

DEPRESSION PREVALENCE, SYMPTOM PATTERN, AND MENTAL
HEALTH SERVICE USE AMONG CHINESE AMERICANS: A
QUANTITATIVE ANALYSIS OF ETHNOCULTURAL DISPARITIES

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ABSTRACT

My dissertation examines the depression prevalence, symptom patterns and dimension, and mental health service use among Chinese Americans. The purpose of this research is to, 1) provide epidemiological data on the prevalence of depression among Chinese Americans, 2) examine sociocultural impacts on the prevalence and specific symptoms patterns of depression, and 3) generate implications for more culturally-sensitive approaches in psychiatric diagnosis and treatment. I use secondary data from the Collaborative Psychiatric Epidemiology Studies (CPES). The CPES consists of three nationally representative surveys conducted between 2001 and 2003. Each of three substantive chapters attempts to a set of issues, and together they contribute to the literature on generational differences in mental health status and help-seeking behaviors among Chinese Americans.

The first substantive chapter examines depression prevalence and correlates among different generations of Chinese Americans, using non-Hispanic whites as a comparison group, using weighted multinomial logistic regression. Results of the study indicate that Chinese Americans in general have a lower risk of depression than do non-Hispanic whites. Moreover, the prevalence and correlates of depression do not show a linear trend of difference from first to second to third-or-higher generation Chinese Americans, and then to non-Hispanic whites; rather, the risk of depression and its associated with social relational factors present distinct patterns for first and second generation Chinese Americans, compared to third-or-higher generation Chinese Americans and non-Hispanic whites. Specifically, friend network and extended family

network play different roles in their influence on depression risk for different generations of Chinese Americans.

In the Chapter Four, I conduct exploratory factor analysis to examine two subgroups of Chinese Americans, the foreign-born and the US-born, and compare them to the non-Hispanic whites. I also conduct weighted binary logistic regression to examine the patterns of depressive symptoms for Chinese Americans (separate by nativity status) and compare the two groups to non-Hispanic whites. I also examine how demographic characteristics and social factors are related to different dimensions of depressive symptoms for each group. I also find very similar factors structures of DSM-IV depressive symptoms among foreign-born Chinese Americans, US-born Chinese Americans, and non-Hispanic whites. For all three groups, suicidal ideation or attempt is a construct that is distinct from the rest of the symptoms items. The three groups have different social correlates, yet there are only minor differences in the social correlates for each one of the four depression dimensions within each group. Chronic physical condition is the most consistently significant predictor, for the negative affect, somatic symptoms, and cognitive symptoms among the two Chinese groups, and for all four dimensions of depression among non-Hispanic whites.

Finally, in Chapter Five, I find significant heterogeneity of exclusive complementary and alternative medicine (CAM) use by race/ethnicity and generational status, as well as English proficiency, gender, age, marital status, education, employment status, having insurance, and having any probably psychiatric disorder. Specifically, first generation Chinese immigrants lag behind second, third-or-higher generation Chinese Americans, and non-Hispanic whites in the likelihood of using exclusive CAM services,

as well as any services in general. In addition, this chapter finds that exclusive CAM service use was more popular than the use of only conventional Western medicine or a combination of both, among all Chinese Americans except for the second generations. The findings provide a more nuanced understanding of the pattern of mental health service use among Chinese Americans.

To my parents, Yu Zhao and Zhihua Zhu,
for their love and support.

献给我的母亲父亲：赵玉和朱治华

谁言寸草心，报得三春晖。

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CHAPTER 1

INTRODUCTION

Introduction

My dissertation is focused on the largest detailed Asian group in the US—Chinese Americans, with four million individuals representing 0.9% of the total US population, according to the 2010 Census (Hoeffel et al. 2012). When referring to Chinese Americans in this study, I include both immigrants from mainland China to the US, and Americans of Chinese descent.

Mental health among Chinese Americans is an understudied area in medical sociology and psychology (Salant and Lauderdale 2003; Vega and Rumbaut 1991). This is partially due to the epidemiological findings of the low prevalence of mental disorders. Findings from Collaborative Psychiatric Epidemiology Surveys (CPES) which joins three nationally representative surveys (2001–2003) showed that the lifetime prevalence of any psychiatrist disorder among Chinese Americans was 18%, and the twelve-month prevalence was 10% (Takeuchi et al. 2007). Using the same survey data, researchers estimated the prevalence of psychiatrist disorder of the entire US population to be much higher (46.4% for lifetime prevalence, 30% for twelve-month prevalence) (Kessler, Berglund, et al. 2005; Kessler, Chiu, et al. 2005).

