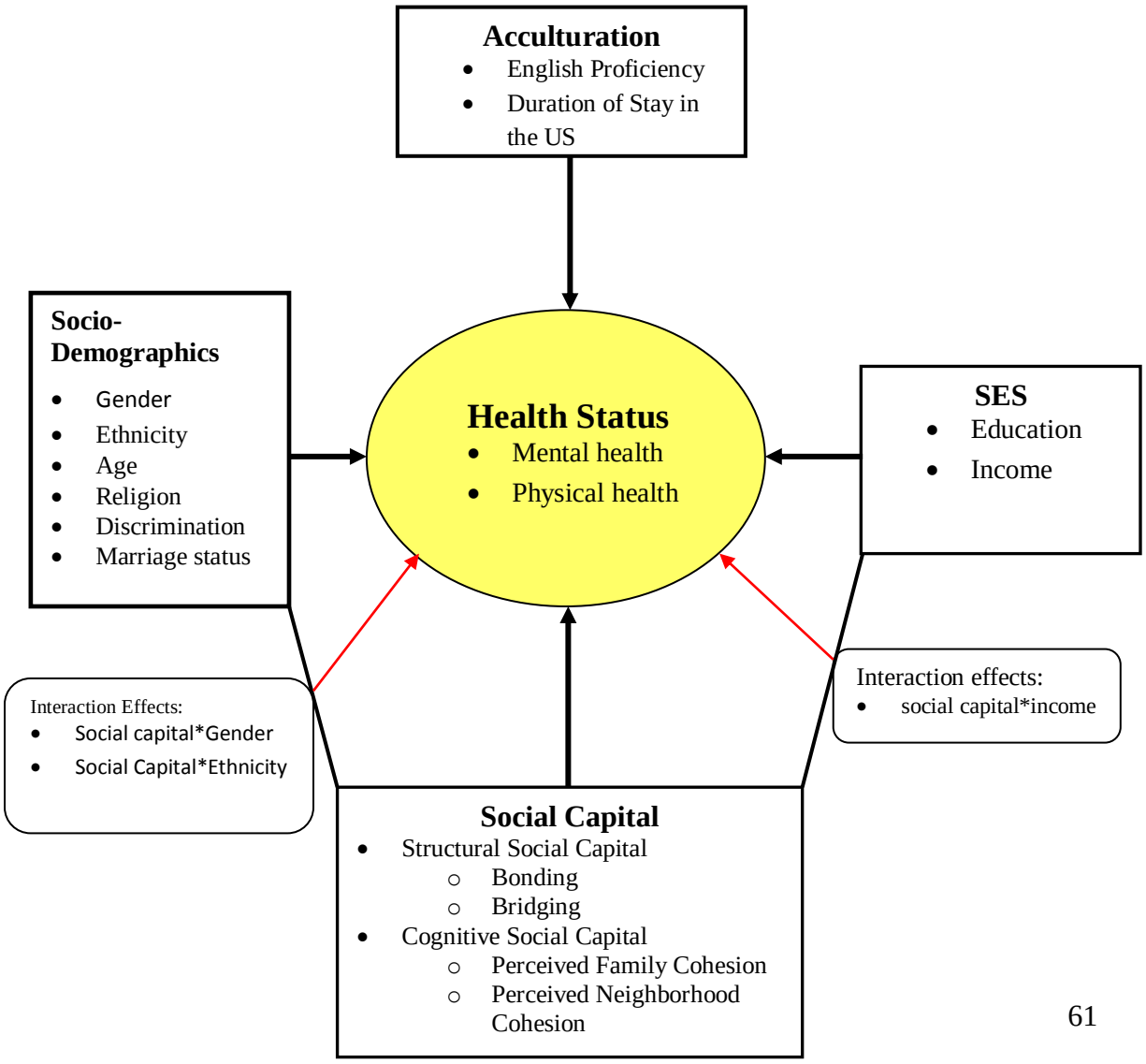
As reviewed earlier, there is a reason to believe that social capital functions differentially across social groups. And, there is now some empirical evidence that there are differential effects of social capital on health. However, little is known about the variations in social capital or their associations with health Among Asian American populations. If social capital is a concept applicable in various populations, differences in culture, tradition and access to power may be expected to have an influence on both the development of social capital and its impact on health. In addition, it is not fully known to what degree associations between social capital and health are independent of variations in ethnicity, income, and gender. Understandings of such inter- and intra population variations among Asian Americans are not only timely, but also necessary for the proper deployment of social capital theory in health policy in this population.

Consequentially, this study takes an approach that is different from traditional understanding of social capital and health, which has often treated social capital as related to health uniformly across people of different social background. In the conceptual model presented in Figure 1, next page, I hypothesize that social capital exerts not only a main

effect on health, but also an interaction effect on health. Specifically, the extent of social capital effects on health depends on individuals' background, such as gender, income level and ethnic identity.

Therefore, in constructing the analytical model for the current study, it will be sensitive to the possibility of interactions with ethnicity, income and gender. It is necessary to point out that the study cannot confirm the causal direction in the analysis of cross-sectional data, the direction as indicated by the arrow in the figure only serves to place the analysis in a theoretical context and may be tested in future analyses.

Figure 1: Conceptual Model of Social Capital and Health with Interaction Effects



2.3.3. Summary

This chapter introduced the concept of social capital and its relevance for health research. Though still facing problems such as a lack of precise definition and measurement, the concept of social capital has been shown to be useful for analyzing health disparities inside and outside the United States. At both ecological and individual levels, empirical studies about the associations between social capital and health have bourgeoned in the past decade and produced considerable evidence that social capital matters for health. However, one major limitation in the literature is that, though hypothesized, the contingency of social capital's effects on health has not been extensively explored in the racially diverse United States. Consequently, this research seeks to explore the associations between social capital and health for Asian American population in the United States, and how it interacts with socioeconomic and race-ethnic effects to produce health. This study is designed to amplify our understanding of how various dimensions of social capital are associated with gender, SES, race-ethnicity, and health progression. The next chapter will present a detailed description of the hypotheses, data source and analysis strategy.

Chapter 3

Research Questions, Hypotheses, and Methodology

The preceding chapters presented an overview of the social capital concept, the empirical literature regarding social capital and health, and the limitations of the literature, as well as a proposal for filling the gaps in the literature. It also discussed the divergence of the social capital-health association across gender, socioeconomic groups and race. The discussion led to the argument that people from different social backgrounds may benefit differentially from social capital. This chapter describes research hypotheses, methodology and analytic approaches to investigate the potential differential impacts of social capital on health.

3.1. Research Questions

Social capital has proved itself as a potential explanatory variable for understanding health disparities. Prior studies have supported the argument that the association of social capital and health status is generally robust and consistent for the general population in the United States and also for people in several European countries (Islam et al, 2006; Kawachi, 2004). There exists, however, an important gap in that literature involving whether the social capital–health relationship varies as a function of ethnicity, SES and gender. There are theoretical reasons and some empirical evidence to believe that it does. However, prior research has not fully accounted for the associations

between social capital, race/ethnicity, income and gender for mental and physical health outcomes. In fact, social capital and health have not been well explored among minority populations, in particular among Asian Americans. A few recent studies have found that in Asian countries, some cognitive social capital elements such as interpersonal trust and norms of reciprocity, proved to be beneficial for health and well-being, but structural social capital measured by organizational membership, was associated with increased health, such as somatic symptoms (Yamaoko, 2008). As for Asian Americans in the United States, whether the different elements of social capital work similarly or differently from the mainstream remains mostly unstudied. This lack of information could be important if it is relevant to the health status among Asian Americans, a fast growing population in the United States.

The purpose of this study is threefold. First, it attempts to determine whether there is a gap in social capital across racial/ethnic, SES and gender lines in the general populations, including Asian Americans, in the United States. Second, it aims to reveal whether social capital is associated with health status and health behaviors among the Asian American populations. Third, the study intends to expand understanding of the dynamic interplay of social capital, gender, SES and race/ethnicity among Asian American populations. In other words, the study investigates whether social capital works similarly or differentially among people with different social identities such as ethnicity, gender and SES. The last point is based on the hypothesis that social capital may yield health benefits across all social groups, but the returns may differ since social groups are not homogenous. The existing literature on social capital, race and health has some preliminary evidence showing that certain individuals may benefit more than others from

the same amount and quality of social capital, but no extensive empirical studies have been done in this field, in particular among Asian Americans. Specifically, the three main research questions to be addressed in the study are as follows:

1. How is social capital distributed by race/ethnicity, gender and SES in the general population as well as in the Asian American populations in the United States?
2. In general, does social capital matter for health within the Asian American populations?
3. If yes, how does the health effect of social capital vary by ethnicity, gender and income among Asian American populations? In other words, do demographic characteristics moderate the relationship between social capital and health outcomes?

3.2. Research Hypotheses

The exploration of differential social capital effects by ethnicity, gender and income are based on the following three hypotheses. In the analysis chapter, these three hypotheses will be tested to answer the research questions.

Hypothesis I: The distribution of social capital is uneven across social groups.

It is widely recognized that social capital is distributed unevenly in all societies. For example, Bolin and his colleagues (2003) found that the level of social capital declined with age, was lower for people who were married or cohabiting, and lower for men than women. Baum et al (2000) noted that in Australia, people with lower levels of income and education tended participate in less in social and civic activities. However, there is very limited research on the extent of such unevenness in the United States. Thus,

the first objective of this study is a broad overview of the distribution of social capital across people of different social backgrounds in the United States. Several sub-hypotheses are derived from the literature.

H1a: Different racial/ethnic groups in the United States possess unequal amounts of social capital, with Whites generally having more social capital than the minority groups.

H1b: People of higher SES possess higher levels of social capital, regardless of racial/ethnic background.

H1c: Men and women possess different amount of social capital across all the racial groups, with women having more bonding social capital and men having more bridging social capital.

Prior studies have shown that there were gaps in social capital between racial/ethnic groups. For example, Hyyppa and Maki (2001) showed that in Finland the Swedish-speakers were more likely to be active in community events and to participate in group activities than the Finnish speakers. In Israel, individual levels of most social capital variables proved higher in Jewish than in Arab individuals (Baron-Epel, et al, 2007). In addition, both income and education have been shown to be a strong predictor of the quantity and quality of social capital. For example, Nieminen and colleagues (2008) found that all of the social capital indicators—social support, social participation and network, trust and reciprocity—are significantly and positively associated with income and education in Finland (i.e, the higher level of income and education, the higher level of social capital). Similarly, Sundquist (2007) revealed that in neighborhoods with a higher proportion of people with low- and middle-education, there was a lower level of

linking social capital, such as voting participation in national elections. Therefore, it is reasonable to hypothesize that higher SES confers a larger stock of social capital.

Gender differences in social network are not new in the literature. Women tend to have closer ties with family members, while men are more likely to possess larger networks of friends. So, the hypothesis would be that women have more bonding social capital while men have more bridging social capital.

Hypothesis II: Both SES and Social capital are predictive of health among Asian Americans similar to the general population.

The literature has competing explanations of whether SES or social capital are the primary determinant of individual health status. Economic theories focus on individual income as a primary determinant of health, and better education may also improve health directly through providing healthy information or indirectly by increasing income. Empirically, the inverse association between SES and health is a well-established finding that has been persistent across various populations, including Asian Americans in the aggregate (McGee et al, 1999). There is no theoretical reason for this association to differ for the sub-samples of Asian American populations.

In parallel, recent researchers found that social capital helps improve health net of income and education. It may work through a variety of mechanisms, such as diffusion of health knowledge, maintaining healthy behavior norms through social control, promoting access to local health services, and providing affective support (Kim & Kawachi, 2006). For example, a qualitative study revealed that access to social and financial capital resources are equally important to overcome hardship and the two types

of capital are more important than the type of hardship (Parks-Yancy, DiTomaso & Post, 2007). Thus, a composite approach is appropriate, since it avoids the exclusion of significant influences overlooked by either the SES or the social capital approach.

There are two sub-hypotheses:

H2a: Both education and income (SES) are major determinants of health among Asian American population, with higher SES having better health outcomes;

H2b: Social capital is predictive of health among Asian Americans similar to that of the general population, i.e., higher level of social capital is associated with better health outcomes.

Hypothesis III: Social capital can have either a positive or negative effect on health and health behavior, and its association with health is a function of race/ethnicity, income and gender.

In this dissertation, I cast doubt on the assumption that social capital has a uniform positive effect on health. Instead, I hypothesize that some aspects of social capital may be harmful for health. In addition, along with the main effects of social capital on health, I also hypothesize there are differential associations between social capital and health among the Asian American populations. In other words, social capital and health may be more strongly related to health among some groups than others. To date, empirical evidence supporting this hypothesis is scant, but as discussed in the previous chapter, it is reasonable to hypothesize that social capital-health associations vary as a function of race/ethnicity, possibly because of the heterogeneity of the Asian

American populations and differing historical and social contexts for various subgroup populations. It is well-known that gender, socioeconomic position and race-ethnicity shape individuals' exposure to and experience of virtually all known psychosocial risk factors as well as many environmental and biomedical risk factors (House, 2002). As part of the social experience, the building and maintenance of social capital comes with different costs to people of different social status.

There are four sub-hypotheses:

H 3a: Social capital has both beneficial and detrimental effects on health.

H3b: People with lower income have higher returns from social capital.

H3c: Women are more sensitive to bonding and cognitive social capital, while men are likely to have better returns from structural social capital.

H 3d: The strength of social capital-health association across Asian American ethnic groups is not homogenous, with better returns for Vietnamese than for Philippines and Chinese.

In this study, I hypothesize that to the extent of social capital's contingence on SES, it would be more favorable for low-status individuals. My reasoning is that people of lower SES rely more on their social network for information and other support than people of higher SES. Further, low status individuals are more likely embedded in relatively small and strong networks that can provide timely and crucial daily support when in need. In comparison, high-status individuals tend to have more loose and diverse connections. Together with their advantaged SES, their larger stock of social capital may result in a "ceiling effect". To date, no empirical studies have been carried out to explore this hypothesis.

Studies have found that gender and class can affect the extent of access to social and financial capital resources, with women tending to have less access to social capital resources than men (Lin, 2001), and that the social and financial capital resources of working-class people are of lesser quality and quantity than those of middle-class people (Elliott, 1999). Social capital, measured by relationships with friends, trust, control, and religious involvement, has been shown to benefit self-rated health and the mental health of women in particular (Hyyppa & Maki 2001, Kawachi et al 1999). The degree of involvement in social networks specially benefits self-rated health and mental outcomes of women during stressful experiences (Achat et al., 1998; Rose 2000).

3.3. Data Source and Study Sample

This study will use the data from the Collaborative Psychiatric Epidemiology Surveys (CPES). The CPES data comprise three independent, nationally representative surveys: the National Comorbidity Survey Replication (NCS-R, 2001-2003); the National Latino and Asian American Study (NLAAS, 2002-2003); and the National Survey of American Life (NSAL, 2001-2003) which is not used in this study. Each of the surveys focuses on different populations. NCS-R aims at the general American population; NLAAS mainly surveys the Latinos and Asian Americans; and NSAL focuses on the African-American and Afro-Caribbean populations. The common theme of the three surveys is to look into the mental health problem and its correlates in the United States. Below is the more detailed description of the two datasets.

----National Comorbidity Survey Replication (NCS-R, 2001-03)

The NCS-R is a nationally representative, face-to-face survey of English-speaking adults ageing 18 or older living in the non-institutionalized civilian household population of the coterminous U.S. (excluding Alaska and Hawaii) plus students living in campus group housing who have a permanent household address. The interview schedule was divided into two parts. Part I consisted of questions about the core WMH-CIDI disorders using the short form which were administered to all 9,282 NCS-R respondents, whereas Part II (the Long Form) which assessed risk factors, treatment, and consequences of mental disorders, was administered only to a sub-sample of 5,692 respondents of the NCS-R respondents who completed Part I. This was meant to reduce respondent burden since Part II took a mean of 109.4 minutes to complete, while Part I only took an average of 33.8 minutes. The overall response rate was 74.6%. (See Kessler, et al, 2003 for details of the sampling design and field procedures).

----National Latino and Asian American Study (NLAAS, 2002-03)

NLAAS is the first nationally representative survey of mental health and service use among Asian Americans and Latinos in the United States (Alegria et al., 2004). The survey population included all the non-institutionalized Latinos and Asian Americans, aged 18 years or older and residing in any of the 50 states and Washington DC. Based on a stratified probability sample design, NLAAS successfully surveyed 4,669 respondents, of which 2,095 were Asian American adults. Briefly, the Asian sample of NLAAS includes three components: a core sample designed to be nationally representative of the entire Asian American adult population, a NLAAS High-Density (HD) supplemental

sample which consisted of geographic areas with greater than five percent residential density for three ethnic groups: Vietnamese, Filipinos, and Chinese; and a second respondent sample from households where a primary respondent had already been interviewed. With proper weighting, the combined data, in theory, provide a representative sample of the entire national Asian American adult population (see Heeringa et al, 2004 for details of the NLAAS sample design and sample methods).

The NLAAS Asian American component was stratified into four categories based on ancestry or national origin: Chinese, Filipino, Vietnamese, and all other Asians. Trained interviewers with cultural and linguistic backgrounds similar to the interviewees administered the survey in the language preferable to the. Each interview was conducted face-to-face, except when the interviewee preferred a telephone survey. The final sample contains 600 Chinese, 508 Filipino, 520 Vietnamese, and 467 "other Asians". Of the total sample, there are 1,097 women (52.36%), and 998 men (47.64%) (See Table 2 below for details). The final weighted response rates for the combined NLAAS samples of primary and secondary adult respondents were 65.6% for the Asian Americans sample (Alegria et al, 2005; Heerenga et al., 2004).

Table 2: Selected Asian Ethnic Groups by Gender in NLAAS

Ethnicity	Male	weighted %	Female	Weighted %	Total	Weighted %
Vietnamese	243	6.11%	277	7.35%	520	13.46%
Filipinos	235	9.91%	273	12.32%	508	22.23%
Chinese	284	13.64%	316	15.85%	600	29.49%
Others	236	17.69%	231	17.13%	467	34.82%
Total	998	47.35%	1,097	52.65%	2,095	100%

----Combined NCS-R and NLAAS Data

Given the objectives of this study, I use the combined dataset of NCS-R and NLAAS for the descriptive analysis of social capital discrepancies across racial, SES and gender groups in the general population in the United States, and the NLAAS for the in-depth analysis of the association between social capital and health among Asian American population. A total of 5,692 respondents in NCS-R completed the long form of questionnaires, in which a total of 185 regarded themselves neither as Asians, Hispanics, black or white. In the current study, these people are excluded from the analysis, bringing the NCS-R sample down to 5,507. Together with the 4,649 respondents from NLAAS, the combined NCS-R and NLAAS have a total sample of 10,156. The number of respondents and weighted percentage are displayed in Table 3 below.

Table 3: Racial/ethnic Data by Gender (NCS-R +NLAAS)

Race	Male	weighted %	Female	weighted %	Total	Weighted %
White	1,802	34.37%	2,378	37.85%	4,180	72.22%
Latinos	1,340	6.18%	1,741	5.78%	3,081	11.95%
Asian	1,035	2.09%	1,143	2.32%	2,178	4.4%
Black	257	4.89%	460	6.54%	717	11.43%
Total	4,752	47.52%	5,248	52.48%	10,156	100%

After weighting, the combined dataset reflects the population reality in the United States with Whites accounting for 72.2% of the populations; Latino became the largest minority with 11.95% compared to 11.43% for African Americans; and Asian Americans accounting for 4.4% of the population. There are more women (52.48%) than men (47.52%).

3.4. Description of the Study Variables

3.4.1. Measures of Health: the Dependent variables

According to the World Health Organization, health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (WHO, 1946). Compared with prior studies in the literature which often used only one or two indicators of health, the current study distinguishes itself by employing multiple physical and mental health indicators. In sum, a total of five dependent variables related to health status and health behavior were tested. Overall health is measured by self-rated physical and mental health. In addition, somatic symptoms, chronic health condition and smoking behavior are also investigated to gain a better understanding of whether social capital functions differently or similarly for the various components of physical and mental health. The use of these multiple health constructs is helpful to facilitate the most complete "snapshot" of the health of Asian Americans and its association with different dimensions of social capital.

Five dependent variables were included in the model, selected because of their possible impact on either access to the elements of social capital or health, or both. All of them are respondents' self assessment of their physical and mental health conditions, which have not been clinically diagnosed or validated. Because the distribution of these health outcomes is skewed very much, the present study chooses to dichotomize them. This may lead to some loss of information in statistical analysis, but that it is consistent with prior literature, in which most researchers also chose to dichotomize health outcomes, helps facilitate cross-study comparisons. Below are the detailed descriptions of the dependent variables.

- *Self-rated physical health*: Self-rated health is one of the most frequently used health outcomes in the social capital literature. The literature has shown through many studies that physical health is strongly conditioned by social factors (Helliwell & Putnam, 2004), and numerous studies have indicated that self-rated health is a powerful and robust predictor of individual well-being and general health status (Fayers & Sprangers, 2002). Other studies have validated this measure as a predictor of mortality (Benyamini & Idler, 1999; Idler & Benyamini, 1997; McGee et al., 1999), morbidity (Ferraro & Farmer, 1999), and health care utilization (Malmstrom, Sundquist, & Johansson, 1999). A review of 27 studies in the United States and international journals showed that this simple self-rating provides a subjective view of overall health status that predicted survival in populations, even when known health risk factors have been accounted for (Idler & Benyami, 1997). The association between self-rated health and mortality has been found among both men and women and among five broad racial/ethnic categories in the U.S. (McGee et al., 1999). In addition, the use of self-rated health facilitates comparison of results across studies which are based on different populations.

  In the NLAAS survey, self-rated physical health is measured by simply asking respondents the question (*see Appendix*): "How would you rate your overall physical health – excellent, very good, good, fair, or poor?" In this study, I collapsed the five descriptors into a dichotomous indicator of self rated health: 1) 1=excellent, very good, or good; 2) 0=fair or poor. This study will analyze the probability of reporting excellent/good health.

- *Self-rated mental health:* Self-rated mental health has not been studied as extensively as self-rated health (which usually refers to physical health). However, it is important in its own right given the increasing emphasis on mental health (Rohrer, 2004). Similar to the above measure, in NLAAS respondents were asked to rate their overall mental health, for which the possible responses were excellent, very good, good, fair and poor *(see Appendix)*. As with the self-rated physical health, I collapsed the five descriptors into a dichotomous indicator of self rated mental health: 1) 1=excellent, very good, or good; 2) 0=fair or poor mental health.
- *Self-reported Somatic symptoms:* Unlike the western view that emphasizes the separateness of the body and mind, Asian traditions have always regarded body and mind as one (Lin & Cheung, 1999). This, together with a tendency to be reticent about emotions, results in reporting somatic symptoms as culturally sanctioned "idioms of distress" (Lin & Cheung, 1999). Items asked about somatic symptoms include stomach pain, trouble breathing, nausea, severe numbness and dizziness, etc. The number of self-reported somatic symptoms was calculated as the sum of reports of the 13 symptoms. The final counts for somatic symptoms in this data range from 0 to 10. In the logistic model, I created a dichotomous measure (1 = having any somatic symptoms, and 0 = none) (*see Appendix*). Dichotomizing the number of somatic symptoms has been used to study social capital and Asian's health in the literature (Yamaoka, 2008).
- *Chronic health conditions:* Chronic health conditions are frequently used in health studies. The health literature shows that ecological and individual level social capital and social support work to protect against chronic illness, such as

hypertension and diabetes (Ahern & Hendryx, 2005). Receipt of social support and satisfaction from one's social network significantly influences whether individuals develop chronic illnesses and report good subjective health (Rennemark & Hagberg 1999, Penninx et al 1999). In NLASS, chronic health conditions were measured by asking respondents whether they had any chronic conditions in their life time (such as arthritis, chronic back/neck problems, frequent or severe headaches) or any physician-diagnosed conditions (such as high blood pressure, diabetes, asthma) (*see Appendix)*. In line with the literature, the variable of chronic conditions was dichotomized to distinguish an absence of chronic conditions (representing 44.4% of respondents; scored 0) from the presence of one or more (scored 1) (Veenstra et al, 2005).

