Exploring the Effects of Limited English Language Proficiency on Disability: A Pilot Study of Adult Chinese-, Japanese-, and Korean-language Speakers in the United States

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A DISSERTATION
Submitted to the graduate faculty of the University of Alabama at Birmingham, in partial fulfillment of the requirements for the degree of Doctor of Sociology

BIRMINGHAM, ALABAMA 2010
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ABSTRACT

This is a pilot study contending that limited language proficiency is associated with disability outcomes for Chinese-, Japanese-, and Korean-speaking Americans in the United States, as determined by application of the Disablement Process model. Using the 5 percent public-use micro-data samples (PUMS) from the United States Census 2000, this study explores the relationship by employing a Poisson regression on these three language groups from a comparative perspective. The findings shed light on the significant effects of limited language proficiency as a predisposing risk factor on disability outcomes and also demonstrate the importance of individual, family, and community characteristics as either interventions or exacerbators. The results of this study should encourage immigrants to learn English and call attention to the needs for equal and comprehensive healthcare services for people who are from diverse ethnic backgrounds.
Dedicated to my family.
ACKNOWLEDGEMENTS

I would like to express the deepest gratitude and warmest appreciation to my committee chair, Dr. William C. Cockerham, for his excellent guidance, caring, patience, and providing me with an excellent atmosphere for doing research. I am heartily thankful to my committee members, Dr. Mark LaGory, Dr. Casey Borch, Dr. John Van Sant, and Dr. Michael Howell-Moroney for reading previous drafts and providing many valuable comments that improved the dissertation. I want to thank my doctoral committee for their consistent support and guidance that have contributed to the overall completion of this dissertation.

I would like to thank my family who offered me unconditional love and support throughout the course of this dissertation. None of this would have been possible without the love and patience of my family, to whom this dissertation is dedicated to, has been a constant source of love, concern, support and strength all these years.
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CHAPTER 1: INTRODUCTION

The social causes of health and disease are a major concern of medical sociology (Cockerham, 2007). In the general population, knowledge about the sources of disability has increased, and the problem is widely recognized. While there has been extensive growth in the number of immigrants, especially Asians, to the United States (US), knowledge about the disabilities of these immigrants is not extensive.

The model used in this study is the Disablement Process as put forth by Verbrugge and Jette (1994). According to these authors, disability generally refers to limitations in performing socially defined roles and tasks. Disability typically begins with acute or chronic disease and consequently leads to a loss of physical function or restriction in performing daily activities. The process consists of four interrelated components: pathology, functional impairments, functional limitations, and disability. Disability occurs when physical impairments progress. This model suggests a relationship between the various components of disability. It consists of a main pathway and other forces, namely risk factors, and internal and external resources that can either speed up or slow down the main pathway.

For immigrants, limited language proficiency can induce stress-related health problems. Relevant questions are as follows: (1) Can limited language proficiency affect the disabilities of immigrants? Specifically, is English language proficiency a predisposing risk factor of disability for Chinese-, Japanese-, and Korean-language
speakers in the US? (2) How does English language proficiency affect the disabilities of immigrants in the US? (3) What is the association of other factors to limited English language proficiency and disability for these immigrants? To date, little attention has been paid to these questions within medical sociology. Meanwhile, the health of immigrants and their difficulty of adjusting to a new society are topics that are likely to continue to be of interest to sociologists.

Since its publication, the Disablement Process model has been widely used in studies and clinical trials with elderly people (Freedman & Martin, 1998; Freedman, Martin, & Schoeni, 2002; Stuck et al. 1995, 1998; Hudak et al., 1996). However, there is no study of the specific characteristic of most immigrants – limited language proficiency. Even though the immigrants’ pathway of disablement, from pathology to impairments, functional limitations and disability is not expected to be different from that for the general population, there is an aspect of most immigrants that is of particular interest, that is, their limited proficiency in the English language.

The effect of limited language proficiency on disability is a central question relating to the study of immigrant disability, and it is potentially of great importance. Limited language proficiency is an inherent characteristic of most immigrants, especially for Chinese-, Japanese-, and Korean-language speakers, whose languages are linguistically distant from English (Chiswick, 2004), the de facto official language in the US. According to the US Census 2000, among these three groups, Korean-language speakers have the highest percentage of people who have a disability (16%), and the lowest percentage of people who have English language proficiency (37%). Japanese-language speakers have the lowest percentage of disability (13%), and the highest
percentage of people with English language proficiency (51%). (See Tables 1 and 2) In this report, this limitation is addressed through use of the Disablement Process, by investigation of the transition from health to disability among adult Chinese-, Japanese-, and Korean-language speakers in the US.

While there have been no empirical studies on the limited language proficiency of immigrants on disability, literature dealing with linguistic problems and their effects on the well being of individuals has implied a relationship between limited language proficiency and disability. The symbolic interactionism literature argues that language is a central part in the interactions of everyday life (Blumer, 1969). Language contributes substantially in the process of symbolic communication, development of self, and construction of identity through interactions with other people (Mead, 1934; Blumer, 1969; Manis and Meltzer, 1978; Rose, 1962). A more detailed discussion is provided by Bourdieu (Bourdieu, 1977; 1986; and 1991). According to him, language is closely related to other social factors of habitus, fields, symbolic power and social capital. Through these four mutually entangled factors, language has the symbolic power to designate an individual’s social position (field) through habitus and social capital. In the process of immigration, limited language proficiency often induces stress during acculturation. Language difficulties can also restrict immigrants to a low socioeconomic status, poor living conditions, and a poor working environment. Inability to communicate creates barriers to health care access and reduces the quality of health care services. These factors are typically entwined and are regarded as causes of illness and health problems. Relating to the Disablement Process, limited language proficiency can
initiate an onset of pathology and act as a predisposing risk factor. As the effects of limited language proficiency progress, disability can occur.

Hence, this study, drawing upon the model of the Disablement Process, assessed evidence relating the effects of limited language proficiency to disabilities. The aims were to review the existing conceptual models assessing the process of disability and to focus on the Disablement Process model with emphasis on limited language proficiency and its possible effects on disabilities for adult Chinese-, Japanese-, and Korean-language speakers. The purposes were to understand how limited language proficiency affects disabilities in different language groups and to provide a better approach for disability prevention for immigrants in the host society. The primary focus was on exploring the relationship between disability and limited language proficiency, rather than on other variables, such as gender or age. Although other variables were included in the study due to their importance in development of disabilities, an adequate discussion of these is beyond the scope of this document.

The results of this study provide information for making efficient public policies to serve people of limited English proficiency. Knowledge of the effect of English language proficiency on the health status of immigrants raises awareness for programs that serve the public health and medical needs of people who have difficulty speaking English. The Civil Rights Act of 1964 and Executive Order 13166 in 2000, have stated that health agencies and care providers must provide equal access to public health benefits and services for people with limited English proficiency. Further, recognition of a relationship between the limited language proficiency and disability would help identify
and ameliorate the negative effects of limited language proficiency and provide immigrants with a more efficient adaptation into the host society.

The effects of limited language proficiency was addressed through exploring the transition from health to disability by use of the Disablement Process model as it relates to the limited language proficiency among adult Chinese-, Japanese-, and Korean-language speakers in the US. Through examination of these three language groups, this study of the effects of limited language proficiency on disability outcome was intended to shed light on the relationship from a comparative perspective. These immigrants have similar immigration histories and experiences, similar levels of educational and socioeconomic achievements, and similar difficulties in learning and speaking English. But they are different in many social, cultural, and medical aspects. For example, compared to other Asian American groups, Japanese Americans have low incidence of mental disorders and low rate of admissions to mental hospital, mainly because of their stable family structure and their strong social solidarity (Gallagher, 1987; Kitano 1967, 1985).

The data sources used for this analysis were the five percent public-use micro-data samples (PUMS) from the US Census 2000, which are, to our knowledge, the only data sets that contain information about the language proficiency of immigrants as well as information on the disabilities of individuals. A Poisson regression was used to examine the effect of limited English language proficiency on aggregate disabilities by counting physical, mental, sensory, self-care, mobility, and employment disabilities. This analysis was conducted within a comprehensive, multivariate framework focusing on the effect of
limited English language proficiency on disability while controlling other factors, including individual, family, and community characteristics.

By applying the sociomedical model of the Disablement Process, this study compared the effect of the limited language proficiency on disabilities for adult Chinese-, Japanese-, and Korean-language speakers in the US. The results highlighted the diversity of adult Asian-language speakers in the US with respect to the ways in which limited English language proficiency is linked to disability outcomes. The study also investigated the predisposing effect of limited language proficiency, especially for Japanese-language speakers. Other factors, such as age and education, were also related to disability outcomes, for which the results are consistent with theoretical expectations. The results suggested that the negative effects of disabilities related to limited language proficiency can be alleviated by encouraging English language learning (increasing capacity) and by proving external support (reducing demand).

The structure of this dissertation is as follows: (1) The existing literature and the theoretical framework of language and its effect on disability status are summarized, with a focus on those aspects most relevant to the analysis of language proficiency of foreign-language speakers. (2) The methods and data are described in detail. The Poisson regression results in each language group show that, although the effects are different for adult Chinese-, Japanese-, and Korean-language speakers in the US, limited language proficiency is significantly associated with disability outcomes.
CHAPTER 2: BACKGROUND: CHINESE-, JAPANESE-, AND KOREAN-AMERICANS AND DISABILITY

In order to understand the relationship between language proficiency and disability for Chinese-, Japanese-, and Korean-language speakers, it is important to consider the history of their participation in and exclusion from the mainstream society of America. Since these groups have similar immigration histories and similar social demographic characteristics, information relative to these groups should provide insight into the association between limited language proficiency and disability from a comparative perspective.

For Asian-Americans, there were two waves of immigration, which date to the mid- and late 1800s. Due to the decline of the African slave trade and the discovery of gold, Asian-Americans were brought to the US as laborers, or Kuli, to work mainly in mines and on railroads. The first wave consisted of Chinese, Japanese, Koreans, Filipinos, and Asian Indians. The effects of the Naturalization Act of 1870 and the Chinese Exclusion Act of 1882 remained until 1943. Chinese immigrants were the first Asian ethnic group permitted to become citizens; for Japanese immigrants and other Asian immigrants, that right did not come until 1952. Not until the 1965 Immigration Act did the second wave of Asian immigrants come to the US. This wave resulted in a large proportion of Asians who are first-generation, or foreign-born, representing 63.1% of the Asian-American population (Paisano, 1993).
During the second half of the 19th century and early 20th century, hundreds of thousands of Chinese, Japanese, and Korean immigrants entered into the US and legally became American citizens (Van Sant, 2000). According to the US Census (2000), over the last decade, the number of immigrants in the US has increased to 26.2 million. Of these, 11.9 million people reported that they were Asian immigrants, representing the highest growth rate, 48%. Among Asian immigrants, 2.4 million were of Chinese origin (21%), 1.1 million were Korean (9%), and 0.8 million were Japanese (7%). The Asian American population currently makes up about 5% of the US population; in the next 50 years, this number is expected to grow to 34 million.

It is generally believed that health-related outcomes among Asians are better than those for other racial groups. The estimated disability prevalence levels for Asians are lower than those of other racial groups (Hayward & Heron, 1999; Waidmann & Liu, 2000). Hummer et al. (1999) and Lauderdale and Kestenbaum (2002) estimated that Asian Americans have considerably lower mortality rates than whites. These favorable health and disability profiles of Asian-Americans can be understood from immigration selection: only those people who are physically and mentally strong are able to immigrate to the US. The selectivity advantages of migration, however, may erode with time in this country. While immigrants accumulate resources and experiences that are positively associated with good health, such as access to medical treatment and health care, the acculturation process may also wear away the advantage of positive health behaviors, including changes in diet and health-related lifestyle behaviors (Angel et. al., 2001; Frisbie et. al., 2001; Guendelman & English, 1995; Hummer et. al., 1999)
The perception of a “model minority” stereotype for Asian-Americans, high academic achievement, socioeconomic attainment, and good health, has perpetuated assumptions that Asian-Americans are a single homogeneous group rather than acknowledging the different traditions, cultures, and languages that exist among this population. In reality, Asians may be the least homogeneous of all racial groups, possessing an unusually wide range of social characteristics, such as culture, tradition, and language. Differences in depression, anxiety, cognitive impairment, and psychosocial dysfunctions exist across Asian-American groups (Ying, 1988; Hurh & Kim, 1988; Kuo, 1984). Thus, each Asian group needs to be studied separately.

Although Asian cultures have influenced each other in their long and colorful histories, they are different in many ways. For example, on a basic level, Asian cultures generally value harmony, but their definitions of harmony are quite different. For Japanese culture, the open expression of emotion is frowned upon and the harmony of the group is more important than individualism, while Chinese and Korean culture focus more on balance.

One of the explanations of the differences among the Chinese, Filipinos, Japanese, and Koreans is found in the study by Kuo and Tsai (1986). They suggested that the personality of “hardiness” and establishment of social networks havesubstantial effects on the life of these immigrants in the receiving society. Those immigrants with hardest personalities, who are active and willing to risk change, are best able to avoid the stress of migration and had the best mental health. Also, immigrants, who are able to enter social networks with others of the same ethnic background, can live apart from the larger society and not suffer from severe social isolation.
Among the first groups of Asian immigrants into the US, unlike Filipinos and Asian Indians who speak English as well as their own languages, Chinese, Japanese, and Korean immigrants generally do not speak English. These immigrants probably have the most limited English language proficiency in the US, where English is the *de facto* official language. According to Chiswick (1995), Asian languages such as Chinese, Japanese, and Korean, are the most linguistically different from English. It is difficult for Chinese-, Japanese-, and Korean-language speakers to learn English as a second language and thereby acquire English language proficiency. Consequently, many Asian immigrants have limited language proficiency and continue to speak a language other than English at home. According to the US Census (2000), more than 70% of Asian immigrants speak a language other than English at home. For Chinese and Koreans, the numbers are 85% and 92%, respectively. Among Asians, the Japanese have the highest percentage of English speakers at home, 50%. Limited English proficiency places Asian-Americans in a disadvantageous position in the social structure of the host country.

Thus, ethnic enclaves and communities attract immigrants of limited English proficiency; in these, the use of English is optional. Jasso and Rosenzweig (1990) found that immigrants with lesser ability to speak English tend to reside in communities with people from countries where the same language is spoken. In fact, researchers have attributed double-edged characteristics to these ethnic enclaves. Ethnic enclaves may offer social comfort through shared language and identity that is unavailable outside the enclave and may buffer the effects of ethnically or linguistically based discrimination from the mainstream society. Some large enclaves may also provide a variety of employment opportunities and services (e.g., health care services) to group members with
limited proficiency in the language of the host country (Bonacich & Modell, 1980; Light, 1984; Wilson & Portes, 1980; Breton, 1978; Wilson & Martin, 1982; Zhou & Logan, 1989; Jasso & Rosenzweig, 1990; Portes & Bach, 1985). On the negative side, by providing a comfortable environment for immigrants with poor English proficiency, ethnic enclaves may trap immigrant workers in a relationship that binds them to low-wage jobs and ethnic solidarity. It may also limit immigrants’ opportunities to learn the host society language and delay assimilation or integration into the host society (Sanders and Nee, 1987). Consequently, language difficulties may mark immigrants for discrimination and segregation when they interact with the mainstream community. It may also make them targets for differential medical treatment (Lang, 1986; Lang, 1993).

Asian immigrants in the United States are generally ignored in medical and sociological studies. This is mostly because of the relatively small number of Asian immigrant cohort. The investigation of immigrants and their health situation in this country is built primarily on earlier experiences of European immigrants. The influx of large numbers of Asian immigrants into this country, however, has called attention to their health requirements. The different immigration pattern challenges the concepts that developed from early European immigrants, who generally had no problem of speaking English. Plus, the character of limited English language proficiency and its potential association with the health and disability status of Asian immigrants’ require in-depth studies in medical and sociological research.
CHAPTER 3: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

The transition from health to disability is complicated. While scholars and researchers have examined the process of becoming disabled in the general population, little research has been accomplished in the area of transition from health to disability among immigrant groups. In addition, previous studies focusing on the prevalence of disability have overlooked the effects of characteristics that increase risk for disability symptoms in certain population cohorts, such as the limited language proficiency of immigrants and its influence on the pathway from a state of health to disability. This is possibly because most investigations of migration and its relationship to illness in the United States have been unduly influenced by study of the influx of Europeans that occurred at the end of last century. Characteristics of the immigrant cohorts are different now from what they were then (Kuo and Tsai, 1986). The present immigration is composed more of Asian people and Asian countries have surpassed Europe as the leading source of legally admitted immigrants (Kuo, 1981). These changing characteristics of the immigrant cohorts imply that studies of immigrant health need to explore factors inherited in the new immigrant cohort. One such factor is limited English language proficiency, for most Asian immigrants facing difficulties in language adjustment in the United States. Even though there is no established relationship between language proficiency and disability, conceptual models for disability processes in the general population allow for studying disability and the transition from a less disabled or
healthier state for immigrants, relating specifically to their characteristic of limited English language proficiency.

Theoretical literature dealing with linguistic problems and their effects on an individual’s well-being has been articulated in symbolic interaction. For symbolic interactionists, language has an essential function in daily interaction. It is important for self development and identity construction. In addition, French sociologist Pierre Bourdieu, a significant contributor to medical sociology, believed language is not only a method of communication but also a mechanism of power. It relates to the stability of the habitus, through which society is impressed on the individual mentally and corporeally. It also designates one’s relative position in the social structure (Hanks, 2005). In the process of immigration, language difficulties create barriers that place immigrants in the most socially, economically, and medically disadvantaged segments of the host society.

According to the disablement process model developed by Verbrugge and Jette (1994), the main pathway leads from pathology to impairments, to functional limitations and, finally, to disability. Speeding and slowing disablement are personal and environmental factors, namely, risk factors, interventions, and exacerbators. The effects of limited language proficiency on disability can be understood from two perspectives: first, limited language proficiency is a predisposing risk factor of disability through induction of stress in the acculturation process of immigration; second, limited language proficiency is related to intra-individual and extra-individual factors, which either slow or hasten movement on the main pathway to disability.
In the following part, I shall discuss first the definitions and models of disability; and then, I shall review and summarize literature on language in sociology and medical sociology, with a focus on symbolic interaction and on Bourdieu’s views on language; at last, I shall discuss the Disablement Process model and how to fit limited language proficiency into this model.

Definitions of Disability

In order to study disability, it is essential to begin with an understanding of the word disability, which has numerous definitions. First, the medical model views disability as a characteristic or attribute located in the individual, which is directly caused by disease or other health conditions, with an emphasis on cure or reduction for the problem (Albrecht, et. al., 2001; Barnes and Mercer, 2003). Second, the social model of disability views disability as a socially created problem, rather than an attribute of the individual. In this model, the problem of disability is created by features of the social and physical environment. The purpose of the social model is to call for a political response or solution (Albrecht, et. al., 2001). Finally, the third conceptual approach, which attempts to integrate the medical and social models, views disability as a consequence of biological, personal, and social forces (Engel, 1977). Today, this perspective is the dominant.

For example, according to the Institute of Medicine’s model (Nagi, 1976), disability refers to limitations in performing socially defined roles and tasks. A more influential example is from WHO’s International Classification of Impairment, Disability,
and Handicaps (ICIDH) (WHO: ICIDH, 1980), which differentiates disability from impairment and handicap and defines disability as a restriction that results from an impairment in ability to perform an activity in the manner considered normal for a human being. However, in 1999, WHO revised their definition of disability in ICIDH-2, retitled as The International Classification of Impairment, Activities, and Participation. Since then, the term has been used to refer to problems related to the full gamut of activities, from those of body structure to societal participation (WHO, ICIDH-2, 1999). Although the concept of disability can be broadly constructed, many research studies use the term to refer to a health-related outcome of a significantly impaired condition or function relative to difficulty in performing key activities in daily life, according to the usual standard for individuals or their group (Verbrugge & Jette, 1994). In other words, disability is defined as “difficulty doing activities in any domain of life (from hygiene to hobbies, errands to sleep) due to a health or physical problem” (Verbrugge & Jette, 1994).

It is generally believed that disability occurs most commonly as a result of acute diseases, chronic conditions, or comorbidities (Fried & Guralnik, 1997; Verbrugge & Jette, 1994), all of which can lead to loss of physical function or to restrictions in daily activities. When physical dysfunctions and restrictions progress, an individual has difficulty in performing routine activities in daily life (Verbrugge & Jette, 1994).

Models of Disablement

In the past three decades, discussions have related to several conceptual models of the transition from health to disability: the Nagi scheme adopted by the Institute of
Saad Nagi’s disability model was originally developed in the early 1960s as part of a study of disability commissioned for the Social Security Administration and related to rehabilitation. In 1953, the U.S. Department of Health, Education, and Welfare assumed responsibility for the reorganized Federal Security Agency, including the administration of vocational rehabilitation. The Vocational Rehabilitation Act of 1954 permitted "the establishment of comprehensive rehabilitation facilities; the creation of specialized clinics of speech, hearing, cardiac, and other disorders; and the development of a variety of services that at one time would have seemed unattainable" (Switzer, 1965). Since the 1954 rehabilitation act, the infusion of funds into the field of rehabilitation and the spread of comprehensive centers involving many disciplines led to competition over resources and concerns for attempts at conceptual distinctions to delineate the roles of the different professions in the fields of disability.

Nagi constructed a framework that differentiated among four basic and interrelated concepts: active pathology, impairment, function limitation, and disability. (Nagi, 1965; Nagi, 1979; Nagi, 1991).

- **Active pathology** is the interruption of normal cellular processes and the simultaneous homeostatic efforts of the organism to regain a normal state and may result from infection, trauma, or any other etiology;

- **Impairment** refers to any loss or abnormality of an anatomical, physiological or mental nature; active pathology usually results in some type of impairment;
Figure 1. Nagi Scheme

Nagi Scheme

ACTIVE PATHOLOGY (interruption or interference with normal processes, and efforts of the organism to regain normal state) ➞ IMPAIRMENT (anatomical, physiological, mental, or emotional abnormalities or loss) ➞ FUNCTIONAL LIMITATION (limitation in performance at the level of the whole organism or person) ➞ DISABILITY (limitation in performance of socially defined roles and tasks within a socio-cultural and physical environment)

(Adopted from p2 Verbrugge and Jette, 1994)
- Functional limitations refer, at the individual level, to any restriction in performing generic physical and mental action;

- And disability refers to difficulty in performing activities in any domain of life. It is a physical or mental limitation in a social context and represents the gap between a person’s intrinsic capabilities and the demands created by the social and physical environment.

The Nagi scheme has gained a strong following among scientific and public health groups involved in disability studies. His scheme includes both medical and social factors in the disability model. It also stipulates that people with the same health condition may not have the same disability results, and similar patterns of disability may result from different types of health conditions. In other words, disability may or may not result from the interaction of an individual’s physical or mental limitation with the social and physical factors in the individual’s environment; and two patients with similar underlying pathology, impairments, and functional limitations may present different disability profiles (Jett, 2006).

Contemporary with Nagi’s work, the ICIDH provides a conceptual framework to assess the consequences of diseases in terms of impairment, disability, and handicap (World Health Organization, 1980). In 1976, the World Health Assembly of the World Health Organization approved the publication of a classificatory instrument incorporating a version of a social model. It is an international classification of disablement, designed to embody the insights of the social model for research and other uses. This was eventually published in 1980 for trial purposes, but has been used in population studies.
(Chamie, 1995), rehabilitative outcomes measurement (De Kleijn-de Vrankrijker, 1989), research on the elderly (Rusinowitz et al., 1993)

Bickenbach et. al. (1999) analyzed the three complementary aspects used in ICIDH to describe the situation of an individual at a point in time.

- **Impairment** is defined as any loss or abnormality of psychological or physical function;
- **Disability** is a reduction or loss of functional capacity resulting from impairment;
- And **handicap** is the social disadvantage resulting from impairment and/or disability.

In the ICIDH, disablement is modeled as a sequence of health problems consequential upon some disease, trauma, mental illness, and chronic or age-related conditions. An initial pathological change, may lead to impairment; then the person will experience disability. Both of these may cause a social disadvantage for the individual by limiting or preventing the fulfillment of role. Thus, they would have a handicap.

Despite the attempt to create a nonmedical model of disablement, the ICIDH fails to provide a flexible tool for guiding research and data collection on all aspects of disablement. This social model of disablement “is only partly adopted and never operationalized. At best, it is a tool for research, administrative and planning uses by medical professionals and physical therapists who, for their purposes, focus entirely on the individual impairments and treat the environment as unchangeable (Bickenbach et. al., 1999, p1176)”.

Due to limitations of the ICIDH, the World Health Organization began. In 1993, the process of revising to ICIDH-2 started, taking the criticism of the original model into
consideration. In 1996, the preliminary draft was subjected to expert review, and a second version was finalized at an international meeting held in Geneva in April, 1997. On May 22, 2001, 191 WHO Member States in the Fifty-fourth World Health Assembly officially endorsed the International Classification of functioning, Disability, and Health (ICF), formerly ICIDH-2.