Previous studies of mental health related topics among Chinese Americans are less than fully illuminating. Most studies used either community samples or specific demographic samples (the elderly, women, college students, etc.), hence the limited generalizability of their studies. Second, studies using large-scale or even nationally

representative data examined Asian Americans as one group. The complexity of the Asian American population and the nuanced mechanism through which immigration and culture affect mental disorders call for careful examination of the intersectionality of acculturation and sociocultural factors within a specific ethnic Asian group.

The Chinese American population has distinct demographic composition, socioeconomic standing, cultural norms, and health-related characteristics (Kalibatseva and Leong 2011; Mui and Suk-Young 2006; Salant and Lauderdale 2003). Additionally, the Chinese American population is characterized with great heterogeneity with regards to social and cultural characteristics. The nativity status, length of residence in the US, English proficiency, and the level of Chinese culture retention and subscription to mainstream American culture differ drastically within the population. There is also significant variation of socioeconomic standing within the Chinese American population (Cook, Chung, and Tseng 2011). And these factors are associated with mental health outcomes and behaviors through various psychosocial mechanisms.

Immigration literature seems to have reached the consensus that acculturation is not a linear, one-directional model where the loss of the original culture occurs through greater acculturation to the host culture, but rather, a dynamic process of negotiating between maintaining original cultural characteristics and being involved in the larger society (Berry 1990, 2003). However, the effects of the acculturation process on an individual-level on health outcomes are difficult to measure given the multifaceted and non-linear nature of the acculturation process. These measurement difficulties have similarly limited our understanding of the impact of culture on social networks, illness careers, and help-seeking behaviors within the larger social context (Nguyen and

Bornheimer 2014). One approach that medical sociologists and social epidemiologists have taken is to examine the effects of proxy measures of acculturation, such as English proficiency, US citizenship, age of immigration, length of residency in the US, and generational status. Among these factors, generational status is one of the most studied. Immigrant generational status is usually defined by the nativity status of respondents and that of their parents. It has a strong empirical association with key direct measures of acculturation, including ethnic identification, language assimilation, and residential spatial concentration (Waters and Jiménez 2005). Immigrants who were born in a foreign country to foreign-born (first generation immigrants) are likely to have different immigrant experiences and socioeconomic trajectories, in general, compared to those who were born in the US to foreign-born parents (second generation), and to US-born individuals with US-born parents (third-or-higher generation) (Salant and Lauderdale 2003).

In this sense, generational status is a concept that encompasses multiple factors related to acculturation; knowledge on the generational differences in depression prevalence sheds some light on the combined effect of the nativity status of an individual, nativity status of parents, English proficiency, and other sociocultural factors. Furthermore, for each specific ethnic group, differences across recent to early immigration generations present a unique pattern and reflects the complexity of immigration history and group socioeconomic status, among other things. In my opinion, generational comparisons are more meaningful within one detailed ethnic group (e.g., Chinese Americans) than within an aggregated group (e.g., Asian Americans, or even, non-whites).

Therefore, I examine the variation of depression prevalence, depressive symptoms, and mental health service use by generational status within the population of Chinese Americans, to explore the acculturation effects on the outcomes variables. And using non-Hispanic white as a comparison group helps establish any trend of change through different generations of Chinese Americans.

Research Question

In this dissertation, I use secondary data from the Collaborative Psychiatric Epidemiology Studies (CPES). The CPES consists of three nationally representative surveys conducted between 2001 and 2003. The purpose of this research is to, 1) provide epidemiological data on the prevalence of depression among Chinese Americans, 2) examine sociocultural impacts on the prevalence and specific symptoms patterns of depression, and 3) promote more culturally-sensitive approaches in psychiatric diagnosis and treatment. Using quantitative research methods, I will explore the following questions.

- How does depression vary across different generations of immigrants? Do sociodemographic, social relational and health-related factors predict depression in the same way for different generations?
- Do Chinese Americans differ from non-Hispanic whites in depressive symptom patterns and social correlates?
- How do Chinese Americans differ from non-Hispanic whites in their use of CAM relative to the conventional Western medical services? What acculturation-related, sociodemographic, and health-related factors are associated with CAM use among Chinese Americans?

Here I provide a brief of the three substantive chapters, each addressing one set of the research questions.