- Smoking Status: Smoking has been identified as the single most important preventable cause of premature death in developed countries (CDC, 1989) and is now emerging as a major public health concern in developing countries. A few recent studies, in particular those by Lindstrom and his colleagues (2002; 2003; 2004) from Sweden, found significant associations between social capital (measured by social participation) and daily smoking as well as smoking cessation. Others have come up with similar findings that those with a higher level of social trust at neighborhood level, such as trust and safety, had a lower rate of smoking (Greiner et al, 2004). In NLAAS, smoking status was assessed by one question: "Are you a current smoker, ex-smoker, or have you never smoked?" (*see Appendix)* Self-reported smoking status has been validated in several studies (Rebagliato, 2002; Vartiainen, Seppala, Lillsunde, & Puska, 2002). In the current

study, responses were collapsed into a dichotomous variable, in which those who reported as current smokers were coded 1 and ex-smokers and those never smoked were coded 0.

3.4.2. Measures of Social Capital

Measurement of social capital is a formidable challenge as there are no uniform criteria in the literature. Many studies have used some combination of measures of trust, associational membership, perceived reciprocity, and social participation. However, other proxy measures have also been used, including volunteerism, community attachment, and even electoral participation. The heterogeneity of indicators used to measure social capital reflects both the newness of the concept and the reliance of investigators on secondary sources of data originally collected for purposes other than public health (Kawachi, 2004). To date, it is widely agreed that social capital is a multidimensional concept, but there is no firm agreement among researchers as to its exact components. Some of the most common measurements of social capital are attributable to James Coleman and Robert Putnam. Coleman (1990) posited that the well-being of children is dependent on the creation and maintenance of social capital and that social capital in the family can be understood as "the relations between children and parents (and when families include other members, relationships with them as well)" (p110).

Comparatively, Putnam's (1995) measurement of social capital derives from his definition of social capital as "the features of social life such as networks, norms, and social trust…" which can "…(Social capital can) be embodied in bonds among family, friends, and neighbors, in the work place, at church, in civic associations, perhaps even in Internet-based 'virtual community'" (Helliwell & Putnam, 2004, p1436). In this vein,

social capital has often been measured by proxies such as association membership, newspaper readership, voting turnout, and social trust or cooperation. In the social capital and health literature, most researchers adopted Putnam's measurement.

To better distinguish dimensions of social capital, it has been suggested that social capital contain cognitive and structural resources (Harpham, Grant, & Thomas, 2002). Cognitive social capital refers to subjective perceptions of the quality of social relationships such as trust, support, norms and reciprocity, while structural social capital refers to the objective quantity of social relationships and activities such as memberships in associational activities (Mitchell & Bossert, 2007). In addition to the cognitive and structural distinctions, some researchers have categorized social capital into bonding, bridging, and linking forms (Helliwell & Putnam, 2004; Szreter & Woolcock, 2004). *Bonding social capital* refers to the relationships among members of a network who see themselves as being similar (i.e., kin family networks). *Bridging social capital* refers to links across different groups without similar status and identity on some key measures. *Linking social capital* refers to the connections with formal and institutionalized power in a society. All three forms of social capital are thought to be important to people's health (Szreter & Woolcock, 2004).

As reviewed earlier, the proper level for analysis of social capital has also been disputed. At a more personal level, involvement in a social network of family and friends has been conceptualized as an important component of social capital (Portes 1998; Woolcock 1998). Various types of social connectedness, or social cohesion, seem to be generated by social network interactions and comprise social capital. Both formal and informal social ties that foster a sense of belonging represent social capital. Others

maintain that social capital is a contextual variable that only applies to community, organizations or even higher levels (Coleman, 1988; Kawachi et al, 1997; Putnam, 2000). Recently, theorists have suggested that the levels of analysis need not to be exclusive but complementary to one another, since individual social capital is partly influenced by the community, and the level of social capital in a community is determined by the social capital of its residents (Kawachi, 2004). Pridmore et al (2007) commented that social capital's effects on health may operate at four different levels: micro (individual/family). meso (neighborhood); city level; and macro (national/global). No consensus has been reached as to which level is preferable.

Given the data availability in NLAAS, in this study social capital is conceptualized into structural and cognitive dimensions at the individual level. The particular measures were arrived at through exploratory principal components factor analysis with 12 items pertaining to the respondents' connectedness and mutual concern among relatives and friends that comprise an individual's social world (see *Appendix* for the question items). The criterion applied to the identification of any orthogonal factor was a minimum Eigenvalue of 1.0, and item selection was based on a minimum absolute value of 0.36 from Varimax rotation. Six items were ultimately retained that correlated with two orthogonal factors, which I define as "bridging social capital" and "bonding social capital" respectively. The former correlates with three Likert-scale items concerning relationships with friends (frequency on phone or get together with friends, reliance on friends when having serious problems, and opening up to friends about worries; Cronbach's alpha=.72) and the latter associates with another three Likert-scale

items (frequency of talk/get together with relatives, reliance on relatives for serious problems and frequency of discussing worries with relatives; Cronbach's alpha=0.70).

Following the same procedure, a second factor analysis was performed on twenty-two items which appeared strongly relevant to the cognitive dimension of social capital *(See appendix)*. Based on a minimum factor loading of 0.40, twenty items were retained that correlated with three factors whose Eigenvalue were over 1.0. These factors were: *perception of neighborhood cohesion, perception of family cohesion* and *perception of family Conflict*. Perception of family and neighborhood cohesion correlates with ten (Cronbach's alpha=0.92) and five items (Cronbach's alpha = 0.81) respectively. The family Conflict factor is more complex. Different from other populations, many Asian American subpopulations are founded on the basis of human relationships, composed of immediate and extended families. Such close family relationships may impose heavy duties, obligations, and moral standards on individuals, which can confine their expressions and liberties (Portes, 1998). In this study, perceptions of family Conflict are not conceptualized as a dimension of social capital; rather, they are seen as an indicator of a deficiency of social capital. Given that we know little about whether or how much social capital affects health in the Asian American population, this factor is retained in the analysis. To measure the amount of social capital for each respondent, I took the mean of the retained question items for each extracted factor. For example, for the bonding social capital, there are three retained question items, and the mean of these three items is used as a proxy of an individual's social capital. If an individual has a missing value for one of the three question items, then the mean of the rest two items is used to approximate the level of social capital of that individual. Then, an individual is

assigned as high or low on social capital if he/she received a score above or below the grand mean of the population's social capital. A summary of the factor analysis results are shown in Table 4 below.

Table 4: Selected Results Related to Factor Analysis

Extracted Dimension	Eigenvalue	Reliability (Cronbach's α)
Bonding Social Capital (Relatives Contacts)	1.1	0.70
Bridging Social Capital (Friends Contacts)	2.8	0.72
Perceived Family Cohesion	7.1	0.92
Neighborhood Trust & Reciprocity	2.3	0.81
Family Conflict	1.16	0.77

Specifically, four measures of individual level social capital are employed to represent the structural and cognitive aspects of individual social capital. Social network with relatives and friends is an important part of an individual's social network structure, while personal evaluations of family cohesion and neighborhood trust and safety measure an individual's perception of their social environment. The measurements also tap into bonding and bridging aspects of social capital with questions about bonding relationships with relatives and bridging relationships with friends.

Table 5 (next page) shows the inter-factor correlation, and the absolute value of the correlations ranges from 0.0077 to 0.50, suggesting that the scales capture the distinct yet closely-related social capital domains.

Table 5: Correlation Coefficients between Social Capital Factors

	Bonding	Bridging	Neighborhood Cohesion	Family Cohesion	Family Conflict
Bonding	1				
Bridging	0.31	1.00			
Neighborhood Cohesion	0.15	0.15	1.00		
Family Cohesion	0.21	0.01	0.24	1.00	
Family Conflict	-0.17	-0.01	-0.17	-0.50	1

Before proceeding to next section, it is necessary to take a notice of several limitations in the measurement of social capital here. First, the survey only allows analysis of social networks with friends and relatives. There is limited or no information regarding civic participation, organizational membership, or political participation—all of which are important indicators of social capital. Secondly, although the measurement covers neighborhood trust, it does not include general interpersonal trust, a commonly used indicator of social capital. Thirdly, due to scant information in the dataset, "linking social capital", which is often defined as "the norms of respect and networks of trusting relationships between people who are interacting across explicit, formal or institutionalized power or authority gradients in society" (Szreter & Woolcock, 2004, p.655) was not considered.

3.4.3 Measurement of Control Variables

Aside from the main independent variable -- social capital, there are three clusters of covariates which were proved to be relevant for health in prior studies. They include the respondents' socio-demographic characteristics, socioeconomic information, and levels of acculturation.

3.4.3.1. Socio-demographic variables

Socio-demographic variables include age, gender, marital status, race/ethnicity, discrimination and religious belief, all of which have been shown to be important covariates for the study of health. Prior research suggests that although many of the observed disparities in health may be explained by socioeconomic differences, each of these demographic characteristics may also have an independent effect on health, and thus should be controlled in the statistical analysis.

- *Age:* Initially measured as a continuous variable ranging from 18 to 99, in this study it is recoded into four categories (18-24; 25-44; 55-64; 65+). The category of 18-24 is treated as the reference group throughout all the analysis.
- *Gender*: Recoded into a dichotomous variable with male as the reference category (male =1; female = 2).
- *Marital Status*: The data has three categories of marital status (currently married, single, or widowed/separated/divorced). In this study, this variable is recoded into a dichotomous variable of married/cohabiting vs. widowed/separated/divorced/never married. The former is treated as the reference category.
- *Ethnicity*: According to national origin, the Asian American population is subdivided into four groups: Vietnamese, Filipinos, Chinese and Others. The "Others" category, consisting of people from over a dozen of minorities, is regarded as a residual category without particular theoretical significance. Vietnamese is the reference category for all the analysis.

- *Everyday Discrimination*: Everyday discrimination is measured by a nine-item scale (Cronbach's a=0.91) adopted from the Detroit Area Study measure of perceptions of chronic and routine unfair treatment (Williams et al, 1997). Respondents indicated how often (almost every day; at least once a week; a few times a month; a few times a year; less than once a year; never) they experienced nine unfair treatments: less courtesy; less respect; threatened or harassed, etc. An exploratory factor analysis supported a one-factor structure of this measurement (Eigenvalue=4.87; factor loading=0.67-0.79), and thus it can be used as unidimentioanl scale. The range of the responses was from 1 to 6, with 1 indicating encountering discrimination almost every day and 6 indicating almost never experiencing unfair treatment. The items were reverse coded to reflect the discrimination experience from low to high. For this study, the mean score of the nine items was calculated and then into three equal categories to indicate low, medium and high degrees of discrimination experienced by individuals.
- *Religion*: Religious belief was measured by one item: "When you have problems or difficulties in your family, work, or personal life, how often do you seek comfort through religious or spiritual means, such as praying, meditating, attending a religious or spiritual service, or talking to a religious or spiritual advisor - often, sometimes, rarely, or never?" The variable is recoded into a dichotomous variable of seeking (often and sometimes) vs. not seeking religion comfort (rarely and never).

3.4.3.2. Socioeconomic Status (SES)

Two commonly used variables, education and income, are included in the study to measure respondents' socio-economic status.

- *Education*: Education is one of the most widely used socioeconomic indicators in health studies (Oakes & Rossi, 2003). Education may affect health via various pathways. For example, higher levels of education lead to better occupations and higher incomes, thus affecting health through access to material resources such as health care, housing, and good food. Better education is also related to cognitive abilities and informational resources that can influence a person's ability to utilize the resources available to them. Analytically, education is preferred over income as it can be determined for everyone, and varies by age, gender, and ethnicity (Williams & Collins, 1995). Moreover, education is generally completed at an early age, so it is easier to determine causal direction. In this study, education was categorized into four groups: less than high school (0-11 years), high school diploma (12 years), some college (13-15 years), and university graduate (>16 years). Less than high school was treated as the reference group.
- *Income*: Income has been regarded by some researchers as the most robust predictor of health (Lynch & Kaplan, 2000). Individual income measures only the respondent's income while household income assesses the income of all members of the household. Since the latter measures the total economic resources available to the family, it may be preferable to individual income. In this study, income refers to household income, broken down into four categories: Low-income: 0 - $24,999 = 1; Low-Middle income: $25,000.00 - $62,499 = 2; Upper-Middle

income: $62,500 - 107,499 = 3; High income >$107,499 = 4. The low-income group was the reference group.

3.4.3.3. Acculturation

Over 76% of Asian Americans in the NLAAS sample are immigrants. Prior studies have shown acculturation can have both protective benefits and detrimental effects on immigrants' health. For example, the health advantages of some immigrants are explained by the selective migration hypothesis, suggesting that healthier individuals are more likely to migrate. However, immigrant status has also been associated with increased stress related to adjustment, the acculturation process, employment, and economic hardships. In this study, proxies for an individual's degree of acculturation are measured by English language ability and duration of stay in the U.S, two commonly used indicators of acculturation.

- *English Proficiency*: Three questions were used to test respondents' ability in speaking, reading and writing in English (Cronbach alpha = .97). Each question item has four answers (poor, fair, good, and excellent), and the summed scale ranged from 3 (poor on all three items) to 12 (excellent on all three items). The variable was dichotomized so that a score equal to or less than six indicates insufficiency in English, and over six indicates proficiency. This is a fairly reliable proxy measure of acculturation and has been shown to be a reliable indicator in health care research among immigrants (Aguirre-Molina, Molina, & Zambrana, 2001).

- *Duration/stay in the U.S.*: Duration/stay in the U.S. measures the length of time the respondent spent in the United States. The assumption is that immigrants who spend more time in the U.S. become more acculturated. In this study, duration of stay is recoded into five categories (U.S. born; 0-4 years; 5-9 years; 10-20 years, and over 20 years). The 5-year duration cut-point is important, because it takes immigrant at least 5 years to obtain citizenship in the United States. The U.S. born category is the reference group. This categorization has been used in other studies of the impact of immigrant status on health among Asian Americans (Frisbie et al., 2001).

3.4.4. Interaction variables

Failure to explore the contingency of social capital's effects on health is one of the major limitations in the empirical literature. As discussed earlier, one of the major objectives of this study is to explore whether the effects of social capital are contingent on factors such as ethnicity, gender and income. However, a purely data-driven approach to searching for interaction effects is not appropriate. According to the findings from the limited literature, three sets of interactions are suggested for this research on Asian American populations:

- *Ethnicity*Social Capital*: The first interaction is between ethnicity and social capital indicators, both structural and cognitive. This two-way interaction item aims to find out whether social capital effects differ across ethnic groups within the Asian American population.
- *Income*Social Capital*: The second interaction is between income and social capital to find whether the effect of social capital is moderated by individuals' income or not.

- *Gender*Social Capital*: The third interaction is between gender and social capital. In the limited existing literature, some studies have found significant gender differences in the association between social environment and health (Stafford, 2005).

3.4.3. Summary of the Dependent and Independent Variables.

Table 6 (next page) provides a brief summary of variables to be used in the analysis, and their coding schemes.

Table 6: Summary of Variables in Regression Analysis

Construct	Variables	Categories
Dependent Variables		
Health Status	Physical Health	0=Poor1=Excellent
	Mental Health	0=Poor; 1=Excellent
	Somatic Symptoms	0=No Symptoms; 1=One or more symptoms
	Chronic Health Conditions	0=No conditions; 1=over 1 condition
	Smoking	0=Non-smoker; 1=Current Smoker
Independent variables		
Social Capital	Bridging	1=Low, 2= high
	Bonding	1=Low, 2=high
	Family cohesion	1=Low, 2=high
	Neighborhood cohesion	1=Low, 2=high
	Family Conflict	1=low, 2=high
Socio-demographic	Ethnicity	1=Vietnamese; 2=Filipinos; 3=Chinese;4=Others
	Gender	1=Male; 2=Female
	Age	1=18-24 years; 2=25-39 years; 3=40-64 years; 4=65+
	Religion	0= Not Seeking religious comfort 1= Seeking religious comfort
	Marital status	0=not married; 1=married/cohabiting
	Discrimination	1=low; 2=medium; 3=high
SES	Income	0=25%; 1=50%; 2=75%; 3=100%
	Education	1=Less than high school 2=High school diploma 3=Some college 4=University graduate and above
Acculturation	English Proficiency	0=Fair/Poor/Not Speak English 1=Excellent
	Duration of Stay in the US	0=US born; 1=0-4 years; 2=5-9 years; 3=11-20 years; 4= 20+
Interaction Variables	Income * Social Capital	Income*Bonding Social Capital Income*Bridging Social Capital Income*Perceived Family Cohesion Income* Neighborhood Cohesion Income*Family Burden
	Gender* Social Capital	Gender*Bonding Social Capital Gender*Bridging Social Capital Gender*Perceived Family Cohesion Gender* Neighborhood Cohesion Gender*Family Burden
	Ethnicity* Social Capital	Ethnicity*Bonding Social Capital Ethnicity*Bridging Social Capital Ethnicity*Perceived Family Cohesion Ethnicity* Neighborhood Cohesion Ethnicity*Family Burden

3.5. Data Analytic Approach

As detailed above, three hypotheses are tested: 1.) social capital is distributed unevenly across social groups; 2.) Social capital is associated with health among Asian American population, so is SES; and 3.) Social capital operates differentially across gender, ethnicity and SES to influence individual health.

The characteristics of social capital are first explored using the combined dataset of NCS-R and NLAAS, then using only the Asians in the NLAAS sample. The data analysis focuses on weighted descriptive statistics of bonding and bridging social capital across gender, SES and the four major racial/ethnic groups in the United States as well as the four ethnic groups among Asian American populations. Descriptive statistics, including means, standard deviations, and cross tabulations, are generated to summarize the demographic characteristics of respondents in the sample. Social capital is compared across race/ethnicity, SES, and gender to investigate if they are significantly different. I compare the means by calculating confidence intervals and identify whether social capital is statistically significant different by racial/ethnic, income and gender groups.

Next, the analysis focuses on the associations between social capital and health within the Asian American population to reconfirm findings from other studies, using only the Asian American component of NLAAS. First, descriptive statistics will be presented to provide a broad overview of the population and its health status by gender, ethnicity and SES. Second, multivariate logistic regression models will be utilized to examine the relationships between social capital and health along with covariates. In order to discern the relative effects of social capital on health and health behaviors and to assess whether the effects are moderated by the covariates of gender, income and

ethnicity, I will test a series of multivariate logistic regression models via block entry method. Social capital indicators will first be entered as a block to evaluate their association with dependent variables. In the analyses that follow, SES was added to the social capital indicators and then, step-by-step, socio-demographics and acculturation variables were introduced. The baseline model contains all the independent variables, including social capital, SES, socio-demographics and acculturation.

Estimates derived from the baseline model are based on the assumption that the effects of social capital, income, gender and ethnicity do not interact with each other. In the next step of analysis, this assumption will be relaxed according to the theories and literature reviewed in Chapter Two. In order to test how individual attributes and social capital operate together to influence the incidence of health problems, two-way interaction terms are used. An interaction effect exists when the impact of one independent variable depends on the existence of another independent variable. In the models I investigate whether the impact of social capital on health may act in conjunction with ethnicity, income and gender. Accordingly, interaction terms are created through multiplying each of the social capital indicators by: (1) ethnicity; (2) household income; and (3) gender.

To avoid model saturation, each interactions is incorporated into the baseline model independently and each model with a group of interaction terms is then compared to the baseline model using a post-estimation test (Wald test). A significant Wald test (0.05 level) suggests that the interaction terms are significantly different from zero, which means the model should include the interaction terms. If they are not significant, they are dropped from later analysis since removing them will not substantially reduce the fit of

the model and retaining them does not help predict the dependent variable. This step-by-step interaction approach allows for the investigation of whether social capital has specific effects and whether these effects persist in the presence of other factors. The final part of the analysis is fitting a full model that simultaneously includes all significant interaction terms identified through Wald tests. Special attention will be paid to the variations of social capital effects by ethnicity, income and gender.

3.6. Strengths and Limitations

There are several strengths and weaknesses of the data and analyses here. The most important strength is that the data are nationally representative and the results are generalizable. While results from the combined NCS-R and NLAAS provide a general picture of discrepancies and gaps in social capital among the general population, the detailed analysis of the NLAAS Asian American sample allows for a more detailed understanding of the entire Asian American populations and its ethnic populations. In addition, compared with many prior studies, the use of multiple indicators of social capital is also an advantage of this study, which will deepen our understanding of how different dimensions of social capital are associated with health. Finally, the comprehensive analysis of interaction effects can be of important theoretical value as well as having policy implications.

Aside from the strengths, there are several limitations that are worth mentioning here. First, only measures of the bonding and bridging social capital are available in the combined NCS-R and NLASS data. Comparison of other dimensions (the cognitive dimension of social capital) is not possible available due to lack of data. However, the

preliminary comparison of bonding and bridging social capital across groups serves as a useful exploratory study into social capital distribution.

Second, even for the structural aspects of social capital, some major measurements, such as association membership and civic participation, are missing from the dataset. As previously addressed, these indicators of social participation may have important implications for health.

Lastly, the data is cross-sectional and many of the processes examined are interrelated. It can be very difficult to categorize variables as either exogenous or endogenous and to identify causal order. While this is a concern, I deal with this by interpreting the results as evidence of relationships rather than precise determinants or consequences.

Despite these drawbacks, the overall strengths of the data and the types of analyses utilized offset these limitations. The nationally-representative nature of the data and the analytic techniques used will advance understanding of how health among the Asian American population and its subgroups is affected by social capital. This advantage, along with the ability to generalize the findings to all Asian Americans in the United States, outweighs the existing shortcomings.

3.7. Summary

This chapter presented the research questions, research hypotheses, data sources, variable operations, and the analysis plan. Results from descriptive analyses of the combined NCS-R and NLAAS dataset and the NLAAS Asian American sample will provide an overview of the distribution of social capital along racial/ethnic, gender and SES lines in the United States. In-depth regression analysis of the NLAAS sample will

reveal the nature of the relationship between social capital and health status for Asian American subpopulations as well as whether such association is moderated by ethnicity, gender and income. The next chapter will present the descriptive and regression results.

Chapter 4

Analysis and Findings

The analyses in this study include two parts. The first part consists of descriptive information of the samples' demographics and their levels of social capital stratified by race/ethnicity, income and gender. It is widely believed that different social groups possess different types and amounts of social capital, but seldom has the subject been thoroughly examined. Specifically, the descriptive analyses detail the socioeconomic gaps and the disparities of social capital among the four major racial groups (Whites, Latinos/as, Blacks and Asian Americans), among people of different SES, and between males and females in the general population of the United States. Similar descriptive analyses are replicated between ethnic, SES and gender groups within the Asian American population. Combined, the two descriptive analyses of social capital provide a broad picture of how social capital is distributed in the general population as well as within the Asian American population.