Termed the 'biopsychosocial' model, this model was developed as a synthesis of the medical and social approaches to disablement. Each dimension of disablement is considered to be an interaction between intrinsic features of the individual and that person's social and physical environment. The three dimensions are called *impairments*, *activity limitations* and *participation restrictions*, to identify the nature and extent of a person's involvement in basic areas of human life.

The World Health Organization updated the ICIDH to the ICF version in 2001, because the old version lacked a basis for hypothesis development, measurement feasibility, and research design. By describing both health and health-related domains, the ICF has moved from consequences of disease to a component of health. The body construct comprises functions of body system and structure. The activities and participation construct covers the complete range of domain, denoting aspects of functioning from both an individual and a societal perspective and a list of environmental factors that have an impact on all constructs. The ICF provides a common framework with standard definitions for scientific research and studies. Further, by including contextual factors, which record the impact of the environment on the person’s functioning, the ICF takes into account the social aspects of disability. In WHO, the ICF framework has been used in the Multi-Country Survey Study in 2000/2001 and the World
Health Survey Program in 2002/2003 to measure the health status of general population in 71 countries.

The most widely used model of disability is presented by Verbrugge and Jette (1994), who proposed the concept of the “Disablement Process.” This model, which has a foundation in the Nagi scheme, expands on the scope and detail of ICIDH. It restates the pathway, taking into account the impact of acute and chronic conditions on the functioning of specific body systems, but emphasizing that disablement is a dynamic process, which is “the trajectory of functional consequences over time and the factors that affect their direction, pace, and pattern of change” (Verbrugge & Jette, 1994, p.3). The primary components of the Disablement Process model include pathology, impairment, functional limitation, and disability. Pathology, the presence of either chronic or acute diseases or conditions, influences impairments that are abnormalities at the physiological, anatomical, or mental level. This leads to functional limitations in basic physical and mental actions, which develop into disability – problems with activities of daily living or instrumental activities of daily living.

A significant contribution to the Disablement Process is that Verbrugge and Jette expanded the concept by emphasizing the predisposing factors that speed up or slow down steps on the pathway. Both intra-individual and extra-individual factors intervene along the main pathway leading from pathology, impairment, functioning limitation, and disability. The term “process” is used to characterize the dynamic nature of disablement.
Figure 22. International Classification of Impairments, Disabilities, and Handicaps

International Classification of Impairments, Disabilities, and Handicaps (ICIDH)

"DISEASE" → IMPAIRMENT → DISABILITY → HANDICAP

(the intrinsic pathology or disorder) (loss or abnormality of psychological, physiological, or anatomical structure or function at organ level) (restriction or lack of ability to perform an activity in normal manner) (disadvantage due to impairment or disability that limits or prevents fulfillment of a normal role (depends on age, sex, sociocultural factors) for the person)

(Adopted from p2 Verbrugge and Jette, 1994)
Figure 3. A Model of The Disablement Process

**EXTRA-INDIVIDUAL FACTORS**

MEDICAL CARE & REHABILITATION
(surgery, physical therapy, speech therapy, counseling, health education, job retraining, etc.)

MEDICATIONS & OTHER THERAPEUTIC REGIMENS
(drugs, recreational therapy/aquatic exercise, biofeedback/meditation, rest/energy conservation, etc.)

EXTERNAL SUPPORTS
(personal assistance, special equipment and devices, standby assistance/supervision, day care, respite care, meals-on-wheels, etc.)

BUILT, PHYSICAL, & SOCIAL ENVIRONMENT
(structural modifications at job/home, access to buildings and to public transportation, improvement of air quality, reduction of noise and glare, health insurance & access to medical care, laws & regulations, employment discrimination, etc.)

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**THE MAIN PATHWAY**

PATHOLOGY — IMPAIRMENTS — FUNCTIONAL LIMITATIONS — DISABILITY

**EXTRA-INDIVIDUAL FACTORS**

LIFESTYLE & BEHAVIOR CHANGES
(over changes to alter disease activity and impact)

PSYCHOSOCIAL ATTRIBUTES & COPING
(positive affect, emotional vigor, prayer, locus of control, cognitive adaptation to one's situation, confidant, peer support groups, etc.)

ACTIVITY ACCOMMODATIONS
(changes in kinds of activities, procedures for doing them, frequency or length of time doing them)

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(Adopted from p4 Verbrugge and Jette, 1994)
These factors can be classified into three broad groups. First, there are risk factors that predispose an individual to develop pathology. These are usually long-term or permanent features of individuals. They can be demographic, social lifestyle, behavioral, psychological, environmental and biological characteristics of an individual that promote progression through disability. Second, interventions serve as “buffers” to reduce restrictions/difficulties that are inserted during the disablement process to avoid, retard, or reverse outcomes. These include medical care, medications and other therapeutic regimens, and activities that patients may perform on their own to improve their condition. Third, exacerbators are factors that can worsen or accelerate progression to disability, which may happen when interventions have negative consequences; when there are behavior or attitude problems in facing declining health and/or function; or when there are societal impediments such as social prejudice, unemployment, or communication barriers.

According to Verbrugge and Jette (1994), the Disablement Process model has several attributes. First, this model can help investigators formulate hypotheses and guide the selection of measurement instruments and operationalization. Second, this model encompasses both lifelong and late-life disabilities, providing the possibility of extending research to other age groups, such as children, youths, and adults. Third, the dynamic process of disablement promotes social research, encourages clinicians to go beyond the traditional biomedical paradigm, and assists their understanding of intra-individual and extra-individual factors of disability. Given the strong interaction among pathology, risk factors and intrinsic and environmental factors, this model allows for a better understanding of prevention of other factors relevant to the process of disability.
Finally, the model states that disability occurs when there is a gap between personal capacity and the demand for activity, which extends traditional epidemiological, medical and public health perspectives and promotes the possibility of preventing disability either by increasing capability or by reducing demand.

Since its publication, the Disablement Process model has drawn attention worldwide and has led to considerable research. The conceptual paradigm has allowed contributions to social research on disability, aging, and health transitions for older populations. Much of the research came from the Established Populations for Epidemiological Studies of the Elderly, the National Long-Term Care Survey, the longitudinal study of aging, and the supplement on aging to the National Health Interview Survey (Peek, Ottenbacher, Markides, & Ostier, 2003). These efforts were attempts to examine a condition, such as a chronic disease, and its association with functional limitations of elderly people (Femia et. al., 2001; Lawrence & Jette, 1996; Peek et. al., 2003). In addition, Femia et al. (2000) emphasized the importance of psychological and internal resource factors on the main pathway of the disablement model. The model provided guidance for clinical research in understanding the factors that cause disability, such as rheumatoid arthritis (Escalante & Rincon, 2002) and dementia-associated problems (Barberger-Gateau, 2002). None of these, however, focused on non-whites, although Lawren and Jette (1996) identified this as an important issue to the process of disablement within racial and ethnic groups.

Researchers have examined the process of becoming disabled; components of this model have been utilized for elderly Whites or for other groups of White patients. Although the Disablement Process model allows the possibility, little research has
examined the process for other ethnic groups. The only exception is by Peek et al. (2003), who applied the Disablement Process to older Mexican-American adults; the results support the main pathway in the model. An important question relating to the study of immigrant disability is whether there are specific, inherent characteristics that increase risk for disability. In the present pilot study, this limitation is addressed through investigation of the transition from health to disability using the Disablement Process model among immigrants with a focus on the effects of limited English language proficiency. This is potentially relevant for immigrants, especially for Chinese-, Japanese-, and Korean-language speakers, many of whom do not speak English well.

Language in Sociology and Medical Sociology

Language represents a unique aspect of the problems experienced by social groups, because people use language to handle problems of most immediate interest (Maynard, 1988). That is, “people demonstrate their orientation, through structures of direct talk and interaction, to difficulties and issues that emerge most intimately and urgently for them. Therefore, language studies, rooted in an analysis of these difficulties and issues, are about 'social' problems in a most radical fashion” (Maynard, 1988, p. 312). Thus, “using language as the starting point for investigation avoids making prejudgments about the so-called disorganized status of the group or the deviance of its members” (Maynard, 1988, p. 313). In terms of social diversity, language helps outsiders to understand how members of groups talk and act with each other and demonstrate problems for them. Language differences are of interest for immigrants, for it is an
important part of their lives in the host society and because it helps to explain how
trouble and problems emerge in their social lives.

“Language is a guide to ‘social reality’…Human beings do not live in the
objective world along, nor along in the world of social activity as ordinarily
understood, but very much at the mercy of the particular language which has
become the medium of expression for their society. It is quite an illusion to
imagine that one adjusts to reality essentially without the use of language and that
language is merely an incidental means of solving problems of communication or
reflection. The fact of the matter is that the ‘real world’ is to a large extent
unconsciously built up on the language habits of the group. No two languages are
ever sufficiently similar to be considered as representing the same social reality.
The worlds in which different societies live are distinct worlds, not merely the
same world with different labels attached…we see and hear and otherwise
experience very largely as we do because the language habits of our community
predispose certain choices of interpretation.” (Whorf, in Mandelbaum, 1949, p.
162)

*Language and Symbolic Interaction*

Symbolic interaction, one of the major theoretical perspectives in sociology,
provides the theoretical underpinnings for traditional understandings of language. From
the perspective of symbolic interactionism, language has an important function in the
process of symbolic communication, development of the self, and construction of identity through interaction with others.

Symbolic interactionism permits a social psychology that allows individuals a role in shaping their own behavior: “accords priority to the individual choosing his or her social behavior in opposition to the structural-functionalist view that such behavior is typically determined by structural influences (Cockerham, 2007, p18).” As a leading agency-oriented theoretical paradigm, symbolic interaction provides a social psychological model for investigating small group behavior. This has recently been used in the applications of sociology and medical sociology.

Herbert Blumer coined the term “symbolic interactionism” and captured an influential statement of central premises of symbolic interaction (1969): human beings act toward things or situations on the basis of the meanings those things or situations have for them; these meanings are derived from the social interactions individuals have with others; and these meanings are modified through interpretation used by individuals in dealing with the things or situations they encounter.

In other words, things as such have no inherent meaning, but derive from the responses individuals make to them. In this sense, humans live in a world of symbols that interact through symbolic communication. In brief, symbolic interactionists claim that social participants are constantly negotiating and communicating a shared definition of the situation: taking each other’s viewpoints into account and interpreting each other’s behavior. Each participant then imaginatively constructs a possible line of interaction as “taking the role” which, in turn, affects the definition in social situation (Mead, 1934; Blumer, 1969; Manis and Meltzer, 1978; Rose, 1962).
A basic proposition of symbolic interactionism is that humans are living in a world of social reality constructed by individuals interacting with each other based on shared meaning. Meaning is the central principle in human behaviors: meaning is conceived as social products arising though the defining acts of individuals as they engage in social interactions which may have influences upon them in turn. According to these investigators, humans are self-conscious beings possessing selves and minds, both of which are conceived as social products and developed within the social process. Such activity is made possible through the use of language – “a group of significant symbols which allow one to employ the standpoints of others in order to view oneself as an object – to see oneself as others do” (Hermand and Reynolds, 1994, p 2).

Language is a complete set of symbols that individuals used intentionally to communicate and represent something. It gives humans a means by which to negotiate meaning through symbols. Mead believed that it is by engaging in speech acts with others – “symbolic interaction”, that humans come to identify meaning, or naming, and develop discourse. Language, based on a mental conversation or dialogue that requires role taking, modifies each individual’s interpretation of symbols. This quality of symbols makes communication possibilities infinitely greater, complex ideas possible, and thinking a central characteristic of the symbol user (Charon, 2002; Karp, et. al. 2005)

Mead (1934) described symbolic communication as initiated by one individual giving a significant symbol, which arouses a similar response both in the speaker and those to whom it is addressed, because the spoken verbal symbol (language) is heard simultaneously by both parties. Thus, significant symbols may be behavioral, but humans rely for the most part on language. “Humans produce responses in themselves
and others by using words, and thus signaling their intentions or plans of action to one another. The key to this process is the fact that significant symbol that is the basis for shared meanings in human life” (Karp, et. al. 2005, p 41). “[B]y thus arousing the same or a very similar response in self and other, both see things in the same way” (Karp, et. al. 2005, p 41).

Language is an aspect of human culture. Only humans can assign meanings to symbols. Symbolic communication involves people’s ongoing interpretations of each other’s action. “[T]he major distinction between humans and nonhumans is that only human beings possess a culture, or collectively shared ideas, concepts, beliefs, and knowledge which can be transmitted to succeeding generations” (Karp, et. al. 2005, p 36). Culture, as a symbolic creation of biological instinct, involves language as an important role in its construction. Language provides a means for persons to present themselves to each other on a symbolic level. Symbolic communication helps us conceptualize the social world in which we live and helps us coordinate our actions with others through social shared meanings.

Another important concept by Mead, the self, underlies the importance of language of from the perspective of symbolic interaction. The view of oneself derived from the ability to evaluate one’s behaviors from the point of view of others, ultimately forms the standards of society as a whole. The self is capable of both action as a subject and then, through an ongoing internal conversation, reflection on its actions as an object. In brief, the self is formed and transformed through interaction with others. “A self idea… seems to have three principal elements: the imagination of our appearance to the
other person; the imagination of his [sic] judgment of that appearance; and some sort of self-feeing, such as pride or mortification” (Cooley, 1902, p 152).

The self, referring to the human being as an individual may act socially toward himself, just as toward others. The self is formed in the same way as other objects through the definition made by others. Language is essential in this process: “[i]It is through language that the child acquires the meanings and definitions of those around him. By learning the symbols of his groups, he comes to internalize their definition of events or things, including their definition of his own conduct” (Herman and Reynolds, 1994, p42).

The social development of the mind is facilitated only through the process of communication and, especially through the use of language. Language enables individuals to incorporate into their own selves the beliefs, sentiments, and thoughts taken from their respective social environments (Dewey, 1896).

The basic premise of symbolic interaction is that people attach symbolic meaning to objects, and meanings are developed and transmitted through interaction. Thus, language plays a central part in the interaction, leading to its function in the interactive construction of an important part of social psychology -- identity. Goffman (1959) and McCall & Simmons (1978) emphasize that identities are strategic social constructions created through interaction: “Negotiations about who people are are fundamental to developing mutual definitions of situations; these negotiation entails self-presentation or impression management” (Howard, 2000, p 371).

Howard (2000) articulated the interactionist view about the important contribution of language on identity and identity construction and communication through language.
People produce identity through their talk in everyday interactions. Identity changes as interactions proceed. Some studies have focused on populations with identity struggles, such as homeless people (Anderson et al, 1994) and AIDS patients (Cheery, 1995). These respondents often use language to avoid stigmatization and guide the social consequences of the discredited status. In contrast, the ethnic minorities indicated that speakers not only avow contradictory identities but also invoke both group distinctiveness and similarity (Antaki et. al., 1996).

*Language and Bourdieu*

Symbolic interactionists have argued that language is an important part of everyday symbolic interaction. Pierre Bourdieu, an acclaimed French sociologist, wrote widely about language and contributed significantly to the literature of sociology. Bourdieu’s book *Distinction* (1984) has drawn the attention of medical sociology and his book *Language and Symbolic Power* has an in-depth discussion of language. His most far-reaching engagement with language was to relate to broader sociological concepts, including habitus, field, social capital, and symbolic power. By elaborating on language, Bourdieu entered into these aspects of social life.

*Habitus*

One of the concepts developed by Bourdieu was his idea of the habitus. He defined habitus as “systems of durable, transposable dispositions, structured structures
predisposed to operate as structuring structures, that is, as principles which generate and organize practices and representations that can be objectively adapted to their outcomes without presupposing a conscious aiming at ends or an express mastery of the operations necessary in order to attain them” (Bourdieu, 1977, p. 53). It explained the social embedding of the actor, that actors are socially formed with relatively stable orientations and habitual ways of acting. Through the habitus, society is impressed on the individual, both mental habits and corporeal habits. That is, “the habitus serves as a cognitive map or set of perceptions in the mind that routinely guides and evaluates a person’s choices and options. It provides enduring dispositions toward acting deemed appropriate by a person in particular social situation and settings. Included are dispositions that can be carried out even without giving them a great deal of thought in advance. They are simply habitual ways of acting when performing routine tasks” (Cockerham, 2007, p. 70).

Relating to language, “the habitus bears on the social definition of the speaker, mentally and physically, on routine ways of speaking, on gesture and embodied communicative actions, and on the perspective inculcated through ordinary referential practice in a given language” (Ochs, 1996, Hanks, 2005, p. 69). “[t]he habitus of the [creator] speaker as a system of schemes constantly orients choices which, while not deliberate are nonetheless systematic, which without being ordered and organized expressly in relation to an ultimate end, are nonetheless bearers of a sort of finality which reveals itself only post festum: that self-constitution of a system of works united by an ensemble of significant relations is accomplished in and through the association of contingency and sense which is made, unmade and remade ceaselessly according to
principles that are all the more constant that they more completely escape consciousness…” (Bourdieu, 1974, pp. 161-162).

Language is a socially constructed habitus. Habitus corresponds to the social formation of speakers, including language use and social value evaluation, and it embodies expression. In Bourdieu’s view, every speech act relates to the linguistic capacity of individual speakers to their given social capacity in certain situation:

“Every speech act and, more generally, every action, is a conjuncture, an encounter between independent causal series. On the one hand, there are the socially constructed dispositions of the linguistic habitus, which imply a certain propensity to speak and to say determinate things (the expressive interest) and a certain capacity to speak, which involves both the linguistic capacity to generate an infinite number of grammatically correct discourses, and the social capacity to use this competence adequately in a determinate situation. On the other hand, there are the structures of the linguistic market, which impose themselves as a system of specific sanctions and censorship” (Bourdieu, 1991, p. 37).

Incorporating Weber’s concepts of life chances and life choices, health lifestyles are “collective patterns of health-related behaviors based on choices from option available to people according to their life chances” (Cockerham, 2007, p. 56). In his book, Cockerham (2007) delineates Bourdieu’s concept of habitus and claims that it is the centerpiece of the healthy lifestyle model. This theoretical model presents that structural variables provide social context for socialization and experience that influences
life choices and collectively constitutes life chances. Life choices and life chances interact and commission the formation of habitus and practice action, involving health-related actions that constitute patterns of health lifestyle. Lifestyle re-enacts in reproduction or modification through feedback to the habitus.

Health lifestyles are “personal routines that merge into an aggregate form representative of specific groups and classes” (Cockerham, 2007, pp. 57-58). The practice of health lifestyles can be integrated into routine behavior acted out without appreciable thinking once established in habitus. As Cockerham observes: “people tend to adopt generalized strategies … oriented toward practical ends in routine situation that they can habitually follow without stopping to analyze them” (Cockerham, 2007, p. 71). In the health lifestyle model, social structure variables are (1) class circumstance; (2) age, gender, and race/ethnicity; (3) collectivities; and (4) living conditions. These social factors, along with the interplay of life choices and life chances, produce habitus which result in health-lifestyle related practices, such as alcohol use, smoking, diet, and exercise. The loop goes back to the habitus, which again affects practices.

In the loop, when habitus are acted upon, they tend to produce or modify the habitus from which they were derived. Immigrants who wish to be part of a host society are required to adopt the appropriate lifestyle accepted by people who are already part of the group. The newly received information through language about health lifestyle helps to modify their practices. Familiarity with the host language helps immigrants to adapt to the new society; being unable to communicate slows down or limits the process. For example, being unable to communicate presents embarrassing socialization experiences; may put an immigrant in a lower socioeconomic status or class; may restrict an individual
to poor living conditions where language demand is not strong; and may limit an individual’s opportunity to gain knowledge of life chances and life choices. Language difficulties also allow individuals to retain old habits of lifestyle and constrain them from learning about the health lifestyle of the new society. All of this feedback to the habitus consequently affects lifestyle practices of immigrants in regard to healthy living.

Field, Symbolic Power, and Social Capital

According to Bourdieu, the habitus emerges specifically in the interaction between individuals and the field, and it can not be apart from the field. From the language perspective, field, symbolic power of language, and social capital are mutually involved. These concepts will be discussed together to elaborate on how language matters in sociology and medical sociology.

Field is the key notion introduced by Bourdieu. For him, field can be understood as a social arena in which people struggle or compete for desirable resources, or a system of social positions, structured internally in terms of a power relationship. Hanks (2005) considered that Bourdieu’s field is a form of social organization of (1) a configuration of social roles, agent positions, and the structures they fit into and (2) the historical process in which those positions are actually taken up, occupied by both individual and collective actors (p. 72). Thus, fields are dynamic and relate to one another by opposition.

From the perspective of practice, speaking and discourse are formed by the field, and the field is a formative input that shapes the individual through the habitus (Hanks,
According to the interpretation of Hanks (2005), speaking is a way to take up positions in social fields, but speakers have trajectories over the course of which they pursue various values. Thus, the speaker who produces discourse in a field is shaped by the positions he/she takes up and the discourse forms they call forth. As defined and interpreted by Jenkins (2002): “the field is the crucial mediating context wherein external factors – changing circumstance – are brought to bear upon individual practice and institutions. The logic, politics and structure of the field shape and channel the manners in which ‘external determinations’ affect what goes on within the field, making them appear a part of the ongoing history and operation of the field itself.”

Because there are many fields in any society, Bourdieu (1977, 1991) calls homology – similarity of organization – to explain why fields are related to each other. Access to capital is different in different fields: people at marginal exclusion, like an outsider to the field of insiders as the poor are to the field of economy. Hanks (2005) interprets linguistic practice as the field that is the socially defined context of utterance. In the course of speaking, interactants take up and vacate positions, and they act within them and upon them. The process constrains participants’ differential access to position. Compared with outsiders, immigrants are at marginal exclusion of the host society. Being unable to understand the language may sustain their engagement in specific fields and restrain the process of assimilation and adaptation into the new society.

By engaging in linguistic practice, an individual is fitted closely to his or her position in the field that is traceable to the pervasive effects of symbolic power: the “invisible power which can be exercised only with the complicity of those who do not want to know that they are subject to it, or even that they themselves exercise it”
Hanks (2005) explained that native speakers are largely unaware of the systematic working of their language, but routine language use provides ready-made terms in which actors apprehend and represent reality. Thus, the speaker is embedded in a symbolic system of distinction and evaluation by speaking a language. Through engaging in speaking a language, actors are complicit with the pervasive power relations in which their language is embedded. Hence competence in the standard language, as refined or proper speaking, is often rationalized as a form of symbolic capital.

Bourdieu (1991) identified symbolic capital to universally recognized benefits from three main types of capital: economic, cultural, and social. The latter, social capital, is one of the most important concepts in sociology and medical sociology, because social capital can cause problems in health and illness, as determined by studies in medical sociology. Social capital is mutually connected with fields and symbolic power. According to Bourdieu’s (1986) definition, social capital consists of relationships and networks of influence and support that people draw benefit for their social position (field); or it is a membership in formal and informal groups that gives privileged access (symbolic power) to different types of resources. While social capital is widely considered as a social structure of cooperative relationships and positive network within a neighborhood for reciprocity and mutual aid, there has not been a generally accepted definition for this concept.

As the first sociologist to formulate language as a social capital, Bourdieu (1986, 1991) contributed by providing a framework of conceptualizing social capital, even though he was not concerned specifically with health. He defined 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 and recognition – or in other rewords, to membership in a group – which provides each of its members with the backing of the collectively-own capital, a ‘credential’ which entitles them to credit, in the various sense of the world” (Bourdieu, 1986, p. 248). Bourdieu measured the amount of social capital by (1) the size of the network whose connections the person can effectively mobilize and (2) the volume of capital possessed by the person that he or she can claim through connections to those networks. Bourdieu’s concept of social capital is consistent with that of Lin, who conceptualized that social capital is quantity and/or quality of resources that an actor can access or use through its location in a social network (Lin, 2000), and that “social capital enhances the likelihood of instrumental returns, such as better jobs, earlier promotions, higher earning or bonuses, and expressive returns, such as better mental health” (Lin, 2000, p. 786).

Language is an important social capital, or at least a bridge to social capital, especially for immigrants in the host society. With communicable language, an individual is able to enjoy access to information from and influence in diverse socioeconomic strata and positions, but an individual with no language ability would have a relatively restricted variety of information and influence. The more linguistic capital that speakers possess, the more likely they are able to exploit the social life to their advantage, and thereby secure a better position in the social space (Bourdieu, 1991). For a better social position, a speaker has to possess the linguistic ability to speak the correct expression in the correct place.
A specific discussion of how social capital affects health was elaborated three ways (Veenstra et al., 2005):

“First, it may influence health directly through the extension of a community’s or social network’s resources to an individual, such as through the provision of quality medical services or caring. Second, it may influence health indirectly through its effects on the larger social, economic, political, and physical environment that serve as health determinants for the population. And third, social capital may interact with other health determinants at the individual or group level to promote health” (Cited from Cockerham, 2007, p. 169).