Chapter 2. Depression Risks and Correlates Among Different Generations of Chinese Americans: The Effects of Friends and Relative Relationships

Depression is a significant contributor to the burden of disease worldwide, because of its high prevalence and its association with functional disability (Andrade et al. 2003; Üstün et al. 2004). The United States is one of the countries with the highest prevalence of depression, with an estimated lifetime prevalence of major depressive disorder of 16.6% (Kessler et al. 2012). Many empirical studies focus on immigrant minority groups because the process of migrating to a new country and adjusting to a new environment has complicated effects on the level and expression of distress, and access to and compliance with treatment (Tabora and Flaskerud 1994). Knowledge of sociocultural factors and their influence on the expression of distress and help-seeking behaviors is of primary importance in the assessments, diagnoses, and interventions made by both public and private health mental health professionals.

In this chapter, I conducted weighted multinomial logistic regression to examine depression prevalence and correlates among different generations of Chinese Americans, using non-Hispanic whites as a comparison group. Results of the study indicate that Chinese Americans in general have a lower risk of depression do than non-Hispanic whites. Moreover, the prevalence and correlates of depression do not show a linear trend of difference from first to second to third-or-higher generation Chinese Americans, and then to non-Hispanic whites; rather, the risk of depression and its associated with social relational factors presents in distinctive patterns for first and second generation Chinese

Americans, compared to third-or-higher generation Chinese Americans and non-Hispanic whites. Specifically, friend network and extended family network play different roles in their influence on depression risk for different generations of Chinese Americans.

The findings of this chapter contributed to the growing body of literature on acculturation and mental health among immigrants, shedding lights on the complicated sociocultural contexts that could influence the mental well-being of individuals. Mental health services providers need to be aware of the complex and nuanced association between social relational factors and depression in their prevention, management, and treatment efforts. Researchers need to further examine the causality issues, and the impacts of other sociocultural factors such as perceive discrimination, family cohesion, and acculturative stress among Chinese Americans.

Chapter 3. Depression Symptom Patterns and Social Correlates among Chinese Americans

To date, most studies of depression among Chinese Americans have focused on comparing the prevalence of depression to other racial/ethnic groups (e.g., Takeuchi et al. 1998; Yeung et al. 2004), or identifying risk factors among Chinese Americans (e.g., Hwang, Myers, and Takeuchi 2000; Ying and Han 2007). In comparison, there are fewer academic studies examining the depression symptom patterns of Chinese Americans. Cultural psychiatrists have asserted that Chinese in China or Taiwan, as well as Chinese Americans, express their depression or impaired mood in a distinct way, and they attribute such cultural difference of depression symptomatology to the collectivism and the philosophical orientation in Chinese culture (Kleinman 1987; Marsella 1978).

In addition, depression is a multidimensional condition. Measurements of depression, including screening tests like the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R) (Radloff 1977), or clinical assessment criteria like the Diagnostic and Statistical Manual of Mental Disorders (DSM), all contain symptoms of various dimensions: emotional/affective symptoms (e.g., feeling blue, discouraged, happy, felt like achieved a lot), somatic symptoms (e.g., fatigue, insomnia), interpersonal relation function (e.g., feeling others are unfriendly, feeling critical of others), self-perception or existential symptoms (feeling hollow, does not respect self), and suicidality (e.g., thought about death, feeling it would be better if dead). However, most studies of the depression did not consider the multidimensionality of depression. They examined either a binary outcome (depressed or not) (e.g., Kessler et al. 2012), or a unidimensional outcome of the total number of symptoms (e.g., Echeverría et al. 2008). Without disaggregating depression symptoms by dimensions, studies might obscure any differences in depressive symptomatology between groups.

In this chapter, I conduct factor analysis to examine two subgroups of Chinese Americans, the foreign-born and the US-born, and compare them to the non-Hispanic whites. I conduct weighted binary logistic regression to examine the patterns of depressive symptoms for Chinese Americans (separate by nativity status) and compare the two groups to non-Hispanic whites.

I find very similar factors structures of DSM-IV depressive symptoms among foreign-born Chinese Americans, US-born Chinese Americans, and non-Hispanic whites. For all three groups, suicidal ideation or attempt is a construct that is distinct from the rest of the symptoms items. The three groups have different social correlates, yet there

are only minor differences in the social correlates for each one of the four depression dimensions within each group. Age is significantly associated with all four dimensions for non-Hispanic whites, but not significant for Chinese Americans. The female preponderance is found for all four dimensions among US-born Chinese Americans and non-Hispanic whites. Having college degree is a unique predictor of negative affect, somatic symptoms, and cognitive symptoms, but for US-born Chinese Americans only.