The second part is a presentation of the results from an in-depth analysis of the associations between social capital and health outcomes. It focuses on whether there are significant associations between social capital indicators and health outcomes within the Asian American population and whether such associations varied by ethnicity, income and gender.

Stata statistical software (v.10.1) was used for all the data analyses. All the analyses were weighted and adjusted the standard errors for the effects of the complex survey design. The amount and distribution of missing data was also evaluated. Since the missing values for variables in the study represented less than 2%, far below the recommended 5% for imputation (Tabachnick & Fidell, 2001), missing values were not imputed and cases with missing values were not included in the analyses.

4.1. Descriptive Findings

4.1.1. Demographics of the Study Samples

Table 7 (p99) shows the weighted distributions and descriptive statistics for the combined NCS-R and NLAAS sample, and for each racial group. On average, Latinos/as are the youngest (38 years) and Whites are the oldest, while Asian Americans and Blacks are in between (41 years for both). In addition, Asian Americans are most likely to be married (68.9%), followed by Latinos (62%) and Whites (59.9%), with Blacks least likely to be married (36%).

The sample also has an uneven distribution of educational attainment and household income across racial groups. Asian Americans have the most education—42.7% of Asian Americans have a university degree compared to 26% of Whites, 10% of Latinos/as and 13% of Blacks. At the lower end of education, Latinos were more likely to not have completed high school (43%) compared to 22% of blacks. Although Asian Americans had a greater percentage with higher education than Whites, they also had a higher percentage with less than high school education than Whites (14.7% vs. 13%), suggesting there exists a bipolar distribution of educational achievement within Asian American populations.

Household income exhibited similar patterns of distribution. Asian Americans as a whole have the highest mean household income of $73,030, followed by Whites at $63,002, Latinos/as at $44,696; and finally, Black families have the lowest mean family income of $42,964. In terms of quartile distribution, 44.2% of Asian American respondents fell in the fourth (highest income) quartile, as compared to 35% of Whites, 21.6% of Latinos/as and 20.9% of Blacks. At the lower end of income, Blacks had the highest percentage of people in lowest quartile (33.2%), followed by Latinos/as at 29.9%. Similar to bipolar distribution in education discussed earlier, while the Asian American populations had higher percentage in the fourth quartile of income, it also had higher percentage in the first quartile when compared to Whites (19.3% v. 15.4%).

In sum, compared with Whites and Asian Americans, Latinos and Blacks had less achievement in both education and lower average household income. In addition, while on average Asian Americans had a higher percentage of completing university education and also a higher mean household income than Whites; they also had a higher percentage of people with least amount of education and household income than Whites. The bipolar distribution of education and income within the Asian American population obviously demonstrates the heterogeneity within this population; and considering them a homogenous group is misleading. Instead, the population should be treated as consisting of very different subpopulations, with research strategies adapted accordingly.

Table 7: Weighted Distribution of Socio-demographic factors (NCS-R+NLAAS)

Characteristics	Total Sample (N= 10,156) M[b] or % (SE)	Whites (N=4,180) M[b] or % (SE)	Asian Americans (N=2,178) M[b] or % (SE)	Latinos (N=3,081) M[b] or % (SE)	African Americans (N=717) M[b] or % (SE)
Total Population [a]	204,967,549	148,027,564 72.2%	9,018,572 4.4%	24,493,622 11.95%	23,427,791 11.4%
Mean Age (SE)	44.9 (0.43)	46.97(0.57)	41.20(0.73)	38.00(0.47)	41.30(1.32)
Sex (SE)					
Male	47.3(0.8)	47.6(1.1)	47.4(1.1)	51.7(1.5)	42.8(1.9)
Female	52.7(0.8)	52.4(1.1)	52.6(1.1)	48.3(1.5)	57.2(1.9)
Marital Status(SE)					
Married	57.6(1.2)	59.9(1.3)	68.9(1.6)	62.3(1.3)	36.1(3.1)
Not Married	42.4(1.2)	40.1(1.3)	31.1(1.6)	37.7(1.3)	63.9(3.1)
Education Level(SE)					
Less than High School	18.0(0.8)	13.2(1.0)	14.7(1.4)	42.8(1.7)	21.8(3.1)
High School Graduate	31.2(1.0)	31.7(1.4)	17.3(1.2)	27.2(1.1)	36.3(2.4)
Some college	27.6(0.7)	28.8(1.1)	25.3(1.4)	19.8(1.1)	28.7(1.7)
College Graduate	23.3(1.0)	26.2(1.3)	42.7(1.9)	10.0(0.8)	13.2(2.0)
Household Income(SE)					
Lowest 25%	19.6(1.0)	15.4(1.0)	19.3(1.4)	29.9(2.2)	33.1(3.2)
Between 25-50%	20.5(1.0)	19.4(1.1)	12.6(0.9)	26.4(1.4)	24.1(2.4)
Between 50%-75%	27.4(1.0)	29.5(1.0)	23.9(1.4)	22.2(1.4)	21.8(2.9)
75%+	32.5(1.3)	35.7(1.7)	44.2(1.9)	21.5(1.3)	20.9(3.1)
Mean Household Income [b] $ (SE)	58,697 (1,387)	63,002(1,707)	73,031 (2,032)	44,696(1,675)	42,964(3,068)

a. Weighted N and weighted percentage

b. M refers to weighted mean

Table 8 (p.103) presents the data on the weighted socio-demographic characteristics of the Asian American population as a whole and by ethnic groups. The Asian sample of NLAAS was comprised of 2,095 respondents, representative of approximately 7.79 million adult Asian Americans nationwide. In the weighted sample, the three major ethnic groups under analysis were the Vietnamese, Chinese, and Filipinos who accounted for 12.9%, 28.7% and 21.6% of the Asian American population respectively. Other Asian Americans made up the residual group in the sample; and they account for 36.8% of the Asian American population. Generally, slightly more than half of the respondents were women for each ethnic group. The majority of Asian American adults (from 66% to 72%) were married. In terms of age, the four ethnic categories in this study had a similar mean age of around 41 years old. Religious belief varied across ethnic groups, with Filipinos the most likely to be religious (68.8%) and Chinese least likely (28.7%); Vietnamese and Others were in-between (40.9% and 54.6% respectively).

As expected, there were enormous disparities in educational achievement and household income among Asian American subgroups. Consistent with findings from other studies (Kuo, 1998), Chinese have a greater proportions who did not finish high school (17.4%) as well as those who graduated from university (45.6%), which could be explained by the two distinct waves of immigration among Chinese. The Vietnamese had the highest proportions in not completing a high school education (31% did not have a high school education), and the lowest proportion in receiving a university degree (23%), which was consistent with their refugee status of many Vietnamese. In contrast, 68.8% of Filipinos had either some college education (32%) or had graduated from university (36.8%). For Other Asian Americans, nearly 76% had some college education or had

graduated from university and less than 7.8% did not complete high school. In sum, except for Vietnamese, over 65% of Asian American adult populations had either some college education or had received a university degree.

For household income, similar gaps exist by ethnic group. Filipinos had the highest household income of $80,329, compared with $51,354 for Vietnamese, the lowest among all ethnic groups. Chinese and Other Asian Americans were in between ($73,678 and $74,272 respectively). It is important to note that higher household income may reflect a greater number of working adults in larger families, so it might not translate into a higher per capita income. After taking into account the number of household members, Chinese had the highest per capita income; however, the differences between Chinese, Filipinos and Other were not significantly different (ranging from $36,406 to 37,786), while Vietnamese had a considerably lower per capita income of $20,503. Beside the inter-ethnic group disparities in income, intra-group disparities were also apparent. For example, although Chinese had the highest per capita income and over 45% of Chinese were in the highest income group, 24.4% Chinese had income in the lowest quartile, second only to 28.9% of Vietnamese. In comparison with Chinese and Vietnamese, only 13% of other Asian Americans and 16% of Filipinos had income in the lowest quartile. Generally, the data showed that Vietnamese had the lowest household income, and Chinese had the most skewed distribution of income among all ethnic groups.

In terms of acculturation, 76.3% of Asian Americans in the sample were born outside the United States. This differed by group, with 96.3% percent of Vietnamese descendents foreign born, compared with 69.1% of Filipinos, 80.9% of Chinese and 69.8% of other Asian Americans. As a result, English language posed a great problem for

some ethnic groups. For example, over 65% Vietnamese and 41.5% of Chinese rated their English as only poor or fair, compared with 9.8% of Filipinos and 14% of Others.

Table 8: Weighted Distribution of Socio-Demographics, NLAAS

Characteristics	Total Sample (N= 2,095) M[b] or % (SE)	Vietnamese (N=520) M[b] or % (SE)	Filipinos (N= 508) M[b] or % (SE)	Chinese (N=600) M[b] or % (SE)	Others (N=467) M[b] or % (SE)
Total Population [a]	7,789,352 100%	1,007,086 12.9%	1,681,420 21.6%	2,234,825 28.7%	2,866,022 36.8%
Mean Age (SE)	41.3(0.86)	41.3(0.80)	41.8(0.97)	41.3(1.11)	41.0(1.58)
Religion					
Religious	51.6(1.9)	40.9(3.1)	68.8(2.3)	28.7(2.6)	54.6(2.4)
Not Religious	48.4(1.9)	59.1(3.1)	31.2(2.3)	71.3(2.6)	45.4(2.4)
Sex					
Male	47.5(1.2)	47.5(2.1)	47.5(2.4)	47.5(2.4)	47.5(2.4)
Female	52.5(1.2)	52.5(2.1)	52.5(2.4)	52.5(2.4)	52.5(2.4)
Marital Status					
Married	68.7(1.6)	71.7(3.1)	68.2(2.7)	65.9(2.6)	70.1(3.4)
Not Married	31.3(1.6)	28.3(3.1)	31.8(2.7)	34.1(2.6)	29.9(3.4)
Education Level					
Less than High School	14.3(1.3)	31.7(3.1)	10.9(2.0)	17.4(3.2)	07.8(1.5)
High School Graduate	17.9(1.3)	21.1(2.1)	20.3(2.5)	16.2(2.1)	16.6(1.9)
Some college	25.2(1.4)	23.5(2.0)	32.0(2.2)	20.8(2.9)	25.3(2.6)
College Graduate	42.6(1.9)	23.7(4.2)	36.8(3.7)	45.6(4.0)	50.4(2.7)
Income					
Lowest 25%	19.6(1.5)	28.9(1.9)	13.6(1.7)	24.4(3.0)	16.1(2.4)
Between 25-50%	12.4(1.0)	21.3(3.0)	10.3(1.4)	13.0(1.5)	09.9(1.1)
Between 50%-75%	24.1(1.3)	23.0(2.1)	23.8(3.4)	17.3(1.7)	30.0(2.9)
75%+	43.9(2.0)	26.7(2.5)	52.2(4.7)	45.3(3.4)	44.0(4.0)
Household mean income $(SE)	72,454(2,351)	51,354(3,349)	80,330(4,496)	73,678(4437)	74,292(4,323)
Mean Per-capita income$(Se)	34,807(1,360)	20,503(1726)	36,689(2,684)	37,786(2,943)	36,406(2,362)
English Proficiency					
Poor	27.7(0.02)	65.8(2.7)	09.8(2.3)	41.5(4.0)	14.0(2.8)
Excellent	72.3(0.02)	34.2(2.7)	90.2(2.3)	58.5(4.0)	86.0(2.8)
Duration of Stay in US					
US born	23.7(3.3)	03.7(0.6)	30.9(4.4)	19.1(3.4)	30.2(4.2)
1-4 years	13.7(1.8)	16.3(3.1)	10.8(2.0)	14.5(2.8)	13.8(3.2)
5-10 years	12.1(1.1)	26.6(3.1)	08.3(1.3)	14.7(1.7)	07.3(1.7)
11-20 years	26.1(1.7)	28.0(3.2)	23.1(3.0)	29.9(2.6)	24.2(2.2)
20+	24.3(1.4)	25.4(3.9)	26.9(2.3)	21.8(2.7)	24.5(2.9)

a. Weighted N and weighted Percentage; b. M refers to weighted mean

4.1.2. Social Capital Distribution

The previous section outlined the demographic information in the general population and within the Asian American populations in particular. Overall, there are significant inter-ethnic and intra-ethnic gaps with regard to educational achievement and household income. In this section, whether such gaps are also reflected in the possession of social capital will be explored.

First, Table 9 (p.109) presents social capital distribution by race/ethnicity, gender, income and education levels using the combined data of NCS-R and NLAAS. As we can see, there were significant variations of bonding and bridging social capital among Whites, Blacks, Asians and Latinos/as. Overall, Whites had significantly higher levels of both bonding ($p<0.001$) and bridging social capital ($p<0.001$) than all the other racial groups. Unexpectedly, in contrast to their higher average levels of education and income, Asian Americans as a whole had the lowest mean level of bonding social capital, significantly lower than Latino/as ($p<0.001$) and Blacks ($p<0.05$). Latinos/as had more bonding social capital than Blacks (but not statistically significant), but Blacks had higher levels of bridging social capital than Latinos/as ($p<0.001$). In terms of bridging social capital, Asian Americans only fared better than Latinos, but significantly poorer than Whites and Blacks ($p<0.05$).

Differences in social capital were also obvious across different income and education groups. Individuals with highest level of income consistently had higher levels of both bonding and bridging social capital than those with lowest level of income ($p<0.01$). The same pattern was seen with education. People who had a university

education had higher levels of both bonding and bridging social capital, particularly bridging social capital ($p<0.05$).

With regard to gender and social capital, women tend to have more bonding and bridging social capital than males. The mean level of bonding social capital for female is 3.39 as compared to 3.12 for males ($p<0.001$); the mean level of bridging social capital for females is 3.29, more than 0.20 points than for men ($p<0.001$). The gender differences in social capital are likely caused by the measurements applied in this study, in which bonding and bridging social capital were measured by social relations with relatives and friends, while neglecting the associational membership and civic participation in which men are more often actively engaged than women. According to Morrow (1999, p.755), such networks are characterized by affective ties, which may be more readily available to women as a result of their concentration in the private sphere. However, this finding is consistent with the literature, which found that women's network size is larger and more diverse than men, though less resource rich (Ziersch, 2005).

Table 10 (p.110) shows the distribution of structural social capital within the Asian American populations. There were significant variations of social capital by ethnic group. Filipinos had the highest level of bonding (mean=3.22) and bridging (mean=2.91) social capital, while the Vietnamese had the lowest levels of both types of social capital (mean=2.51 and 2.43 respectively); Chinese are in between. The gaps in bonding and bridging social capital between Filipinos and Vietnamese, between Filipinos and Chinese, and between Chinese and Vietnamese were all statistically significant ($p<0.001$). The education gradient of social capital distribution is exactly the same as that seen in the overall sample. Those with the highest level of education had a mean of 3.34 bonding

social capital compared with 3.09 for those with less than high school education ($p<0.001$); for bridging social capital, the difference was even larger at 3.40 vs. 2.82 ($p<0.001$). The gender difference in social capital was similar within the Asian American population and to that of the general population. Asian American women tended to have more bonding (3.07 v. 2.87, $p<0.001$) and bridging (2.82 v. 2.72, $p<0.01$) social capital than men. When looking only at the NLAAS sample, the income gradient of bonding social capital was the same as that of the general population, but it was slightly different for bridging social capital. For Asian Americans, those whose incomes were in the first quartile have more bridging social capital than those in the second and third quartile ($p<0.01$), though significantly less than the forth quartile.

Turning to cognitive social capital, Table 11 (p.111) presents the distribution. Differences across ethnic group, income, education and gender were much less pronounced than for bridging social capital. In terms of perceived family cohesion and neighborhood cohesion, Vietnamese (mean=3.76) and Filipinos (M=3.71) received the highest score, while Chinese had the lowest score of 3.56 for family cohesion and 3.12 for perceived neighborhood cohesion. The differences between the Vietnamese and Chinese were statistically significant ($p<0.001$). Family Conflict for the four ethnic groups was comparatively low, with no significant differences.

As for income, individuals with higher levels of income also tended to have higher levels of perceived family and neighborhood cohesion. For example, individuals whose income fell within the fourth quartile had a mean of 3.71 family cohesion and 3.27 of neighborhood cohesion, significantly more than the 3.61 and 3.10 for the lowest first and second quartile ($p<0.05$). The trend for education was different. There was a

reversed trend (i.e., people with the least education had the highest level of perceived family cohesion) and differences with other education groups were statistically significant. For perceived neighborhood cohesion, there were no significant differences between people with different levels of education attainment, and gender differences in perceived family cohesion and neighborhood cohesion were not significant.

In sum, the analysis showed that both the U.S. general population the Asian American population exhibited similar patterns of social capital distribution. For both the general and Asian American populations, individuals with higher levels of income and education tended to enjoy higher levels of social capital, particularly bonding and bridging social capital such as social relations with friends and relatives. However, the analysis of NLASS Asian Americans revealed that the distribution of cognitive social capital generally had an income gradient (i.e., the higher the income, the higher level of cognitive social capital), but this was not the case for education and gender. Contrary to expectations, individuals with the least education had the highest level of perceived family cohesion, while there were no significant gender differences in either perceived family or neighborhood cohesion, inconsistent with the literature, which found that women tended to have higher level of trust than men (Ziersch, 2005). In addition, the descriptive statistics also revealed that Asian Americans, though on average having higher level of education and income, scored very low on social capital as compared with other racial groups. And within the Asian American populations, though Chinese had higher levels of income and education than Vietnamese, the social capital of Chinese did not exhibit obvious advantage over Vietnamese; on the contrary, in terms of cognitive social capital, Vietnamese had significantly higher level of social capital than Chinese.

Combined, the findings suggested that the distribution of social capital might be more complex than expected: it is not only a function of SES, but also of other factors, such as race/ethnicity, etc. Moreover, as the bonding social capital is important for "getting by" and bridging social capital is for "getting ahead", disparity in these domains can have significant implications for the wellbeing for the populations.

Table 9: Structural Social Capital Distribution, General Population

Characteristics	Bonding Social capital		Bridging Social Capital	
	weighted Mean (SE)	CI 95%	Weighted mean	CI 95%
Race/Ethnicity				
Asian Americans	2.96 (0.04)	2.89-3.03	2.89 (0.03)	2.83-2.95
Latinos	3.18 (0.03)	3.12-3.23	2.80 (0.02)	2.77-2.84
Black	3.10 (0.05)	3.01-3.19	3.01 (0.05)	2.91-3.12
White	3.32 (0.02)	3.28-3.36	3.32 (0.02)	3.27-3.36
Income				
1st Quartile	3.13 (0.05)	3.03-3.23	3.05 (0.03)	2.99-3.11
2nd Quartile	3.24 (0.03)	3.18-3.30	3.09 (0.03)	3.02-3.15
3rd Quartile	3.31 (0.02)	3.26-3.35	3.24 (0.03)	3.19-3.29
4th Quartile	3.31 (0.03)	3.26-3.36	3.32 (0.02)	3.28-3.36
Education				
Less Than High School	3.09 (0.03)	3.04-3.15	2.82 (0.03)	2.77-2.88
High School Diploma	3.27 (0.03)	3.21-3.32	3.16 (0.03)	3.10-3.21
Some College	3.29 (0.03)	3.24-3.34	3.31 (0.03)	3.25-3.36
University Graduate	3.34 (0.02)	3.29-3.39	3.40 (0.02)	3.36-3.44
Gender				
Male	3.12(0.02)	3.08-3.16	3.09 (0.03)	3.04-3.15
Female	3.39(0.02)	3.35-3.43	3.29 (0.02)	3.26-3.33

Table 10: Structural Social Capital Distribution, Asian Americans

Characteristics	Bonding Social capital		Bridging Social Capital	
	Weighted Mean	CI (95%)	Weighted mean	CI (95%)
Race/Ethnicity				
Vietnamese	2.51 (0.04)	2.42 -2.60	2.43 (0.03)	2.36-2.50
Filipinos	3.22 (0.05)	3.11-3.33	2.91 (0.05)	2.82-3.00
Chinese	2.82 (0.05)	2.72-2.92	2.69 (0.04)	2.62-2.77
Others	3.11 (0.05)	3.00-3.22	2.87 (0.04)	2.80-2.95
Income				
1st Quartile	2.79 (0.06)	2.66-2.91	2.77 (0.04)	2.68-2.86
2nd Quartile	2.80 (0.08)	2.64-2.97	2.60 (0.06)	2.48-2.73
3rd Quartile	2.98 (0.06)	2.86-3.09	2.73 (0.03)	2.66-2.81
4th Quartile	3.10 (0.05)	3.00-3.20	2.84 (0.02)	2.80-2.88
Education				
Less Than High School	2.56 (0.07)	2.42-2.70	2.54 (0.05)	2.43-2.64
High School Diploma	2.90 (0.07)	2.76-3.05	2.71 (0.04)	2.63-2.79
Some College	3.02 (0.06)	2.90-3.14	2.83 (0.05)	2.73-2.93
University Graduate	3.11 (0.04)	3.03-3.19	2.84 (0.03)	2.78-2.91
Gender				
Male	2.87 (0.04)	2.79-2.94	2.72 (0.02)	2.69-2.75
Female	3.07 (0.06)	2.95-3.19	2.82 (0.04)	2.74-2.89

Table 11: Cognitive Social Capital Distribution, Asian Americans

Characteristics	Perceived Family Cohesion		Perceived Neighborhood Cohesion		Family Conflict	
	Weighted Mean	CI 95%	Weighted Mean	CI 95%	Weighted Mean	CI 95%
Race/Ethnicity						
Vietnamese	3.76 (0.02)	3.72-3.81	3.21 (0.04)	3.12-3.29	1.25(0.02)	1.22-1.29
Filipinos	3.71 (0.02)	3.67-3.74	3.25 (0.05)	3.14-3.36	1.31(0.03)	1.25-1.36
Chinese	3.56 (0.02)	3.52-3.61	3.12 (0.04)	3.03-3.21	1.30(0.02)	1.26-1.34
Others	3.70 (0.04)	3.63-3.78	3.21 (0.05)	3.11-3.30	1.31(0.03)	1.26-1.36
Income						
1st Quartile	3.61 (0.03)	3.55-3.66	3.10 (0.05)	3.00-3.19	1.29(0.02)	1.25-1.33
2nd Quartile	3.61 (0.05)	3.52-3.70	2.99 (0.05)	2.89-3.09	1.31(0.04)	1.23-1.40
3rd Quartile	3.69 (0.03)	3.62-3.75	3.22 (0.04)	3.14-3.29	1.33(0.02)	1.29-1.36
4th Quartile	3.71 (0.02)	3.67-3.74	3.27 (0.04)	3.19-3.35	1.29(0.02)	1.26-1.32
Education						
Less Than High School	3.78 (0.02)	3.73-3.83	3.20 (0.05)	3.09-3.31	1.23(0.02)	1.19-1.26
High School Diploma	3.67 (0.03)	3.60-3.74	3.15 (0.05)	3.05-3.25	1.29(0.03)	1.24-1.34
Some College	3.62 (0.03)	3.56-3.70	3.20 (0.05)	3.10-3.31	1.29(0.02)	1.24-1.34
University Graduate	3.66 (0.02)	3.62-3.70	3.19 (0.04)	3.11-3.27	1.33(0.02)	1.29-1.37
Gender						
Male	3.67 (0.02)	3.62-3.72	3.20 (0.04)	3.13-3.27	1.29(0.02)	1.25-1.32
Female	3.67 (0.02)	3.64-3.71	3.18 (0.03)	3.11-3.25	1.31(0.02)	1.28-1.34

4.1.3. Health Distribution among Asian American Population

The previous two sections demonstrated that the Asian American population was very heterogeneous in terms of income, education and social capital. This section will examine disparities in health outcomes within the Asian American population.