Relating to field, symbolic power, and social capital, the importance of language ability in health outcomes for immigrants is obvious. First, being unable to speak the native language limits immigrants’ access to social network resources, such as quality medical service and care, most of which are provided in the host language. Second, it may influence health indirectly on a larger scale, such as living conditions, working environment, social discrimination, and lower socioeconomic status. Third, language problems may interact with other health determinants, such as education and lifestyle.

In conclusion, Bourdieu’s concepts of habitus, field, symbolic power, and social capital have identified the importance of language and have linked language to other social factors that have effects on health-related problems. The resulting causal chain runs from language to social factors, such as lifestyle, living and working conditions, socioeconomic status, and poverty, to disease, illness, and other health-related problems.
Following this logic, immigrants who have language difficulties in the host country may face poverty, unhealthy lifestyles, poor living neighborhoods working conditions, and lower socioeconomic status, all of which may lead the immigrant on a pathway to disease, illness, or other health problems. Although considerable work needs to be done, the possible causal relationship is displayed in the next figure. The relationship between language difficulty and health problems is a promising avenue of research related to immigrants.

The Disablement Process and Limited English Language Proficiency

While there have been many studies on disabilities in the general population, especially for older members, not much information is available for adult Chinese-, Japanese-, and Korean-Americans. Thus, it is not clear how the process of disablement works in adult immigrants. Though the pathways to disability are not expected to differ for these adults compared to other groups, it is important to examine how these immigrants become disabled.

About 13.5% of adult Chinese-Americans have some kind of disability. The percentages are 12.9% and 15.8% for adult Japanese-Americans and adult Korean-Americans, respectively (Table 1). The percentages are expected to be higher when elderly Asian-Americans are included, because older people generally have a higher prevalence of disability. Compared to the 20% disability prevalence rate in the general population of the US, adult Chinese-, Japanese-, and Korean-Americans may not have a better disability profile relative to other race groups; perhaps it is worse. Moreover,
previous research indicates that adult Chinese-, Japanese-, and Korean-Americans have a high prevalence of limited English language proficiency. Their languages are the most linguistically distanced from English, which makes it difficult for them to reach English language proficiency (Chiswick, 2004). Since the focus of the present research is on disabilities among adult Chinese-, Japanese-, and Korean-Americans, the Disablement Process was applied among them, focusing on the effects of limited English language proficiency.

*Limited Language Proficiency is a Stressor: a Risk Factor of Disability*

In the Disablement Process model, Verbrugge and Jette (2004) defined risk factors in a standard epidemiological manner. Risk factors exist at or before the onset of the disablement and are usually long-term or permanent features of the individual. Risk factors can be any social, demographic, environmental, or biological characteristics that “can affect the presence and severity of impairment, functional limitation, and disability” (Verbrugge & Jette, 2004, p. 8).

Limited language proficiency is a risk factor of disability for immigrants. As immigrants move into the host country, they may encounter the barrier of language deficiency. This applies especially to Chinese-, Japanese-, and Korean-Americans, whose native languages are quite different from English. Given the differences in the structure of Asian languages and English, it is especially difficult for adult Chinese-, Japanese-, and Korean-Americans to learn English. Even though an immigrant’s grammar and vocabulary skills may be enough to allow comprehension, it is unlikely that an immigrant
will reach English language proficiency equivalent to native English speakers. Long (1990) found that most people retain their original accents when they acquire a second language after childhood. Although children will not retain an accent if they acquire a new language before the age of seven, adolescents of seventeen or older will have little chance of an accent-free second language (Tahta et al., 1981). Thus, it is likely that limited English language proficiency will accompany immigrants for years, if not for their whole life.

There are no empirical studies relevant to whether limited language proficiency leads to disability. Because his or her native language is not English, however, a foreign-born immigrant would need to learn the host country language before or after the immigration process. A native-born person may not reach English language proficiency until he or she starts to communicate with English speakers. In other words, an immigrant is born with limited language proficiency for the host country. Since a person can not have a disability until he or she is born, it is common sense that limited language proficiency may exist at the outset of the disablement process, if not before.

Limited language proficiency can induce stress, which can promote physiological responses in the body. For vulnerable people, the stress may promote ill health. When the illness is prolonged, disability can occur. Stress can be defined as “a heightened mind-body reaction to stimuli inducing fear or anxiety in the individual” (Cockerham, 1998, p. 62). Stress, which can lead to serious illness, disability, and even death, “typically starts with a situation that people find threatening or burdensome” (Cockerham, 1998, p. 62). Limited language proficiency can induce stressful situations and lead to
stress by creating anxiety, embarrassment, fear, confusion, discrimination and other psychological discomfort.

The experience of stress is accompanied by a physiological fight-or-flight response. The hypothalamus of the brain activates the sympathetic division of the autonomic nervous system, which in turn stimulates the inner part of the adrenal glands. Hormones, including epinephrine and norepinephrine are released by these glands (Cockerham, 1998). An explanation of the general adaptation syndrome provided by Selye (1956) has three stages: alarm, resistance, and exhaustion. According to Selye (1956), an organism first recognizes a threatening situation, and the resistance stage occurs when stress continues. If stress is prolonged, organisms reach exhaustion. In this stage, organisms become more susceptible to disease. When the disease becomes chronic, disability occurs.

*Medical Models and the Stress Process*

Because stress is highly complex and involves a variety of causal factors, it is necessary to review some of the theoretical models that have been formulated to explain the process of distress. There have been no satisfactory explanations offered to account for the diverse variations in the cause and description of this process. There are different competing viewpoints, which show incomplete understanding (Cockerham, 1992). It is the intent here to review only those models that are the most influential: the medical model and social stress model.

The medical model is a prevailing view of pathology in the medial world. Generally speaking, this model attributes mental problems to physiological, biochemical,
or genetic causes that can be treated through medical procedures (Cockerham, 1992). In this sense, psychological distress is regarded as a disease in the same category as any other physical illness and is defined as such by medical practitioners. That is, psychological distress is some kind of neurological or physiological defect responsible for disordered thinking and behavior, requiring treatment through medical care (Carson, Butcher & Mineka, 2000). Psychological distress is considered to be the deviation from some objective healthy state of being; it is negative feelings of restlessness, depression, anger, anxiety, loneliness, isolation and problematic interpersonal relationships (Burnette & Mui, 1997). Medical procedures, in this regard, are considered to be an attempt to achieve and maintain a mental state in a relatively normal range of behavior in daily social interaction and to allow functioning as normal as possible.

Even though the medical model remains influential, it ignores many psychological and sociological correlates and external environments that provoke abnormalities. Thus, a promising and active arena of research arises: the social stress model. This model incorporates aspects of medical and sociological concepts and focuses primarily on the effects of stressful life events that may occur routinely and accumulate overtime to trigger a stress-induced mental disorder. The medical factor refers to possible genetic triggering of biochemical abnormalities; the social factor refers to stress-induced social interaction between people (Moss, 1973). Mental breakdown is induced when there is a gap between environmental demands and person’s capability to respond. In this sense, stress can serve as cues to elicit fear or anxiety responses, which can result in a psychophysiological reaction that causes changes in body tissues and promote the onset of physical disorders, such as heart disease, hypertension, peptic ulcer,
muscular pain, and migraine headaches (Cockerham, 1992). In turn, both mental and physical dysfunctions may be expected in a stressed individual.

Many studies of social stress focus on the ways in which social stressors from various sources result in ill health. In 1981, Pearlin and his colleagues published a basic conceptual framework of the stress process. They provided a generalized view of the social processes for the occurrence of stress, including social origins for stress, multiple roles for the intervention of coping resources, the differentiation of stressors into types that can be interrelated in sequences of exposure over time, and range of interrelated outcomes, one of which is mental health (Pearlin, et al., 1981). Pearlin's Stress Process Model portrays the relationship between social stress and possible negative mental health outcomes. With three major constructs: stressors, mediator or coping resources, and distress or health outcome, the model outlines the consequences of social stressors, which vary substantially across individuals and social groups. It also explains how such variations are determined by psychological and social coping resources, including personality, coping efforts and skills, and social supports.

Pearlin’s social stress model is integrative and multidimensional, showing how stress works. First, the stress process model explicitly demonstrated the central role of chronic stressors, in addition to the usual emphasis on life event stressors, operating in a sequence of stress accumulation. Second, this model is among the few that consider the roles of social support and personal resources as buffers in the stress process. In addition, this model emphasizes that stressors are socially embedded: they arise from the conditions that accompany social position and social advantage.
The stress process model was significant because it allowed a larger perspective, including both social and personal coping resources and coexisting forms of context – social, situational, and biographical – in determining the stress potential of putative stressors (Wheaton, 1999). A pioneering work on the importance of context (Brown, 1974) stated that contextual factors must be considered in specifying the actual stressfulness of events. Wheaton (1999) distinguished at least three uses of context, each of which may contribute to the potential for stress: (1) current life context, described in terms of the conditions, demands, and attendant stressors in current social roles; (2) biographical context, referring to the effect of past experience, both in terms of timing and content, on the “meaning” of current stress; and (3) social context, referring to the influence of higher units of analysis – neighborhood, school, city, country – on the meaning of current stress.

Overall, the stress process model provides us a conceptual framework that allows determination of whether the stressor is actually stressful. For such determinations, the context and coping capacities are brought to bear on the event of interest.

*Limited Language Proficiency is a Stressor*

Limited language proficiency is a factor likely to create stressful social situations that may increase the occurrence of disability. In the US, immigrants whose native languages are not English are the most sensitive population suffering from limited
English language proficiency; they are consequently likely to have an increased prevalence of disability.

Limited language proficiency is a stressor. As identified by Pearlin (1989), there are two types of social stressors: life events and chronic strains, the latter of which are more enduring or recurrent life problems. Even though events and strains converge and provide meaningful contexts for each other (Pearlin, 1989), having limited language proficiency can be referred to as a chronic strain which is a “enduring problem, conflicts and threat that people face in their daily life” (Pearlin, 1989, p. 245). Having limited language proficiency can account for at least three types of role strains: first, role overload is “a condition that exists when demands on energy and stamina exceed the individual’s capacities” (Pearlin, 1989, p. 245). This could happen in occupations and employment where language proficiency is required or no same language caregiver is available for seriously impaired people. Second, interpersonal conflicts within role sets entail “problems and difficulties that arise among those who interact with each other in sets of complementary roles” (Pearlin, 1989, p. 245). This is likely to happen to poor English speakers in worker-supervisor situations or to parents with limited language proficiency whose children are in English-speaking public schools. Third, role capacity exists “when one is an unwilling incumbent of a role” (Pearlin, 1989, p. 245). Immigrants experiencing this type of strain (including those who have limited language proficiency) prefer to live in an ethnic community for a more comfortable linguistic environment, where the host language is optional for residence and employment opportunities. In the US, where English is the host language, “a person who does not speak English well is potentially limited in his or her efforts to obtain schooling,
employment, and social or health services” (Burr & Mutchler, 2003, p. 83). Without language proficiency, an immigrant will be in stressful situations, due to inability to complete his or her roles, obligations, and other daily functions in the host society.

The above discussion of limited language proficiency being a stressor is based on the assumption that it occurs singly; in fact, its effect is more complicated. When an immigrant is exposed to limited language proficiency, it is likely that he or she will be exposed to other stressors as well, as has been implied by Pearlin (1989) in his view of primary and secondary stressors.

Based on the presumed order in the stress process, Pearlin distinguishes primary and secondary stressors. These names are not on the basis of their importance to the process, because secondary stressors may produce even more intense stress than primary stressors. “Whereas primary stressors can be conceptualized as occurring first in experience, secondary stressors come about as a consequence of the primary stressor” (Pearlin, 1989, p. 248). “Thus clusters of stressors may develop, each cluster made up of a variety of events and strains” (Pearlin, 1989, p. 247). These are intended to illustrate that limited language proficiency is a complicated case of stressors. During the process of immigration, limited language proficiency, a primary stressor, is likely to occur first. As a consequence, secondary stressors arise from the primary stressor, such as unemployment, lack of health care services, discrimination, ethnic identity, acculturative difficulties, and other uncomfortable psychological problems. These secondary stressors produce negative outcomes in addition to those caused by limited language proficiency. These stressors, both primary and secondary, affect the health, well-being, and disability status of immigrants.
Limited proficiency in the host country’s dominant language is the most important migration-related stressor (Ying, 1996; Liebkind & Jasinskaja-Lahti, 2000). This is mainly because limited language proficiency diminishes the immigrant’s ability to function effectively in the new setting (Ying, 1996). Immigrants with more language problems are less satisfied with their lives. A study by Noel et al. (1996) found that higher levels of self-perceived second-language proficiency are related to a sense of personal control, self-esteem, and less stress. Liebkind and Jasinskaja-Lahti (2000), who studied immigrant adolescents in Finland, found that most indices of psychological well-being are negatively related to perceived discrimination, and self-esteem and sense of mastery are positively related to second-language proficiency.

Other studies, focusing on refugees in the US, led to a theory of a causal relationship between the feelings of social isolation, hopelessness, and helplessness faced in resettlement with limited language proficiency. Lack of English skills among Southeast Asian refugees was predictive of demoralization and depression (Nicassio et al., 1986; Ying & Akursu, 1997). Although Wooden (1991) suggested a difference in proficiency in English language skills between refugees and non-refugee immigrants, poorer English skills placed refugees at a disadvantage in the labor markets, which led to mental health problems (Wooden, 1991; Westermeyer et al., 1989; Westermeyer & Her, 1990; Chung & Kagawa-Singer, 1993; Hinton et al., 1997).

Immigration is stressful. When individuals interface with a new host society, they face challenges in adjusting to language, customs, laws, rules, and lifestyle. **Acculturation** has been defined as “those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with
subsequent changes in the original culture patterns of either or both groups” (Berry, 1992, p 271 ). These include physical, biological, cultural, social relationship, and psychological changes (Berry & Kim, 1987). Behavior changes and reduction in mental health status generally occur as individuals attempt to adapt to their new life in the host country (Berry & Kim, 1987).

Acculturation is closely related to host language ability, and the best measures of acculturation are based on questions examining the level of language ability or proficiency (Olmedo & Padilla, 1978; Fraser et al. 1998, Marín & Gamba, 1996). Language use or language proficiency is an important indicator in both scale and non-scale measures of acculturation (Salya & Lauderdale, 2003). Language captures the most variation in acculturation (Vega et al., 1993), and language difficulty often emerges as a major stressor. Being unable to communicate with proficiency creates anxiety, embarrassment, fear, confusion, and other psychological discomfort, all of which are parts of acculturative stress.

*Acculturative stress* refers to stress in which “the stressors are identified as having their sources in the process of acculturation,” and it is accompanied by a particular set of stress behaviors, such as lowered mental health status with confusion, anxiety, depression, feelings of marginality and alienation, heightened psychosomatic symptom levels, and identity confusion (Berry & Kim, 1987, p. 492). Acculturative stress thus induces a reduction in the mental health status of individuals, along with causing physical changes and negative effects on other aspects of health (Berry & Kim, 1987).

Greater stress related to English proficiency predicted more symptoms of depression. Westermeyer et al. (1984) conducted a study of Hmong refugees in
Minnesota, using English language proficiency as an indicator of acculturation. At a 3.5-year follow-up, refugees who reported having no English language proficiency scored higher on the scale for depression symptoms than their counterparts. In contrast, as their English ability improved, individuals became more familiar with American culture and were better able to utilize available information. Hence, more acculturated individuals with better language proficiency have more knowledge about health and disease than those at a lower level of English proficiency (Marks, Garcia, & Solis, 1990; Organista, Organista, & Soloff, 1998).

Vega and Rumbaut (1991) identified two categories of stressors to which ethnic minorities are likely subjected during their immigration process: objective statuses and events, such as unemployment or a fragmented social network, and subjective factors, such as perception of unfair treatment or blocked opportunity. Both are related to limited language proficiency and are mutually entangled. For example, an immigrant would be likely to reside within an enclave of similar ethnicity that can shelter him or her from prejudice or discrimination of the mainstream of the host society. This leads to the next important perspective, discrimination, which faces immigrants with limited language proficiency.

Discrimination can be seen as a life event and a chronic stressor that directly relates to depression. “Discrimination is an intrinsic part of life in the US and affects minority groups on a daily basis. Discrimination is often invoked as the explanation for racial/ethnic gaps in education, employment, income, and other sociodemographic factors” (Finch et al., 2000, p. 297). Studies investigating the relationship between discrimination and health are not new. Discrimination correlates with psychological distress and a
lower level of psychological well-being and with higher levels of stress, anxiety, depression, and interpersonal sensitivity (Dion, Dion, & Pak, 1992; Dion & Earn, 1975; Moritsugu & Sue, 1983). Similarly, discrimination has physical effects of higher blood pressure, narrowing of coronary arteries, chronic health problems, and disability (Krieger, Sidney, & Coakley, 1999).

Related to acculturative stress and discrimination, social identity is another important factor in the relationship between language proficiency and health status of immigrants. There is considerable interest in language and social identity, which have been influential in developing an understanding of the relationship between limited language proficiency, stress, and health. Discrimination can cause stress, and discrimination-related stress is linked to health problems; this has been used to explain the poorer health among members of minorities (Williams & House, 1991; Williams, Spencer, & Jackson, 1999; James, Lovato, & Khoo, 1994). Social identity possibly correlates with stress and health and with self-esteem and collective esteem, value differences, social expressiveness, prejudice, and discrimination (James, Lovato, & Khoo, 1994).

The theory of identity and language can be traced to Bourdieu (1977), who focused on the relationship between identity and symbolic power. “Just as, at the level of relations between groups, a language is worth what those who speak it are worth, so too, at the level of interactions between individuals, speech always owes a major part of its value to the value of the person who utters it” (Bourdieu, 1977, p. 653). Because competence should include the “right to speak” or “the power to impose reception” (Bourdieu, 1977, p. 75) and because “the right to speak intersects in important ways with
language is also an investment in a learner’s own social identity” (Norton, 1997, p. 411).

The most notable theories of social identity were developed by the social
psychologist Tajfel (1974, 1981), who defined social identity as a part of an individual’s
self-concept which “derives from his knowledge of his membership of a social group (or
groups) together with the emotional significance attached to that membership” (Tajfel,
1974, p. 69). Thus, in order to change to an identity, an individual may need to change
group membership. Although the social identity theory has made contributions to the
understanding of social identity, it does not deal with multiple group memberships, such
as individuals that may belong to several ethnic groups that could be defined by language.
Rather, Tajfel maintains that the individual may wish to identify with a certain group in
specific contexts, such as speaking different languages in different situations (Hansen &
Liu, 2000).

Based on Tajfel’s theory, Giles and John (1987) developed an ethnolinguistic
identity theory and focused on the observation that language is a salient marker of group
membership and social identity. Individuals compare their own social group to out-
groups in order to achieve a positive social identity. Thus, one is likely to assimilate into
a group that is more positive, during which the individual may face linguistic adaptations
if a large number of members of a particular group assimilate into another to achieve a
more positive group identity. “Language develops between groups of people and
involves shared meanings, share expressions and shared function” (Dryden & Gile, 1987,
p. 124). Ethnolinguistic identity theory was developed in order to take into account
group motives in understanding the psychological climate of linguistic differences
between groups (Gile, Bourhis, & Tylor, 1977). “We categorize the social world and hence perceive ourselves as members of various groups” (Dryden & Gile, 1987, p. 125). Group members are defined by our social identity, which may be positive or negative, according to social comparison with relevant out-groups. Language may be a dimension for comparison between different groups. Fishman (1977) claimed that language can be the prime emotional component of identity for members of ethnic groups.

Other studies on language and social identity include those of Gumperz (1970, 1982) and Heller (1982, 1987, and 1988). The former believes that “social identity and ethnicity are in large part established and maintained through language” (Gumperz & Cook-Gumperz, 1982, p. 7); the latter concludes that “language is a symbol of ethnic identity, and language choice is a symbol of ethnic relations as well as a means of communication” (Heller, 1982, p. 308) and that languages “symbolize group identity and become emblems of that identity, especially when there is contact with other groups whose ways of being are different” (p. 3).

First, social identity processes can promote prejudice and discrimination (Allport, 1954; Tajfel & Turner, 1979). Frone, Russell, and Cooper (1990) found that perceived prejudice and discrimination were sources of stress for minority workers more than other stressors. Prejudice and discrimination also affect levels of esteem and can limit an individual’s opportunity to demonstrate competence and esteem-enhancing experiences (Grebler et al., 1970; Crocker & Major, 1989; James & Khoo, 1991). Second, the value differences promoted by social identity also help to trigger denigration of and discrimination against individuals which, consequently, exert effects on health by means of prejudice and discrimination (Fernandez, 1981; Greenberg, Pyszczynski, & Solomon,
Prominent value differences may damage an individual’s sense of self-esteem by contributing to the perception that he/she does not fit in with the dominant social and organizational systems (James, Lovato, & Khoo, 1994). Third, social identity limits social expressiveness of immigrants as minority individuals. A study by Fernandez (1981) in the workplace found that minority workers who spoke out about perceived problems tended to experience greater scrutiny and pressure for conformity. Therefore, social identity at least partially influences health by way of prejudice and discrimination, along with esteem, value differences, and social expressiveness, all of which tend to be entangled.

Within the scope of social identity, an issue an immigrant faces in the host country is ethnic identity. Because of the role of ethnic identity in psychological well-being, it is important to understand the variables that contribute to its development and maintenance. Research on ethnic identity has been conceptualized in a variety of ways. Two theoretically based elements to ethnic identity support the views of a positive relationship between language proficiency and psychological health well-being: a group membership component and a development component. Phinney (1992) termed the first component *ethnic affirmation and belonging*, which is based on social identity theory. In this way, ethnic identity is a subjective sense of belonging to an ethnic group and identification with the feeling and attitudes that accompany this sense of group membership (Phinney, 1990; Phinney, 1992). People strive to achieve or maintain a positive social identity, which is enhanced the psychological well-being accompanying ethnic group membership. If ethnic identity is difficult to achieve, self-concept is under pressure. The second component is involved in the developmental process of exploration.
of ethnic identity. Most minority youths explore the meaning of being a member of an ethnic group within a large society, the process of which is assumed to include positive feelings about one’s group and to be a source of personal strength and positive self-evaluation (Phinney, 1989; Phinney & Kohatsu, 1997). Language is perhaps the greatest contributor to ethnic identity (Phinney et al., 2000).

Even though ethnic identity was brought up to discuss ethnic language retention, this also applies to immigrants of any age who experience host language difficulties during the immigration process. An individual does not have a sense of belonging if he or she does not speak the same language. Thus, if an immigrant does not speak the host language in the new society, he or she will not have a sense of belonging to or social identity of the host society. In the US, acquisition of English has been assumed to be essential for the integration of immigrants and their assimilation into American society. Proficiency in the host language by immigrants is considered a marker for belonging in the host society. In the case of unsatisfactory social identity due to limited English language proficiency, the immigrant’s self-concept is under pressure. Also, during the process of assimilation or integration, immigrants explore the meaning of being a member of the new society. Limited host language proficiency may cause decreased personal strength and negative self-evaluation.

Another basis for this thought comes from work on immigrant acculturation. Berry (1990, 1997) introduced a two-dimensional model of acculturation to identify four acculturation strategies: integration, assimilation, separation, and marginalization. These were derived by yes or no answers to two questions: Is it considered to be of value to maintain one’s cultural heritage? And is it considered to be of value to develop
relationships with the larger society? Studies show that integration, defined by positive answers to both questions, is the most adaptive mode of acculturation and the most conducive to the immigrants’ well-being, whereas marginalization, defined by negative answers to both questions, is worse (Berry, 1997).

Based on the analogy to this two-dimensional model of acculturation, Vedder (2005) distinguished four types of bilingualism of immigrant adolescents in the Netherlands: integration (strong in both languages), assimilation (weak proficiency in ethnic language, strong proficiency in the host language), separation (strong in ethnic language, weak proficiency in the host language), and marginalization (weak proficiency in either language). Adaptation of immigrants was more positive to the extent that they were more proficient in the host language; and host language proficiency predicted students’ self-esteem. In addition, immigrants with a proficiency in both the host language and ethnic language had a better psychological and sociocultural adaptation than immigrants who were weak in one or both languages.

In a summary, limited language proficiency is a possible risk factor in the process of disablement. In the host society, acculturative stress, discrimination, and social identity related to limited language proficiency are stressors, as well as limited language proficiency itself. These stressors, which are overlapping during acculturation process, predispose immigrants of any age to the disadvantages of pathology, impairment, functional limitations, and disability. These stressful situations affect the mental and physical health of immigrants and, if the negative effects are prolonged, may lead to disability.
Figure 4. A Model of The Disablement Process Applied to Limited English Language Proficiency

EXTRA-INDIVIDUAL FACTORS

Family characteristics and community characteristics

THE MAIN PATHWAY

PATHOLOGY → IMPAIRMENTS → FUNCTIONAL LIMITATIONS → DISABILITY

RISK FACTORS:

The limited language proficiency and others

INTRA-INDIVIDUAL FACTORS

Individual characteristic
“A lack of satisfying and quality communication can have serious implications for our psychological well-being and physical health” (Dryden & Giles, 1987). For people who immigrate into the US, the demands of language ability and cultural adjustment are inescapable. Limited English language proficiency continues to act as an important stressor, until the immigrant is acculturated into the host country with a full mastery of English. Even though some adult immigrants may attain adequate language abilities for work and ordinary social functions, however, they never reach social fluency. The situation is even more difficult for elderly immigrants, who seldom reach host language proficiency (Westermeyer, 1989).