Table 12 (p116) shows the weighted distributions of health variables by ethnicity, income and gender. Although Vietnamese are more likely to report poor physical health than Chinese, Filipinos and Other Asian Americans, overall, Chinese and Filipinos have less favorable self rated health conditions. For example, almost 21.6% Chinese rated their physical health as "poor or fair", only slightly lower than 21.9% of Vietnamese. For mental health, 14% of Chinese rated their overall mental health as "poor or fair", followed by Vietnamese (11.5%), Filipinos (7%), and Others (5%). And a higher percentage of Filipinos reported having one or more somatic symptoms than Vietnamese and Chinese. Furthermore, Filipinos (16%) were more likely to be a current smoker than Vietnamese and Chinese (11%), which was congruent with earlier reports of smoking prevalence among Asian American population (Kuo, 1998). That Vietnamese have better self rated health conditions than Chinese and Filipinos are unexpected, given their much lower SES, suggests that health might not only be a function of SES, but also of other factors.

The impact of income on health outcomes within the Asian American populations was obvious in the data. People with higher levels of income were least likely to rate their physical and mental health as poor or fair. Specifically, only 10% of respondents in the fourth quartile of income rated their health as poor or fair, compared with 26% and 23% in the first and second quartiles. Similarly, only 6% in the fourth quartile of income rated

their mental health as poor or fair, compared with 15% and 14% in the first and second quartiles. Though the trend was less obvious for somatic symptoms, people with higher incomes had fewer somatic symptoms and chronic conditions. What is interesting is that for Asian Americans, individuals with high incomes are as likely to smoke as those with low incomes. Only those in the upper-middle income category are significantly less likely to smoke.

Table 12 (p. 116) also shows that health is unevenly distributed across gender. Generally, women are more likely than men to report being less healthy in almost every health outcome except smoking. For example, 18.1% and 10.2% of women reported poor physical and mental health compared with 12.7% and 6.7% for men. Over 36% of women reported having one or more somatic symptoms, compared to 28.5% of men. However, within the Asian American population, women were much less likely to smoke than men (7.1% vs. 20.1%). This is consistent with Asian culture, which strongly discourages women from smoking, while male smoking is an accepted practice (Kuo, 1998; Chuang & Chuang, 1998; Yamaoka, 2008).

Table 13 (p.117) details the differences in health that exist across various levels of social capital. Overall, there are discernable differences on each health measure for the four social capital indicators. Generally, the higher the levels of social capital, regardless of type, the better are the health outcomes. For example, individuals with high levels of bonding social capital are much less likely to report poor or fair physical (11.5%) and mental (5.6%) health, compared with 20.1% and 12.3% of those with low levels. The percentage reporting poor mental health for those with high levels of bridging social capital is only 3.7%, compared with 14.7% of those with low levels. Higher levels of

perceived neighborhood cohesion are associated with reduced likelihood of smoking (11.1% v. 18.7%). However, both high levels of bonding and bridging social capital are associated with higher levels of smoking among Asian American populations.

4.1.4. Brief Summary of the Descriptive Statistics

In summary, the descriptive analysis provided useful demographic information for the general population and the Asian American population. It provided a preliminary look into the uneven distribution of social capital across income, education and gender. Significant disparities in income and education exist in the general population, with Whites and Asian Americans having higher levels of income and education compared with Blacks and Latinos/as. In terms of social capital, Whites have significantly higher levels of both bonding and bridging social capital than the other three racial groups in the analysis, and Asian American populations scored low in terms of both bridging and bonding social capital, incommensurate with their higher levels of socio-economic status.

Within the Asian American populations, socio-economic outcomes, social capital and heath status differ significantly across groups. The descriptive analysis suggested that health varied markedly and consistently by ethnicity, income and social capital. Paradoxically, the Vietnamese had the lowest socio-economic outcomes, but they have relatively better health outcomes compared with other ethnic groups. Although one would expect that Chinese and Filipinos would have good health given their higher level of SES, the findings showed that Chinese and Filipinos had health status incommensurate with their superior SES status, and in several cases, even worse than Vietnamese. As expected, the descriptive analysis also showed that individuals with more social capital

tended to have better health outcomes, except that structural social capital seems to be associated with an increased probability of smoking.

Table 12: Weighted Health Outcomes by Socio-Demographics (NLAAS)

		Ethnicity (%)				Income (%)			
Characteristics		Vietnamese	Filipinos	Chinese	Others	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
SRPH	Poor	21.9	11.5	21.6	10.9	26.2	23.4	12.1	10.5
	Excellent	78.1	88.5	78.4	89.1	73.8	76.6	87.9	89.5
Chronic Conditions	None	37.2	30.1	35.8	39.3	32.8	41.2	38.9	34.5
	Any Conditions	62.8	69.9	64.2	60.7	67.2	58.8	61.1	65.5
SRMH	Poor	11.5	06.9	13.7	4.50	15.5	13.6	05.5	05.7
	Excellent	88.5	93.1	86.3	95.5	84.5	86.4	94.5	94.3
Somatic Symptoms	No Symptoms	74.6	65.1	69.5	64.9	65.3	65.6	69.0	68.2
	Any Symptoms	25.4	34.9	30.5	35.1	34.7	34.4	31.0	31.8
Smoking Status	Smoker	84.8	83.8	89.2	87.1	85.8	79.3	91.1	86.8
	Nonsmoker	15.2	16.2	10.8	12.9	14.2	20.7	08.9	13.2

Table 12 (Cont.)

		Gender (%)		Education (%)			
Characteristics		Male	Female	>High School	High School Diploma	Some College	University Graduate
SRPH	Poor	12.7	18.1	29.0	20.4	13.0	10.5
	Excellent	87.3	81.9	71.0	79.6	87.0	89.5
Chronic Conditions	None	39.5	32.9	33.6	39.2	31.4	38.3
	Any Conditions	60.5	67.1	66.4	60.8	68.6	61.7
SRMH	Poor	06.7	10.2	21.9	10.3	6.70	4.50
	Excellent	93.3	89.8	78.1	89.7	93.3	95.5
Somatic Symptoms	No Symptoms	71.5	63.9	70.8	71.8	63.4	67.0
	Any Symptoms	28.5	36.1	29.2	28.2	36.6	33.0
Smoking Status	Smoker	79.9	92.9	16.4	20.8	12.1	9.80
	Nonsmoker	20.1	07.1	83.6	79.2	87.9	90.2

Table 13: Weighted Health Outcomes by Social Capital (NLAAS)

Characteristics		Structural Social Capital				Cognitive Social Capital					
		Bonding		Bridging		Family Cohesion		Neighborhood Cohesion		Family Conflict	
		low	high	low	high	low	high	low	high	low	high
SRPH	Poor	20.3	12.0	20.1	12.1	17.7	14.3	17.5	13.8	14.9	16.3
	Excellent	79.7	88.0	79.9	87.9	82.3	85.7	82.5	86.2	85.1	83.7
SRMH	Poor	12.3	05.8	12.9	05.4	10.6	7.40	10.7	6.80	8.40	8.50
	Excellent	87.7	94.2	87.1	94.6	89.4	92.6	89.3	93.2	91.6	91.5
Somatic Symptoms	No Symptoms	68.1	67.0	67.8	67.2	62.7	69.8	65.3	69.1	73.5	57.5
	Any Symptoms	31.9	33.0	32.2	32.8	37.3	30.2	34.7	30.9	26.5	42.5
Chronic conditions	No Condition	36.7	35.6	34.7	37.0	35.6	36.3	38.4	34.2	36.6	35.1
	Any Conditions	63.3	64.4	65.3	63.0	64.4	63.7	61.6	65.8	63.4	64.9
Smoking Status	Smoker	12.2	13.9	12.0	14.0	85.8	87.3	84.5	88.6	88.2	84.6
	Nonsmoker	87.8	86.1	88.0	86.0	14.2	12.7	15.5	11.4	11.8	15.4

4.2. Results of Multivariate Analyses

The following section presents findings from the multivariate regression models. As stated before, all the dependent variables are dichotomized, and therefore a proper method is to the logistic regression models. The dependent variables for the analyses cover three aspects of health: physical health (self-rated physical health, chronic health conditions), mental health (self-rated mental health, and somatic symptoms), and health behaviors (smoking status).

As stated in Chapter 3, the analysis followed a block entry method to assess the changes of the effects of social capital after adjusting for the covariates. Specifically, Model 1 assessed social capital as a predictor of health outcomes without adjusting for other variables. Based on Model 1, Model 2 controlled for SES (education and income). In Model 3, socio-demographic factors were added in addition to social capital and SES. Model 4 brought in acculturation as a covariate to fit a baseline model. Finally, all significant interaction items, retained from Wald Tests, were added together to the baseline model to fit a full model. In the presentations below, I will first present findings for physical health, then mental health and lastly smoking behavior.

4.2.1. Social Capital and Physical Health

Physical health in this study was measured by two indicators: self-rated physical health and chronic conditions. As detailed in Chapter 3, self-rated physical health was dichotomized into good/excellent (coded as 1) vs. poor/fair (coded 0), and somatic symptoms were measured as having any somatic symptoms (coded as 1) and none (coded 0).

4.2.1.1. Self-Rated Physical Health

Table 14 (p.121) reports the logistic regression findings for self-rated physical health.

Model 1 assessed the association of social capital and self-rated physical health without adjustment for other factors. The results showed that individuals with higher levels of structural social capital, both bonding and bridging, were more likely to report good or excellent physical health. Particularly, the odds for people with a high level of bridging social capital reporting good/excellent physical health was 1.60 times that of those who reported low level of bridging social capital. Similarly, those with a high level of bonding social capital also had an increased likelihood of reporting good/excellent health (OR=1.58). As for cognitive social capital, both perceived family cohesion and neighborhood cohesion were associated with an increased probability of reporting good/excellent health, but the results were not statistically significant.

Model 2 adjusted for SES variables, education and household income. Bridging social capital remained significant, but bonding social capital did not. In addition, both education and income were significant predictors of good/excellent physical health. Specifically, the odds of reporting good/excellent physical health for those with some college education or those who had graduated from university were 2.17 and 2.52 times respectively greater than those who did not finish high school. Similarly, the odds for people with incomes in the third and fourth quartile were 2.50 and 2.44 times greater than those in the lowest quartile, respectively.

Model 3 further adjusted for socio-demographic factors. In this model, the association between bridging social capital and physical health was rendered

insignificant. While education and household income continued to be significant, their effects were attenuated, suggesting that socio-demographic information might have a strong intervening influence on physical health. Not surprisingly, age was a statistically significant predictor of physical health status. Those age 40-64 (OR=0.51) and those over 65 (OR=0.21) were much less likely to report good/excellent health compared to the reference group of aging 18-24.

Model 4 added acculturation (English proficiency and duration of stay in the United States) as a predictor of physical health. Adjusting for acculturation, education was no longer significantly associated with physical health. Instead, proficiency in English proved to be a highly significant factor affecting the self-rating of physical health. Individuals whose English was excellent were 3.57 times greater to report good/excellent health compared with those whose English was poor/fair. Furthermore, individuals who immigrated less than 5 years ago were 1.78 times greater to report good/excellent health than Asian Americans born in the United States. These analyses suggest that acculturation had strong mediating effects on self-rated physical health among Asian Americans.

Table 14: Logistic Regression Results: Physical health

Characteristic	Model 1	Model 2	Model 3	Model 4 (Baseline)	Interaction Model
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Structural Social Capital					
Bridging Social Capital					
High	1.60(1.14-2.26)***	1.60(1.12-2.29)***	1.28(0.86-1.91)	1.18(0.78-1.78)	1.20(0.80-1.81)
Bonding Social Capital					
High	1.58(1.04-2.41)**	1.24(0.83-1.86)	1.24(0.83-1.85)	1.19(0.78-1.82)	1.21(0.79-1.84)
Cognitive Social Capital					
Perceived Family Cohesion					
High	1.22(0.94-1.59)	1.26(0.96-1.65)	1.28(0.95-1.72)	1.18(0.86-1.62)	1.17(0.86-1.59)
Neighborhood Cohesion					
High	1.15(0.88-1.51)	1.07(0.82-1.40)	1.11(0.84-1.47)	1.07(0.80-1.43)	2.27(1.44-3.60)***
Family Conflict (Low)					
High	0.99(0.74-1.33)	0.84(0.64-1.11)	0.85(0.62-1.16)	0.88(0.64-1.21)	0.88(0.64-1.20)
SES					
Education (less than HS)					
high school graduate		1.38(0.86-2.20)	1.08(0.65-1.79)	0.88(0.54-1.43)	0.88(0.54-1.44)
some college		2.17(1.53-3.07)***	1.63(1.19-2.23)***	1.24(0.87-1.78)	1.24(0.85-1.82)
graduate and above		2.52(1.66-3.81)***	1.95(1.26-3.03)***	1.28(0.81-2.02)	1.26(0.81-1.97)
Income (1st Quarter)					
2nd Quartile		1.31(0.80-2.14)	1.14(0.66-1.95)	1.10(0.64-1.89)	1.13(0.65-1.95)
3rd Quartile		2.50(1.62-3.87)***	2.31(1.39-3.84)***	2.18(1.26-3.78)***	2.20(1.29-3.77)***
4th Quartile		2.44(1.59-3.74)***	2.32(1.41-3.82)***	2.07(1.17-3.65)***	2.16(1.22-3.83)***
Socio-demographics					
Age (<24)					
25-39			0.79(0.44-1.43)	1.04(0.57-1.88)	1.01(0.57-1.81)
40-64			0.51(0.28-0.91)**	0.83(0.46-1.50)	0.83(0.46-1.49)
≥65			0.21(0.12-0.38)***	0.37(0.18-0.75)***	0.37(0.18-0.75)***
Gender (male)					
Female			0.72(0.49-1.05)	0.69(0.46-1.05)	0.69(0.45-1.05)
Ethnicity (Vietnamese)					
Filipinos			1.54(0.92-2.57)	0.94(0.53-1.68)	1.41(0.72-2.77)
Chinese			0.85(0.60-1.22)	0.72(0.51-1.02)	1.06(0.67-1.69)
Others			1.51(0.92-2.48)	0.99(0.56-1.76)	1.79(0.87-3.69)
Religion (not religious)					
religious			0.92(0.69-1.23)	0.87(0.63-1.21)	0.84(0.61-1.17)

Table 14 (Cont.)

Discrimination (low)			
medium	0.83(0.56-1.24)	0.76(0.51-1.11)	0.77(0.52-1.14)
high	0.68(0.42-1.11)	0.60(0.37-0.99)	0.61(0.38-1.01)**
Marriage (Not Married)			
Married	0.78(0.46-1.33)	0.78(0.45-1.35)	0.77(0.45-1.32)
Acculturation			
English (Poor)			
Excellent		3.57(2.21-5.76)***	3.61(2.26-5.76)***
Year in US (Native Born)			
>5 years		1.78(1.10-2.89)**	1.83(1.11-2.99)**
5-10 years		1.10(0.58-2.09)	1.09(0.58-2.06)
11-20 years		1.51(0.96-2.38)	1.51(0.95-2.40)
20+		0.91(0.59-1.39)	0.89(0.59-1.34)
Interactions			
Filipinos*Neighbor cohesion			0.44(0.20-0.99)**
Chinese* Neighbor cohesion			0.46(0.22-0.94)**
Chinese* Neighbor cohesion			0.32(0.13-0.76)***

Notes: *N=2,071*
Physical health (1=good/excellent; 0=poor/fair)
** $p < 0.05$, *** $p < 0.01$

4.2.1.2. Chronic Health Conditions

Table 15 (p.125-126) presents the findings for chronic conditions, another indicator of physical health. Model 1 showed that the associations between social capital indicators and chronic conditions were modest and non-significant. Surprisingly, SES (education and income) was also not significantly associated with chronic conditions, as seen Model 2, suggesting that SES might not be a major determinant of the occurrence of chronic conditions.

Model 3 added demographic factors. Age was a highly significant predictor of chronic health conditions. Specifically, the odds of reporting chronic conditions for people aged 25-39, 40-64, and 65+ were 2.88, 3.99 and 35.44 times greater respectively than the reference group (age=18-24). The results demonstrated that aging is one of the main factors in predicting chronic health conditions. Additionally, discrimination was positively associated with the incidence of chronic conditions. Compared with those reporting low levels of everyday discriminations, individuals experiencing medium (OR=1.67) or high level of discrimination (OR=2.44) were more likely to report chronic conditions, and such associations continued to be significant after adjusting for acculturation variables.

Finally, the addition of acculturation variables in Model 4, English proficiency and duration of stay in the United States, slightly attenuated the associations between age, discrimination and chronic conditions. Acculturation was itself significantly related with individuals' chronic conditions. Particularly, regardless of duration of stay in the United States, both newly-arrived and long-term immigrants had decreased odds of having one or more chronic conditions compared with native born Asian Americans (OR ranges from

0.34 to 0.48). This finding provides some support to the "healthy immigrant effect" argument, which maintains that, despite the high-risk and low-socioeconomic profile, new immigrants tend to show unexpectedly favorable health outcomes compared to Whites and their native-born counterparts (Markides & Coreil 1986; Rumbaut 1997a, 1997b).

Overall, this analysis revealed, somewhat unexpectedly, that income and education were not associated with chronic health conditions. Instead, age, discrimination and acculturation are significant predictors of chronic health. Being old, discriminated against or native born would increase one's risk of having one or more chronic conditions. No social capital indicators were significantly associated with chronic health conditions, consistent with Veenstra's finding (2005) that neither associational involvement or neighborhood of residence was a significant predictor of number of chronic conditions after controlling for age and gender.

Table 15: Logistic Regression Results: Chronic Conditions

Characteristic	Model 1	Model 2	Model 3	Model 4	Interaction Model
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Structural Social Capital					
Bridging Social Capital					
High	0.86(0.65-1.15)	0.84(0.62-1.14)	1.07(0.76-1.51)	1.08(0.78-1.50)	1.12(0.81-1.55)
Bonding Social Capital					
High	1.07(0.81-1.43)	1.11(0.84-1.46)	1.07(0.77-1.50)	1.02(0.72-1.45)	1.00(0.70-1.43)
Cognitive Social Capital					
Perceived Family Cohesion					
High	0.95(0.73-1.25)	0.96(0.73-1.27)	0.96(0.68-1.34)	1.05(0.75-1.48)	0.95(0.52-1.72)
Neighborhood Cohesion					
High	1.22(0.87-1.72)	1.19(0.85-1.67)	1.14(0.80-0.61)	1.03(0.71-1.50)	1.04(0.71-1.51)
Family Conflict (Low)					
High	1.09(0.86-1.37)	1.14(0.90-1.44)	0.98(0.75-0.27)	1.08(0.83-1.42)	1.81(1.09-3.02)**
SES					
Education (less than HS)					
high school graduate		0.79(0.56-1.12)	1.03(0.67-0.60)	0.93(0.56-1.53)	0.93(0.55-1.56)
some college		1.10(0.72-1.68)	1.51(0.93-2.46)	1.43(0.87-2.37)	1.39(0.82-2.36)
graduate and above		0.78(0.50-1.22)	1.00(0.61-1.62)	1.06(0.62-1.79)	1.05(0.60-1.84)
Income (1st Quarter)					
2nd Quartile		0.65(0.37-1.14)	0.74(0.39-1.38)	0.72(0.40-1.33)	0.75(0.40-1.39)
3rd Quartile		0.73(0.52-1.02)	0.72(0.46-1.12)	0.73(0.46-1.14)	0.74(0.48-1.13)
4th Quartile		0.90(0.62-1.29)	0.84(0.55-1.26)	0.81(0.53-1.23)	0.80(0.54-1.20)
Socio-demographics					
Age (<24)					
25-39			2.08(1.47-2.95)***	2.19(1.51-3.17)***	2.15(1.49-3.10)***
40-64			3.99(2.72-5.85)***	4.17(2.62-6.63)***	4.27(2.69-6.76)***
≥65			35.14(19.56-63.11)***	33.1(18.02-60.81)***	33.1(18.69-59.24)***
Gender (male)					
Female			1.27(0.92-1.75)	1.27(0.93-1.74)	1.28(0.92-1.77)
Ethnicity (Vietnamese)					
Filipinos			0.93(0.64-1.35)	0.89(0.58-1.36)	0.84(0.31-2.24)
Chinese			0.90(0.59-1.37)	0.88(0.58-1.35)	0.83(0.38-1.81)
Others			0.67(0.44-1.02)	0.64(0.42-0.97)**	0.97(0.39-2.41)
Religion (Not Religious)					
religious			1.25(0.95-1.62)	1.26(0.96-1.66)	1.27(0.95-1.69)

Table 15 Cont.

Discrimination (low)			
medium	1.67(1.14-2.44)***	1.60(1.06-2.41)**	1.55(1.03-2.35)**
high	2.44(1.70-3.50)***	2.24(1.50-3.35)***	2.19(1.47-3.26)***
Marriage (not married)			
Married	1.01(0.78-1.32)	1.15(0.88-1.50)	1.16(0.88-1.54)
Acculturation			
English (Poor)			
Excellent		0.78(0.53-1.14)	0.80(0.55-1.17)
Year in US (Native Born)			
>5 years		0.34(0.25-0.47)***	0.35(0.25-0.48)***
5-10 years		0.48(0.26-0.88)**	0.48(0.27-0.86)**
11-20 years		0.40(0.30-0.54)***	0.39(0.29-0.52)***
20+		0.41(0.31-0.55)***	0.41(0.31-0.56)***
Interactions			
Filipinos*Family Conflict			0.79(0.38-1.64)
Chinese*Family Conflict			0.49(0.26-0.92)**
Others*Family Conflict			0.51(0.25-1.04)

Notes: *N=2,059*
Chronic Conditions (1=Any Conditions; 0=None)
** $p < 0.05$, *** $p < 0.01$

4.2.2. Social Capital and Mental Health

The previous section presented the regression findings regarding the relationship between social capital and physical health measures. This section will present the findings on social capital and several mental health outcomes, specifically the association between social capital variables and self-rated mental health and somatic symptoms.

4.2.2.1. Self-Rated Mental Health

Self-rated mental health is a global measurement of mental health condition. In this study, good/excellent mental health is coded as 1, while poor/fair coded as 0. As seen in Table 16 (p.129-130) Model 1 showed that, generally, higher levels of social capital, regardless of type, were associated with better mental health outcomes. Particularly, the odds of reporting good/excellent mental health for people with high levels of bridging social capital were 2.19 times greater compared to those with low levels; these associations were highly significant. Similarly, individuals with a high level of bonding social capital also had greater odds of reporting good/excellent mental health (OR=1.74).

The addition of SES in Model 2 resulted in some changes. The association between bridging social capital and self-rated mental health remained unchanged (OR=2.19), but bonding social capital was rendered insignificant. On the other hand, perceived family cohesion, which was not significant in Model 1, was significantly related with mental health in Model 2. Those with a high level of family cohesion were 58% more likely to report good/excellent mental health. Both education and income were significant predictors of global mental health conditions. Specifically, the odds of being in good/excellent mental health for those with some college education or graduated from

university were respectively 3.21 and 4.25 times greater than those who did not finish high school. Similarly, those with incomes in the third and fourth quartile were, respectively, 3.13 and 2.16 times more likely to report good/excellent mental health than those in the lowest quartile.

Model 3 added socio-demographic factors. The associations between bridging social capital and mental health were attenuated (OR=1.94), and the association between perceived family cohesion and mental health was rendered insignificant. The association between SES and mental health remained significant, though slightly attenuated, indicating that individuals' socio-demographic characteristics matter for their mental health. However, of all the socio-demographic variables, only age was significantly associated with mental health conditions. Individuals who were 40+ years old were more likely to report they had poor/fair mental health compared to those under age 24.

Finally, after the controlling for acculturation in Model 4, the associations between bridging social capital and mental health was further attenuated, but remained significant; the odds ratio of reporting good/excellent mental health for those having a high level of bridging social capital was 1.74 that of those low on bridging social capital. Chinese were much less likely to report good/excellent mental health conditions compared with Vietnamese (OR=0.58). Individuals whose English was good/excellent were more likely to report good/excellent mental health (OR=2.97).

To briefly summarize, the analysis showed that individuals with higher levels of bridging social capital, such as social networks with friends, tended to have better mental health. Furthermore, education, income and English proficiency were all positively associated with better mental health.

Table 16: Logistic Regression Results: Mental Health

Characteristic	Model 1	Model 2	Model 3	Model 4
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Structural Social Capital				
Bridging Social Capital (low)				
High	2.19(1.48-3.24)***	2.19(1.48-3.25)***	1.94(1.34-2.82)***	1.74(1.16-2.62)***
Bonding Social Capital (low)				
High	1.74(1.06-2.85)**	1.26(0.83-1.92)	1.27(0.83-1.92)	1.15(0.77-1.71)
Cognitive Social Capital				
Family Cohesion (low)				
High	1.44(0.94-2.20)	1.59(1.06-2.40)**	1.49(0.95-2.34)	1.42(0.88-2.29)
Neighborhood Cohesion (low)				
High	1.36(0.96-1.92)	1.30(0.92-1.82)	1.32(0.92-1.90)	1.30(0.87-1.93)
Family Conflict (Low)				
High	1.15(0.66-2.01)	0.91(0.53-1.58)	0.87(0.52-1.45)	0.92(0.53-1.58)
SES				
Education (less than HS)				
high school graduate		2.12(1.15-3.90)**	1.87(0.99-3.53)**	1.58(0.85-2.95)
some college		3.21(1.70-6.06)***	2.92(1.52-5.62)***	2.25(1.18-4.28)**
graduate and above		4.35(2.58-7.32)***	3.65(2.01-6.64)***	2.46(1.22-4.95)***
Income (1st Quarter)				
2nd Quartile		1.47(0.85-2.52)	1.35(0.76-2.38)	1.32(0.72-2.41)
3rd Quartile		3.13(1.87-5.24)***	2.90(1.64-5.13)***	2.74(1.49-5.05)***
4th Quartile		2.16(1.41-3.31)***	2.03(1.33-3.09)***	1.80(1.07-3.04)**
Socio-demographics				
Age (<24)				
25-39			0.67(0.31-1.45)	0.88(0.40-1.92)
40-64			0.39(0.19-0.80)***	0.62(0.28-1.35)
≥65			0.39(0.16-0.97)***	0.67(0.22-1.98)
Gender (male)				
Female			0.76(0.49-1.17)	0.73(0.46-1.15)
Ethnicity (Vietnamese)				
Filipinos			0.92(0.51-1.67)	0.59(0.27-1.26)
Chinese			0.65(0.41-1.04)	0.58(0.37-0.92)**
Others			1.27(0.68-2.40)	0.87(0.46-1.65)

Table 16 cont.

Religion (Not Religious)		
religious	0.95(0.67-1.34)	0.91(0.64-1.30)
Discrimination (low)		
medium	0.74(0.47-1.17)	0.69(0.45-1.07)
high	1.11(0.68-1.81)	1.06(0.60-1.86)
Marriage (Not Married)		
Married	1.37(0.81-2.32)	1.39(0.80-2.42)
Acculturation		
English (Poor)		
Excellent		2.97(1.41-6.27)***
Year in US (Native Born)		
>5 years		1.76(0.75-4.14)
5-10 years		0.83(0.38-1.78)
11-20 years		0.97(0.42-2.22)
20+		0.77(0.39-1.55)

Notes: *N=2,070*
Mental Health (1=good/excellent; 0=poor/fair)
** $p < 0.05$, *** $p < 0.01$

4.2.2.2. Somatic Symptoms

Table 17 (p. 133-134) shows the relationship between social capital and somatic symptoms. In Model 1, high levels of all types of social capital except bonding social capital, are associated with a slightly lower probability of reporting somatic symptoms (OR ranges from 0.88 to 0.98); however, the associations were not significant. Instead, family conflict (OR=1.99) was significantly associated with an increased likelihood of reporting one or more somatic symptoms, and the associations remained significant after controlling for all other covariates in the rest of the models. Interestingly, Model 2 showed neither income nor education was significant predictors of somatic symptoms.

Model 3 adjusted for socio-demographic factors. Family Conflict remained significantly associated with somatic symptoms, though the associations were slightly attenuated (OR=1.76). Age, religion and everyday discrimination were also significant predictors of somatic symptoms. Specifically, the older an individual was, the more likely he/she was to report having somatic symptoms. People who sought religious comfort during times of difficulties were more likely to report somatic symptoms than those who did not (OR=1.58). The odds of reporting any somatic symptoms were 2.15 times greater for individuals who experienced high levels of discrimination.

The adjustment for acculturation in Model 4 brought little change in direction or significance levels from the associations in Model 2, except for education. Compared with those having less than a high school education, individuals with some college education were more likely to report having somatic symptoms (OR=1.54). What was most interesting in this model was that both English ability and immigration status were significantly associated with the occurrence of somatic symptoms. Individuals whose

English was good/excellent were less likely to report having any somatic symptoms compared with those who rated their English as poor/fair (OR=0.63). Immigrants were significantly less likely to report having any somatic symptoms than those born in the United States, regardless of how long they had been in the U.S. (OR ranges from 0.52-0.62).

To briefly summarize, the models revealed that social capital, though tending to have a depressive effect, was not a significant predictor of somatic symptoms. Instead, family Conflict, age and discrimination were all associated with somatic symptoms. Acculturation (English proficiency and immigrant status) was negatively associated with reporting any somatic symptoms.

Table 17: Logistic Regression Results: Somatic Symptoms

Characteristic	Model 1	Model 2	Model 3	Model 4 (Baseline)	Interaction Model
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Structural Social Capital					
Bridging(low)					
High	0.98(0.74-1.29)	0.96(0.25-0.90)	0.96(0.71-1.29)	0.99(0.72-1.35)	0.95(0.74-1.22)
Bonding(low)					
High	1.16(0.92-1.47)	1.15(0.90-1.47)	1.00(0.81-1.25)	0.98(0.77-1.24)	0.90(0.63-1.28)
Cognitive Social Capital					
Family Cohesion(low)					
High	0.88(0.57-1.35)	0.89(0.58-1.39)	0.91(0.60-1.40)	0.98(0.63-1.53)	0.33(0.17-0.61)***
Neighborhood Cohesion					
High	0.90(0.66-1.22)	0.91(0.67-1.22)	0.95(0.68-1.33)	0.91(0.63-1.30)	0.90(0.63-1.28)
Family Conflict (Low)					
High	1.99(1.57-2.52)***	2.02(1.58-2.58)***	1.76(1.32-2.36)***	1.84(1.38-2.45)***	1.84(1.36-2.49)***
SES					
Education (less than HS)					
high school graduate		0.90(0.59-0.60)	0.97(0.60-1.59)	0.99(0.63-1.56)	0.99(0.64-1.54)
some college		1.39(0.11-0.92)	1.46(0.91-2.34)	1.54(1.01-2.36)**	1.61(1.04-2.48)**
graduate and above		1.10(0.50-0.82)	1.10(0.75-1.61)	1.30(0.93-1.81)	1.40(0.99-1.98)
Income (1st Quarter)					
2nd Quartile		0.95(0.82-0.60)	1.03(0.64-1.64)	1.03(0.67-1.60)	0.58(0.38-0.90)**
3rd Quartile		0.79(0.19-0.55)	0.74(0.49-1.13)	0.75(0.50-1.12)	0.35(0.20-0.62)***
4th Quartile		0.83(0.25-0.60)	0.77(0.51-1.18)	0.78(0.51-1.20)	0.35(0.20-0.59)***
Socio-demographics					
Age (<24)					
25-39			1.83(1.16-2.91)***	1.82(1.14-2.89)***	1.71(1.07-2.73)**
40-64			1.97(1.27-3.06)***	1.88(1.18-2.99)***	1.76(1.10-2.80)**
≥65			3.49(2.04-5.95)***	3.05(1.74-5.36)***	2.76(1.57-4.82)***
Gender (male)					
Female			1.34(0.96-1.87)	1.35(0.96-1.89)	1.01(0.65-1.57)
Ethnicity (Vietnamese)					
Filipinos			1.15(0.88-1.51)	1.27(0.93-1.72)	0.71(0.44-1.15)
Chinese			1.20(0.88-1.65)	1.23(0.88-1.70)	0.64(0.42-0.96)**
Others			1.31(0.88-1.96)	1.40(0.91-2.14)	0.81(0.45-1.47)
Religion (Not religious)					
religious			1.58(1.24-2.03)***	1.63(1.27-2.08)***	1.59(1.23-2.05)***

Table 17 Cont.

Discrimination (Low)			
medium	1.34(0.96-1.88)	1.35(0.94-1.95)	1.35(0.95-1.91)
high	2.15(1.46-3.19)***	2.14(1.40-3.28)***	2.12(1.40-3.20)***
Marriage (not married)			
Married	0.92(0.68-1.26)	0.97(0.72-1.33)	1.02(0.75-1.38)
Acculturation			
English (Poor)			
Excellent		0.63(0.41-0.95)**	0.64(0.43-0.96)**
Year in US (Native Born)			
>5 years		0.52(0.35-0.77)***	0.51(0.35-0.75)***
5-10 years		0.62(0.40-0.97)**	0.60(0.39-0.92)**
11-20 years		0.62(0.47-0.82)***	0.61(0.46-0.81)***
20+		0.62(0.44-0.87)***	0.63(0.45-0.89)***
Interactions			
Gender*famcohesion			1.58(1.08-2.33)**
2nd Quartile*Briding			2.55(1.14-5.69)**
3rd Quartile*Bridging			3.43(1.54-7.63)***
4th Quartile*Bridging			3.52(1.57-7.88)***
Filipinos*famcohesion			2.46(1.28-4.76)***
Chinese*famcohesion			2.78(1.59-4.85)***
Others*famcohesion			2.32(1.23-4.37)***

Notes: N= 2,064

Somatic Symptoms (1=Any Symptoms; 0=None)

** $p < 0.05$, *** $p < 0.01$

4.2.3. Health Behavior: Smoking

Table 18 (p. 138-139) shows the results of the multivariate logistic regression of social capital and smoking. Model 1 shows that none of the social capital indicators was significantly associated with smoking. There was some evidence that structural social capital, both bonding and bridging, was associated with an increased likelihood of smoking, while higher levels of cognitive social capital was associated with a decreased likelihood of smoking. However, a lack of social capital, measured by family Conflict, was associated with an increased probability of smoking (OR=1.32), and such associations were robust regardless of adjustments for other covariates in the rest of the models, suggesting the strong effects of family Conflict on smoking behavior.

The introduction of education and income in Model 2 slightly changed the odds ratio, but not the significance of any of the variables from Model 1, indicating that education and income moderated the association between smoking and social capital, but only to a very limited extent. Interestingly, the analysis found that among Asian Americans income was not significantly associated with smoking behavior. Clearly, however, higher levels of education had a significant depressive effect on smoking. Compared with individuals with less than a high school education, people who received some college education (OR=0.64) or graduated from a university (OR=0.47) were much less likely to be a current smoker.

Model 3 additionally adjusted for socio-demographics characteristics. Bonding social capital became significantly associated with smoking; the odds ratio of smoking for individuals with a high level of bonding social capital was 1.58 times greater than those with low level of bonding social capital. In addition, several socio-demographic

characteristics were significant predictors of smoking. Female (OR=0.25) who sought religious comfort during difficulties (OR=0.33) and those who were over 65 years old (OR=0.67) were significantly less likely to be a current smoker. Model 4 adjusted for acculturation variables. Overall, acculturation seemed to have no independent effect on smoking and moderated slightly the relationship between smoking, social capital and socio-demographic variables.

4.2.4. A Brief Summary

Finally, Table 19 (p. 140) presents a summary of significant associations between the explanatory variables and various health outcomes.

Three social capital indicators were found to be significantly related with some health outcomes. Specifically, bridging social capital was positively related with reporting good/excellent mental health, while bonding social capital was associated with increased risk of smoking among Asian Americans. Comparatively, the lack of social capital at home, measured by family conflict, was associated with increased probability of reporting one or more somatic symptoms. At the same time, family conflict was also associated with increased risk of smoking. However, though the models do not find significant associations between cognitive social capital (family cohesion and neighborhood cohesion) and health, there was a clear trend that they were protective of individual health and health behavior.

Besides, as seen in this table, income and education were significantly associated with all different dimensions of health. Specifically, education was positively associated with self-rated good/excellent mental health and somatic symptoms, but adversely with

smoking status; income was positively related to one's level of self-rated physical and mental health as well as reporting no/mild psychological distress, but not other outcomes. Other notable significant associations include the negative impacts of everyday discrimination on health and the positive effects of efficiency in English. The discussion section later will elaborate on the implications of these findings.

Table 18: Logistic Regression Results: Smoking

Characteristic	Model 1	Model 2	Model 3	Model 4 (Baseline Model)	Interaction Model
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Structural Social Capital					
Bridging (low)					
High	1.19(0.84-1.68)	1.25(0.86-1.82)	1.18(0.81-1.73)	1.23(0.86-1.78)	0.86(0.57-1.29)
Bonding(low)					
High	1.20(0.84-1.71)	1.35(0.96-1.91)	1.58(1.09-2.29)**	1.62(1.12-2.37)***	1.34(0.85-2.12)
Cognitive Social Capital					
Perceived Family Cohesion(low)					
High	0.98(0.57-1.69)	1.00(0.57-1.78)	1.21(0.69-2.11)	1.24(0.73-2.13)	1.21(0.72-2.01)
Neighborhood Cohesion(low)					
High	0.69(0.46-1.03)	0.71(0.48-1.03)	0.71(0.45-1.11)	0.69(0.43-1.10)	0.69(0.43-1.10)
Family Conflict (Low)					
High	1.32(1.05-1.65)**	1.47(1.16-1.86)***	1.64(1.25-2.16)***	1.65(1.26-2.15)***	1.61(1.23-2.10)***
SES					
Education (less than HS)					
high school graduate		1.19(0.60-2.36)	0.98(0.45-2.12)	1.02(0.48-2.15)	0.99(0.44-2.22)
some college		0.64(0.43-0.95)**	0.55(0.36-0.84)***	0.59(0.39-0.89)***	0.56(0.35-0.89)**
graduate and above		0.47(0.28-0.79)***	0.36(0.19-0.67)***	0.42(0.24-0.73)***	0.38(0.20-0.72)***
Income (1st Quartile)					
2nd Quartile		1.60(0.64-3.99)	1.49(0.65-3.43)	1.50(0.68-3.33)	1.53(0.69-3.38)
3rd Quartile		0.66(0.33-1.30)	0.50(0.23-1.11)	0.50(0.24-1.02)	0.51(0.26-1.02)
4th Quartile		1.15(0.71-1.86)	0.84(0.51-1.41)	0.83(0.51-1.34)	0.85(0.52-1.39)
Socio-demographics					
Age (<24)					
25-39			1.52(0.80-2.89)	1.48(0.81-2.70)	1.45(0.79-2.66)
40-64			1.22(0.73-2.02)	1.10(0.66-1.83)	1.12(0.67-1.88)
≥65			0.32(0.11-0.93)**	0.27(0.09-0.86)**	0.29(0.09-0.96)**
Gender (male)					
Female			0.26(0.15-0.47)***	0.26(0.15-0.46)***	0.05(0.02-0.14)***
Ethnicity (Vietnamese)					
Filipinos			1.27(0.79-2.04)	1.37(0.87-2.17)	1.30(0.81-2.09)
Chinese			0.70(0.42-1.17)	0.71(0.43-1.16)	0.68(0.42-1.12)
Others			0.96(0.52-1.79)	1.03(0.55-1.93)	0.98(0.53-1.80)
Religion (Not religious)					
religious			0.68(0.48-0.96) **	0.68(0.48-0.96)**	0.68(0.47-0.98)**

Table 18 Cont.			
Discrimination (low)			
medium	1.32(0.74-2.36)	1.30(0.70-2.43)	1.38(0.73-2.60)
high	1.26(0.65-2.42)	1.22(0.60-2.46)	1.26(0.63-2.52)
Marriage (not married)			
Married	0.83(0.66-1.04)	0.84(0.66-1.07)	0.83(0.64-1.07)
Acculturation			
English (Poor)			
Excellent		0.74(0.47-1.15)	0.74(0.47-1.18)
Year in US (Native Born)			
>5 years		0.59(0.24-1.47)	0.62(0.25-1.53)
5-10 years		0.87(0.52-1.45)	0.91(0.55-1.52)
11-20 years		0.97(0.63-1.49)	0.97(0.63-1.50)
20+		0.93(0.52-1.67)	0.88(0.49-1.57)
Interactions			
Gender* Bridging			3.93(1.59-9.72)***
Gender*Bonding			2.34(1.16-4.73)**

Notes: N=2,071

Smoking (1=Current Smoker; 0=Non-smoker)

** $p < 0.05$, *** $p < 0.01$

Table 19: Summary of Significant Variables for Health Outcomes [a]

	Self-rated Physical health (good/excellent)	Self-rated mental health (good/excellent)	Any Somatic Symptoms	Any Chronic Conditions	Smoking Status (current smoker)
Social Capital					
Bonding social capital					+
bridging social capital		+			
family Conflict			+		+
SES					
education		+	+		-
income	+	+			
Socio-Demographics					
Age	-	-	+	+	-
Everyday Discrimination	-		+	+	
religion			+		-
gender					-
Chinese		-		-	
Acculturation					
English proficiency	+	+	-		
Duration of Stay in US	+		-	-	

Notes:
a. The table is based on the Model 4 from Table 15 to Table 20. Model 4 is the model with all covariates except the interaction items.
b. "–" sign means a negative effect and a "+" sign means a positive effect. Those cells without any signs refer to insignificant associations.

4.3. Interaction Effects

As detailed in Chapter 3, one of the main objectives of the study was to investigate whether the impact of social capital on health acts uniquely in conjunction with gender, income and ethnicity; in other words, whether social capital interacts with an individual's background to jointly affect their health outcomes. Accordingly, interaction terms were created by multiplying each of the social capital indicators by (1) household income, (2) ethnicity, and (3) gender. The choice of income, ethnicity and gender was informed by both theoretical inquiry and empirical studies in the literature. Using step-by-step elimination of insignificant interaction items, the final interaction model, presented in this section, simultaneously included all significant interaction terms, but only those that remained significant are listed and presented to simplify the presentation.

While the previous section provides essential information on the statistical significance of the interaction terms indicating interactions between social capital and the chosen socio-economic characteristics (i.e. income, ethnicity and gender), it is very hard to explain the findings in terms of odds ratios and not easy to capture the magnitude of these effects by examining point estimates only. Therefore, I used methods recommended by Jaccard (2001) to calculate and graph the predicted probabilities, which should help facilitate the interpretation of the findings. In calculating the predicted probabilities, all control variables were held at their reference groups in this study. The formula used to calculate the probabilities is:

$$\text{Pred. prob} = e^{(\text{Log Odds})}/(1+e^{(\text{Log Odds})})$$

The interaction effects are presented in the following three sections. Initially, the statistically significant interaction terms between social capital and ethnicity are presented. This is followed by a discussion of statistically significant interaction effects between social capital and income. Lastly, statistically significant interactions between social capital and gender are presented.

4.3.1. Specific Effects for Ethnicity

A number of models provide support for the hypothesis that some indicators of social capital work differentially across ethnic groups. As indicated in Tables 14 and 15 in the previous section, there were significant interactions between perceived neighborhood cohesion and ethnicity in predicting self-rated physical health, and between ethnicity and family conflict in predicting chronic health conditions. Table 17 also demonstrated that perceived family cohesion significantly interacted with ethnicity in predicting the occurrence of somatic symptoms.

Table 20 (next page) presents the predicted probabilities of reporting good/excellent physical health with the focal independent variables (ethnicity) presented in the first column and the moderator variable (perceived neighborhood cohesion) displayed in column two. Column three and four are the log-odds and predicted probability calculated. The results indicate that with a low level of neighborhood cohesion, 72% of Vietnamese would report good/excellent physical health, the lowest percentage when compared with 73% of Chinese, 78% of Filipinos and 82% of Other Asian Americans. However, with a high level of neighborhood cohesion, 85% of Vietnamese would rate their physical health as good/excellent, the highest among all the

Asian American ethnic groups, suggesting neighborhood cohesion had the strongest impact on Vietnamese.

Table 20: Predicted Probability of Good/Excellent Physical Health by Neighborhood Cohesion

Ethnicity	Neighborhood Cohesion	Log Odds	Pred. Prob
Vietnamese	Low	0.921	0.72
Vietnamese	High	1.743	0.85
Filipinos	Low	1.264	0.78
Filipinos	High	1.275	0.78
Chinese	Low	0.982	0.73
Chinese	High	1.017	0.73
Others	Low	1.505	0.82
Others	High	1.182	0.77

Figure 2 (next page) presents the relationship between perceived neighborhood cohesion and self-rated physical health by ethnicity. Vietnamese had the lowest rate of reporting good/excellent physical health when neighborhood cohesion was low; however, the steep slope for Vietnamese showed that neighborhood cohesion had a stronger increasing effect for Vietnamese than any other groups. Comparatively, the flat slope for Filipinos and Chinese showed that neighborhood cohesion had virtually no impact for these two ethnic groups.