**Intervention or Exacerbation?**

According to Verbrugge and Jette (1994), interventions and exacerbators co-exist in the Disablement Process. The locus of action for these factors can be intra-individual, extra-individual, or both. Inserted during the process in order to avoid, retard or reverse outcomes are medical interventions, working on pathology and impairments; personal and allied health profession interventions working on functional limitations and disabilities; and societal interventions, working on disabilities. To the contrary, exacerbators can prompt or maintain dysfunctions. Unlike interventions, exacerbators can happen during disablement or they can be predisposing. Certain interventions, such as drugs intended to cure a disease, but which have side effects, can simultaneously be exacerbators.
There is little research on disability-related factors regarding limited language proficiency. Nevertheless, the available literature on segregation and health care service provides information relevant to interventions and exacerbators of the disablement process.

**Social Factors**

Segregation is an issue during the process of immigrant acculturation. The differentiation of two or more population groups among subunits of a given population can be divided along lines that are racial/ethnic or associated with language (Acevedo-Garcia & Lochner, 2003, p. 265). An immigrant tends to be more assimilated and acculturated if he or she has learned to speak English. It is generally accepted that most native Americans speak English but no other language. In certain geographical areas, the ability to speak English can account for the segregation of immigrant groups from resident Americans. An isolated group would have less reason and fewer opportunities to learn English than a group widely dispersed among resident Americans.

Segregation sorts population groups into various neighborhoods and contexts, thus shaping the living environment at the neighborhood level (Acevedo-Garcia & Lochner, 2003). Studies of the effects of segregation on health have been primarily focused on the health status of the black population (Yankauer, 1950). However, there is now interest in the health consequences of residential segregation for immigrant groups. Conclusions on the effects of segregation have been inconsistent. Some investigators argue that immigrants who have not mastered English may be residually isolated and
less aware of cultural nuances and the language of individual-level discrimination than those who have a mastery of English (Finch et al., 2000). Isolation could lead to better mental health for minorities living in predominately black neighborhoods because those living in outside areas may experience hostility and discrimination (Kelly & Schauffler, 1996).

Sociological evidence indicates that segregation affects the health of minorities through the neighborhood disadvantage of poverty concentration, substandard housing, high unemployment rates, and low wages, all of which influence health outcomes (LaVeist, 1996; Williams, 1996, 1997). By creating feeling of being discriminated against, unfulfilled, and marginalized, segregation also has effects on health outcomes through individual socioeconomic attainment of minorities. Among African-Americans, segregation is aligned with high rates of teenage pregnancy and with risk of unemployment and criminality (Massey & Shibuya, 1995).

In short, segregation has opposing effects. On one hand, may shelter immigrants with limited language proficiency from discrimination by the outside world; on the other hand, it may trap immigrants inside ethnic enclaves, which in turn discourage immigrants from improving their English skills and integrating into the society.

Another disablement-related factor is medical care. Disability typically begins with the onset of a chronic disease or an acute situation. By utilizing health care services, people may reduce the possibility of developing a disability. For immigrants, however, limited language proficiency may restrict their access to health care services and reduce the quality of health care.
The effect of language proficiency on health care can be understood on the basis of patient-provider communication, which is central to the practice of medicine (Woloshin, 1995). There are three aspects of the communication processes, as suggested by Kaplan et al. (1989): the amount of information exchanged; the patients' control of the dialogues; and establishment of rapport. These are generally built through the effective use of language. Being limited in English language proficiency obviously reduces the quality of communication, which would reduce the positive effect on health care outcomes. A deficiency in communication means that doctors and patients cannot fully discuss symptoms or treatment regimens, which may lead to misdiagnoses or improper treatment (Andrulis et al., 2002). Patients may not be able to understand medication instructions or comply with prescriptions (Ku & Freilich, 2001). Similar to language communication, lower health literacy is strongly linked to lower health status by poor understanding of health conditions and medical instructions (Williams et al. 1998; Baker, 1999).

In addition to communication problems, the impact of limited language proficiency on health outcomes can be related to not having a regular source of health care. Limited language proficiency is a barrier to having a regular source of care, such as a regular physician (Weinick & Krauss, 2000). Moreover, patients may have more confidence in care providers from their own ethnic background who speak the same language (Ahmad et al., 1989; Saha et al., 2000). A new immigrant with limited language proficiency is less likely to have a regular doctor.

There is considerable evidence on the negative effects of limited language proficiency on health access and care. Limited language proficiency affects an
individual’s ability to communicate with health care providers, and it affects health care activities by limiting access of health care services and reducing the quality of health care.

*Health care services access*

A concept related to health care utilization by immigrants is acculturation. In many studies, language has been a measure of acculturation. Subsequent, however suggest that language proficiency itself may be a determining factor in access to health care service.

Accessing health care service is essential to maintaining health, and limited language proficiency presents a barrier to health care service and may result in delayed care or avoidance of routine care. Language itself has emerged as a contributory variable to explain the low rates of participation in prevention programs, such as mammography screening (Fox & Stein, 1991). In a British study, language was a barrier to interest in a cervical screening program (Naish et al., 1994), which helped to explain the lower participation of minority women. Solis et al. (1991) suggested that the effect of language on screening practices should be interpreted as an access factor.

Limited language proficiency restrains insurance coverage. People with limited language proficiency are more likely to be employed in occupations with more physical demands and less health insurance coverage (Williams & Collins, 1995). Limited language deficiency causes difficulties in insurance applications. Parents who speak Spanish, Chinese, Korean, or Vietnamese have difficulties in finding translated
Applications and in obtaining language assistance for Medicaid or SCHIP (Perry et al. 2000; Institute of Health Policy Studies, 2000).

Studies have also provided insights into mental health, rehabilitation and counseling services. They have indicated that, even when patients have contact with the health care system, they may delay seeking care for mental health problems due to language barriers and underutilized mental health/counseling services and have turned to informal resources (Li et al., 1999; Nyman, 1991; Trauer, 1995; Sterinberg et al., 1998; Stuart et al., 1996). Additionally, non-English speaking patients report that language barriers prevent them from taking their children for care (Chak et al., 1984). Other studies relate to barriers to health promotion and education resources (Anderson et al., 1993), access rehabilitation services (Stevens, 1993), and support for caregivers of the elderly and disabled (Plunkett & Quine, 1996).

Limited language proficiency may be a factor that results in treatment differences experienced by various ethnic groups. There are case studies concerning delayed diagnosis, misdiagnosis, and inappropriate referral. Lee et al. (1998) found that language disparity significantly increased the risk of hospital admissions for adults; the risk of admission decreased when an interpreter was used. With a number of limitations to the study, Hampers et al. (1999) reported that language barriers accounted for a $38 increase in charges for testing and for a 20-minute longer hospital stay. Concerning pain management, Cleeland et al. (1997) found that difficulties in assessing pain due to language and culture were factors explaining the finding that only 35% of minority patients received recommended analgesic prescriptions, compared to half of non-minority patients. A study by Chan and Woodruff (1999) suggested that patients not fluent in
English received less than optimal palliative care. Apparently, language is a ubiquitous barrier to access of appropriate mental health services. Lower utilization of such programs is also determined by providers, who may feel the therapy is not of use to those with limited official language proficiency. Providers may therefore be less likely to initiate or continue treatment (Marcos, 1979). Language barriers may present almost insurmountable problems for services such as speech therapy or assessment of developmental delay (Jackson, 1998).

Few studies have investigated differences in health outcomes related to language proficiency. Existing studies, however, show that there are delays in seeking care, misdiagnosis, or inappropriate treatment relating to language barriers. Ghandi et al. (2000) demonstrated that a primary language other than English or Spanish was significantly correlated with reported drug complications. LeSon and Gershwin (1996) found that patients who have an inability to speak English were over 17 times more likely to be intubated than patients with the same characteristics who were fluent in English. In addition, Flores et al. (1998) reported that language barriers caused immigrant children to receive poor medical care (8%), misdiagnoses (6%), inappropriate medication (5%), and inappropriate hospitalization (1%).

A pilot study conducted in six hospitals in the US (all Joint Commissioned and accredited) found that language barriers increase the risks to patient safety (Divi, 2007). According to the study, 49% of adverse events involving patients with limited language proficiency resulted in some physical harm, compared with 29% of adverse events involving English-speaking patients.
Overall, language proficiency has an impact on access to health services, quality of healthcare, insurance coverage, and patient compliance. Insufficient access and low quality of health services affects the outcome for both mental and physical health. Poor psychological health also impacts physical well being. In order to prevent disability occurrence from language miscommunication, there is a need for ready access to competent language services. Providers need to collect reliable language data at the patient point of entry and document the language services provided during the patient-provider encounter.

Other Factors Related to the Disablement Process

The above literature review shows that limited language proficiency can induce stress through acculturation, segregation, and discrimination. Limited language proficiency affects an individual’s access to health service and the quality of health care. Both have impacts on an immigrant’s mental and physical health. If the situation continues, disability can occur. Nevertheless, there have been no explicit or empirical studies on the subject.

As the number of immigrants to the US increases, interest in their health and related sociodemographic factors also increases. In order to study the relationship between limited language proficiency and disability for immigrants, it is important to review the factors that have an impact on language proficiency and disability as well as health status and health care for immigrants. These factors can be categorized as individual, family, and community characteristics.
Individual Characteristics

Investigations of disability among Asian Americans in the US indicate that country of origin, native status, and duration of residence are related to disability levels. Asian-Americans are diverse: each group has its own language and culture. Each group should be studied based on their country of origin. For example, Chinese, Japanese, Korean, and Filipino immigrants were the first Asian immigrants in the US, but the linguistic experiences of the first three population groups are different from the Filipinos, for whose country English is the *lingua franca*.

Nativity appears to have complex effects on health. Ying and Miller (1992) found that American birth of Chinese children predicts if parents seek health help. Herrinton et al. (1994) found this had no significant relationship with ovarian cancer, in terms of acculturation. Moreover, there was a generational lag in rates of cancer increase when considering nativity for Asian women. This information also implied the existence of group differences among Asian-Americans.

Immigration selectivity policy may account for the superior health profiles among immigrants (Hummer et al., 1999). After entry, health and disability among immigrants are related to time in the US. On one hand, the longer they stay in the US, the more resources and experiences immigrants accumulate, and these are positively related with good health (Angel, Buckley, & Sakamoto, 2001). In contrast, negative health and disability outcomes may accumulate over time (Hummer et al., 1999).
In addition, disability status is strongly associated with demographic characteristics and socioeconomic status, such as gender, age, and educational attainment (Williams & Collins, 1995). Differences in opinion exist as to whether gender has an impact on health. Ghuman (1999) proposed that Japanese women have lower rates of health problems associated with slow acculturation and life style changes; Shin (1994) and Nguyen and Peterson (1992) suggested that women experience more mental illness than men as a result of social isolation and traditional gender roles. The different effects of gender on health could be related to the examination of different population groups and to different health outcomes.

Age and education show a relatively consistent relationship, but in a different direction: people are more likely to have health problems while aging, and people of higher education are more likely to have insurance and learn more health-related information, which consequently leads to fewer health problems.

In measuring the acculturation or assimilation level, some studies included citizenship, which has a substantial effect on an immigrant’s ability to access health services and obtain insurance coverage. Kitano et al. (1992) reported that egalitarian norms toward female drinking associated with nationality, but the effect was different among different age groups. Recent studies, which include westernization as measured by diet and activity, explore its impact on health outcomes. Huang et al. (1996) found an association between Western lifestyle and diabetes; Le Marchand et al. (1997) found increased colorectal cancer risk associated with diet, activity, and smoking for the first generation only; and Hsing et al. (2000) found that westernization of Asian men was associated with increases in prostate cancer rates and screening.
Some studies included citizenship to measure the acculturation or assimilation level, which has substantial effects on an immigrants’ ability to access health services and obtain insurance coverage.

Investigations of disability among Asian-Americans in the US indicate that these individual characteristics are possibly related to disability levels. Since Asian-Americans are diverse, and each group has its own language and culture, each group should be studied separately.

*Family Characteristics*

Family characteristics influence individuals in seeking formal health care and affect associated health outcomes. According to Aceron and Savage (2004), a married couple immigrating together provides support for each other and therefore reduces stressful feelings during the migration process. First, family provides a basis of economic resources and financial access to medical insurance; second, family provides information and advice for an individual’s health care opportunities and decisions (Litwak & Messeri, 1989). The birth of children in the US can also help tie the immigrant parents to the host society by facilitating interactions related to child care. Parents socialize children into particular patterns of health care use by demonstrating behavior related to illness and help-seeking (Doherty & McCubbin, 1985; Sallis & Nader, 1988; Scho et al., 1987).
Community/Contextual Characteristics

The final dimension is reception of the host society. Whether an immigrant is living or residing in an ethnic enclave or ethnic community is of great importance. The nature of the community can affect the ease of assimilation and adaptation of the immigrating individual. Ethnic communities attract immigrants with poor English by providing a comfortable environment that shelters them from discrimination, provides employment opportunities, and alternative medication when standard medical health services are not available due to language communication barriers (Chiswick & Miller 1995; Espenshade & Fu, 1997; Espinosa & Massey, 1997). Such environments, however, reduce immigrants’ exposure and opportunity to learn English and limit knowledge of health care services and health information available to the mainstream society.

In addition, some southern states are generally considered to discriminate against minorities, as well as poor and uneducated individuals. Southern residence is associated with greater reported language fluency, especially when considering minority language concentration together (Chiswick, 1990). It is generally believed that people in southern states have more disabilities.

Some studies relating to prevalence of mental disorders also suggest an urban-rural difference in mental health (Paykel, et. al 2000). Data from the Household Survey of the National Morbidity Survey of Great Britain were analyzed for differences between urban, semi-rural and rural areas. Urban subjects were considerably high stressed, along with alcohol dependence and drug dependence, which may largely be attributable to more adverse urban social environments.
The idea that contextual factors must be considered has broadened over time in studying stress, which gives specificity to a range of theoretical possibilities (Brown, 1974). Relating to the limited language proficiency of immigrants in the United States, the available empirical evidence on this point is not conclusive. Even though there has been no consistency among discussions and arguments, the limited language proficiency and ethnic community characteristics are considered to be mutually interacting on each other. In brief, on one hand, the limited language proficiency retains immigrants within the ethnic community; on the other hand, the ethnic community may be sheltering immigrants, while it also discourages them to go out of the community and improve their language proficiency.

Immigrants tend to cluster together with people who speak the same language in the ethnic enclaves. Portes (1983) noted the importance of ethnic enclaves in allowing immigrants to escape from economic exploitation. Ethnic enclaves offer a kind of protection by hiring immigrants who lack good English language skills, and provide an alternative for economic incorporation a segmented labor market. Many immigrants are limited to certain “immigrations jobs” where English language is not demanding; even though immigrants have lower wages than natives because of the job they hold (Bonacich, Light, and Wong, 1977; Piore, 1979; Ports, 1981). Ethnic communities are important in serving as social support systems or as haven from illness, and thus they shelter immigrants from adaptation stresses (Murphy, 1973; Banchevska, 1981; Koranyi, 1981).

While being protected in the ethnic community, some immigrants may also be subject to severe exploitation and working with low wage, and poor benefits. According to the “Assimilation Hypothesis” promoted in the works of Chiswick (1978, 1982, 1983),
immigrations accept undesirable work during the first couple of years in the United States, but they assimilate into the labor market and move into jobs of better pay and benefits through information gathering and job mobility. In contrast, Chiswick and Miller (2002) show that linguistic concentrations (enclaves) reduce an immigrant’s English language skills. Moreover, immigrants’ earnings are low for those with poor English language proficiency and for those living in groups with a concentration of their origin language.

Ethnic enclaves are also a language trap, because they attract people with limited language proficiency and sustain their language ability (Bauer, et. al., 2002). Immigrants with good English proficiency will choose to migrate to locations with relatively low concentrations of immigrants of similar ethnicity and language. If the size of the enclave is relatively small, it enables them to improve their English proficiency over time, which in turn affects their earnings and assimilation into the local population. On the other hand, immigrants with poor English proficiency will choose to migrate to locations with relatively large networks of migrants of similar ethnicity and language. This in turn decreases their ability to increase their English proficiency, which negatively affects their earnings and assimilation into the local population (Bauer, et. al., 2002, p6). In short, it seems likely that limited language proficiency would have a large effect on the probability of living in an ethnic community, and living in an ethnical contextual community would have an effect on the probability of speaking English well. If so, including measures of interaction of contextual effects and language proficiency will capture the mutual effects of contextual characteristics and limited language proficiency.
In sum, sociological theories and empirical studies imply that, for immigrants, an association exists between limited language proficiency and health-related disabilities. Individual and family characteristics of immigrants and characteristics of the community where they live may affect language proficiency or disability, or both.

This pilot study related to the effect of language proficiency on the health and disability status among Chinese, Japanese, and Korean immigrants in the US by applying the Disablement Process model. Its implications may be extended to other immigrant groups. With the influx of foreign language speakers into the US, dissemination of health and disease information to these groups is important. This research may shed light on the importance of individual, family, and community characteristics to lessen the negative influences of immigrants’ limited language proficiency. Moreover, the substantial number of Asian immigrants of whom English is not the primary language underscores the need to improve their English language ability and the public’s need to translate health information into minority languages.
CHAPTER 4: RESEARCH DESIGN

Data and Definition

The data sources used for this analysis were the five percent public-use micro-data samples (PUMS) from the U.S. Census 2000, which are, to our knowledge, the only data sets for the US that contain information about immigrants’ language proficiency as well as information on their level of disability. Another advantage of using census data for this study was the large sample sizes available for each Asian-origin group. The census provides the most nationally representative data collection. In addition, the data include information at several geographic levels, making it possible to facilitate the calculation of aggregate characteristics.

As mentioned earlier, this pilot study was designed to examine the association between limited language proficiency and disability of immigrants in the US. To be consistent with other health and medical studies, this study focused on people whose mother language was not English, but Asian in origin: Chinese-, Japanese-, and Korean-language speakers in the US.

This study was limited to respondents who classified themselves in the census as Chinese, Japanese, or Korean speakers at home. Further, they had to be aged 16-64. This age range was consistent with census questionnaire criteria. Census 2000 data provides representative data on adult Chinese-, Japanese-, and Korean-language speakers.
in the US nationwide. Also, while most disability studies focus on late-life disability, Verbrugge and Jette (1994) encouraged the study of lifelong disability in the Disablement Process model: (a) “Disability is an experience that spares no age group;” (b) “The usual causes of lifelong disability are congenital/ developmental conditions and severer injury in childhood or youth;” and (c) “Disability tends to be mild or moderate, initially restricted to a few activity domains but expanding over time, and slow to accumulate.”. Thus, they claim that a good model of disablement should encompass both lifelong and late-life disability. The Disablement Process model is suitable for both experiences. In this study, the focus was on adult Chinese-, Japanese-, and Korean-language speakers in the US. Future studies may be expanded to other immigrants when data are available. Studies with adult Chinese-, Japanese-, and Korean-language speakers in the US call attention to other elderly immigrants, because elderly people tend to have more disability problems than other adults.

Hypotheses

Social literature and sociological theories have suggested that limited language proficiency is a stressor. It possibly induces stress by way of acculturation and problems with social identity, which consequently put immigrants at risk of disability. Thus,

Hypothesis 1: Limited language proficiency has negative effects on disability outcomes for adult Chinese-, Japanese-, and Korean-language speakers in the US. In
each language group, people with limited language proficiency are likely to have more disabilities than people with language proficiency.

According to the Disablement Process model, extra-individual factors and intra-individual factors may function as interventions or exacerbators. Thus, some individual, family, and community characteristics, such as education, may help to reduce the negative effects of limited language proficiency on disability outcomes. Some of these characteristics, such as age, may speed up the disability. In addition, some characteristics, such as ethnic enclave and patient-healthcare providers’ communication, may have an ambiguous or double-edged effect. For example, ethnic enclaves shelter immigrants from prejudice and discrimination of the mainstream society, but they also limit an individual’s seeking health care services and reduce their health status through low-standard housing and environment. For disability prevention, these characteristics should help to reduce the effect of limited language proficiency on disability outcomes. Although these controlling variables are not the focus of this study, their effects were assessed and examined in the following hypotheses:

The second hypotheses are to test the effect of other individual (H2.1), family (H2.2), and community (H2.3) characteristics on disability outcomes:

Individual characteristics:
H2.1.1 In each language group, gender is negatively related with disability outcomes. That is, adult women tend to have less disability outcomes than adult men.

H2.1.2 In each language group, age is positively related with disability outcomes. That is, older adult people tend to have more disability outcomes than younger adult people.

H2.1.3 In each language group, education is negatively related with disability outcomes. That is, people of higher education levels are likely to have fewer disability outcomes than people of lower education levels.

H2.1.4 In each language group, foreign-born is positively related with disability outcomes. That is, foreign-born people have a higher disability outcome than native-born people.

H2.1.5 In each language group, citizenship is negatively related with disability outcomes. That is, people with U.S. citizenship have less disability outcomes than people without.

H2.1.6 In each language group, years in the US is positively related with disability outcomes. That is, the longer an adult lives in the United States, the more disability outcomes he/she has.
Family Characteristics:

H2.2.1 In each language group, marital status is negatively related with disability outcomes. That is, adult person who is married with spouse present have less disability outcomes than people who is not.

H2.2.2 In each language group, having a child is negatively related with disability outcomes. That is, an adult people who have children have less disability outcomes than people who do not have children.

Contextual Characteristics:

H2.3.1 For each language group, exposure of mother language speakers to English language speakers is negatively associated with disability outcomes.

H2.3.2 For each language group, the ratio of mother-language-speaking healthcare staff is negatively associated with disability outcomes.

H2.3.3 For each language group, southern state residency is positively associated with disability outcomes. That is, people who live in southern states tend to have more disability outcomes than their counterpart.
H2.3.4 For each language group, metropolitan residency is positively associated with disability outcomes. That is, people who live in metropolitan area tend to have more disability than people who live otherwise.

In addition to the above hypotheses, interaction variables between contextual characteristics and English language proficiency are added into the formula for the purposes of controlling interaction.

Considering the diversity of the Asian population in the US in terms of different traditions, cultures, and languages, the effect of limited language proficiency on disability outcomes would be expected to be different across different language groups. Thus,

Hypothesis 3: The effects of limited language proficiency on disability outcomes are different for different language groups. Some language groups may demonstrate a stronger effect than others.

Like hypothesis 2, the effects of other individual, family, and community characteristics on disability outcomes may be different across different language groups, due to their different social, cultural, and medical diversities.
Data and Measurements

This section discusses the data sources, variables, and methods that were used to conduct the analyses.

*Aggregate Disability vs. Specific Disability*

Disability can be measured as a categorical variable or as continuous variables, with considerable differences in results (Reynolds & Silverstein, 2003). The measure of aggregate disability often counts the number of disabilities or limitations, while a dichotomous measure often uses an any/none version, the latter of which is likely skewed and biased (Young, 2000). Verbrugge and Jette (1994) suggest that a continuous score that taps full ranges of disability in a population would be desirable. Even though tests with continuous scores may cost more in training, equipment, and administration time, their utility for both scientific analysis and public health statistics is enhanced, and their value rises (Verbrugge & Jette, 1994). For a better descriptive picture, aggregate measures of disabilities were employed in this pilot study by counting the number of disabilities. For reference purposes, logistic regression analyses were run on each individual dichotomous measurement of disability.

To provide better estimates of disability, the US Census 2000 provides data on disability outcomes. This is derived from self-reported answers to a series of questions on disability on the long-form questionnaire relating to the existence of long-lasting conditions for those 16 to 64 years old. Even though these data are more limited than
those available in data collections that focus primarily on health-related outcomes, these measures have improved substantially over past census-based efforts at measuring disability (Adler et al., 1999) and they allow comparison of groups that are not represented adequately in other data collections (see Appendix 1).

Traditionally, self-reported measures of disability ask individuals to report what they believe they are able to do. Census 2000 uses six questions assessing the following disabilities: sensory, physical, mental, self-care, going outside, and employment. Analyzing these aspects of disability as a scale variable (0-6) allows increased flexibility in capturing each dimension of immigrant-related differences in disability outcomes.