Figure 2: Predicted Probability of Self Rated Physical Health by Neighborhood Cohesion and Ethnicity

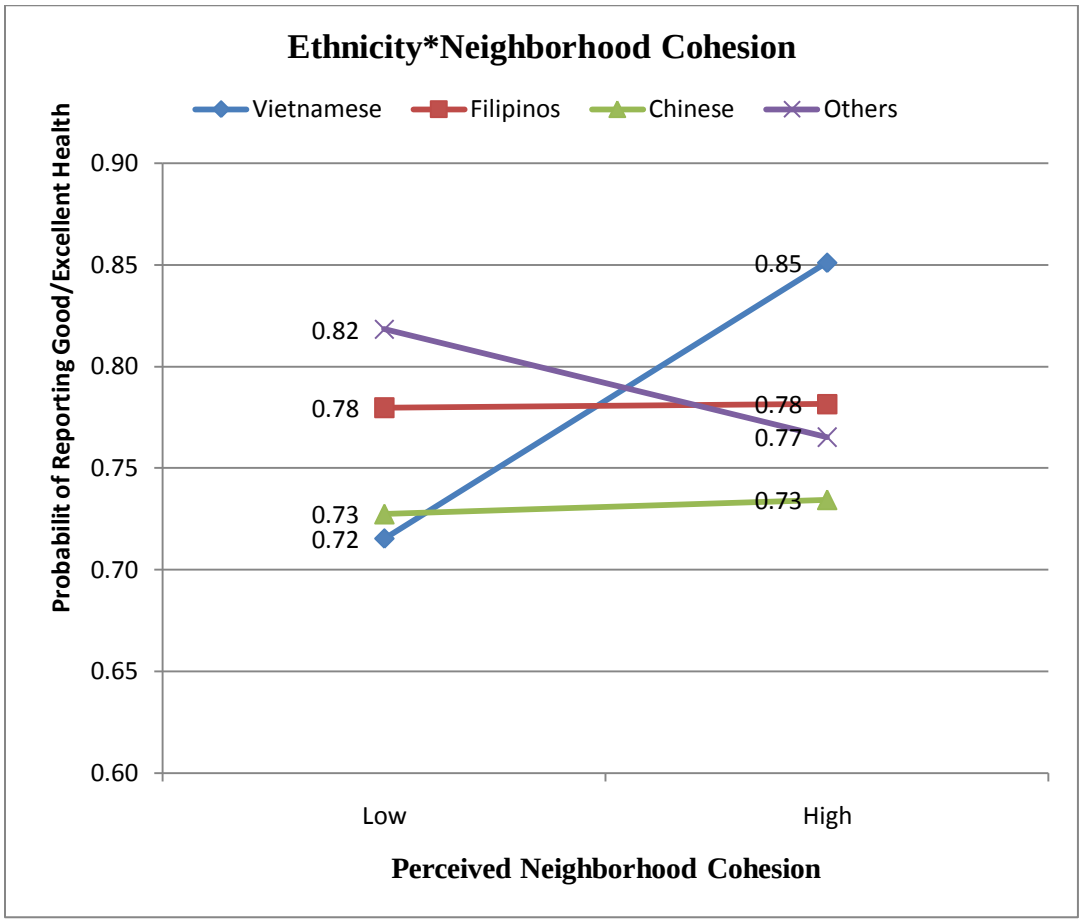


Table 21 (next page) presents the predicted probability of reporting one or more chronic conditions by family conflict, a measure of the lack of social capital. Although initially the Vietnamese had the highest percentage in reporting one or more chronic conditions (38%), the gap with Filipinos and Chinese was only 4%. However, when family conflict changed from low to high, 53% of Vietnamese would be predicted to report having chronic conditions, compared to 43% for Filipinos and 31% for Chinese. Family conflict's impact on chronic conditions was more pronounced for Vietnamese than for any other ethnic groups.

Table 21: Predicted Probability of Chronic Conditions by Family Conflict

Ethnicity	family Conflict	Log Odds	pred.prob
Vietnamese	Low	-0.480	0.38
Vietnamese	High	0.116	0.53
Filipinos	Low	-0.655	0.34
Filipinos	High	-0.295	0.43
Chinese	Low	-0.667	0.34
Chinese	High	-0.789	0.31
Others	Low	-0.515	0.37
Others	High	-0.590	0.36

Figure 3 below graphs the relationship between family conflict and the occurrence of chronic conditions by ethnicity, holding all other variables at the reference group. The steeper upward slope for Vietnamese shows that family conflict has a greater negative impact on Vietnamese than other ethnic groups.

Figure 3: Predicted Probability of Any Chronic Conditions by Family Conflict and Ethnicity

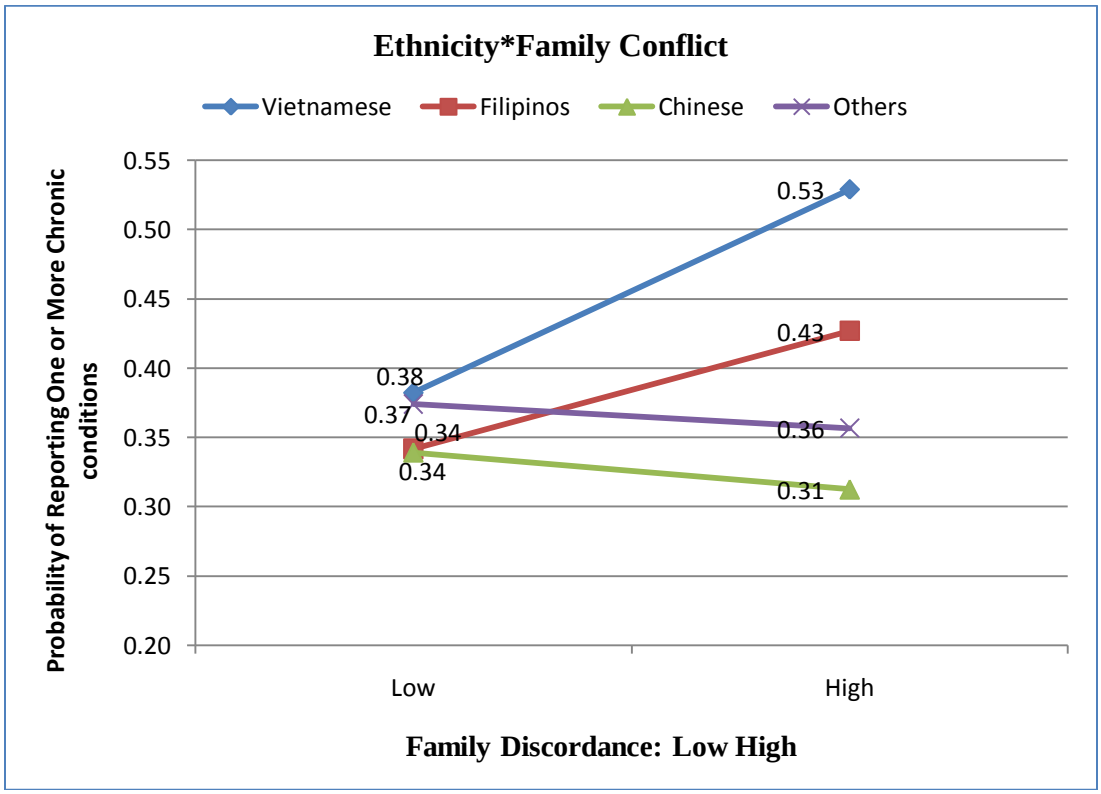


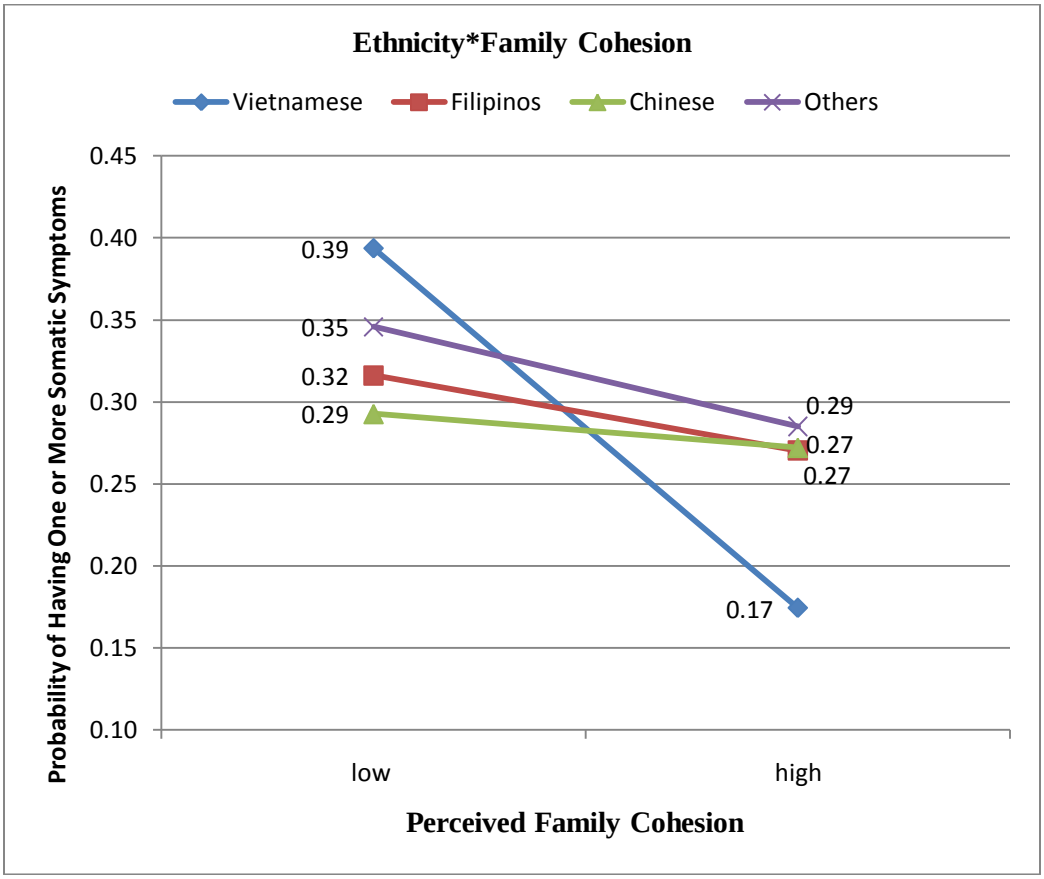
Table 22 presents the predicted probability of reporting one or more somatic symptoms. Similarly, the focal independent variable (ethnicity) presented in the first column and the moderator variable (perceived family cohesion) displayed in column two. Vietnamese (39%) were mostly likely to report having one or more somatic symptoms in less cohesive families, followed by Filipinos (32%) and Chinese (29%). However, in highly cohesive families only 17% of Vietnamese would be predicted to have one or more somatic symptoms, compared to 29% for Filipinos and 27% for Chinese.

Table 22: Predicted Probability of Somatic Symptoms by Family Cohesion

Ethnicity	Family Cohesion	Log Odds	pred.prob
Vietnamese	Low	-0.43	0.39
Vietnamese	High	-1.55	0.17
Filipinos	Low	-0.77	0.32
Filipinos	High	-0.99	0.27
Chinese	Low	-0.88	0.29
Chinese	High	-0.98	0.27
Others	Low	-0.64	0.35
Others	High	-0.92	0.29

Figure 4 in the next page represents the relationship between perceived family cohesion and somatic symptoms by ethnicity. The steep slope for Vietnamese shows that family cohesion has a stronger decreasing effect on the occurrence of somatic symptoms for Vietnamese than for other ethnic groups.

Figure 4: Predicted Probability of Somatic Symptoms by Family Cohesion and Ethnicity



4.3.2. Specific Effects for Different Income Groups

In addition to the effects of ethnicity, there was some evidence that social capital had a unique association with health, varying by income level. As indicated in Table 20 in the prior section, there was a significant interaction between income and bridging social capital in predicting the occurrence of somatic symptoms.

Table 23 calculated the predicted probabilities of reporting one or more somatic symptoms by bridging social capital across different income levels. Not surprisingly, individuals with low income and low bridging social capital were more likely to report

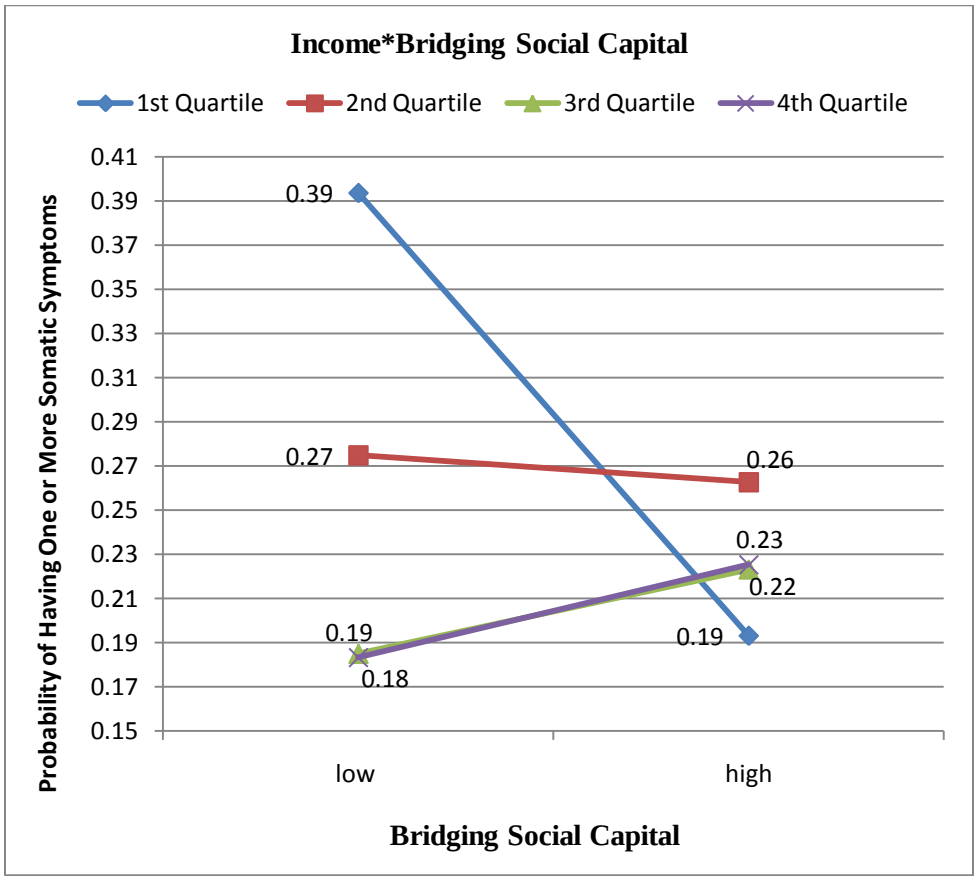
having one or more somatic symptoms: 39% of individuals with low bridging social capital and income in the first quartile would report having one or more somatic symptoms, compared with 27% in the second income quartile, 19% in the third quartile and 18% in the fourth quartile. However, when the level of bridging social capital changed from low to high, individuals with lower incomes were least likely to report somatic symptoms.

Table 23: Predicted Probability of Somatic Symptoms by Bridging Social Capital

Income by Quartile	Bridging	Log-odds	pred.prob
1st quartile	Low	-0.43	0.39
1st quartile	High	-1.43	0.19
2nd quartile	Low	-0.97	0.27
2nd quartile	High	-1.03	0.26
3rd quartile	Low	-1.48	0.19
3rd quartile	High	-1.25	0.22
4th quartile	Low	-1.49	0.18
4th quartile	High	-1.23	0.23

Figure 5 in the next page shows that for individuals with income in the first quartile, the change of bridging social capital from low to high was accompanied by a steep drop in the probability of reporting somatic symptoms. However, for the second quartile, the change from 27% to 26% was negligible; and for the third and fourth quartile, there was a slight increase in the probability of reporting somatic symptoms.

Figure 5: Predicted Probability of Any Somatic Symptoms by Income and Bridging Social Capital



4.3.3. Particular Effects Unique to Gender

As displayed in Tables 17 and Table 18, significant interactions were found between gender and family cohesion in predicting somatic symptoms, and between gender and structural social capital in predicting current smoking status. Table 24 in the next page shows that with a low level of family cohesion, slightly higher percentage of women than men (40% v. 39%) tends to report at least one somatic symptom; this difference was greater at high levels of family cohesion. Compared to 25% of women

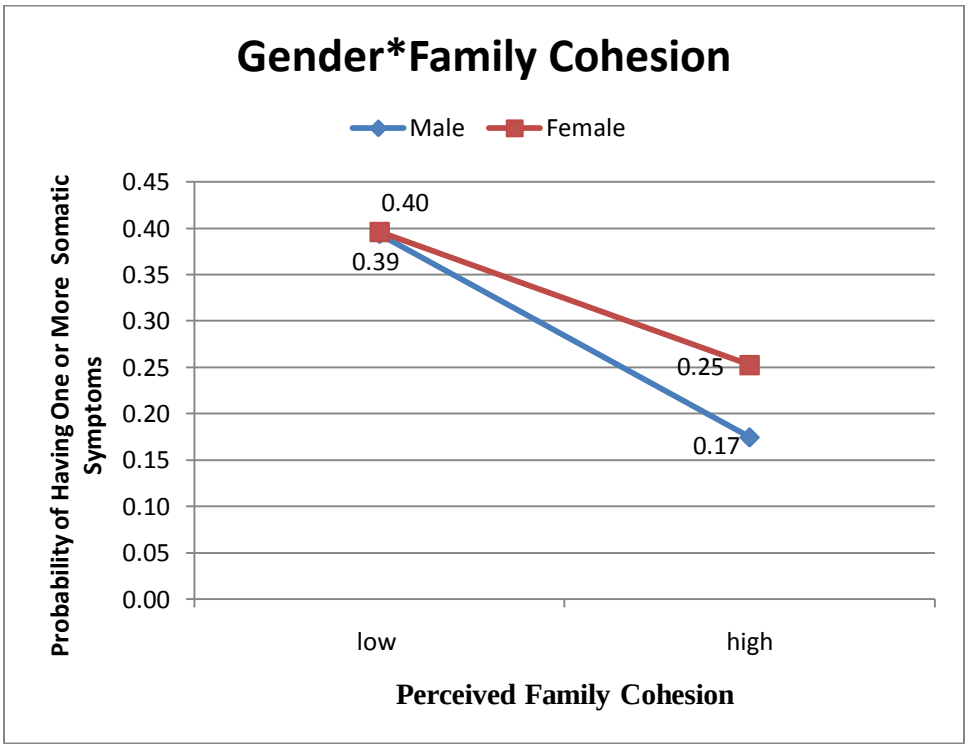
who would report having somatic symptoms when family cohesion was high, only 17% of men would do so.

Table 24: Predicted Probability of Somatic Symptoms by Family Cohesion and Gender

Gender	Family Cohesion	Log Odds	pred.prob
Male	Low	-0.432	0.39
Male	High	-1.555	0.17
Female	Low	-0.422	0.40
Female	High	-1.085	0.25

The differential effects of perceived family cohesion are shown in Figure 6 below. As family cohesion changes from low to high, compared to females, the slope for male Asian Americans is more steep, indicating that the effect of family cohesion in reducing probability of having somatic symptoms is stronger for male Asian Americans than females.

Figure 6: Predicted Probability of Any Somatic Symptoms by Gender and Family Cohesion



The predicted probabilities of reporting severe psychological distress between different levels by family conflict across gender are shown in Table 27. At low levels of family Conflict, 7% of women and 6% men would be in severe psychological distress; however, at high levels, 20% of women would be in severe psychological distress, compared with 12% of men, suggesting that although family Conflict was harmful for both men and women, it was especially detrimental for women.

Table 25 showed the differential effects between bonding social capital and smoking status by gender. At the low level of bonding social capital, a predicted 38% of men would be current smokers compared with only 3% of women. However, when bonding social capital increases, while both men and women are more likely to smoke, the pace of change is more pronounced for women, although the rate is still very low. Specifically, with a high level of bonding social capital, 45% of men, an increase of 7%, would be smokers, compared with 9% of women, a threefold increase in smoking behavior.

Table 25: Predicted Probability of Smoking by Bonding Social Capital and Gender

Gender	Bonding Social Capital	Log Odds	pred.prob
Male	Low	-0.508	0.38
Male	High	-0.213	0.45
Female	Low	-3.412	0.03
Female	High	-2.267	0.09

Figure 7 in the next page shows the effects of bonding social capital and current smoking status by gender, holding all other variables at reference group. Although

women were much less likely to smoke, the proportional increase of smoking from a low level of bonding social capital to a high level was more pronounced for women than for men.

Figure 7: Predicted Probability of Smoking by Gender and Bonding Social Capital

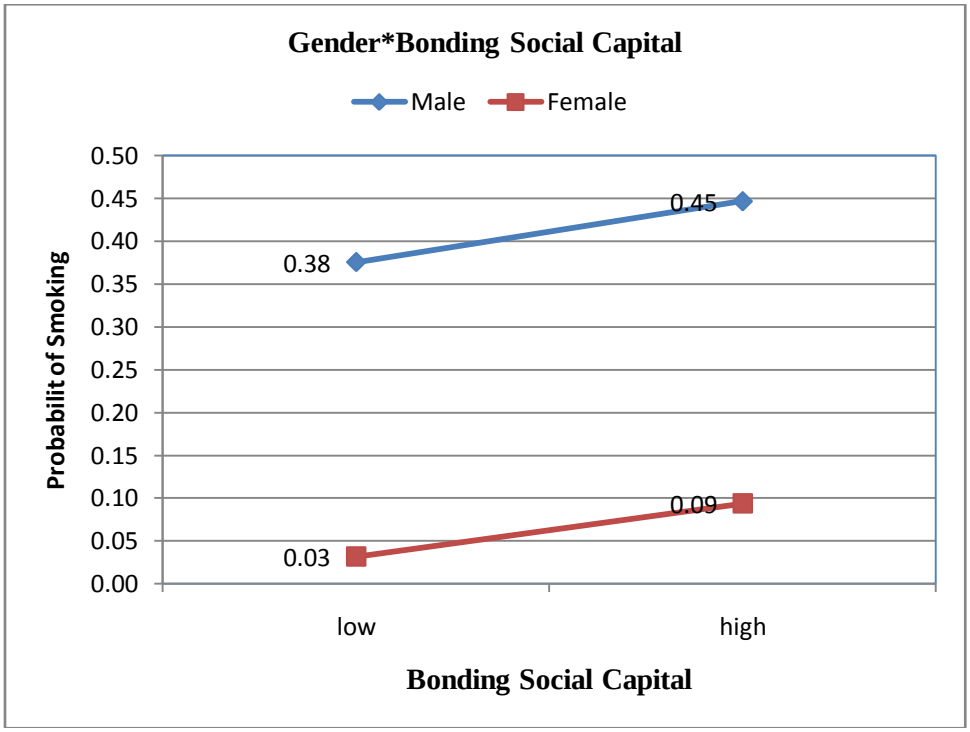


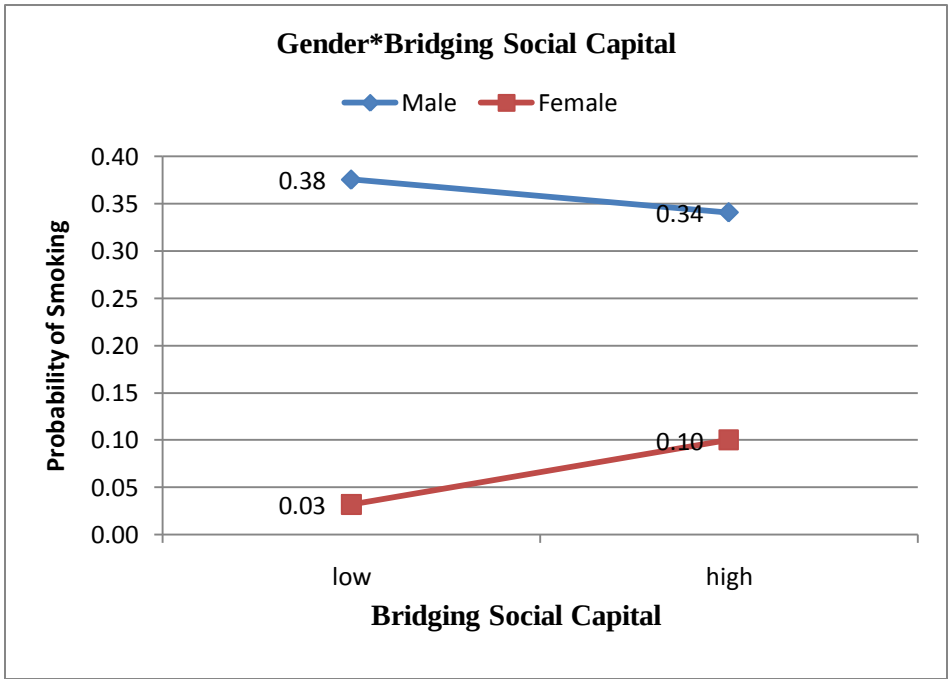
Table 26 shows similar differential effects for bridging social capital on smoking across gender. Again, the impact of bridging social capital was much stronger for women than men, with virtually the same percentages as for bonding social capital. The same is true for men.

Table 26: Predicted Probability of Smoking by Bridging Social Capital and Gender

Gender	Bridging Social Capital	Log Odds	pred.prob
Male	Low	-0.508	0.38
Male	High	-0.660	0.34
Female	Low	-3.412	0.03
Female	High	-2.194	0.10

Figure 8 presents the relationship between bridging social capital and smoking by gender. Although men were more likely to smoke than women (38% v. 3%), the effects of bridging social capital on smoking were different. The upward slope for females shows that bridging social capital has an increasing effect on smoking for women, while the downward slope for men meant that bridging social capital had a decreasing effect for men.

Figure 8: Predicted Probability of Smoking by Gender and Bridging Social Capital



4.4. Discussion

Social capital has increasingly been investigated as a possible explanation for differences in health that are found between places, or between groups of people as reviewed in the prior chapters. Most of the early social capital studies have linked the presence of social capital in communities, states or even nations, with some health

outcomes. But social capital is not entirely the property of social structure and social relationships; it exists, at least in part, in individuals since individuals are the repository of societal norms and values (Veenstra, 2000). If there is a relationship between social capital and the health of populations at the contextual level, as research had indicated (Kawachi et al., 1997), then it is reasonable to expect that there might also be an association at the individual level. Empirically, some recent studies have found that social capital at the individual level indeed is associated with individuals' well-being, self rated health, and mortality (Helliwell & Putnam, 2004; Lindstrom, 2004; Kim, et al, 2006; Hyyppa & Maki, 2007).

Besides, prior empirical studies have focused mostly on the general population without due attention to minority groups, particularly Asian American populations. As a social construct, it is reasonable to hypothesize that social capital might work differentially across social groups. And some recent evidence has suggested that social capital indeed works differentially across gender, race/ethnicity and people with different incomes (Hyyppa & Maki, 2007; Chuang & Chuang, 2008; Kim et al, 2006). Several studies have pointed out that minorities benefited less from social capital than Whites. For example, in mass media use and social capital, although Blacks and Whites both benefit from news use in the development of social capital, the benefits attained by Whites were significantly greater than those attained by Blacks; meanwhile, the negative relationship between entertainment TV viewing and social capital development was more negative for Blacks than for Whites (Beaudoin &Thorson, 2006). Another study (Lochner et al., 2003) showed that higher levels of social capital were consistently and

significantly associated with lower rates of all-causes mortality and heart disease among Whites in Chicago, but to a much lesser extent among Blacks.

The empirical analysis done in this study highlights the disparities of social capital across social groups in the general population and within the Asian American population. It also examines the relationship between individual level social capital with health outcomes among Asian American populations before and after controlling for key characteristics, such as income, education and socio-demographic information. The results reveal that social capital is positively associated with better health outcomes, but some elements of social capital are also associated with increased probability of unhealthy behavior such as smoking. Moreover, the interaction analysis demonstrated that the effects of social capital vary across income, ethnicity and gender. The following is a more detailed discussion of the findings.

4.4.1. The uneven distribution of social capital

The descriptive analysis presented in this chapter has confirmed the hypothesis that social capital is unevenly distributed across social groups. In line with the sub-hypothesis, the study found that Whites had the highest level of both bonding and bridging social capital, compared with Blacks, Asian Americans and Latinos. And the differences in social capital between the Whites and other racial groups were statistically significant. The study also found that not only income and education were unevenly distributed across racial groups in the United State, but also social capital. As shown in the descriptive analysis, disparities in social capital are clearly marked by income and education, particularly structural social capital. Individuals with higher income or

education have significant higher level of bonding and bridging social capital in the general population as well as within the Asian American populations.

However, the study revealed a paradoxical phenomenon, i.e., on average, Asian Americans had the highest level of income and highest percentage of graduates from universities, but they had the lowest level of bonding and bridging social capital as compared with other racial/ethnic groups. This finding suggests that though SES plays an important role in the development of social capital, it might not be the only key determinant factors. Race/ethnicity identity, tradition and culture, etc., might also be factors that are crucial for the accumulation of social capital. More studies are needed to investigate why Asian Americans, who have higher SES, have lower level of social capital.

The descriptive analysis sets up a stage for more in-depth analysis of social capital and health. Because if social capital is a factor that does "cause" the disparities in health across social groups, the unequal distribution of social capital could result in health disparities between racial groups and across individuals with different levels of education and incomes. This speculation leads to and strengthens the investigation of social capital and health at individual level among Asian Americans, above and beyond individual characteristics.

4.4.2 The Main Effects of SES on Health

It is widely accepted that health is far from being purely determined by genetic and biological factors, but socially embedded. Particularly, in the United States, health to

a large extent is stratified by race/ethnicity and socioeconomic position (Williams & Collins, 1995).

The current empirical study further confirmed the hypothesis that the socioeconomic factors, i.e., education and income, were strong predictors of individual health among Asian Americans. In fact, after making all the adjustments, education and income were significantly associated with five out of the six health outcomes (except for the chronic conditions) investigated in this study. Even though the descriptive statistics indicated substantial disparities in health outcomes between ethnic groups and gender within the Asian American population; they vastly disappeared after adjusting for SES and other covariates. This finding suggests the differences in health outcomes between Asian American ethnic groups might be largely attributable to the lower SES of certain groups than merely their ethnic status. The same was found for gender, which exhibited substantial disparities in the descriptive statistics, but after controlling for SES, gender became insignificantly associated with health status, which could mean that the lower SES of women were the major underlying causing factors for their worse health status.

However, SES is not the sole story. Another finding shows that of the three main ethnic groups investigated, Chinese have the highest per capita income and the highest percentage of people completing a university education than Filipinos and Vietnamese. In terms of education at the lower end, Chinese fare better than Vietnamese with less percentage of people not completing high school, though not as few as Filipinos. Unexpectedly, however, the analysis showed that the health conditions of Chinese are not commensurate with their higher levels of income and education. Except that Chinese had a lesser prevalence of smoking, there was higher percentage of Chinese reporting

poor physical and mental health than Vietnamese. In fact, the only significant association between ethnicity and health outcomes after adjustment of covariates was that being Chinese was associated with increased probability of reporting poor mental health. The mechanisms of why Chinese tended to report worse health conditions were beyond the scope of this study, but certainly worth further investigation.

Beyond SES, the study also demonstrated that acculturation and discrimination were strong predictors of health among Asian American population. Although Asian American immigrants have faced barriers of language and other acculturation stress, they showed unexpectedly favorable health outcomes as compared with the native born counterparts. For example, controlling for SES and other covariates, Asian American immigrants were more likely to rate their mental health as good/excellent, less likely to have any somatic symptoms or chronic conditions. In the literature, this phenomenon was labeled as "the healthy immigrant effect" or "the epidemiological paradox" (Markides & Coreil 1986; Rumbaut 1997a, 1997b). Williams (2001) predicted that, along with the healthy immigrant effect, one likely trend to affect future patterns of minority health is that "increasing length of stay … of Hispanic and Asian or Pacific Islander populations will lead to worsening health for them" (p. 399). However, the study found that, although the initial benefits might decay with time, Asian American immigrants overall enjoyed better health outcomes, regardless of the length of stay in the United Sates.

Another important finding is that English ability was a strong predictor of health among Asian Americans, even after controlling for socioeconomic and demographic factors. This study found that greater English proficiency was significantly associated with better self rated physical and mental health as well as less likely to report any

somatic symptoms. This study showed that over 76% of Asian Americans in the sample were immigrants, and language might be one of the greatest barriers to health care access. Asian Americans without proficient English ability might be kept out of the complex health services, which was already difficult for those who speak English fluently.

Last but not least, the study found that everyday discrimination was a significant risk factor for the health of Asian Americans. Past research had documented that discrimination affects physical as well as mental health. For example, using the same data as this study, Gee et al (2007a) found that everyday discrimination was associated with indicators of heart disease, pain, and respiratory illnesses, and might contribute to stress experienced by racial/ethnic minorities, leading to chronic illness. The same authors (2007b) also found that self-reported discrimination was associated with increased risk of several mental disorders among Asian Americans and such relationship was not explained by social desirability, physical health, or socio-demographic factors. Similarly, Finch et al (2001) reported that perceived racial/ethnic discrimination affected self-rated physical health and chronic conditions among Mexican origin adults. This study further confirmed the deleterious impact of discrimination on not only physical health, but also overall mental health and the incidence of somatic symptoms. Particularly, the study found that the more acculturated (like Filipinos), the more likely discrimination might exert negative impacts on physical and mental health.

4.4.3. The Main Effects of Social Capital

A second major hypothesis of this study is that the significant associations between social capital and health found in the general population in the literature would

also hold for Asian American population. Further, the study hypothesizes that social capital might exert both positive and negative effects on health. The empirical results partially support the hypotheses in finding that social capital is associated with the health of Asian Americans but to a very limited extent. In addition, social capital exhibits both positive and negative associations with health and health behaviors.

---*Positive Association between Social Capital and Health*

This study employs five variables that capture the presence of social capital in families, neighborhood, and social network. Specifically, the social capital indicators includes bonding social capital with relatives, bridging social capital with friends, perceived family and neighborhood cohesion as well as an indicator of the deficit of social capital—family conflict. This study has demonstrated that dimensions of social capital have measurable associations with self rated mental health. Specifically, when individuals have high level of bridging social capital with friends, they are more likely to have rated their mental health as good/excellent controlling for relevant SES and socio-demographic variables. This finding replicates prior studies that have demonstrated the beneficial effects of social capital (Phongsavan et al, 2006). The social connections with friends may reflect present and anticipated sources of emotional support for Asian Americans that bolster the mental health outcomes. They may also increase their activity levels and self-esteem, each of which may increase mental health over time. Scheffler et al (2007) summarized that there are three major potential ways that social capital can affect mental health. First, social capital can enhance the diffusion of information on healthy behaviors, which, in turn, can improve their health. Second, social capital can

provide potential avenues for psychosocial support, which can be accessed by individuals who then receive psychosocial support that can reduce stress and improve mental health. Third, social capital can promote political organizing, which may result in more mental health resources being brought into a community. This may result in more individuals receiving mental health services and thus improving their mental health.

Although the association with the cognitive dimensions of social capital fails to reach statistical significance after adjusting for confounders, the direction of the association is consistent with the general hypothesis. Having higher levels of family and neighborhood cohesion are associated with lower odds of reporting psychological distress, chronic conditions and somatic symptoms. Particularly, neighborhood cohesion has an almost statistically significant depressing effect on smoking. The failure to have significant associations between cognitive social capital and health outcomes might be caused by the coding scheme in the study. The decision to use social capital as dichotomous variable, measured by above and below average of social capital scales, has the merit of simplifying comparisons, it might have also sacrificed the precision of measuring social capital. In fact, a more fine-grained coding of neighborhood cohesion into three scales (low medium and high) instead of a cut-off at the mean, would result in a highly significant negative association between neighborhood cohesion and smoking (results not shown in the study, but available from the author).

---*Negative Association between Social Capital and Health*

A theoretical development after introducing social capital into health study is the notion that social capital might not be a universally beneficial factor (Portes, 1998). The

empirical results of this study confirmed that social capital might be negative for health, particularly, for increasing probability of engaging in unhealthy behaviors. Specifically, the study has revealed that both bonding and bridging social capital works to increase the probability of smoking among Asian American men and women. It is understandable the involvement with friends might increase probability of smoking because of peer influence or increased exposure to smoking; but the puzzle was the positive association between involvement with relatives and increased probability of smoking. The literature has no explanation for this, but one possible explanation might be that Asian Americans usually have close family and relative network, and when experiencing stress and difficulties, they are more likely to rely on them for emotional and substantive support. So, it might be the stress or hardship per se that leads to increased probability of smoking. Apparently additional research is needed to identify the mechanism by which having more close relationship with relatives is connected to increased probability of smoking. Furthermore, the study revealed strong negative associations between the lack of social capital and health status. The lack of social capital, measured by family Conflict, is found to be significant predictors of somatic symptoms, psychological distress, and smoking.

4.4.5 The Differential Effects of Social Capital

Previous research has often concentrated upon a somewhat simplistic relationship between social capital and health outcomes, without consideration of alterations of this relationship by race/ethnicity, income and gender. But as Subramanian et al. (2002) found that low-trusting individuals did not report better health if they lived in high-trust

communities, while individuals reporting high levels of trust were more likely to experience worse health if they resided in low-trust communities. In other word, social capital is more context-dependent: a particular type of individual social capital is not equally important to everyone, but dependent on individual background, needs and opportunities. Given that health can be enhanced by many sources and in many forms, conceptualizing individual social capital should cover a range of interactions across various life domains, including ethnicity, income and gender, among others.

Some limited empirical literature presented in Chapter 2 demonstrated that social capital could be confounded by the characteristics of individuals' ethnic background, income and gender (Poortinga, 2006; Subramanian et al., 2002). The analysis in this study points to the complex interplay between social capital indicators, ethnicity, income and gender. As shown above, though only a limited number of social capital indicators yielded significant main effects upon health, the interaction effects clearly confirmed a significantly differential process that varies by ethnicity, income, and gender. Figure 2-9 provided evidence of distinct process at work for Asian Americans.

-- *Differential Effects of Race/Ethnicity*

Although the main effects of the perceived family cohesion and perceived neighborhood cohesion are not significant for health after adjustment of covariates, the interaction effects tested in the logistic models have shown that these variables had unique effects across ethnicity. As shown in Figure 2, it appeared that neighborhood cohesion particularly benefits Vietnamese than other ethnic groups in physical health. At low level of neighborhood cohesion, a predicted 72% of Vietnamese would report

good/excellent physical health, while the percentage would jump to 85% at high level of neighborhood cohesion. In contrast, for Chinese and Filipinos, the change of neighborhood social capital did not bring any changes in self rated physical health at all.

The sensitivity of Vietnamese response to social capital is also reflected in family cohesion and family Conflict. As shown in Figure 3 and Figure 4, Vietnamese are particularly sensitive to family Conflict in reporting any chronic conditions and somatic symptoms. For example, the change of family Conflict from low to high levels for Vietnamese is accompanied by a jump of 15% to report having one or more chronic conditions, compared with 9% for Filipinos and negative 3% for Chinese. With respect to another measurement of social capital, family cohesion, although all ethnic groups benefit from the depressing effects of family cohesion on the occurrence of somatic symptoms, Vietnamese witness a dramatic 21% drop in percentage of reporting any somatic symptoms, compared with 5% and 2% for Filipinos and Chinese respectively.

Overall, the interaction of social capital and ethnicity demonstrates that Vietnamese are especially responsive to social capital in families and neighborhood, and the deficit of social capital is also particularly deleterious for them. Comparatively, social capital negligibly interacts with Filipinos and Chinese. This finding is particularly intriguing, given that prior literature often found that ethnicity with lower SES are less likely to benefit from social capital (Lochner et al, 2003).

A possible explanation for the salient health effects of social capital on Vietnamese should consider the historical context of Vietnamese immigration. Different from other Asian ethnic groups, most of the Vietnamese were forced to emigrate because of war in 1970s, and they arrived in the United States as refugees with low levels of

human and financial capital. In addition, because they immigrated en masse in such a short period of time, they lacked a pre-existing ethnic community network to assist them. Consequentially, Vietnamese immigrants tend to cluster and rebuild their community in close proximity mainly in declining urban neighborhoods (Zhou & Bankston III, 1994)). According to the study by Zhou & Bankston III (1994), the Vietnamese immigrants, though modest in socioeconomic backgrounds, have a high level of social capital exhibited by strong family integration, and a high degree of consensus over value and behavior standards in the community. These forms of social capital are crucial for the Vietnamese students to have done well in school, even more important than traditional human capital.

The current study reinforced the findings by Zhou and Banskston III (1994) in arguing that cognitive social capital, measured by family and neighborhood cohesion, was particularly important for Vietnamese to stay healthy. We may hypothesize that immigrants, particularly those immigrants who came to the United States for political reasons with little human and financial capital, depend more on family and ethnic community as an important resource; indeed, it may be the only resource available. It is possible to suggest a mechanism by which support and norms from disadvantaged immigrants' family and community can provide protective forces against their lower socioeconomic status. In these neighborhoods where difficult conditions and disruptive elements are often found, immigrants may have to consciously rely on social capital by means of family integration and ethnic solidarity such as to sustain their lives in this unfamiliar land. Future studies could expand this line of research by looking into other ethnic groups (i.e. Cubans, Laos, Cambodians, etc.), which immigrated into the United

States for political reasons, and which also have similar re-settlement experience in the United States as that of Vietnamese.

--- *Differential Effects across Income*

One of the sub-hypotheses from the previous chapter is that individuals with lower income would benefit more from social capital. The rationale is that people with lower income do not have many resources and choice, and thus social capital may offer more critical support for them to "getting by" and "getting ahead". The analysis partially has confirmed the hypothesis that individuals with lower level of income will harvest more benefits from social capital than those with higher income. As indicated in Table 25 and Figure 5, income interacts significantly with bridging social capital in predicting the occurrence of any somatic symptoms. Specifically, the interaction model demonstrates that for individuals with the lowest income, moving from low level of bridging social capital to high social capital is accompanied by a drop of 20% in reporting any somatic symptoms. This is possible that in low income groups where survival rests upon helping one another, social capital carried more benefits than others. However, such negative association of bridging social capital and somatic symptoms is almost eliminated for the second quartile of income, and unexpectedly, interactions of income and bridging social capital for the third and fourth quartile income groups are positive. This suggests that for individuals with higher level of income, having more bridging social capital such as increased contact with friends is not a benefit but a liability for individual health among Asian American population.

The finding that bridging social capital has more favorable effects for the health of the low income population and negative consequences for high income groups challenged the conventional notion that social capital is a universal beneficial factor for health, or it is a more beneficial factor for people with higher SES. However, the cross sectional nature of the data makes causality impossible. There may be additional aspects or types of social relationships that lead to negative consequences that are currently unexplored here. These findings may be attributable to the fact that individuals within the social networks of higher income may have more resources themselves, economic and otherwise, and over-involvement with social network, like friends, becomes a burden. The nuances of other aspects of social relationships, influenced by income level, have not been substantially tested in the existing research on health and warrant further study. But one recent study did find that social capital, measured by associational involvement, did not benefit individuals in the disadvantaged neighborhoods (Veenstra et al, 2005).

--- *Differential effects across gender*

Finally, the third major hypothesis, i.e., the effects of social capital are moderated by gender, was partially supported by the empirical analysis. However, the direction of the interaction was not uniform for males and females. Contrary to expected, family cohesion has a stronger impact on men than women in predicting somatic symptoms (see Table 6 and Figure 6). Generally, men and women were predicted to report the occurrence of somatic symptoms at a very similar frequency; however, high level of family cohesion is more conducive to the reduction of the occurrence of somatic symptoms for men than for women. On the other hand, women are more responsive to

the deficit of social capital, i.e., the family Conflict exerts more deleterious impacts on women's psychological distress than men as shown in Figure 7. This is consistent with some literature that has suggested women are more vulnerable to negative impacts of relationships, due to their greater emotional involvement in relationships than men (Burg & Seeman, 1994).

Further evidence has been found in supporting that the effects of social capital differ by gender, particularly with regard to smoking behavior. In Asian culture, the normative traditions strongly discourage women from smoking; however, Asian American women are not immune from tobacco use in the United States. Although the smoking prevalence rate is much less than the 20.1% for Asian American males, still about 7.1% of Asian American women are current smokers in this nationally representative sample. In addition, the study reveals that while higher level of bonding social capital is associated with increased probability of smoking for both women and men, the increasing effects are especially stronger for women than for men, as shown by the interactions (Figure 8 & 9). When women have low level of bonding social capital, the predicted probability of smoking was only 3%; however, when social capital changed from low to high, the probability of smoking jumps up to 9%.

For bridging social capital, measured by social relations with friends, the interaction effect is intriguing. Higher level of involvement with friends has a slightly depressing effect on smoking for men, while the contrary is true for women. Specifically, high level of bridging social capital for men is associated with a 4% decrease in predicted probability of smoking, compared with a 7% of increase for women. Considering only 3% of smoking among women with low bridging social

capital, such an increase represented a substantial increase in probability of smoking. The finding in this study is echoed by an earlier study conducted in the Taiwan Province of China, which revealed that social trust had stronger depressing effects on female smoking than men, so did neighborhood closeness on drinking for women than men (Chuang & Chuang, 2008).

The question is why Asian American women are especially vulnerable to bridging social capital with respect to smoking. The descriptive analysis of this study has demonstrated that Asian women have more bonding and bridging social capital than men; hence it is plausible that they are more likely exposed to peer influences and more likely to be better acculturated than men. As prior study showed that the more women are acculturated (Romina et al, 2008), the more likely they are going to smoke. Another explanation may come from the psychological stress perspective. It is possible that increased contacts with friends and relatives are just embodiment of enhanced stress of women than men. And since women are more likely to be part of tightly bonded social networks with friends and relatives that typically result in closer relationship, bonding and bridging social capital is just an intervening factor for stress, an important risk factor for smoking. Because of differences in the samples and measurement of social capital variables, it is often difficult to determine whether the findings are consistent or contradictory with prior research. But still, the findings in this study provide new evidence for the differential effects of social capital by gender, suggesting that more research is needed to understand these interactions, and to delineate their underlying pathways and mechanisms by which the effects may vary with gender.

4.4.6. Brief summary

Overall, the empirical results of the study partially supported the role of social capital in explaining health disparities among Asian Americans, and also that the effects of social capital were moderated by ethnicity, income and gender. The findings are concordant with much of previous research that social capital may be a beneficial factor for health; however, the study also revealed that social capital might be deleterious for some health behaviors, such as smoking. Furthermore, as a preliminary attempt to investigate the differential social capital influence on health, even with real limitation of data and method, the study contends that there is evidence to support the hypothesis that social capital has differential impacts for different individuals. Ethnicity, SES, social capital, on the one hand and health outcomes on the other seemed to have different magnitudes in different populations.

However, as the first study that has systematically examined the interaction effects of social capital among Asian American population, more focused research is needed to further study these differences in effect and to provide satisfactory theoretical interpretations. This work provides an initial step toward understanding the complex interplay of social capital and individual characteristics in predicting health among Asian Americans, and enhanced our knowledge on the relationship between social capital and health. The whole piece of work serves as a small step toward uncovering the complexities of the relationship between social capital and health.

Chapter 5

Conclusion, Limitation and Implications

Social capital theorists and empirical researchers have argued that social capital can enhance economic productivity and social development as well as promote health, although this theory has rarely been tested on the Asian American population. Using the most recent and best available data source on a nationally representative sample of Asian Americans, this dissertation examines the health status of Asian Americans in relation to social capital. The findings of this research provide scientific and empirical evidence on the social capital correlates of the health outcomes among an under-researched racial and ethnic minority group in the United States, Asian Americans.

As a preliminary effort to disentangle the relationships between social capital and health among this under-explored population, this dissertation achieves several research objectives. One is to highlight the disparities of social capital across social groups in the general population and within the Asian American population. Second, this is one of the first in-depth analyses of the association between social capital indicators and health outcomes (including physical health, mental health and health behavior) among the Asian American population, before and after controlling for other individual characteristics, such as income, education and socio-demographic information. Third, this study explored the contingency of social capital on ethnicity, income and gender for individual health.

This research finds that the relationship of social capital to health may be more complex than previously assumed, and that while social capital exerts some beneficial effects on health, it also has some deleterious correlations on health behavior. Moreover, the positive and negative associations between social capital and health vary across social groups defined by ethnicity, income and gender. In this concluding chapter, I will first summarize the study's major findings, then discuss its limitations and make recommendations for future research. Finally, I will briefly discuss the theoretical and practice implications. The work serves as a small step toward uncovering the complexities of the relationship between social capital and health.