Thus, six domains include the following:

Sensory disability (1= yes; 0= no): blindness, deafness, or a severe vision or hearing impairment;

Physical disability (1= yes; 0= no): a condition that substantially limits one or more basic physical activity, such as walking, climbing stairs, reaching, lifting, or carrying;

Mental disability (1= yes; 0= no): learning, remembering, or concentrating;

Self-care disability (1= yes; 0= no): dressing, bathing, or getting around inside the home;

Going outside the home disability (1= yes; 0= no): going outside the home alone to shop or visit a doctor’s office; and

Employment disability (1= yes; 0= no): working at a job or business.
Thus, the dependent variable is a scale ranging from 0-6:

Independent Variables

Language proficiency vs. limited language proficiency: The definition of language proficiency follows previous studies by defining a dichotomous variable to capture proficiency levels among immigrants (Chiswick, 1995, 2007). These variables distinguish individuals who speak a language other than English in the home and who speak English either (i) “Very Well”; (ii) “Well”; (iii) “Not Well”; and (iv) “Not at all.” The benchmark is those who speak only English at home. For the foreign born, the final two categories are combined into a single “Not Well/Not at All” category (see Appendix 2). So these two categories are classified as limited language proficiency, and the rest are of language proficiency.

Controlling Variables

In order to study the relationship between limited language proficiency and disability for immigrants, it is important to review matters that have an impact on these factors, which can be categorized into three dimensions: individual, family, and community characteristics. For controlling purposes, interaction variables are also added.
The following controlling variables were used in this study.

*Individual characteristics*: Other than gender (female = 1) and age, educational attainment, nativity, years since migration, and nationality are included as follows:

Educational attainment: this variable records the total years of full-time equivalent education. It has been constructed from the census data on educational attainment by assigning the following values to the census categories: completed less than fifth grade (2 years); completed fifth or sixth grade (5.5); completed seventh or eighth grade (7.5); completed ninth grade (9); completed tenth grade (10); completed eleventh grade (11); completed twelfth grade or high school (12); attended college for less than one year (12.5); attended college for more than one year or completed college (14); bachelor’s degree (16); master’s degree (17.5); professional degree (18.5); doctorate (20).

Years in the US: this is computed from the year the foreign-born person came to the US to stay. The square of years in the US is also included for controlling purposes.

Foreign born: this is a dichotomous variable, set to one if the individual was born outside of US territory; or zero if the individual was born in the US

Citizenship: this is a dichotomous variable, set to one if the individual was a citizen of the US, or zero if the individual was not a citizen of the US

*Family characteristics*: marital status and an indicator of having children.

Marital status: this is a dichotomous variable that distinguishes individuals who are married, spouse present (equal to 1), from all other marital statuses.
Having children: this is also a dichotomous variable that distinguishes individuals who have at least one child (equal to 1).

*Community characteristics:* There are four variables: exposure index of specific language group, ratio of healthcare staff who speak that Asian-language, southern residency, and metropolitan residency.

Measure of linguistic exposure (\(xP^*y\)): This residential exposure index measures the probability that members of a group of interest share a neighborhood with members of native language speakers. It refers to “the degree of potential contact, or the possibility of interaction, between minority and majority group members with geographic areas” (Massey & Denton, 1988, p. 287). This analysis was used to measure the extent to which Asian-language speakers and native-language speakers physically confront one another by virtue of sharing a common residential area. It is also called an interaction index, which measures the extent to which Asian-language speakers are exposed to native-language speakers.

This index has been employed in a series of investigations (Lieberson, 1980; Massey & Mullan, 1984) and has been denoted by Lieberson. The index was calculated for each language group. For example, for Chinese-language speakers, the index refers to the chance of potential contact or the possibility of interaction between the Chinese speaker and an English speaker. This was accomplished by calculating the ratio of Chinese-language speakers in the census tract to the total Chinese-language speakers in the Primary Metropolitan Statistical Area/ Metropolitan Statistical Area (PMSA/MSA),
multiplied by the ratio of native language speaker in each census tract to the total population in the census tract, and then summing those up for each Primary Metropolitan Statistical PMSA/MSA area. (If the PMSA was not available, MSA was used.) The same calculation was used for each language group. For the pooled model, the index was the average index of these three groups. The formula is as follows:

\[ x_{P^*y} = \sum_{i=1}^{n} \left[ \frac{x_i}{X} \right] \left[ \frac{y_i}{t_i} \right] \]

Where:

\( x_{P^*y} \): Represents exposure index for each group of Asian-language speakers: Chinese-, Japanese-, or Korean-language speakers

\( x_i \): Number of Asian-language speakers in census tract \( i \) in a PMSA/MSA

\( y_i \): Number of native-language speakers in census tract \( i \) in a PMSA /MSA

\( t_i \): Number of the total population in census tract \( i \) in a PMSA /MSA

\( X \): Total number of Asian-language speakers in a PMSA /MSA

The ratio of healthcare staff who speaks the relevant Asian language: this measured how many healthcare providers who speak the same Asian-language are available for each language group in each PMSA/MSA area. This was calculated for each language group. For example, for the Chinese-language group, the ratio was the total number of Chinese-speaking healthcare staff to the total number of Chinese-language speakers in PMSA/MSA area. This value was derived by summing up each individual case in each PMSA/MSA from raw data. The same calculation was used for each
language group. For the pooled model, the ratio was the average of these three groups. The formula is as follows:

\[
\text{Ratio} = \frac{x_i}{X}
\]

Where

\(x_i\): Number of Asian-speaking healthcare providers in a PMSA/MSA

X: Total number of Asian-language speakers in a PMSA /MSA

Southern residency: this variable recorded residence of the southern States (equal to 1). The states included in this classification are: Alabama, Arkansas, Delaware, The District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

Metropolitan residency: this variable recorded whether the person was living in a metropolitan area. A person who lived inside the central city was coded as one; other people were coded as zero.

In addition to the above, interaction variables between language proficiency and length of stay, interaction between language proficiency and exposure index, and interaction between language proficiency and length of stay were added to the model for controlling purposes.
Statistical Models

The primary goal of this proposal was to describe the association between English language proficiency and disabilities among Chinese-, Japanese-, and Korean-language speakers in the US, with estimates of the effects of English language proficiency on disability and controlling for individual, family, and community characteristics. For this purpose, this study employed a Poisson regression on aggregate disability outcome for each language group by adding individual, family, and community characteristics in turn. Considering that a large portion of sample population had no disability, the Poisson regression smoothed the sample distribution.

The general regression analysis can help to understand how the dependent variable changes when any one of the independent variables is varied, while the other independent variables are held constant. The important assumptions are variables have normal distributions and the standard multiple regressions can only accurately estimate the relationship between dependent and independent variables if the relationships are linear in nature. The non-normal distributed variables can distort relationship and significance test.

In the census 2000 dataset, the majority people have no disability. In other words, a large number of disability outcome variables have a value of zero. In this case, transformations, such as log, can improve normality. Thus, Poisson analysis will be employed to measure the relationship between the limited language proficiency and disability outcomes. Poisson regression is a form of regression analysis with the logarithm, and it is more appropriate when the dependent variable is a count. Poisson
regression analysis helps to smooth out zeros and provides a better understanding of the effects of limited language proficiency on disabilities.

Poisson regression on disability outcomes for each language group:

The full model:

\[
\text{Loge (Disability outcomes)} = \beta_0 + \beta_1 \text{ LEP (Limited language Proficiency)} + \sum \beta_j \text{ IC}_j \text{ (Individual characteristics)} + \sum \beta_n \text{ FC}_n \text{ (Family characteristics)} + \sum \beta_n \text{ CC}_n \text{ (Community characteristics)} + \sum \beta_p \text{ IV}_p \text{ (Interaction variables)}
\]

For each language group of Chinese-, Japanese-, and Korean-language, respectively, the controlling variables of individual, family, and community characteristics, and interaction variables were added to the basic model in turn:

Basic model:

\[
\text{Loge (Disability outcomes)} = \beta_0 + \beta_1 \text{ LEP (Limited language proficiency)}
\]

Model 1:

\[
\text{Loge (Disability outcomes)} = \beta_0 + \beta_1 \text{ LEP (Limited language proficiency)} + \sum \beta_j \text{ IC}_j \text{ (Individual characteristics)}
\]
Model 2:
\[
\log_e (\text{Disability outcomes}) = \beta_0 + \beta_1 \text{LEP} \ (\text{Limited language proficiency})
\]
\[
+ \sum \beta_j IC_j \ (\text{Individual characteristics})
\]
\[
+ \sum \beta_m FC_m \ (\text{Family characteristics})
\]

Model 3:
\[
\log_e (\text{Disability outcomes}) = \beta_0 + \beta_1 \text{LEP} \ (\text{Limited language proficiency})
\]
\[
+ \sum \beta_j IC_j \ (\text{Individual characteristics})
\]
\[
+ \sum \beta_m FC_m \ (\text{Family characteristics})
\]
\[
+ \sum \beta_n CC_n \ (\text{Community characteristics})
\]

Full model:
\[
\log_e (\text{Disability outcomes}) = \beta_0 + \beta_1 \text{LEP} \ (\text{Limited language proficiency})
\]
\[
+ \sum \beta_j IC_j \ (\text{Individual characteristics})
\]
\[
+ \sum \beta_m FC_m \ (\text{Family characteristics})
\]
\[
+ \sum \beta_n CC_n \ (\text{Community characteristics})
\]
\[
+ \sum \beta_p IV_p \ (\text{Interaction variables})
\]
Logistic regression on specific disability:

For each language group of Chinese-, Japanese-, and Korean-language speakers:

Physical disability (Physical Disability = 1) = $\beta_0$
\[ + \beta_1 \text{ LEP (Limited language proficiency)} \]
\[ + \sum \beta_j \text{ IC}_j \text{ (Individual characteristics)} \]
\[ + \sum \beta_m \text{ FC}_m \text{ (Family characteristics)} \]
\[ + \sum \beta_n \text{ CC}_n \text{ (Community characteristics)} \]
\[ + \sum \beta_p \text{ IV}_p \text{ (Interaction variables)} \]

Mental disability (Mental disability = 1) = $\beta_0$
\[ + \beta_1 \text{ LEP (Limited language proficiency)} \]
\[ + \sum \beta_j \text{ IC}_j \text{ (Individual characteristics)} \]
\[ + \sum \beta_m \text{ FC}_m \text{ (Family characteristics)} \]
\[ + \sum \beta_n \text{ CC}_n \text{ (Community characteristics)} \]
\[ + \sum \beta_p \text{ IV}_p \text{ (Interaction variables)} \]

Sensory disability (Sensory Disability = 1) = $\beta_0$
\[ + \beta_1 \text{ LEP (Limited language proficiency)} \]
\[ + \sum \beta_j \text{ IC}_j \text{ (Individual characteristics)} \]
= \beta_0 + \beta_1 \text{LEP} + \sum \beta_j \text{IC}_j + \sum \beta_m \text{FC}_m + \sum \beta_n \text{CC}_n + \sum \beta_p \text{IV}_p

Self-care disability (Self-care Disability = 1) = \beta_0

= \beta_0 + \beta_1 \text{LEP} + \sum \beta_j \text{IC}_j + \sum \beta_m \text{FC}_m + \sum \beta_n \text{CC}_n + \sum \beta_p \text{IV}_p

Going-outside disability (Going-outside Disability = 1) = \beta_0

= \beta_0 + \beta_1 \text{LEP} + \sum \beta_j \text{IC}_j + \sum \beta_m \text{FC}_m + \sum \beta_n \text{CC}_n + \sum \beta_p \text{IV}_p

Employment disability (Employment Disability = 1) = \beta_0

= \beta_0 + \beta_1 \text{LEP}
\[ + \sum \beta_j IC_j \text{ (Individual characteristics)} \]
\[ + \sum \beta_m FC_m \text{ (Family characteristics)} \]
\[ + \sum \beta_n CC_n \text{ (Community characteristics)} \]
\[ + \sum \beta_p IV_p \text{ (Interaction variables)} \]
CHAPTER 5: RESULTS AND DISCUSSION

In terms of disability outcomes, the percentage of any disability among all Chinese-, Japanese-, and Korean-language speakers was 14.04%. Among them, Korean-language speakers had the highest percentage, 15.79%, while Japanese-language speakers had the lowest percentage, 12.89%. The percentage for Chinese-language speakers was 13.48%, which was in the middle of these three groups (Table 1). Considering that the sample population was limited to ages of 16-64, however, a large number of elderly people who are expected to have a much higher rate of disability are not available. The actual cohort of these Asian immigrants may have a much higher rate of disability. This may challenge the general impression that Asian immigrants have a good health profile.

Table 2 presents a profile of Chinese-, Japanese-, and Korean-language speakers in the US, suggesting the existence of some similarities and differences among these groups. They had many similar sociodemographic characteristics. They had similar gender composition of more females than males; they had about the same average age of 39 years old; they had similar education levels of associate/bachelor degrees (15-16 years); the majority population of each group was foreign-born; more than half of each group was married with the spouse living together; a small portion had their own children under 18 years old.
<table>
<thead>
<tr>
<th></th>
<th>Go-out disability</th>
<th>Sensory disability</th>
<th>Physical disability</th>
<th>Mental disability</th>
<th>Self-care disability</th>
<th>Employment disability</th>
<th>Any disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese-Language Speakers</td>
<td>7.19%</td>
<td>0.92%</td>
<td>1.85%</td>
<td>1.47%</td>
<td>0.84%</td>
<td>10.03%</td>
<td>13.48%</td>
</tr>
<tr>
<td>Japanese-language Speakers</td>
<td>5.06%</td>
<td>1.46%</td>
<td>2.93%</td>
<td>1.74%</td>
<td>0.94%</td>
<td>8.48%</td>
<td>12.89%</td>
</tr>
<tr>
<td>Korean-Language Speakers</td>
<td>8.43%</td>
<td>0.98%</td>
<td>2.82%</td>
<td>1.72%</td>
<td>1.28%</td>
<td>11.60%</td>
<td>15.79%</td>
</tr>
<tr>
<td>All</td>
<td>7.26%</td>
<td>1.01%</td>
<td>2.25%</td>
<td>1.57%</td>
<td>0.97%</td>
<td>10.25%</td>
<td>14.04%</td>
</tr>
</tbody>
</table>

Note:

1. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3
2. Sample population is limited to those who speak Chinese, Japanese, or Korean at home, and whose age is between 16-64
Table 2: Descriptive Profile of Chinese-, Japanese-, and Korean-language Speakers in the United States

<table>
<thead>
<tr>
<th>Variables</th>
<th>Chinese-Language Speakers</th>
<th>Japanese-language Speakers</th>
<th>Korean-Language Speakers</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent variable</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English language proficiency</td>
<td>1= Language proficiency</td>
<td>41.55%</td>
<td>51.00%</td>
<td>37.27%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1= Female</td>
<td>52.29%</td>
<td>54.99%</td>
<td>55.11%</td>
<td>53.40%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years</td>
<td>38.5</td>
<td>38.38</td>
<td>39.09</td>
<td>38.64</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years</td>
<td>15.46</td>
<td>16.52</td>
<td>15.8</td>
<td>15.69</td>
</tr>
<tr>
<td><strong>Foreign born</strong></td>
<td>1= Foreign born</td>
<td>90.08%</td>
<td>70.58%</td>
<td>89.48%</td>
</tr>
<tr>
<td><strong>Years in U.S.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years</td>
<td>15.56</td>
<td>19.89</td>
<td>16.36</td>
<td>16.33</td>
</tr>
<tr>
<td><strong>Citizenship</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1= Citizenship</td>
<td>58.61%</td>
<td>43.82%</td>
<td>53.19%</td>
<td>55.25%</td>
</tr>
<tr>
<td><strong>Family characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>1 = Married with spouse</td>
<td>65.76%</td>
<td>60.76%</td>
<td>66.04%</td>
</tr>
<tr>
<td>Have children</td>
<td>1 = Have children</td>
<td>2.93%</td>
<td>2.50%</td>
<td>3.66%</td>
</tr>
<tr>
<td><strong>Community characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure index</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate * 100</td>
<td>0.57</td>
<td>0.72</td>
<td>0.63</td>
<td>0.64</td>
</tr>
<tr>
<td><strong>Ratio of Doctor/Healthcare giver</strong></td>
<td></td>
<td>2.94</td>
<td>2.12</td>
<td>3.35</td>
</tr>
<tr>
<td>Southern States</td>
<td>1 = In Southern states</td>
<td>1.31%</td>
<td>5.74%</td>
<td>2.88%</td>
</tr>
<tr>
<td>Metropolitan area</td>
<td>1 = Inside central city</td>
<td>33.09%</td>
<td>20.03%</td>
<td>25.48%</td>
</tr>
</tbody>
</table>

Note:
1. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3
2. Sample population is limited to those who speak Chinese, Japanese, or Korean at home, and whose age is between 16-64
<table>
<thead>
<tr>
<th>Variables</th>
<th>Chinese-Language Speakers</th>
<th>Japanese-language Speakers</th>
<th>Korean-Language Speakers</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Means</td>
<td>SD</td>
<td>Means</td>
<td>SD</td>
</tr>
<tr>
<td>Disability Outcome</td>
<td>0.23</td>
<td>0.64</td>
<td>0.21</td>
<td>0.63</td>
</tr>
<tr>
<td>Number of Disabilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English language proficiency</td>
<td>0.42</td>
<td>0.49</td>
<td>0.51</td>
<td>0.5</td>
</tr>
<tr>
<td>1= Language proficiency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.53</td>
<td>0.5</td>
<td>0.55</td>
<td>0.5</td>
</tr>
<tr>
<td>1= Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>38.5</td>
<td>12.32</td>
<td>38.38</td>
<td>12.65</td>
</tr>
<tr>
<td>Years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td>15.46</td>
<td>5</td>
<td>16.52</td>
<td>2.9</td>
</tr>
<tr>
<td>Years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign born</td>
<td>0.9</td>
<td>0.3</td>
<td>0.71</td>
<td>0.46</td>
</tr>
<tr>
<td>1 = Foreign born</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years in U.S.</td>
<td>15.56</td>
<td>10.74</td>
<td>19.89</td>
<td>16.68</td>
</tr>
<tr>
<td>Years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citizenship</td>
<td>0.59</td>
<td>0.49</td>
<td>0.44</td>
<td>0.5</td>
</tr>
<tr>
<td>1 = Citizenship</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>0.66</td>
<td>0.47</td>
<td>0.61</td>
<td>0.49</td>
</tr>
<tr>
<td>1 = Married with spouse</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have children</td>
<td>0.03</td>
<td>0.17</td>
<td>0.03</td>
<td>0.16</td>
</tr>
<tr>
<td>1 = Have children</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure index</td>
<td>0.57</td>
<td>0.18</td>
<td>0.72</td>
<td>0.12</td>
</tr>
<tr>
<td>Ratio of Doctor/Healthcare giver</td>
<td>2.94</td>
<td>1.47</td>
<td>2.12</td>
<td>1.7</td>
</tr>
<tr>
<td>Rate * 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southern States</td>
<td>0.01</td>
<td>0.11</td>
<td>0.06</td>
<td>0.23</td>
</tr>
<tr>
<td>1 = In Southern states</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metropolitan area</td>
<td>0.33</td>
<td>0.47</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>1 = Inside central city</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:
1. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3
2. Sample population is limited to those who speak Chinese, Japanese, or Korean at home, and whose age is between 16-64
Table 2 shows some heterogeneity among these groups. While Japanese-language speakers had the longest years in the US, an average of about 20 years, they had the lowest percentage of American citizenship, less than 50%. Most Chinese-language speakers and Korean-language speakers had stayed in US for 15-16 years, and more than half of them had citizenship. Japanese-language speakers had the highest exposure index, which means that they had the highest possibility of interacting or communicating with native English speakers; Chinese-language speakers had the lowest exposure index.

Chinese- and Korean-language speakers had a higher ratio of healthcare staff who speak Chinese or Korean, which means they had, on average, at least one healthcare person who spoke their language for every hundred people in a PMSA/MSA area; Japanese-language speakers had a lower ratio, 0.65%. Chinese-language speakers had the lowest percentage of people who lived in Southern states, and the highest percentage of people who lived inside a central city; Japanese-language speakers had the opposite, with a higher percentage of people living in southern states and a lower percentage of people inside a central city.

Among these three groups, there was a significant difference in terms of English language proficiency. More than half of the Japanese-language speakers reported English language proficiency. More than half of the Chinese- and Korean-language speakers were not able to speak English. About two thirds of the Korean-language speakers had limited language proficiency; only 37% could speak English well. For Chinese-language speakers, 58% reported limited English language proficiency. These findings indicated that most of these immigrants were disadvantaged in their ability to speak and communicate in English.
Table 3 presents statistically significant results of the Poisson regression analyses modeling predictors of disability outcomes. These five pooled models contain data for the entire sample, including Chinese-, Japanese-, and Korean-language speakers whose ages were between 16 and 64. Tables 4, 5, and 6 present statistically significant results of the Poisson regression analyses for Chinese-, Japanese-, and Korean-language groups separately. Because of the large sample size, only p values <0.001 were considered significant.

In all models, English language proficiency was negatively associated with disability outcomes. In the pooled model, English language proficiency was significantly different, with a negative coefficient of 0.3961, if no other variables were controlled. Since other variables were held constant by controlling other individual, family, and community characteristics, English language proficiency remained significantly different, but with a reduced coefficient of 0.22. When interaction variables were added into the full model, English language proficiency was significantly different at a marginal level of p=0.006, with a reduced coefficient of negative 0.1768.

In each language group, the data suggested different patterns. For Chinese- and Korean-language speakers, English language proficiency appeared to be significant in the basic model. When controlling for individual, family, and community characteristics, English language proficiency remained significantly different, but with a reduced coefficient. In the full model, when all other variables were held constant, English language proficiency was not significant. For Japanese-language speakers, however, the pattern was different. English language proficiency was insignificant in the basic model.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Basic Model</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Full Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=114,102</td>
<td>n=114,102</td>
<td>n=114,102</td>
<td>n=106,783</td>
<td>n=106,783</td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.3101</td>
<td>-2.2087</td>
<td>-2.1564</td>
<td>-2.2487</td>
<td>-2.2615</td>
</tr>
<tr>
<td></td>
<td><strong>&lt;.0001</strong>*</td>
<td><strong>&lt;.0001</strong>*</td>
<td><strong>&lt;.0001</strong>*</td>
<td><strong>&lt;.0001</strong>*</td>
<td><strong>&lt;.0001</strong>*</td>
</tr>
<tr>
<td>English language proficiency (EP)</td>
<td>-0.3961</td>
<td>-0.2130</td>
<td>-0.2200</td>
<td>-0.2150</td>
<td>-0.1768</td>
</tr>
<tr>
<td></td>
<td><strong>&lt;.0001</strong>*</td>
<td><strong>&lt;.0001</strong>*</td>
<td><strong>&lt;.0001</strong>*</td>
<td><strong>&lt;.0001</strong>*</td>
<td>0.0056</td>
</tr>
</tbody>
</table>

**Individual characteristics**

- Gender: -0.1562 **<.0001***<0.0001***<0.0001***<0.0001***
- Education: -0.0541 **<.0001***<0.0001***<0.0001***<0.0001***
- Foreign born: 0.7515 **<.0001*** 0.7662 **<.0001*** 0.8487 **<.0001*** 0.8505 **<.0001***
- Citizenship: 0.0065 0.6899 0.0111 0.4938 0.0152 0.3618 0.0151 0.3644
- Age: 0.0177 **<.0001*** 0.0220 **<.0001*** 0.0223 **<.0001*** 0.0223 **<.0001***
- Years in U.S.: 0.0535 **<.0001*** 0.0531 **<.0001*** 0.0482 **<.0001*** 0.0485 **<.0001***
- Years in U.S. (Square): -0.0005 **<.0001*** -0.0005 **<.0001*** -0.0004 **<.0001*** -0.0004 **<.0001***
- Foreign born * Years in U.S.: -0.0293 **<.0001*** -0.0296 **<.0001*** -0.0270 **<.0001*** -0.0272 **<.0001***

**Family characteristics**

- Marital status: -0.3327 **<.0001*** -0.3160 **<.0001*** -0.3153 **<.0001*** -0.3153 **<.0001***
- Have Children: -0.3923 **<.0001*** -0.3612 **<.0001*** -0.3640 **<.0001*** -0.3640 **<.0001***

**Community characteristics**

- Exposure index of Asian-language speaker: -0.2796 **<.0001*** -0.2809 **<.0001***
- Ratio of Asian-language-speaking healthcare staff: 0.0106 0.0003 0.0124 0.0007
- Southern states: 0.5424 **<.0001*** 0.5436 **<.0001***
- Metropolitan area: 0.2054 **<.0001*** 0.2055 **<.0001***

**Interaction variables**

- EP*Exposure index of Asian-language speaker: -0.0014 0.9879
- EP*Ratio of Asian-language-speaking healthcare staff: -0.0047 0.4368
- EP*Years in U.S.: -0.0012 0.3333

|  | Basic Model | Model 1 | Model 2 | Model 3 | Full Model |
|  |            |         |         |         |           |
| AIC | 129713.1   | 124832.4 | 124272.6 | 115399.7 | 115404.1   |
|  | 129716.1   | 124859.9 | 124306.2 | 115445.1 | 115458.6   |

Note:
1. Disability outcome is a scale variable based on mental disability, physical disability, sensory disability, self-care disability, go-outside disability, and employment disability.
2. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S. Census 2000 SF3. Sample population is limited to Asian-language-speakers who speak Chinese, Japanese, or Korean at home, and whose age is between 16-64.
3. **p<0.001***
When controlling for individual, family, and community variables by adding them into the models, English language proficiency was significant with a larger coefficient. Since all other variables were held constant in the full model, English language proficiency was significant, with a coefficient of -0.8821. In other words, the difference in the logs of disability outcomes was 0.8821 units higher for Japanese-language speakers with limited language proficiency compared to Japanese-language speakers with language proficiency, holding the other variables constant.