5.1. Summary of Findings

---- Disparities in Social Capital

Asian Americans are sometimes portrayed as a "model minority" presumed to have higher income and education than other minority groups as well as excellent health conditions. This study shows that, on average, Asian Americans do enjoy better income and educational achievement; however, there are substantial intra-group disparities in income, education and health outcomes which deserve further investigation.

The descriptive analysis in the study revealed several patterns in social capital distribution. First, in the general population of the United States, Whites have significantly more bonding and bridging social capital than any other major racial group. Among the three major minority groups examined in this study (Blacks, Latino/as and Asian Americans), Asian Americans tend to have significantly less bonding and bridging social capital than Blacks and Latino/as, even though Asian Americans are more likely to

enjoy higher levels of SES. Within the other two groups, Blacks tend to have more bridging social capital, and Latino/as more bonding social capital. Disparity in social capital is found within the Asian American population, with Filipinos having more bonding and bridging social capital than Vietnamese and Chinese.

With respect to SES and social capital, the study found that individuals with higher levels of income or education enjoy higher levels of bonding and bridging social capital, both in the general population and within the Asian American population. But somewhat unexpectedly, this study found that women tend to have higher levels of both bridging and bonding social capital than men. One possible reason for this is that the measurement of structural social capital adopted in this study focuses on the social network of friends and relatives, while ignoring broader social participation or associational involvement, where men are traditionally more represented. Another point worth mentioning is that the study revealed that social capital disparities among the Asian American population mainly exist in structural rather than cognitive dimensions; for cognitive social capital, no major patterns of significant differences are found among groups of different income, gender and ethnicity (except that Chinese tend to have lower levels of both perceived family cohesion and neighborhood cohesion).

Overall, the study highlights the necessity to simultaneously consider racial/ethnic, income and gender factors when exploring the disparities in social capital distribution. For example, although SES is a strong predictor of social capital, Asian Americans as a whole have less social capital than other racial groups despite their higher SES and, although Chinese have the highest level of per capita income within the Asian American population, they have significantly less social capital compared with

Vietnamese and Filipinos. The interplay of race/ethnicity and income in social capital development warrants further investigation.

----The Main Effects of Social Capital and SES on Health

In response to Macinko and Starfield's (2001) criticism of the use of a single item to measure social capital, this study used a range of proxies based on factor analysis of more than thirty social capital related items. Consistent with findings from prior literature, this study found evidence that social capital is positively associated with better health outcomes among Asian Americans. For instance, a higher level of bridging social capital is significantly associated with better overall mental health after adjusting for all other confounders. A deficit of social capital, measured by family Conflict, is significantly correlated with an increased probability of reporting poor health conditions, such as somatic symptoms. These results echo the findings by Helliwell & Putnam (2004), who found that frequent interactions with friends and neighbors were associated with systematically higher assessment of subjective well-being, including self-rated physical health. On the other hand, the study showed that social capital might not be a uniformly beneficial factor for individual health. Networking with friends and relatives is associated with an increased risk of being a current smoker, particularly for Asian American women. However, the mechanisms by which social capital increases smoking for women more than for men is less clear and deserves further exploration.

Apart from the findings on social capital and health, this study supports the literature concerning the social distribution of health: Individuals who are more advantaged socio-economically are also better off health-wise. The old standbys such as

education and income, are found to be important determinants of health for Asian Americans, as they are for other populations. However, education and income do not matter equally for the different components of health among Asian Americans. Specifically, higher levels of education appear to be associated with reduced risk of smoking and better mental health such as having less somatic symptoms, while higher income is significantly correlated with better overall self-rated physical health.

There were three additional important findings from this dissertation.

1. Among the Asian American population proficiency in English is a strong predictor of individual physical and mental health status. Those excellent in English are much more likely to report better health outcomes, both physical and mental.
2. Everyday discrimination is significantly and negatively associated with both mental and physical health outcomes. The negative impact of discrimination is even more evident for those immigrants with longer times of residence.
3. Ethnicity does not have independent effects in all the models in this study. The findings about race/ethnicity in other research have been mixed with some arguing that race/ethnicity is related to health only through SES, and others arguing that race/ethnicity has an independent association with health. Further research is necessary to either confirm this finding or dispute it.

----Interaction Effects

As argued by Phongsavan and colleagues (2006), a specific type of individual social capital is not equally important to everyone but depends on individual needs and

opportunities. Conceptualizing individual social capital should cover a range of interactions across various life domains. The findings in this study partially offer support to this argument in that associations between social capital and health are found to vary by ethnicity, income and gender. Specifically, although all ethnic groups benefit from increased levels of social capital, the benefits attained by Vietnamese are significantly greater than those attained by other groups. In a similar vein, while all are harmed from the lack of social capital, Vietnamese would be harmed the most. Considering that Vietnamese generally represent a lower SES group comprised largely of political or humanitarian refugees (Xie & Goyette 2004), this might be because there are fewer other types of resources readily available to Vietnamese. This finding is further substantiated by the fact that the lowest income group would rake significantly more benefits in reducing somatic symptoms given an increased level of bridging social capital. Together, the finding that Vietnamese and low income individuals benefit more from social capital suggests that social capital may provide a counter-weight to economic and social disadvantage since they may use it to compensate for shortfalls in other resources.

This study also justifies a criticism in prior literature regarding the lack of accounting for differential effects of social capital by genders (Kavanagh, Bentley, Turrell, Broom, & Subramanian, 2006). Somewhat unexpectedly, this study revealed that while family cohesion benefits both genders in relieving somatic symptoms, the effects are significantly more pronounced for men than women. And, while higher levels of bridging and bonding social capital are associated with increased probability of smoking among both men and women, a unit increase in these types of social capitals is accompanied by an uneven increase in probability of smoking by gender. Specifically,

although Asian American women are by far less likely than men to be smokers, bonding and bridging social capital had a stronger increasing effect on smoking for women than men. The reason for this is worth further investigation.

Together, the above findings of interaction effects among ethnic, income and gender groups, although preliminary, suggest that social capital may well not be a factor that contributes uniformly to health across people of different social identities. Yet, given the scope of the study, enhanced research is necessary to explore possible mechanisms linking social capital and health among different social groups.

5.2. Limitations and Future Research

Despite the important findings gained from this research, the results should be viewed with caution given a number of limitations of this study.

First, the causal direction between measures of social capital and health outcomes cannot be established easily given the cross-sectional nature of the data. For example, although the study presumes that higher level of social capital lead to better mental health outcomes, it might be that mentally sound individuals are more likely to engage in social connections with others. Similarly, increased networking with friends and relatives might encourage individuals to take up smoking; however, it is equally possible that individuals with smoking habits would more likely get together with relatives or friends who also smoke. Participatory and qualitative research evidence may shed light on otherwise intractable associations (Cattell, 2001), but these have not featured prominently in the social capital and mental health debate. In addition, longitudinal studies and experimental designs would also provide clearer insight, which is outside the scope of this study.

Second, as acknowledged by some highly-regarded social capital researchers, defining, measuring and interpreting social capital is a formidable task (Kawachi & Blakerly, 2001; Lochner et al, 1999; Putnam, 2001). Noting the multidimensional nature of social capital, this study uses multiple composite variables, such as social network and perceived family and neighborhood cohesion as well as family conflict, to represent social capital, a step forward. Still, given the reliance on secondary data, the measurement only has limited information to quantify social capital, failing to capture some other aspects of social capital, such as civic participation or organizational membership, not available in the NLAAS data but widely perceived as an integral part of social capital which has been shown to be related to health (Rietschlin, 1998). This partial or incomplete measurement may have caused some problems, such as biasing the results and/or rendering the results incomparable with other studies. Future research in this field should underscore the importance of civic participation and other social capital elements, and consider more sophisticated ways to operationalize the concept beyond social network with friends and relatives. Future social surveys should develop more refined instruments to measure social capital so that more definitive conclusions can be drawn regarding the health implications of social capital.

Third, this research is limited to an examination of three major Asian American ethnic groups and a residual group, while the Asian American population comprises at least 29 ethnic groups (Kuo, 1998). It remains to be seen whether the associations between social capital and health reported here apply to other Asian American subpopulations (such as Koreans, Japanese, Indians), which have different immigration histories, cultures and traditions from the three groups analyzed here. In particular,

further study is warranted to explore whether the stronger associations between social capital and health among Vietnamese would be found in other ethnic groups, such as Hmong and Cambodians, which have similar political reasons for emigration and similar SES as Vietnamese in the United States. In addition, the interaction effects may not be generalizable to other lower SES groups in the U.S. population given the unique economic, cultural and other characteristics of Asian American population.

Fourth, future research on social capital and health needs to be better theorized in terms of the mechanisms through which social capital can impact health. Critical attention needs to be paid to thinking about how social capital operates differentially across social groups and how it may benefit or harm various components of health. Cross-racial/ethnic comparisons need to be extended to Hispanics, Blacks and Whites and thought must be given to the health-promoting or damaging effects potential pathways may have on individuals. Exploration in this regard might benefit from thorough reviews of health and non-health-related social science literature, such as political science and sociology, etc. Also important for social capital-health theory development is the role of qualitative health research. Contributing far more than just theoretical ideas, some recent ethnographic studies have offered interesting insights into the measurement and pathways social capital may operate on health. For example, Ziersch and colleagues (2005) found that social capital is multifaceted and its relationship with health is complex. They also found that measuring neighborhood social capital by aggregating individual level social capital, a method widely used in the field, potentially misrepresents social capital since individuals might have strong ties with people outside their own neighborhood.

Finally, conceptualizing and measuring social capital solely at the individual level is viable, but it has been suggested that doing this is "re-labeling terminology" (Kawachi, 2004, p683), creates potential circularity in defining causes or making inferences (Henderson & Whiteford, 2003), and may also bias the final results given that social capital and its health effects may be embedded to some degree within communities (Veenstra, 2005). Thus, Kawachi (2004, p. 683) proposes that "the effects of social capital on health ought not to be couched in terms of a dichotomy (*either* individual level *or* the collective level)—rather, it is *both*, implemented within a multi-level analytical framework (italicized original)". One statistically viable way of distinguishing individual effects of social capital from contextual effects is to apply a multilevel modeling method. In fact, some researchers have recently applied this method to untangle individual social capital from social capital at community, neighborhood and state levels (Scheffler et al, 2007). Future research on social capital and health among the Asian American population might also improve methodology by conceptualizing social capital both at individual and higher levels.

5.3. Theoretical and Practical Implications

5.3.1. Theoretical Contribution

Notwithstanding these limitations, this dissertation makes several important contributions to the social capital and health literature.

First, this study responds to the recent call for research on social capital in community and religious institutions (Putnam, 2000). Past scholarship has generally been limited to the general population in Europe or North America, resulting in insufficient

attention to the health effects of social capital among minorities, particularly Asian Americans. As one of the first efforts to understand social capital and health using a nationally-representatively sample of the Asian American population, this work begins to fill in this void in the literature. The findings of this research expand our empirical knowledge on the social capital and SES correlates of health among the increasing Asian American population, which in turn substantiates the scholarly work on social capital and health theory.

Second, this research represents an important effort at better understanding the differential effects of social capital upon health outcomes, providing new information to inform the social capital and health theory. The analysis showed significant interactions existed between social capital and ethnicity, income, and gender in affecting various health outcomes. In most cases, the Vietnamese and low-income groups tended to benefit more from social capital. As demonstrated in this study, social capital has not always played a positive role for health. Rather, in some cases, some forms of social capital may reinforce unhealthy behaviors such as smoking. As such, this research advances the social capital health literature by providing empirical support for the differential effects of social capital across health dimensions and for the need for a more inclusive theory frame to explain the health mechanisms associated with social capital, race/ethnicity, income and gender. Prior conceptualizations of social capital as a uniformly benign, one-size-fits-all concept should be revised, as some researchers have already started to do, to include economic, culture and other contextual factors.

Third, this dissertation extends existing studies on social capital and health through the employment of multiple items for social capital measurement and health

outcomes. Unlike most other studies, which have focused solely on one or two survey items of social capital, this study has taken into account both the structural and cognitive dimensions of social capital: social networking with friends and relatives, and perceived cohesion in families and neighborhood. It is helpful to unpack social capital into these two dimensions; as shown in the analysis, they are differentially related to health outcomes. Similarly, previous studies have mainly focused on one or two health outcomes, usually mortality or global self-rated health, for examining the effects of social capital. In contrast, this study adopted multiple measures of physical and mental health as well as health behavior. This more comprehensive approach is very helpful for gaining a more complete understanding of the relationship between social capital and health.

Fourth, this dissertation shows that, to have truly meaningful and useful health analysis, diversity and heterogeneity among Asian American population should be given full consideration. As a political, not a cultural or biological term (Ghosh, 2003), the concept of "Asian American" masks the vast diversity of the group and that disease burdens are not shared equally among subgroups. Consequentially, conceptualizing Asian Americans as a single population leads to a misunderstanding of health status, particularly those subgroups with lower SES. As the population of Asian Americans continues to grow quickly, such misunderstandings might well result in the wrong types of policies regarding health and health services for subgroups and the wasting of limited resources. This dissertation highlights the need for concentrated research efforts on this neglected and soon-to-be sizable minority group.

Altogether, this study makes significant theoretical contributions by arguing for important adjustments in the existing theories of social capital and its impact on health.

Increased attention to the differential effects of social capital will heighten its effectiveness as a theoretical framework and its viability for policy design. This study serves as a useful starting point for future studies regarding social capital, race/ethnicity, SES and health in our society.

5.3.2. Policy Implications

Generally, as a body of public health research, social capital is not well enough understood to inform sound policy recommendations. However, the findings of this dissertation may provide some new directions for future policies as well as for social work practice.

First, the substantial and persistent intra-group disparities in social capital and health outcomes among the Asian American population revealed in this study warrant more attention from policy makers. Despite the image as "model minority", the Asian American community has unresolved tension, poverty and economic insecurity, which are imposing unequal constraints on the health of some subgroups. Policy makers should be aware that aggregating Asian American ethnic groups into one category for policy purposes does not capture the internal heterogeneity of this population, and the failure to make adequate distinctions among socio-demographic factors, particularly ethnic and cultural variables, greatly limits both public health research and service provision. In the future, policy makers and researchers should consider tailoring data collection methods to include enough diversity within the Asian American sample to allow the analysis of subgroups. Similarly, public policy and intervention programs targeting Asian American

subpopulations should take into account their unique health needs, barriers to services, and gaps in services, particularly for the Vietnamese and low-income Chinese.

Second, an important implication of this study for policy interventions is the potential negative effects of social capital on health. The findings of this study warn against easy and uncritical acceptance of social capital into public health promotion since certain types of social capital may lead to health-risk behavior. For example, networking with friends and relatives may be one of the pathways or mechanisms by which individuals take up smoking, particularly among women. Furthermore, we do not fully comprehend the mechanisms through which social capital matters for health among different subgroups within populations. If future research in this field clearly establishes a causal link between social capital and health, social workers might propose initiatives to boost neighborhood cohesion and to develop individual social capital.

Both of these concerns warrant careful consideration when formulating policies to develop social capital for health. Moreover, a comprehensive understanding of the intricately entwined associations of social capital and income, ethnicity, and gender is also critical for designing effective social capital interventions for health promotion among the Asian American population. Given few social capital intervention programs have ever been implemented in Asian American communities, future policy decisions should be made after more thorough research on social capital and health has been conducted among the Asian American populations.

Third, the results of this study indicate that health disparities present among the Asian American population are partly attributable to the difficult and stressful experiences that accompany economic disadvantage and everyday discrimination. As

with other research, this study demonstrated that there were both quantitative and qualitative associations between income, education and health status. Despite stronger associations between social capital and health among the less advantaged, social capital alone was by far inadequate to explain the health gaps between the better off and the worse off. In addition, the fact that the rich and the educated had higher levels of social capital suggests that social capital cannot be conceived in isolation from economic and political structures. Instead, while recognizing the importance of social capital for health promotion, social capital should be placed in the economic and political context since it is itself contingent on, and structured by such context (Wakefield & Poland, 2005). For policy makers, this finding suggests not only the necessity of building up social capital among the disadvantaged; more importantly, it warrants ethnic and subgroup specific interventions that focus on creating more conducive political and social environment for the disadvantaged, particularly in areas of income security and human capital development.

Overall, this study highlights some considerations for policy decisions to narrow health disparities within the Asian American population; however, it is just a starting point for future research in this field. In order to provide more concrete and proper policy suggestions for improving population health and addressing racial, ethnic and socioeconomic inequalities in health, ongoing research is needed. Specifically, understanding the ways social capital operates in various geographic, economic, and socio-cultural contexts can lead to more appropriate and effective interventions and supports for Asian Americans and others who face daily challenges in their lives. On a larger scale, this will involve addressing the failures of educational and health care

delivery systems and the underlying discriminatory practices that create disproportionate burdens for many lower-SES populations in their day-to-day lives.

5.3.3. Social Work Practice Implications

This dissertation has concrete implications for social work practice. It provides a knowledge base for social work community practitioners who work in Asian American ethnic communities.

First, social workers should draw attention to the necessity of creating social capital within Asian American ethnic communities. Those involved in community organization can have a direct role in marshalling community resources to provide for appropriate opportunities for informal interactions among neighbors and friends. The promotion of social capital generation activities in communities can prevent conflicts, increase trust and encourage individuals to participate in normative activities and build more trustful neighborhoods.

Second, given the substantial negative effects of family conflict on individual health outcomes, social workers can adopt family intervention approaches to include facilitating family members in resolving conflicts. Family-centered policies which promote family harmony should be considered. These may include providing more information and resources to family members, particularly those in lower income communities, on how to handle family issues.

Third, based on the finding that language skills are positively associated with better health outcomes among Asian Americans, social workers could help provide opportunities for Asian Americans, especially recent immigrants, to learn and improve

their English skills. This will not only reduce immigrants' sense of frustration, improve access to health care and services, but also increase their opportunities to actively participate in community activities and networking. In addition, social workers could to encourage health institutions to offer affordable linguistically- and culturally-appropriate services for Asian Americans as they improve their English skills. Given the diversity of the Asian American population, a culturally competent system will not emerge easily, but policy makers and practitioners need to identify ways to improve the system.

5.3.4. Conclusion

As with most studies, this study provides more questions than answers. Because of data limitations, some questions could not be resolved, such as the causal direction. However, the findings point to certain very important conclusions. The main conclusion can be stated in one sentence: *Social capital is partially associated with the health of Asian American populations, but such associations vary across ethnic, income and gender groups and might also be negative.* The results of this study help further the argument that in understanding the health impacts of social capital, racial/ethnic and socio-economic contexts must be considered. Hopefully, this work helps set the stage for future research on social capital and health among Asian American populations as well as other populations.

Appendix

Description of Physical Health

How would you rate your overall physical health – excellent, very good, good, fair, or poor?

EXCELLENT 1

VERY GOOD.....2

GOOD.....3

FAIR.....4

POOR.....5

DON'T KNOW.....8

REFUSED.....9

Description of Mental Health

How would you rate your overall mental health – excellent, very good, good, fair, or poor?

EXCELLENT 1

VERY GOOD.....2

GOOD.....3

FAIR.....4

POOR.....5

DON'T KNOW.....8

REFUSED.....9

Description of Somatic Symptoms

The next few questions are about frequent or severe health problems you might have had at any time in your life that have interfered with your life. Have you ever had any of the following: (Yes, No)

1) Frequent or severe stomach or belly pain?
2) Frequent or severe diarrhea, loose bowels or constipation?
3) Frequent or severe pain in arms, legs or joints?
4) Frequent or severe chest pain?
5) Frequently feeling your heart pound or race?
6) Frequent shortness of breath or trouble breathing?
7) Frequent or severe back pain?
8) Frequent or severe nausea, gas or indigestion?
9) Frequent or severe pains or problems during sex?
10) Frequent or severe dizziness?
11) Frequent or severe fainting spells?
12) Frequent trouble swallowing/lump in throat?
13). Frequent or severe numbness or tingling in body or extremities?

Description of chronic health conditions

The next few questions are about health problems you might have had at any time in your life. Have you ever had any of the following:

1 arthritis or rheumatism?
2 Chronic back or neck problems?
3 Frequent or severe headaches?
4 Any other chronic pain?
5 Seasonal allergies like hay fever?
6 A stroke?
7 A heart attack?

Did a doctor or other health professional ever tell you that you had any of the following illnesses:

8 Heart disease?
9 High blood pressure?
10 Asthma?
11 Any other chronic lung disease, like COPD or emphysema?
12 Diabetes or high blood sugar?
13 An ulcer in your stomach or intestine?
14 Epilepsy or seizures?
15 Cancer?

Current Smoking Status

Are you a current smoker, ex-smoker, or have you never smoked?
1. Current
2. Ex-smoker
3. Never
4. (If vol) Only smoked a few times

Factor Loadings for Social Network Variables

Variables	Factors with Eigenvalue>1	
	Factor 1	Factor 2
1. Freq talk on phone/get w/ relatives who don't live w/ you	0.1296	**0.3639**
2. Freq rely on relatives who don't live w/ you for serious prob	0.2206	**0.7281**
3. Freq can rely on relatives who don't live w/ you to disc worries	0.2458	**0.732**
4. How often relatives make too many demands on you	0.1019	0.1004
5. How often your relatives argue with you	0.0822	0.0752
6. How often talk on phone or get together with friends	**0.4017**	0.0951
7. How much can rely on friends when have serious problem	**0.7744**	0.2092
8. How much can you open up to friends and talk about worries	**0.7771**	0.2054
9. How often you let someone else know about your problems	0.3088	0.246
10. How often friends make too many demands on you	0.1981	0.0021
11. How often your friends argue with you	0.1806	-0.0092
12. How often you let relatives know about your problems	0.0929	0.2237

Factor Loadings for Family/neighborhood Cohesion

Variables	Factors with Eigenvalue>1		
	Factor 1	Factor 2	Factor 3
1. Family members respect one another	**0.6440**	0.0501	0.1467
2. Family shares values	**0.7022**	0.0863	0.1198
3. Things work well as family	**0.7681**	0.1023	0.1539
4. Family trusts and confides in each other	**0.7846**	0.0886	0.1522
5. Family loyal to family	**0.7742**	0.0865	0.1281
6. Proud of family	**0.7495**	0.0752	0.1264
7. Express feelings with family	**0.7702**	0.0819	0.1432
8. Family likes to spend free time with each other	**0.7436**	0.0877	0.1361
9. Family feels close to each other	**0.8114**	0.0887	0.14
10. Family togetherness is important	**0.6749**	0.0414	0.0746
11. Being too close to family interfered with goals	0.144	0.0391	**0.5011**
12. Argue with family over different customs	0.2821	0.0279	**0.5393**
13. Lonely and isolated due to lack of family unity	0.3408	0.0819	**0.5965**
14. Family relations less important to people close to you	0.3564	0.0571	**0.6007**
15. Personal goals conflict with family	0.2442	0.0491	**0.5991**
16. People in neighborhood can be trusted	0.1044	**0.5893**	0.0625
17. People in neighborhood get along w/ each other	0.1166	**0.6777**	0.0384
18. People in neighborhood help in emergency	0.0954	**0.7026**	0.0298
19. People in neighborhood look out for each other	0.1333	**0.7643**	0.0412
20. I feel safe alone in neighborhood at night	0.1099	**0.4651**	0.0455
21. People get mugged in neighborhood	-0.0765	0.2395	0.0842
22. People sell/use drugs in neighborhood	-0.1174	0.2399	0.0622

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