For Japanese-language speakers, on average, a female at age 38 with a bachelor’s degree, who was foreign born but had lived for 20 years in the US, married but without children, living outside of a central city in a non-southern state with a exposure index of 0.7 and healthcare staff ratio of 0.65%, the possibility of a disability outcome was 0.11 if she had language proficiency and 0.14 if she had limited language proficiency. The change ratio was 27.3%. This means that, for an average Japanese-language speaker in the US, those with limited language proficiency had 27.3% more disability than people with language proficiency.

Other than English language proficiency, individual, family, and community characteristics were related to disability outcomes. In the pooled model, all individual characteristics, except for citizenship; all family characteristics; and all community characteristics showed significant effects on disability, which is consistent with existing literature.

Table 4 presents statistical results for Chinese-language speakers. All individual characteristics, except for citizenship, showed significant effects on disability outcomes. The difference in the logs of disability outcomes was expected to be 0.1556 units less for
<table>
<thead>
<tr>
<th>Variable</th>
<th>Basic Model</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Full Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=68,530</td>
<td>n=68,530</td>
<td>n=68,530</td>
<td>n=64,613</td>
<td>n=64,613</td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.3174</td>
<td>-2.1687</td>
<td>-2.0755</td>
<td>-2.1312</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>English language proficiency (EP)</td>
<td>-0.5155</td>
<td>-0.216</td>
<td>-0.2209</td>
<td>-0.2077</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Individual characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.1534</td>
<td>-0.16</td>
<td>-0.155</td>
<td>-0.1556</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Education</td>
<td>-0.0575</td>
<td>-0.0573</td>
<td>-0.0512</td>
<td>-0.0512</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Foreign born</td>
<td>0.9637</td>
<td>0.9386</td>
<td>0.8942</td>
<td>0.9066</td>
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</tr>
<tr>
<td>Citizenship</td>
<td>0.0068</td>
<td>0.0082</td>
<td>0.0184</td>
<td>0.0171</td>
<td>0.4379</td>
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<tr>
<td>Age</td>
<td>0.013</td>
<td>0.017</td>
<td>0.0173</td>
<td>0.0175</td>
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</tr>
<tr>
<td>Years in U.S.</td>
<td>0.0528</td>
<td>0.0507</td>
<td>0.0416</td>
<td>0.0432</td>
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</tr>
<tr>
<td>Years in U.S. (Square)</td>
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<td>-0.0004</td>
<td>-0.0004</td>
<td>-0.0003</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Foreign born * Years in U.S.</td>
<td>-0.0326</td>
<td>-0.0314</td>
<td>-0.0262</td>
<td>-0.0273</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Family characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>-0.3044</td>
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<td>-0.2775</td>
<td>-0.3984</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Have Children</td>
<td>-0.4023</td>
<td>-0.3898</td>
<td>-0.3984</td>
<td>-0.3984</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Community characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure index of Chinese-speaker</td>
<td>-0.4726</td>
<td>-0.4211</td>
<td>-0.2225</td>
<td>0.0544</td>
<td></td>
</tr>
<tr>
<td>Ratio of Chinese-speaking healthcare staff</td>
<td>0.0265</td>
<td>0.0367</td>
<td>0.0367</td>
<td>0.0367</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Southern states</td>
<td>0.3342</td>
<td>0.3543</td>
<td>0.3543</td>
<td>0.3543</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Metropolitan area</td>
<td>0.2368</td>
<td>0.2385</td>
<td>0.2385</td>
<td>0.2385</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Interaction variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP*Exposure index of Chinese-speaker</td>
<td>-0.4726</td>
<td>-0.4211</td>
<td>-0.2225</td>
<td>0.0544</td>
<td></td>
</tr>
<tr>
<td>EP*Ratio of Chinese-speaking healthcare staff</td>
<td>0.0265</td>
<td>0.0367</td>
<td>0.0367</td>
<td>0.0367</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>EP*Years in U.S.</td>
<td>-0.0055</td>
<td>0.0016</td>
<td>-0.0055</td>
<td>0.0016</td>
<td></td>
</tr>
</tbody>
</table>

| AIC                              | 75530.49    | 73048.84 | 72783.92 | 68390.76 | 68374.10   |
| BIC                              | 75533.33    | 73074.37 | 72815.11 | 68432.91 | 68424.69   |

**Note:**
1. Disability outcome is a scale variable based on mental disability, physical disability, sensory disability, self-care disability, go-outside disability, and employment disability
2. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3
3. *** p<0.001
females compared to males, holding the other variables constant. The difference in the logs of disability outcomes was expected to be 0.9066 units higher for foreign-born compared to native-born, holding the other variables constant in the full model. With the other variables in the full model held constant, for each one year increase in education level, the difference in the logs of disability outcomes would be expected to decrease by 0.0512 units; for each one year increase in residency in the US, the difference in the logs of expected disability outcomes increased 0.0432; for each one year of increase in age, the difference in the logs of expected disability outcomes was expected to increase by 0.0171.

Family characteristics also helped to reduce the disability outcomes. For Chinese-language speakers, people who were married would be expected to have fewer units in the difference of logs of disability outcomes than their counterparts; this applied also to people who had children under 18 years old. In addition, people who lived in southern states and people who lived inside a central city would be expected to have more disability outcomes than people who lived in other states or who lived outside central cities, holding other variables constant. The exposure index was negatively associated with logs of expected disability outcomes, which means that with more opportunity to interact with English speakers, there were fewer logs of expected disability outcomes, holding other factors equal. On the contrary, the ratio of Chinese-speaking healthcare staff was positively associated with logs of expected disability outcomes. This was probably due to the fact that, since more information was available, an individual would
Table 5: Poisson Regression Analysis on Disability Outcomes for Japanese-Speaking Americans in the United States

<table>
<thead>
<tr>
<th>Variable</th>
<th>Basic Model</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Full Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=14,611</td>
<td>n=14,611</td>
<td>n=14,611</td>
<td>n=11,243</td>
<td>n=11,243</td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.5771</td>
<td>-1.593</td>
<td>-1.4099</td>
<td>-1.7827</td>
<td>-1.4119</td>
</tr>
<tr>
<td>English language proficiency (EP)</td>
<td>-0.0053</td>
<td>0.8848</td>
<td>-0.1838</td>
<td>-0.1864</td>
<td>-0.8821</td>
</tr>
<tr>
<td>Individual characteristics</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.2246</td>
<td>-0.222</td>
<td>-0.2138</td>
<td>-0.2135</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>-0.0682</td>
<td>-0.0668</td>
<td>-0.0641</td>
<td>-0.0646</td>
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</tr>
<tr>
<td>Foreign born</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Citizenship</td>
<td>0.1364</td>
<td>0.1147</td>
<td>0.048</td>
<td>0.0524</td>
<td>0.4613</td>
</tr>
<tr>
<td>Age</td>
<td>0.0227</td>
<td>0.0277</td>
<td>0.0268</td>
<td>0.0265</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Citizenship</td>
<td>0.1364</td>
<td>0.1147</td>
<td>0.048</td>
<td>0.0524</td>
<td>0.4613</td>
</tr>
<tr>
<td>Years in U.S.</td>
<td>0.0258</td>
<td>0.0203</td>
<td>0.0195</td>
<td>0.0173</td>
<td>0.1379</td>
</tr>
<tr>
<td>Years in U.S. (Square)</td>
<td>-0.0002</td>
<td>-0.0002</td>
<td>-0.0002</td>
<td>-0.0002</td>
<td></td>
</tr>
<tr>
<td>Foreign born * Years in U.S.</td>
<td>-0.0037</td>
<td>0.5103</td>
<td>-0.0016</td>
<td>-0.0026</td>
<td>0.8636</td>
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<tr>
<td>Family characteristics</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Marital status</td>
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<td>-0.3485</td>
<td>-0.3516</td>
<td>-0.3516</td>
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</tr>
<tr>
<td>Have Children</td>
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<td>-0.4969</td>
<td>0.0135</td>
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</tr>
<tr>
<td>Community characteristics</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Exposure index of Japanese-speaker</td>
<td>0.2096</td>
<td>0.2658</td>
<td>0.1519</td>
<td>0.5569</td>
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</tr>
<tr>
<td>Ratio of Japanese-speaking healthcare staff</td>
<td>0.015</td>
<td>0.091</td>
<td>-0.0046</td>
<td>0.774</td>
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<tr>
<td>Southern states</td>
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<td>&lt;.0001</td>
<td>0.5394</td>
<td>&lt;.0001</td>
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</tr>
<tr>
<td>Metropolitan area</td>
<td>0.1301</td>
<td>0.0091</td>
<td>0.1301</td>
<td>0.0091</td>
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</tr>
<tr>
<td>Interaction variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP*Exposure index of Japanese-speaker</td>
<td>0.7379</td>
<td>0.0499</td>
<td>0.8625</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP*Ratio of Japanese-speaking healthcare staff</td>
<td>0.03</td>
<td>0.1302</td>
<td>0.0041</td>
<td>0.1281</td>
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<tr>
<td>EP*Years in U.S.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>AIC</td>
<td>15532.58</td>
<td>14523.38</td>
<td>14427.74</td>
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<td>10977.73</td>
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<tr>
<td>BIC</td>
<td>15534.75</td>
<td>14542.87</td>
<td>14451.55</td>
<td>11013.33</td>
<td>11014.65</td>
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</tbody>
</table>

Note:
1. Disability outcome is a scale variable based on mental disability, physical disability, sensory disability, self-care disability, go-outside disability, and employment disability
2. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3
3. *** p<0.001
Table 6: Poisson Regression Analysis on Disability Outcomes for Korean-Speaking Americans in the United States

<table>
<thead>
<tr>
<th>Variable</th>
<th>Basic Model</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Full Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-1.2135 &lt; .0001 ***</td>
<td>-2.4816 &lt; .0001 ***</td>
<td>-2.4858 &lt; .0001 ***</td>
<td>-2.4994 &lt; .0001 ***</td>
<td>-2.5204 &lt; .0001 ***</td>
</tr>
<tr>
<td>English language proficiency (EP)</td>
<td>-0.3028 &lt; .0001 ***</td>
<td>-0.1496 &lt; .0001 ***</td>
<td>-0.1655 &lt; .0001 ***</td>
<td>-0.1613 &lt; .0001 ***</td>
<td>-0.1075 0.3298</td>
</tr>
<tr>
<td><strong>Individual characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.1447 &lt; .0001 ***</td>
<td>-0.1549 &lt; .0001 ***</td>
<td>-0.1492 &lt; .0001 ***</td>
<td>-0.149 &lt; .0001 ***</td>
<td>-0.149 &lt; .0001 ***</td>
</tr>
<tr>
<td>Education</td>
<td>-0.0443 &lt; .0001 ***</td>
<td>-0.0409 &lt; .0001 ***</td>
<td>-0.0401 &lt; .0001 ***</td>
<td>-0.0401 &lt; .0001 ***</td>
<td>-0.0401 &lt; .0001 ***</td>
</tr>
<tr>
<td>Foreign born</td>
<td>0.6794 &lt; .0001 ***</td>
<td>0.7351 &lt; .0001 ***</td>
<td>0.7511 &lt; .0001 ***</td>
<td>0.7554 &lt; .0001 ***</td>
<td>0.7554 &lt; .0001 ***</td>
</tr>
<tr>
<td>Citizenship</td>
<td>0.0059 0.8398</td>
<td>0.0106 0.7147</td>
<td>0.0237 0.4383</td>
<td>0.0237 0.4383</td>
<td>0.0237 0.4383</td>
</tr>
<tr>
<td>Age</td>
<td>0.0256 &lt; .0001 ***</td>
<td>0.0298 &lt; .0001 ***</td>
<td>0.0296 &lt; .0001 ***</td>
<td>0.0297 &lt; .0001 ***</td>
<td>0.0297 &lt; .0001 ***</td>
</tr>
<tr>
<td>Years in U.S.</td>
<td>0.0567 &lt; .0001 ***</td>
<td>0.0577 &lt; .0001 ***</td>
<td>0.05 &lt; .0001 ***</td>
<td>0.0501 &lt; .0001 ***</td>
<td>0.0501 &lt; .0001 ***</td>
</tr>
<tr>
<td>Years in U.S. (Square)</td>
<td>-0.0005 &lt; .0001 ***</td>
<td>-0.0006 &lt; .0001 ***</td>
<td>-0.0005 &lt; .0001 ***</td>
<td>-0.0005 &lt; .0001 ***</td>
<td>-0.0005 &lt; .0001 ***</td>
</tr>
<tr>
<td>Foreign born * Years in U.S.</td>
<td>-0.0328 &lt; .0001 ***</td>
<td>-0.0341 &lt; .0001 ***</td>
<td>-0.0328 &lt; .0001 ***</td>
<td>-0.028 &lt; .0001 ***</td>
<td>-0.0281 &lt; .0001 ***</td>
</tr>
<tr>
<td><strong>Family characteristics</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>-0.3641 &lt; .0001 ***</td>
<td>-0.3451 &lt; .0001 ***</td>
<td>-0.3445 &lt; .0001 ***</td>
<td>-0.3445 &lt; .0001 ***</td>
<td>-0.3445 &lt; .0001 ***</td>
</tr>
<tr>
<td>Have Children</td>
<td>-0.3567 0.0002 ***</td>
<td>-0.401 &lt; .0001 ***</td>
<td>-0.3993 0.0001 ***</td>
<td>-0.3993 0.0001 ***</td>
<td>-0.3993 0.0001 ***</td>
</tr>
<tr>
<td><strong>Community characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure index of Korean-speaker</td>
<td>-0.0999 0.1905</td>
<td>-0.0657 0.4563</td>
<td>-0.0657 0.4563</td>
<td>-0.0657 0.4563</td>
<td>-0.0657 0.4563</td>
</tr>
<tr>
<td>Ratio of Korean-speaking healthcare staff</td>
<td>-0.0038 0.5045</td>
<td>-0.0054 0.475</td>
<td>-0.0054 0.475</td>
<td>-0.0054 0.475</td>
<td>-0.0054 0.475</td>
</tr>
<tr>
<td>Southern states</td>
<td>0.545 &lt; .0001 ***</td>
<td>0.5503 &lt; .0001 ***</td>
<td>0.5503 &lt; .0001 ***</td>
<td>0.5503 &lt; .0001 ***</td>
<td>0.5503 &lt; .0001 ***</td>
</tr>
<tr>
<td>Metropolitan area</td>
<td>0.1941 &lt; .0001 ***</td>
<td>0.1954 &lt; .0001 ***</td>
<td>0.1954 &lt; .0001 ***</td>
<td>0.1954 &lt; .0001 ***</td>
<td>0.1954 &lt; .0001 ***</td>
</tr>
<tr>
<td><strong>Interaction variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP*Exposure index of Korean-speaker</td>
<td>-0.1201 0.4459</td>
<td>-0.1201 0.4459</td>
<td>-0.1201 0.4459</td>
<td>-0.1201 0.4459</td>
<td>-0.1201 0.4459</td>
</tr>
<tr>
<td>EP*Ratio of Korean-speaking healthcare staff</td>
<td>0.004 0.7272</td>
<td>0.004 0.7272</td>
<td>0.004 0.7272</td>
<td>0.004 0.7272</td>
<td>0.004 0.7272</td>
</tr>
<tr>
<td>EP*Years in U.S.</td>
<td>0.0004 0.8658</td>
<td>0.0004 0.8658</td>
<td>0.0004 0.8658</td>
<td>0.0004 0.8658</td>
<td>0.0004 0.8658</td>
</tr>
<tr>
<td>AIC</td>
<td>38301.27</td>
<td>36767.45</td>
<td>36570.12</td>
<td>32391.69</td>
<td>32397.06</td>
</tr>
<tr>
<td>BIC</td>
<td>38303.76</td>
<td>36789.87</td>
<td>36597.51</td>
<td>32428.32</td>
<td>32441.02</td>
</tr>
</tbody>
</table>

Note:
1. Disability scale is developed based on mental disability, physical disability, sensory disability, self-care disability, go-outside disability, and employment disability
2. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3
3. *** p<0.001
<table>
<thead>
<tr>
<th>Variable</th>
<th>Chinese-Speaker n=64,613</th>
<th>Japanese-Speaker n=11,243</th>
<th>Korean-Speaker n=27,688</th>
<th>Pooled n=106,783</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-7.2973 &lt;.0001 ***</td>
<td>-4.4808 &lt;.0001 ***</td>
<td>-7.8016 &lt;.0001 ***</td>
<td>-7.1109 &lt;.0001 ***</td>
</tr>
<tr>
<td>English language proficiency (EP)</td>
<td>-1.1156 0.0002 ***</td>
<td>-2.3156 0.0075</td>
<td>-1.1093 0.0108</td>
<td>-1.5386 &lt;.0001 ***</td>
</tr>
<tr>
<td>Individual characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.0109 0.8569</td>
<td>0.0585 0.6564</td>
<td>0.0511 0.5424</td>
<td>0.0271 0.5417</td>
</tr>
<tr>
<td>Education</td>
<td>-0.0602 &lt;.0001 ***</td>
<td>-0.097 &lt;.0001 ***</td>
<td>-0.069 &lt;.0001 ***</td>
<td>-0.0641 &lt;.0001 ***</td>
</tr>
<tr>
<td>Foreign born</td>
<td>1.3398 0.0032</td>
<td>0.2183 0.7904</td>
<td>1.5058 0.0195</td>
<td>1.1455 0.0002 ***</td>
</tr>
<tr>
<td>Citizenship</td>
<td>0.00135 0.9864</td>
<td>0.3477 0.1397</td>
<td>-0.0087 0.9323</td>
<td>0.0246 0.6677</td>
</tr>
<tr>
<td>Age</td>
<td>0.064 &lt;.0001 ***</td>
<td>0.0365 0.0008 ***</td>
<td>0.0724 &lt;.0001 ***</td>
<td>0.0642 &lt;.0001 ***</td>
</tr>
<tr>
<td>Years in U.S.</td>
<td>0.1127 &lt;.0001 ***</td>
<td>0.0506 0.1757</td>
<td>0.1376 &lt;.0001 ***</td>
<td>0.1119 &lt;.0001 ***</td>
</tr>
<tr>
<td>Years in U.S. (Square)</td>
<td>-0.0013 &lt;.0001 ***</td>
<td>-0.0003 0.397</td>
<td>-0.0017 &lt;.0001 ***</td>
<td>-0.0012 &lt;.0001 ***</td>
</tr>
<tr>
<td>Foreign born * Years in U.S.</td>
<td>-0.0538 &lt;.0001 ***</td>
<td>-0.0202 0.3419</td>
<td>-0.0672 0.0007 ***</td>
<td>-0.0532 &lt;.0001 ***</td>
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<td>Family characteristics</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>-0.7294 &lt;.0001 ***</td>
<td>-0.5519 &lt;.0001 ***</td>
<td>-0.6798 &lt;.0001 ***</td>
<td>-0.7004 &lt;.0001 ***</td>
</tr>
<tr>
<td>Have Children</td>
<td>0.352 0.274</td>
<td>-0.8875 0.2446</td>
<td>0.0974 0.831</td>
<td>0.132 0.5851</td>
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<tr>
<td>Community characteristics</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure index of Asian-language speaker</td>
<td>-0.04 0.859</td>
<td>-0.0636 0.939</td>
<td>0.349 0.2292</td>
<td>0.1753 0.3316</td>
</tr>
<tr>
<td>Ratio of Asian-language-speaking healthcare staff</td>
<td>0.0383 0.1115</td>
<td>0.0151 0.6861</td>
<td>0.0242 0.197</td>
<td>0.0276 0.0041</td>
</tr>
<tr>
<td>Southern states</td>
<td>0.5594 0.0329</td>
<td>0.7778 &lt;.0001 ***</td>
<td>0.8195 0.0011 ***</td>
<td>0.7701 &lt;.0001 ***</td>
</tr>
<tr>
<td>Metropolitan area</td>
<td>0.1061 0.1067</td>
<td>-0.194 0.2378</td>
<td>0.1351 0.1522</td>
<td>0.0345 0.4776</td>
</tr>
<tr>
<td>Interaction variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP*Exposure index of Asian-language speaker</td>
<td>0.9129 0.038</td>
<td>2.5725 0.0243</td>
<td>1.0173 0.0778</td>
<td>1.5459 &lt;.0001 ***</td>
</tr>
<tr>
<td>EP*Ratio of Asian-language-speaking healthcare staff</td>
<td>-0.0072 0.8445</td>
<td>0.0214 0.6454</td>
<td>-0.0685 0.0696</td>
<td>-0.0305 0.0759</td>
</tr>
<tr>
<td>EP*Years in U.S.</td>
<td>0.00714 0.2511</td>
<td>0.00837 0.3024</td>
<td>0.0208 0.0265</td>
<td>0.0108 0.0055</td>
</tr>
<tr>
<td>-2 Log L</td>
<td>10681.529</td>
<td>2204.731</td>
<td>5743.311</td>
<td>19548.161</td>
</tr>
</tbody>
</table>

Note:
1. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3. Sample population is limited to Asian-language-speakers who speak Chinese, Japanese, or Korean at home, and whose age is between 16-64.
2. *** p<0.001
Table 8. Logistic Regression Analysis on Mental Disability for Chinese-, Japanese-, and Korean-Language Speaker in the United States

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chinese-Speaker</th>
<th>Japanese-Speaker</th>
<th>Korean-Speaker</th>
<th>Pooled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=64,613+13</td>
<td>n=11,243</td>
<td>n=27,688</td>
<td>n=106,783</td>
</tr>
<tr>
<td>Intercept</td>
<td>-4.5861 &lt;.0001  ***</td>
<td>-2.8945 0.0107</td>
<td>-5.0956 &lt;.0001  ***</td>
<td>-4.5007 &lt;.0001  ***</td>
</tr>
<tr>
<td>English language proficiency (EP)</td>
<td>-1.146 0.0008  ***</td>
<td>-1.7381 0.0855</td>
<td>-0.6989 0.1653</td>
<td>-1.2718 &lt;.0001  ***</td>
</tr>
<tr>
<td><strong>Individual characteristics</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.07 0.3044</td>
<td>0.118 0.4581</td>
<td>0.1034 0.3132</td>
<td>0.0045 0.9316</td>
</tr>
<tr>
<td>Education</td>
<td>-0.0998 &lt;.0001  ***</td>
<td>-0.1363 &lt;.0001  ***</td>
<td>-0.0943 &lt;.0001  ***</td>
<td>-0.0998 &lt;.0001  ***</td>
</tr>
<tr>
<td>Foreign born</td>
<td>0.3128 0.449</td>
<td>0.0881 0.9183</td>
<td>0.8719 0.1523</td>
<td>0.2241 0.4477</td>
</tr>
<tr>
<td>Citizenship</td>
<td>0.0594 0.5003</td>
<td>0.207 0.4571</td>
<td>0.2331 0.0731</td>
<td>0.0971 0.149</td>
</tr>
<tr>
<td>Age</td>
<td>0.039 &lt;.0001  ***</td>
<td>0.023 0.05</td>
<td>0.0331 &lt;.0001  ***</td>
<td>0.0364 &lt;.0001  ***</td>
</tr>
<tr>
<td>Years in U.S.</td>
<td>0.0435 0.0469</td>
<td>0.0641 0.1303</td>
<td>0.0928 0.0097</td>
<td>0.0603 0.0002  ***</td>
</tr>
<tr>
<td>Years in U.S. (Square)</td>
<td>-0.0004 0.1756</td>
<td>-0.0009 0.0532</td>
<td>-0.0011 0.0147</td>
<td>-0.0007 0.0003  ***</td>
</tr>
<tr>
<td>Foreign born * Years in U.S.</td>
<td>-0.0265 0.0461</td>
<td>-0.0209 0.3979</td>
<td>-0.0392 0.0681</td>
<td>-0.0275 0.0046</td>
</tr>
<tr>
<td><strong>Family characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>-1.0378 &lt;.0001  ***</td>
<td>-0.8413 &lt;.0001  ***</td>
<td>-0.8585 &lt;.0001  ***</td>
<td>-0.9493 &lt;.0001  ***</td>
</tr>
<tr>
<td>Have Children</td>
<td>-0.0663 0.7949</td>
<td>-0.769 0.1779</td>
<td>-0.3595 0.3138</td>
<td>-0.2278 0.2248</td>
</tr>
<tr>
<td><strong>Community characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure index of Asian-language speaker</td>
<td>0.204 0.4017</td>
<td>0.0603 0.9492</td>
<td>0.6365 0.0754</td>
<td>0.4924 0.0179</td>
</tr>
<tr>
<td>Ratio of Asian-language-speaking healthcare staff</td>
<td>0.0526 0.0323</td>
<td>0.0225 0.5785</td>
<td>-0.0552 0.1104</td>
<td>0.00933 0.4754</td>
</tr>
<tr>
<td>Southern states</td>
<td>0.6958 0.0067</td>
<td>0.3667 0.1754</td>
<td>1.2494 &lt;.0001  ***</td>
<td>0.7791 &lt;.0001  ***</td>
</tr>
<tr>
<td>Metropolitan area</td>
<td>0.2217 0.0022</td>
<td>-0.07 0.7114</td>
<td>-0.0972 0.4194</td>
<td>0.0627 0.2614</td>
</tr>
<tr>
<td><strong>Interaction variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP*Exposure index of Asian-language speaker</td>
<td>0.6888 0.1768</td>
<td>1.2681 0.3526</td>
<td>-0.3185 0.642</td>
<td>0.8095 0.0502</td>
</tr>
<tr>
<td>EP*Ratio of Asian-language-speaking healthcare staff</td>
<td>0.00467 0.8974</td>
<td>0.00686 0.9033</td>
<td>0.0392 0.4533</td>
<td>-0.0045 0.838</td>
</tr>
<tr>
<td>EP*Years in U.S.</td>
<td>-0.0003 0.9647</td>
<td>0.0165 0.132</td>
<td>0.0119 0.2773</td>
<td>0.00653 0.1789</td>
</tr>
</tbody>
</table>

-2 Log L

8798.648 1663.448 4189.977 15280.833

Note:
1. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3. Sample population is limited to Asian-language-speakers who speak Chinese, Japanese, or Korean at home, and whose age is between 16-64.
2. *** p<0.001
Table 9. Logistic Regression Analysis on Self-Care Disability for Chinese-, Japanese-, and Korean-Language Speaker in the United States

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chinese-Speaker</th>
<th>Japanese-Speaker</th>
<th>Korean-Speaker</th>
<th>Pooled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=64,613</td>
<td>n=11,243</td>
<td>n=27,688</td>
<td>n=106,783</td>
</tr>
<tr>
<td></td>
<td>β</td>
<td>p</td>
<td>β</td>
<td>p</td>
</tr>
<tr>
<td>Intercept</td>
<td>-5.3471</td>
<td>&lt;.0001 ***</td>
<td>-4.4802</td>
<td>0.0656</td>
</tr>
<tr>
<td>English language proficiency (EP)</td>
<td>-0.39</td>
<td>0.325</td>
<td>-2.289</td>
<td>0.0799</td>
</tr>
</tbody>
</table>

**Individual characteristics**

| Gender | -0.0916 | 0.2909 | 0.0126 | 0.957 | 0.0062 | 0.9511 | 0.0062 | 0.957 |
| Education | -0.0763 | <.0001 *** | -0.0611 | 0.0494 | -0.062 | <.0001 *** | -0.0667 | <.0001 *** |
| Foreign born | 0.891 | 1.163 | -0.0877 | 0.9461 | 0.9185 | 0.235 | 0.934 | 0.0221 |
| Citizenship | -0.0675 | 0.5528 | -0.2499 | 0.4969 | 0.0323 | 0.8234 | -0.0854 | 0.3027 |
| Age | 0.0223 | <.0001 *** | 0.0312 | 0.0398 | 0.0407 | <.0001 *** | 0.031 | <.0001 *** |
| Years in U.S. | 0.0365 | 0.2038 | 0.0177 | 0.7561 | 0.0743 | 0.075 | 0.0521 | 0.111 |
| Years in U.S. (Square) | -6E-05 | 0.8535 | -8E-05 | 0.9022 | -0.0007 | 0.1517 | -0.0004 | 0.1183 |
| Foreign born * Years in U.S. | -0.0336 | 0.0611 | -0.0048 | 0.8889 | -0.0457 | 0.0812 | -0.0342 | 0.0066 |

**Family characteristics**

| Marital status | -0.5255 | <.0001 *** | -0.1967 | 0.3692 | -0.4809 | 0.0002 *** | -0.5055 | <.0001 *** |
| Have Children | -0.2359 | 0.5028 | 0.5304 | 0.527 | 0.112 | 0.8005 | 0.0218 | 0.9328 |

**Community characteristics**

| Exposure index of Asian-language speaker | 0.0416 | 0.8937 | -0.8098 | 0.4917 | 0.3439 | 0.3891 | 0.3187 | 0.2158 |
| Ratio of Asian-language-speaking healthcare staff | 0.0788 0.002 | 0.0217 0.7514 | 0.0023 | 0.9392 | 0.0188 | 0.2663 |
| Southern states | 0.7425 | 0.0383 | 1.129 | 0.0005 *** | 0.6346 | 0.0677 | 0.9001 | <.0001 *** |
| Metropolitan area | 0.363 | 0.0001 *** | 0.1393 | 0.5543 | 0.2887 | 0.0241 | 0.262 | 0.0001 *** |

**Interaction variables**

| EP*Exposure index of Asian-language speaker | -0.2472 | 0.6885 | 1.96 | 0.2672 | 0.4214 | 0.5988 | 0.1456 | 0.7704 |
| EP*Ratio of Asian-language-speaking healthcare staff | -0.0207 | 0.62 | -0.0742 | 0.409 | -0.0041 | 0.9357 | 0.00178 | 0.9421 |
| EP*Years in U.S. | 0.00191 | 0.8268 | 0.0232 | 0.0979 | 0.0104 | 0.3912 | 0.0113 | 0.0491 |

-2 Log L

| 6000.269 | 1099.536 | 3481.855 | 10992.195 |

Note:
1. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3. Sample population is limited to Asian-language-speakers who speak Chinese, Japanese, or Korean at home, and whose age is between 16-64.
2. *** p<0.001
### Table 10. Logistic Regression Analysis on Employmentl Disability for Chinese-, Japanese-, and Korean-Language Speaker in the United States

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chinese-Speaker</th>
<th>Japanese-Speaker</th>
<th>Korean-Speaker</th>
<th>Pooled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=64,613</td>
<td>n=11,243</td>
<td>n=27,688</td>
<td>n=106,783</td>
</tr>
<tr>
<td></td>
<td>β</td>
<td>p</td>
<td>β</td>
<td>p</td>
</tr>
<tr>
<td>Intercept</td>
<td>-3.041</td>
<td>&lt;.0001 ***</td>
<td>-2.4854</td>
<td>&lt;.0001 ***</td>
</tr>
<tr>
<td>English language proficiency (EP)</td>
<td>0.2165</td>
<td>0.0517</td>
<td>-0.3579</td>
<td>0.4145</td>
</tr>
<tr>
<td><strong>Individual characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.3102 &lt;.0001 ***</td>
<td>-0.4451 &lt;.0001 ***</td>
<td>-0.2865 &lt;.0001 ***</td>
<td>-0.311 &lt;.0001 ***</td>
</tr>
<tr>
<td>Education</td>
<td>-0.0482 &lt;.0001 ***</td>
<td>-0.054 &lt;.0001 ***</td>
<td>-0.0275 &lt;.0001 ***</td>
<td>-0.044 &lt;.0001 ***</td>
</tr>
<tr>
<td>Foreign born</td>
<td>1.2629 &lt;.0001 ***</td>
<td>-0.0114 0.9775</td>
<td>1.2067 &lt;.0001 ***</td>
<td>1.1802 &lt;.0001 ***</td>
</tr>
<tr>
<td>Citizenship</td>
<td>-0.0049 0.8908</td>
<td>0.0503 0.6593</td>
<td>0.00036 0.9941</td>
<td>-0.0063 0.8129</td>
</tr>
<tr>
<td>Age</td>
<td>0.0107 &lt;.0001 ***</td>
<td>0.0286 &lt;.0001 ***</td>
<td>0.0298 &lt;.0001 ***</td>
<td>0.0181 &lt;.0001 ***</td>
</tr>
<tr>
<td>Years in U.S.</td>
<td>0.0697 &lt;.0001 ***</td>
<td>0.0254 0.1865</td>
<td>0.0841 &lt;.0001 ***</td>
<td>0.0737 &lt;.0001 ***</td>
</tr>
<tr>
<td>Years in U.S. (Square)</td>
<td>-0.0007 &lt;.0001 ***</td>
<td>-0.0004 0.0612</td>
<td>-0.0011 &lt;.0001 ***</td>
<td>-0.0008 &lt;.0001 ***</td>
</tr>
<tr>
<td>Foreign born * Years in U.S.</td>
<td>-0.0393 &lt;.0001 ***</td>
<td>-0.0002 0.9835</td>
<td>-0.0446 &lt;.0001 ***</td>
<td>-0.038 &lt;.0001 ***</td>
</tr>
<tr>
<td><strong>Family characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>-0.1131 0.0005 ***</td>
<td>-0.2808 0.0003 ***</td>
<td>-0.2612 &lt;.0001 ***</td>
<td>-0.1826 &lt;.0001 ***</td>
</tr>
<tr>
<td>Have Children</td>
<td>-0.8295 &lt;.0001 ***</td>
<td>-1.031 0.0075</td>
<td>-0.8649 &lt;.0001 ***</td>
<td>-0.84 &lt;.0001 ***</td>
</tr>
<tr>
<td><strong>Community characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure index of Asian-language speaker</td>
<td>-0.4509 &lt;.0001 ***</td>
<td>-0.0265 0.9518</td>
<td>-0.0922 0.5281</td>
<td>-0.3298 &lt;.0003 ***</td>
</tr>
<tr>
<td>Ratio of Asian-language-speaking healthcare staff</td>
<td>0.0295 0.0271</td>
<td>-0.0321 0.352</td>
<td>-0.0118 0.3611</td>
<td>0.00573 0.3955</td>
</tr>
<tr>
<td>Southern states</td>
<td>0.1736 0.249</td>
<td>0.4685 0.0023</td>
<td>0.4601 0.0033</td>
<td>0.3837 &lt;.0001 ***</td>
</tr>
<tr>
<td>Metropolitan area</td>
<td>0.2854 &lt;.0001 ***</td>
<td>0.2474 0.002</td>
<td>0.2203 &lt;.0001 ***</td>
<td>0.2594 &lt;.0001 ***</td>
</tr>
<tr>
<td><strong>Interaction variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP*Exposure index of Asian-language speaker</td>
<td>-0.0812 0.6514</td>
<td>0.2419 0.6953</td>
<td>-0.2251 0.3652</td>
<td>-0.0644 0.6665</td>
</tr>
<tr>
<td>EP*Ratio of Asian-language-speaking healthcare staff</td>
<td>-0.0455 0.0382</td>
<td>0.0665 0.1038</td>
<td>0.0216 0.2362</td>
<td>0.00093 0.9279</td>
</tr>
<tr>
<td>EP*Years in U.S.</td>
<td>-0.0078 0.006</td>
<td>0.00992 0.8407</td>
<td>-0.0044 0.3189</td>
<td>-0.0045 0.0247</td>
</tr>
<tr>
<td><strong>-2 Log L</strong></td>
<td>40795.74</td>
<td>6245.381</td>
<td>19211.525</td>
<td>68326.043</td>
</tr>
</tbody>
</table>

**Note:**
1. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3. Sample population is limited to Asian-language-speakers who speak Chinese, Japanese, or Korean at home, and whose age is between 16-64.
2. *** p<0.001
### Table 11. Logistic Regression Analysis on Going-Out Disability for Chinese-, Japanese-, and Korean-Language Speaker in the United States

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chinese-Speaker</th>
<th>Japanese-Speaker</th>
<th>Korean-Speaker</th>
<th>Pooled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>p</td>
<td>β</td>
<td>p</td>
</tr>
<tr>
<td>Intercept</td>
<td>-2.2215</td>
<td>&lt;.0001***</td>
<td>-2.0707</td>
<td>0.0013***</td>
</tr>
<tr>
<td>English language proficiency (EP)</td>
<td>0.3053</td>
<td>0.019</td>
<td>-0.2731</td>
<td>0.6148</td>
</tr>
<tr>
<td><strong>Individual characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.095</td>
<td>0.002</td>
<td>-0.0811</td>
<td>0.3497</td>
</tr>
<tr>
<td>Education</td>
<td>-0.0526</td>
<td>&lt;.0001***</td>
<td>-0.0629</td>
<td>&lt;.0001***</td>
</tr>
<tr>
<td>Foreign born</td>
<td>0.6075</td>
<td>0.003</td>
<td>-0.482</td>
<td>0.322</td>
</tr>
<tr>
<td>Citizenship</td>
<td>0.0349</td>
<td>0.3925</td>
<td>-0.0517</td>
<td>0.7049</td>
</tr>
<tr>
<td>Age</td>
<td>0.00772</td>
<td>&lt;.0001***</td>
<td>0.0289</td>
<td>&lt;.0001***</td>
</tr>
<tr>
<td>Years in U.S.</td>
<td>0.0124</td>
<td>0.2485</td>
<td>-0.0228</td>
<td>0.314</td>
</tr>
<tr>
<td>Years in U.S. (Square)</td>
<td>-9.7E-06</td>
<td>0.941</td>
<td>0.00026</td>
<td>0.3123</td>
</tr>
<tr>
<td>Foreign born * Years in U.S.</td>
<td>-0.0094</td>
<td>0.1776</td>
<td>0.0224</td>
<td>0.0962</td>
</tr>
<tr>
<td><strong>Family characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>-0.1341</td>
<td>0.0004***</td>
<td>-0.3355</td>
<td>0.0004***</td>
</tr>
<tr>
<td>Have Children</td>
<td>-0.2412</td>
<td>0.0364</td>
<td>0.1473</td>
<td>0.6497</td>
</tr>
<tr>
<td><strong>Community characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure index of Asian-language speaker</td>
<td>-0.9087</td>
<td>&lt;.0001***</td>
<td>-0.1617</td>
<td>0.7365</td>
</tr>
<tr>
<td>Ratio of Asian-language-speaking healthcare staff</td>
<td>0.0414</td>
<td>0.0054</td>
<td>-0.0134</td>
<td>0.6867</td>
</tr>
<tr>
<td>Southern states</td>
<td>0.258</td>
<td>0.162</td>
<td>0.3473</td>
<td>0.1161</td>
</tr>
<tr>
<td>Metropolitan area</td>
<td>0.2874</td>
<td>&lt;.0001***</td>
<td>0.2437</td>
<td>0.0123</td>
</tr>
<tr>
<td><strong>Interaction variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP*Exposure index of Asian-language speaker</td>
<td>-0.6301</td>
<td>0.0035</td>
<td>-0.3923</td>
<td>0.6093</td>
</tr>
<tr>
<td>EP*Ratio of Asian-language-speaking healthcare staff</td>
<td>-0.0342</td>
<td>0.1793</td>
<td>0.0547</td>
<td>0.2187</td>
</tr>
<tr>
<td>EP*Years in U.S.</td>
<td>-0.0068</td>
<td>0.0428</td>
<td>-0.0007</td>
<td>0.8952</td>
</tr>
</tbody>
</table>

-2 Log L: 32496.417, 4561.043, 15771.882, 54311.236

**Note:**

1. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3. Sample population is limited to Asian-language-speakers who speak Chinese, Japanese, or Korean at home, and whose age is between 16-64.
2. *** p<0.001
Table 12. Logistic Regression Analysis on Sensory Disability for Chinese-, Japanese-, and Korean-Language Speaker in the United States

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chinese-Speaker n=64,613</th>
<th>Japanese-Speaker n=11,243</th>
<th>Korean-Speaker n=27,688</th>
<th>Pooled n=106,783</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>p</td>
<td>β</td>
<td>p</td>
</tr>
<tr>
<td>Intercept</td>
<td>-5.4575</td>
<td>&lt;.0001 ***</td>
<td>-4.5308</td>
<td>0.0012</td>
</tr>
<tr>
<td>English language proficiency (EP)</td>
<td>-0.2813</td>
<td>0.4504</td>
<td>-2.5481</td>
<td>0.0291</td>
</tr>
<tr>
<td><strong>Individual characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.278</td>
<td>0.001</td>
<td>-0.32</td>
<td>0.0778</td>
</tr>
<tr>
<td>Education</td>
<td>-0.0622</td>
<td>&lt;.0001 ***</td>
<td>-0.0805</td>
<td>0.0018</td>
</tr>
<tr>
<td>Foreign born</td>
<td>-0.5493</td>
<td>0.304</td>
<td>0.9742</td>
<td>0.3751</td>
</tr>
<tr>
<td>Citizenship</td>
<td>0.1332</td>
<td>0.2473</td>
<td>0.2832</td>
<td>0.3734</td>
</tr>
<tr>
<td>Age</td>
<td>0.0587</td>
<td>&lt;.0001 ***</td>
<td>0.0070</td>
<td>0.6307</td>
</tr>
<tr>
<td>Years in U.S.</td>
<td>-0.0148</td>
<td>0.5547</td>
<td>0.074</td>
<td>0.1458</td>
</tr>
<tr>
<td>Years in U.S. (Square)</td>
<td>0.00021</td>
<td>0.4706</td>
<td>-0.0004</td>
<td>0.4449</td>
</tr>
<tr>
<td>Foreign born * Years in U.S.</td>
<td>0.00864</td>
<td>0.5634</td>
<td>-0.0217</td>
<td>0.4513</td>
</tr>
<tr>
<td><strong>Family characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>-0.6181</td>
<td>&lt;.0001 ***</td>
<td>-0.4478</td>
<td>0.0159</td>
</tr>
<tr>
<td>Have Children</td>
<td>-0.7856</td>
<td>0.1456</td>
<td>-13.174</td>
<td>0.9758</td>
</tr>
<tr>
<td><strong>Community characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure index of Asian-language speaker</td>
<td>0.00219</td>
<td>0.9947</td>
<td>-0.6216</td>
<td>0.5713</td>
</tr>
<tr>
<td>Ratio of Asian-language-speaking healthcare staff</td>
<td>0.0426</td>
<td>0.2183</td>
<td>0.0219</td>
<td>0.6123</td>
</tr>
<tr>
<td>Southern states</td>
<td>0.4596</td>
<td>0.2014</td>
<td>0.9527</td>
<td>0.003</td>
</tr>
<tr>
<td>Metropolitan area</td>
<td>0.1463</td>
<td>0.1133</td>
<td>-0.1656</td>
<td>0.4604</td>
</tr>
<tr>
<td><strong>Interaction variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP*Exposure index of Asian-language speaker</td>
<td>0.1177</td>
<td>0.8361</td>
<td>2.7866</td>
<td>0.074</td>
</tr>
<tr>
<td>EP*Ratio of Asian-language-speaking healthcare staff</td>
<td>-0.0009</td>
<td>0.9855</td>
<td>-0.0237</td>
<td>0.6983</td>
</tr>
<tr>
<td>EP*Years in U.S.</td>
<td>0.00527</td>
<td>0.5015</td>
<td>0.00938</td>
<td>0.4044</td>
</tr>
<tr>
<td><strong>2 Log L</strong></td>
<td>6208.257</td>
<td>1319.386</td>
<td>2683.574</td>
<td>10663.504</td>
</tr>
</tbody>
</table>

Note:
1. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3. Sample population is limited to Asian-language-speakers who speak Chinese, Japanese, or Korean at home, and whose age is between 16-64.
2. *** p<0.001
Table 13. Logistic Regression Analysis on Any Disability for Chinese-, Japanese-, and Korean-Language Speaker in the United States

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chinese-Speaker</th>
<th>Japanese-Speaker</th>
<th>Korean-Speaker</th>
<th>Pooled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=64,613</td>
<td>n=11,243</td>
<td>n=27,688</td>
<td>n=91,907</td>
</tr>
<tr>
<td></td>
<td>β</td>
<td>p</td>
<td>β</td>
<td>p</td>
</tr>
<tr>
<td>Intercept</td>
<td>-2.2148</td>
<td>&lt;.000 ***</td>
<td>-1.1075</td>
<td>0.014</td>
</tr>
<tr>
<td>English language proficiency (EP)</td>
<td>0.09</td>
<td>0.359</td>
<td>-1.07</td>
<td>0.004</td>
</tr>
<tr>
<td><strong>Individual characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.1932</td>
<td>&lt;.000 ***</td>
<td>-0.2907</td>
<td>&lt;.000 ***</td>
</tr>
<tr>
<td>Education</td>
<td>-0.0567</td>
<td>&lt;.000 ***</td>
<td>-0.0777</td>
<td>&lt;.000 ***</td>
</tr>
<tr>
<td>Foreign born</td>
<td>0.8249</td>
<td>&lt;.000 ***</td>
<td>-0.1365</td>
<td>0.681</td>
</tr>
<tr>
<td>Citizenship</td>
<td>0.0099</td>
<td>0.754</td>
<td>0.0509</td>
<td>0.608</td>
</tr>
<tr>
<td>Age</td>
<td>0.0169</td>
<td>&lt;.000 ***</td>
<td>0.0248</td>
<td>&lt;.000 ***</td>
</tr>
<tr>
<td>Years in U.S.</td>
<td>0.0391</td>
<td>&lt;.000 ***</td>
<td>0.012</td>
<td>0.451</td>
</tr>
<tr>
<td>Years in U.S. (Square)</td>
<td>-0.0003</td>
<td>0.111</td>
<td>-8E-05</td>
<td>0.675</td>
</tr>
<tr>
<td>Foreign born * Years in U.S.</td>
<td>-0.0258</td>
<td>&lt;.000 ***</td>
<td>0.0025</td>
<td>0.792</td>
</tr>
<tr>
<td><strong>Family characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>-0.2707</td>
<td>&lt;.000 ***</td>
<td>-0.3299</td>
<td>&lt;.000 ***</td>
</tr>
<tr>
<td>Have Children</td>
<td>-0.4682</td>
<td>&lt;.000 ***</td>
<td>-0.5493</td>
<td>0.026</td>
</tr>
<tr>
<td><strong>Community characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure index of Asian-language speaker</td>
<td>-0.4426</td>
<td>&lt;.000 ***</td>
<td>-0.4562</td>
<td>0.209</td>
</tr>
<tr>
<td>Ratio of Asian-language-speaking healthcare staff</td>
<td>0.0216</td>
<td>0.074</td>
<td>-0.0111</td>
<td>0.641</td>
</tr>
<tr>
<td>Southern states</td>
<td>0.2508</td>
<td>0.042</td>
<td>0.5408</td>
<td>&lt;.000 ***</td>
</tr>
<tr>
<td>Metropolitan area</td>
<td>0.2907</td>
<td>&lt;.000 ***</td>
<td>0.1407</td>
<td>0.042</td>
</tr>
<tr>
<td><strong>Interaction variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP*Exposure index of Asian-language speaker</td>
<td>-0.0962</td>
<td>0.543</td>
<td>1.2075</td>
<td>0.021</td>
</tr>
<tr>
<td>EP*Ratio of Asian-language-speaking healthcare staff</td>
<td>-0.0163</td>
<td>0.375</td>
<td>0.0376</td>
<td>0.22</td>
</tr>
<tr>
<td>EP*Years in U.S.</td>
<td>-0.0079</td>
<td>0.001 ***</td>
<td>-0.0002</td>
<td>0.955</td>
</tr>
</tbody>
</table>

-2 Log L

19147.759 8098.324 23189.277 83063

Note:
1. Sources: 5% Public Use Micro Statistics (PUMS) data from U.S Census 2000 SF3. Sample population is limited to Asian-language-speakers who speak Chinese, Japanese, or Korean at home, and whose age is between 16-64.
2. *** p<0.001
realize that he or she was having a disability if there were more healthcare providers speaking the same language.

Table 6 represents almost identical statistical results of Korean-language speakers, compared to Chinese-language speakers. All individual characteristics showed significant effects on disability outcomes, except for citizenship. Family characteristics showed the same effects on disability with similar coefficients. The only difference was in community characteristics. As determined with the full model and holding other variables constant, living in a central city and living in southern states affected the logs of disability outcomes positively, but the exposure index and ratio of healthcare staff who speaks Korean was not significant.

For Japanese-language speakers (Table 5), the picture was different. Fewer variables significantly affected the logs of disability outcomes. At the individual level, only gender, education level, and age were significant. Holding other variables constant in the full model, the difference in logs of expected disability outcomes was 0.2135 units lower for females compared to males. For each one year increase in education, the difference in the logs of expected disability outcome would be expected to decrease by 0.0646 units. For each one year of age, the difference in logs of expected disability outcome would be expected to increase by 0.0265 units. At the family level, the difference in the logs of expected disability outcomes would be expected to be 0.3516 less for married people than people who were not married, other factors being equal. Having a child did not appear to be a significant effect. Holding other factors constant in the full model, at the community level, people who lived in southern states were expected
to have higher logs of disability outcomes by 0.5394 units relative to people who were not living in these states.

The different effect of limited language proficiency on disability outcomes varied across the language groups, representing by different coefficients in each group. For Chinese speakers, the coefficient was 0.5155 in the basic model to 0.0883 in the full model. For Japanese speakers, it was 0.0053 in the basic model to 0.8821 in the full model. And for Korean speakers, it was 0.3028 in the basic model to 0.1075 in the full model.

For each model, the model fitness are shown by Akaike’s information criterion (AIC) and Bayesian information criterion (BIC). The full model studied the effects of limited language proficiency on disability outcomes, while controlling individual, family, and community factors. The purpose was to capture the effects while controlling other variables, as well. In the pooled model, AIC value for model 3 were 115399.7 and 115404.1 for the full model; BIC values were 115445.1 for model 3 and 115458.6 for the full model. In this case, model 3 had a better fitness.

Community/contextual characteristics are important parts of relationships. However, there have not been agreements or empirical consistency of community/contextual factors on the well-being of immigrants; the present effort is the first use of these characteristics in disability studies, and the census data limit the measurements available. Also, considering the model fitness, the third model signifies the importance of the relationship. The full model is necessary to prove the relationship if further information becomes available and a consistent view is reached on the matter.
CHAPTER 6: CONCLUSIONS AND IMPLICATIONS

The purpose of this study was to call attention and raise awareness to the effects of limited language proficiency on disability. Based upon the Disablement Process model, the basic thesis was that limited language proficiency is a predisposing risk factor for disability. By inducing acculturative stress during the process of immigration and through discrimination, restriction to lower socioeconomic status and lower living conditions, and barriers to health care services, limited language proficiency can initiate the pathology of disability, even for adult immigrants. The effect can be severe, because limited language proficiency continuously affects an immigrant’s health until he or she reaches full proficiency in the host language, or when he or she is disabled, or dead.

This study did not fully capture the socioeconomic mechanisms of the effects of limited language proficiency on disability. The direct causal relationship between limited language proficiency and disability was complicated and unclear. Nevertheless, to my knowledge, this study was the first that explicitly draws upon limited language proficiency and its effects – an ignored and under-utilized, but important, factor for the health status of immigrants. In addition, there have been few comparative studies of ethnic groups in the U.S. that concentrate on health or disease. Thus, this study, which explored the effects of limited language proficiency on disabilities in three Asian language groups, was a first step in establishing a body of knowledge for medical sociology.
The Effects of Limited Language Proficiency

According to Bourdieu, language is an important and has symbolic power to designate one’s position in the society. Language contributes substantially in daily communication. Following that logic, being unable to speak the host language can put he or she into a disadvantage position, such as lower socioeconomic status and reduced health care services. Our data analysis results confirm the importance of language proficiency. Relating to immigrants, limited language proficiency can trigger illness and other health problem by inducing stress during immigration process. As the effects of limited language proficiency progress, disability can occur.

This study used a comprehensive model of the Disablement Process relating to limited language proficiency. The results establish that limited language proficiency influences disability of adult Chinese-, Japanese-, and Korean-language speakers in the US. Limited language proficiency can induce stress through confusion, anxiety, acculturative stress and discrimination. The language problem also is also related to other social factors, such as lower socioeconomic conditions and reduced health care services.

Limited language proficiency appears to be a disposing risk factor for disability outcomes. According to the Disablement Process model, a risk factor exists at or before the onset of the disablement process, and it is a long-term, if not permanent, characteristic of individuals. As discussed above, foreign, non-English speakers are born with limited language proficiency. This deficiency would be evident for an individual non-English
speaker, if he or she starts to learn English after a certain age. Considering immigration selectivity, immigrants must be healthy enough to come to the US.

This study demonstrated that limited language proficiency was significantly associated with disability outcomes. Even though the mechanism by which limited language proficiency affects disability outcomes is not clear, at this point, it seems possible that the problem induces disabilities through stress during the acculturation process. It may also cause accidents and injuries due to their inability to communicate or speak and may lead to inadequate care in medical settings.

Relative to the second hypothesis, some individual, family, and community characteristics were negatively associated with disability outcomes, while others affected disability outcomes in an opposite way. As predicted, education level was negatively associated with disability outcomes; people with higher education had fewer disabilities. This is consistent with other studies. Gender affected disability outcomes differently; females tended to have fewer disability outcomes than males. One explanation would be that females tend to take care of their bodies more than males. Another explanation is that females, who are generally the main care-givers in households, would be unlikely to report or admit that they are disabled.

Other individual characteristics, foreign-born, age, and years in the US, were positively related to disability outcomes. As predicted, elderly people were more disabled than younger people. This is true according to the Disablement Process: disabilities can be mild or moderate in childhood or youth, and accumulate with age.

Being foreign-born and years in the US appeared to have different effects on disability outcomes for Chinese- and Korean- language speakers relative to Japanese-
language speakers. Foreign-born Chinese- and Korean-language speakers were more likely to be disabled than those who were native-born. The data in this study do not explain the result, but the difference may lie in the experiences and life in the immigrant-sending country. In contrast, whether or not an immigrant was foreign-born did not affect the disability outcomes for Japanese-language speakers. Years in the US was designed to measure how long an immigrant had been living in the host country. The results showed that the longer an individual lived in the US, the more likely this person was to be disabled. This may be partially due to aging. Another factor used in other studies, years before immigration, was not included in this study because of its significant relationship with years in the host country.

Concerning the third hypothesis, individual characteristics had similar affects on disability outcomes, with almost identical coefficients for Chinese- and Korean-language speakers, even in the pooled model. They did not have any effects on disability outcomes on Japanese-language speakers. Although the reason is not clear, the results prove the third hypothesis that the effects of the limited language proficiency on disability outcomes are different across different language groups. This also reinforced the idea that social studies need to examine each ethnic group, separately.

There were only two family characteristics involved in this study. In the pooled mode, both marital status and having a child were significantly associated (negatively) with disability outcomes. Specifically, immigrants who were married were less disabled; immigrants who had children were less disabled. These results showed the impact of family and family support. However, these family effects were evident only for Chinese- and Korean-language speakers, not for Japanese-speakers, for whom family
characteristics did not affect the disability outcomes. Considering these differences across the language groups, further studies should consider the potential cultural, traditional, and life differences between language groups.

Community characteristics were different among the three language groups. These characteristics were significantly different and uniquely affected the disability outcomes of each language group. For Chinese-language speakers, all community characteristics were significantly associated with disability outcomes. The exposure index was designed to measure the interaction between Chinese-language speakers and English-language speakers. The more interaction they had, the less disabled they became. As discussed above, this may have been associated with the double-edged effects of the community. On one hand, the more they interacted with English-speakers, the more stress they had. On the other hand, the more interaction with English-speakers, the more information they had, as well as better health service, better living conditions, and better opportunities to improve their English. The latter appeared to be more effective for Chinese-language speakers.

The ratio of Chinese-speaking health care staff was designed to measure how much health service was available for foreign-language speakers. The results were expected to have a negative association. That is, Chinese-speakers would have fewer disability outcomes if more healthcare staff spoke Chinese. However, the results showed the opposite: Chinese-speakers reported more disability outcomes with more healthcare staff of Chinese-language. This may be due to our data being based on self-reported information. Thus, with more healthcare staff of Chinese-language, more Chinese-speakers would be able to realize that they were disabled.
Southern states were included in the study because of the higher disability ratios in the south. The results showed that people in the Southern states reported more disabilities than people of other states. The last variable involved was metropolitan area to measure whether an individual lived in a census-defined metropolitan area. The results showed that people who lived in metropolitan areas reported more disability outcomes.

While all community characteristics affected disability outcomes for Chinese-language speakers, only residence in southern states positively affected the outcomes for Japanese-language speakers. That is, for Japanese-language speakers in the US, those who lived in the southern states had more disability outcomes than people who lived in other states. No other community characteristics affected the disability outcomes for Japanese-language speakers.

For Korean-language speakers, residence in southern states and in metropolitan areas was positively associated with disability outcomes. Korean-language speakers who lived in southern states and who lived in metropolitan areas had more disability outcomes than their counterparts.

Thus, the results of individual, family, and community characteristics for the three language groups showed how intra-individual and extra-individual characteristics affect the disabilities of each group. They demonstrated the variations for each ethnic group and reinforced the importance of separating each group in social studies. According to the Disablement Process, interventions reduce disabilities and difficulties, and exacerbators promote or maintain disabilities. However, interventions can go awry: interventions can become exacerbators, such as community characteristics. In order to
prevent disabilities, it is important to introduce more disability interventions, or more intervention effects, and reduce exacerbators and their effects.

The Limited Language Proficiency and the Disablement Process

The Disablement Process has been an important model in the field of disability research. First, the model views disability as a process, rather than a static state, with potentials for intervention and exacerbators during the process. The transition process from health to disability is complicated. Previous studies and models have overlooked the effects of social factors as influences on the pathway from disease to disability. The Disablement Process model allows the possibility of considering social factors during the process of disablement.

Second, the disablement process model provides a conceptual framework for disability progression that allows a better understanding of the social consequences of limited language proficiency, as well as its possible interactions with other social factors. This model provides a rationale to assess the effects of limited language proficiency on disability of immigrants, and it contributes in clarifying the relationship between daily living factors and disability, which should be considered for clinical applications and institution of public policies.

Third, the disablement process model can help in designing and evaluating specific disability interventions. The causal role of social factors, such as limited language proficiency, can be demonstrated to understand the impact on disability and target disability intervention. The impact of these social factors on the whole process,
leading from pathology to impairment, should be assessed in order to improve prevention of the consequences of limited language proficiency on disability. This application can also be extended to other factors of disability for purposes of prevention.

Evaluation of the Disablement Process model in exploring limited language proficiency is an important step in disability research. There are two important contributions of this study to the disability literature. One is the addition of limited language proficiency to the disablement process model. The other is study of the disability process from a comparative perspective.

First, the attempt to address risk factors through the inclusion of limited language proficiency is a step towards a more complete examination of the process leading to disablement. This factor was included in the model as a risk factor. The original Disablement Process model suggested that risk factors are relevant in understanding the effects they have in the process. This is important for future research on prevention in the transition to disability.

The results of this study support the hypothesis that limited language proficiency is a factor in the disablement process. They highlight the predisposing character of limited English language proficiency of Asian immigrants in the US. Because it is common for immigrants to have limited language proficiency, many people ignore its significance. This study demonstrated that limited English language proficiency significantly affects an individual’s health, which consequently leads to disability. Future research on immigrants should include other risk factors in the process to address their effects in the transition to disability.
Second, another objective of this study was to examine the Disablement Process model in a sample of different language groups of adult immigrants. This study was undertaken in an attempt to address the lack of comparative research on the transition from health to disability in adult ethnic groups. The Disablement Process model provides the possibility of studying the disabilities of any population, such as an age group or an ethnic group. The results confirmed the diversity of ethnic groups, even among Asian language speakers. Limited language proficiency affected disabilities among all groups in this study, but the effects were different across language groups. Thus, prevention strategies for disabilities may be different as well. Future studies should compare the Disablement Process model across race and ethnicity to address potential differences in the transition to disability.

The results of this study highlight the diversity of Asian populations with respect to disability outcomes. Differences in disability risk by spoken languages, nativity, and length of stay in the US are notable. These disparities may reflect differences in the selectivity of the migration process associated with timing of arrival and with country of origin. For example, being foreign-born and the length of stay in the US affect the disability process for Chinese- and Korean-speakers but not Japanese-speakers.

The primary purposes for studying disabilities are to develop prevention strategies and to decrease their prevalence. This study has identified the importance of limited language proficiency in the process of disablement for Asian immigrants in the US and has added to the disability profile of immigrants. In order to prevent disabilities for immigrants, the negative effects of limited language proficiency should be decreased.
Since no research has been accomplished on the effects of limited language proficiency of adult Chinese-, Japanese-, and Korean-language speakers in the US, this study helps to expand understanding of these effects. Although this study is only a first step in examining the issue, these findings demonstrate the importance of language proficiency in predicting disability outcomes. Individual, family, and community characteristics are important. Even though Chinese-, Japanese-, and Korean-language speakers have some similar sociodemographic characteristics, English language proficiency affected disability outcomes in a different pattern for Japanese-language speakers relative to Chinese- and Korean-language speakers. The variance in each language group reinforces the importance of social and healthcare service providers being careful not to consider Asian people as a single group. Further, the effects of language proficiency as a predictor of disability outcomes among these immigrants group points to the importance of training language-competent healthcare providers.

**Other Outcomes and Prevention of Disability**

“Disability is a precursor for important outcomes such as hospitalization, institutionalization, and death. It also has a powerful effect on happiness, life satisfaction, and other global well-being indicators” (Verbrugge & Jette, 1994, p. 7). One disablement process “can lead to downward-spiraling function, and sometimes even prompt new pathologies and their associated dysfunctions” (Verbrugge & Jette, 1994, p. 7). In addition, consequences can be both a feedback loop within a disablement process and lead to another disablement process (Verbrugge & Jette, 1994).
Figure 5. Other Outcomes

1. Quality of Life

\[
\text{DISABILITY} \rightarrow \text{DIRE AND GLOBAL OUTCOMES} \\
(\text{hospitalization, institutionalization, death; global wellbeing, happiness, life satisfaction})
\]

2. Secondary Conditions and Dysfunctions

Within a Disablement Process:

\[
\text{PATHOLOGY} \quad \text{IMPAIRMENTS} \quad \text{FUNCTIONAL LIMITATIONS} \quad \text{DISABILITY}
\]

A New Disablement Process:

\[
\text{PATHOLOGY} \quad \text{IMPAIRMENTS} \quad \text{FUNCTIONAL LIMITATIONS} \quad \text{DISABILITY}
\]

(Adopted from p7 Verbrugge and Jette, 1994)
The limited language proficiency, a problem facing many immigrants may create negative outcomes and consequences. It may predispose for disablement through pathology, impairment, functional limitation, and disability. People with impairments, function limitations, and disabilities would have reduced opportunities of learning and improving their English language abilities. This, in turn, induces stress on human body and promotes disablement. “Loops like this can become vicious spirals; a flare-up or a fall can cause swift interrelated declines in many systems, eventuating in institutionalization or death” (Verbrugge & Jette, 1994, p.7). A patient’s mismanagement by medical staff due to limited language proficiency, can lead to medical accidents and to more serious disabilities. As mentioned above, limited language proficiency may be a long-term, if not permanent, characteristic of individuals if he or she does not learn English in childhood, this is the case for most immigrants. Thus, the vicious cycle of limited language proficiency and disabilities continues to function until an immigrant does not have difficulties with the host language, which rarely happens, or until the immigrant dies.

Verbrugge and Jette (1994) have developed a “person-environment fit” model, and claim that disability “denotes a relationship between a person and her/his environment” (p. 9) and that disability “occurs for a given activity when there is a gap between personal capability and the activity’s demand” (p. 9). Thus, “Disability can be alleviated at either side, by increasing capacity or by reducing demand” (p. 9). In order to reduce demand, the options are activity accommodations, environmental modifications, psycho-social coping and external support (Verbrugge & Jette, 1994). Rather than focusing on the person, the person-environment fit model has extended the purview to
Figure 6. A Loop: The Limited Language Proficiency and the Disablement Process

The Limited Language Proficiency

PATHOLOGY → IMPAIRMENTS → FUNCTIONAL LIMITATIONS → DISABILITY

The Limited Language Proficiency
include demographic, social and psychological characteristics that affect pathology, impairment and other functional outcomes of the disablement process.

It is generally believed that the best way to reduce the negative effects of limited language proficiency is to learn and improve language abilities. It is true that improved host language ability minimizes stress, thus reducing the negative impacts on people. This person-centered strategy may not be satisfying without considering the contextual environment. Following the logic of the person-environment fit model, to reduce the negative effects of the limited language proficiency on disability outcomes, it is important to reduce the demand for host language proficiency. This is not to discourage learning of the host language; instead, it is still essential for individuals to try to learn the host language. This would help alleviate the effect of limited language proficiency on disability outcomes from both sides: increasing capability and reducing the demand. On one side, individuals should take all possible opportunities to improve their host language ability; on the other side, the family and the host society should provide possibilities to reduce the demand of host language proficiency.

The person-environment provides the following options, which can be applied to the issue of limited language proficiency. (1) Activity accommodation. For example, an individual who does not speak English well may want to look for a job that requires relatively less language skills, such as computer programming rather than computer sales. (2) Build, physical and social environment. To modify the build environment, social attitudes and supporting facilities would reduce demand. For example, employing more non-English-speaking physicians, nurses, and other healthcare providers would provide more communication for non-English-speaking patients in US hospitals. If these
Figure 7. Person-Environment Fit Model

INTRA- & EXTRA-INDIVIDUAL FACTORS THAT AFFECT DEMAND:
Modifications of Built, Physical, & Social Environment
Activity Accommodations (what, how, how often, how long)
External Supports (personal assistance, special equipment)
Psychosocial Attributes & Coping

TASK ENVIRONMENT: DEMAND

PATHOLOGY → IMPAIRMENTS → FUNCTIONAL LIMITATIONS → DISABILITY

PERSON: CAPABILITY

INTRA- & EXTRA-INDIVIDUAL FACTORS THAT AFFECT CAPABILITY:
Medical Care & Rehabilitation
Medications & Other Therapeutic Regimens
Lifestyle & Behavior Changes

(Adopted from p10 Verbrugge and Jette, 1994)
personnel are not available, translator assistance or translation system would also fulfill the task.  (3) Psychological coping. Language difficulties are extensive and long-lasting. Coping behaviors derived from family, relatives, and friends can alter a person’s standard and definition of self that is “less demanding.”  (4) External supports. As stated by Verbrugge and Jette (1994), whether this will help to reduce the demand is ambiguous. Personal assistance from other people can help to solve problems quickly. However, this adoption of external support may be psychologically difficult because of public labeling or self definition.

The Disablement Process model extends to traditional epidemiological, medical and public health perspectives, and it offers structure for research design and for applications of research results in health policy and medical care. With limitations of data measurement, the present study attempts to apply the disablement process model to the effects of limited language proficiency. The ultimate purpose is to prevent disabilities. Disability prevention is now popular among public health professional, clinicians, and social scientists, due to the fatal outcomes of disabilities and to the reduced functioning in the presence of disability.

In the Disablement Process model, Verbrugge and Jette (1994) consider various prevention strategies used in medicine and public health. According to them, primary prevention aims to avert the onset of pathology. Secondary prevention is early detection and management of pathology. Tertiary prevention is interventions to reduce the impact of disease. Quaternary prevention is to maintain and/or restore functions.

“The goal of disability prevention is to sustain and restore functional capacity and to maximize older person’s social involvement and independence” and “primary
Figure 8. Disability as a Gap between Capability and Demand in terms of Limited Language Proficiency

EXTRA-INDIVIDUAL FACTORS

Family characteristics and community characteristics

↓

TASK ENVIRONMENT: DEMAND

PATHOLOGY → IMPAIRMENTS → FUNCTIONAL LIMITATIONS → DISABILITY

PERSON: CAPACITY

↓

INTRA-INDIVIDUAL FACTORS

Individual characteristic

The limited language proficiency
Figure 9. Prevention Strategies

(Adopted from p12 Verbrugge and Jette, 1994)
prevention acts ahead of pathology, secondary before impairment, tertiary on feedback effects for new pathology and new impairment, and quaternary before functional limitation and disability” (Verbrugge & Jette, 1994, p. 12). Considering the issue of the negative effects of limited language proficiency on disability outcomes, these strategies can be applied at any point during the process of disablement. It is beneficial if the options available in the person-environment fit model are combined into prevention strategies.

Limitations and Implications for Future Research

The Disablement Process helps to establish common ways of thinking and talking about disability. This study complements and advances this model by exploring the effects of limited language proficiency on the disability outcomes for adult Chinese-, Japanese-, and Korean-language speakers in the US from a comparative perspective. By comparing different language groups, this study opens a door to investigate factors such as gender and geriatric issues in the appropriate context.

The study examined the disability pathway from pathology to disability by applying the effects of limited language proficiency from medial sociological perspectives. It elaborated on the basic process and scheme by identifying limited language proficiency as a predisposing risk factor for disability; by extending to other intra-individual and extra-individual factors associated with limited language proficiency; and by evaluating the effects of individual, family, and community characteristics.
Figure 10. Prevention Strategies Applied to the Limited Language Proficiency

Disability Prevention Strategies: Options for the limited language proficiency

Individual: Person center
Family and Community:
Activity accommodation;
Build, physical and social environment;
Psychological coping;
External support; etc

PATHOLOGY → IMPAIRMENTS → FUNCTIONAL LIMITATIONS → DISABILITY
By focusing on a unique characteristic of these immigrants -- limited language proficiency, this pilot study demonstrated a new sociological contribution to disabilities of adult Chinese-, Japanese-, and Korean-language speakers in the US. Its scope covered various activity domains; it considered prevention of disabilities from a person-environment perspective; and it compassed adult disabilities, which have rarely been considered before.

While there are contributions of this exploration of the Disablement Process model to disability research, this study is only a first step toward understanding and comparing the process of becoming disabled among immigrant adults. It has limitations, mainly concerning data measurement and variable availability. Although the US Census 2000 provided the largest representative dataset, the measurement of language proficiency depends on a self-reported scale. An ideal measurement of language proficiency would be a test based on an individual’s reading, writing, and speaking capabilities. For the census, however, it would not be possible to collect such detailed information. A similar limitation relates to the measurements of disability. An ideal disability scale would include a level of mental disability and a functional level of disability derived from clinical tests. Another limitation lies in data availability. Not available from the US Census is information relating to diet, activity, social networking, and coping. These are factors associated with disability and other health outcomes; it would be appropriate to include this information into future studies.

The key measurement in disability studies is disability outcomes. According to the Disablement Process, disability is experienced difficulty doing activities in any domain of life due to a health or physical problem. The standard procedure is to have
self-reports or proxy reports with simple ordinal or interval scoring of degree-of-difficulty (Verbrugge & Jette, 1994). With six disability outcomes, this study measured a more general scope of outcomes. It also created a continuous score to measure the degree of difficulty. However, the best measurement for degree of difficulty, is “none, some, a lot, or unable.” This is not yet available for such a large dataset. A similar issue is with the other key measurement in this study: language proficiency. This was identified as proficiency and limited proficiency in speaking, which is the only available data for the US Census 2000. Language proficiency can be measured not only from speaking, but also from reading and writing. A measurement of standard language proficiency would be necessary to provide a comprehensive, accurate picture.

The second limitation relates to data availability. Some information is not available from the US Census, such as the variables of diet and activity, social networks, and coping. These are factors associated with disability and other health outcomes. In order to present a clear and comprehensive picture of the effects of limited language proficiency on disability for immigrants, further studies are necessary to provide more detailed information on the subject. There is a need for more theoretical work and for empirical studies on the mechanism by which limited language proficiency relates to disability outcomes, such as the onset and duration of disablement.

In conclusion, the Disablement Process model is a conceptual paradigm that provides a mechanism for studies on disability for various population groups, including immigrants. As these populations continue to age and to cope with chronic health conditions, research that focuses on the pathways and transitions from health to disability and on disability prevention will become increasingly important for development of
relevant theories, further empirical studies, clinical applications, and development of public policies.

This study draws attention to the disabilities of immigrants. It also encourages learning of the host language by individual immigrants, along with family support and environmental accommodation, to reduce the negative effects of limited language proficiency on disability. Although this study focused on Chinese-, Japanese-, and Korean-language speakers in the US, similar results can be expected for other language groups in the US, and for immigrants who face language difficulties in other host countries, such as Canada or Australia. This issue is not relative to a single country; it has worldwide implications.
REFERENCES


Chamie, M., 1995. What does morbidity have to do with disability?. Disability and Rehabilitation 17, 323.


Appendix A.

Questions of disability outcomes are asked as following:

16. Does this person have any of the following long-lasting conditions:
   a. Blindness, deafness, or a sever vision or hearing impairment?
   b. A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying?

17. Because of a physical, mental, or emotional condition lasting 6 months or more, does this person have any difficulty in doing any of the following activities:
   a. Learning, remembering, or concentrating?
   b. Dressing, bathing, or getting around inside the home?
   c. (Answer if this person is 16 years old or over.) Going outside the home along to shop or visit a doctor’s office?
   d. (Answer if this person is 16 years old or over.) Working at a job or business?

(Apple Page 5 from the Census 2000 questionnaire)

Appendix B.

Questions of English language proficiency are asked as following:

11. a. Does this person speak a language other than English at home?
    b. What is the language?
    c. How well does this person speak English?
       (Very Well; Well; Not Well; Not at all)

(Apple Page 4 from the Census 2000 questionnaire)