Chronic physical condition is the most consistently significant predictor, for the negative affect, somatic symptoms, and cognitive symptoms among the two Chinese groups, and for all four dimensions of depression among non-Hispanic whites. In addition, relative support is significantly associated with all four dimensions for non-Hispanic whites. Relative conflict is a significant predictor for negative affect, somatic symptoms, and cognitive symptoms among foreign-born Chinese Americans, and it is significantly associated with all four dimensions for non-Hispanic whites.

Chapter 4. Complementary and Alternative Medical Service Use for Mental Health Problems Among Chinese Americans: The Effect of Acculturation-Related Factors

Complementary and alternative medicine (CAM) has been defined as “medical interventions not taught widely at U.S. medical schools or generally available at U.S. hospitals” (Eisenberg et al. 1993:246). They are, in a sociological perspective, “practices that are not in conformity with the standards of the medical community” (Eisenberg et al. 1993:246). CAM use among US adults substantially increased in the 1990s, and has remained stable for the past decade (Barnes, Bloom, and Nahin 2008). According to data from the 2012 National Health Interview Survey, approximately one third of US adults had used some type of CAM in the past twelve months (Clarke et al. 2015).

This chapter is focused on the effects of acculturation-related factors on CAM use among Chinese Americans. Acculturation is generally defined “as the process by which individuals adopt the attitudes, values, customs, beliefs, and behaviors of another culture” (Abraido-Lanza et al. 2006:1342). Specifically, in the context of CAM use, the concept of acculturation encompasses various barriers to conventional treatment, culturally based beliefs about health and medicine, and immigration-related factors. Therefore, it serves as the lens for a panoramic view of the issue at hand.

In this chapter, I investigate the twelve-month prevalence and predictors of the use of CAM therapies relative to conventional Western medical services among Chinese Americans. The first part of the study examined the differences in the service utilization patterns between Chinese Americans and non-Hispanic whites, while the second part investigate the effects of acculturation-related factors among Chinese Americans.

Multinomial logistic regression analyses revealed significant heterogeneity of exclusive CAM use by race/ethnicity and generational status, as well as English proficiency, gender, age, marital status, education, employment status, having insurance, and having any probably psychiatric disorder. Specifically, first generation Chinese immigrants lag behind second, third-or-higher generation Chinese Americans, and non-Hispanic whites in the likelihood of using exclusive CAM services, as well as any services in general. In addition, this chapter finds that exclusive CAM service use was more popular than the use of only conventional Western medicine or a combination of both, among all Chinese Americans except for the second generations. The findings provide a more nuanced understanding of the pattern of mental health service use among Chinese Americans. Implications for health policy and future research are discussed.

Significance

My inquiry will challenge the conventional ways in which researchers and the general population view mental health issues among Chinese Americans on several aspects. First, Chinese American is one of the fastest growing detailed ethnic groups in the United States. However, our knowledge about the mental health conditions of this population is incomplete. As increasing amounts of efforts are made to examine the political, economic, and social standings of Chinese Americans, medical sociologists and epidemiologists also need to examine the health another aspect of the model minority image: the well-adjusted model minority. Sakamoto, Goyette, and Kim (2009) argue that the public portrayal applied to Asian Americans as model minority regarding their high achievement in socioeconomic attainments is not entirely a myth. They suggest that to better understand the socioeconomic standings of contemporary Asian Americans in the post-Civil Rights era, researchers need to examine the process of assimilation and the rising class inequalities. My dissertation extends their argument to the study of mental health issues. Through my analyses on depression prevalence and symptoms dimensions among Chinese Americans, I depict a multidimensional picture of the current situation of depression and mental health-related service use in this population. By doing so, I challenge stereotyping and overgeneralization, to promote the awareness and efforts from public health agents and healthcare services in more efficient prevention, diagnosis, and treatment of depression among Chinese Americans.

Second, my research challenges the reductionist approach in current psychiatric diagnosis and treatment. As brilliantly described by Charles Rosenberg, medicine went through a revolutionary shift in the nineteenth century, from a model that is “all-

inclusive, antireductionist, capable of incorporating every aspect of man's life in explaining his condition" to a system highly specified and standardized (Rosenberg 1979:10). As modern medical history proceeds, we see the human body as estranged from its environment, the mind from the body, and the moral from the healthy. In psychiatry, Western-defined symptoms, diagnostic standards, and treatments (together with bureaucratic rigidities) are at risk of overlooking cultural diversities in symptom manifestation, and help-seeking behavior. By examining depressive symptom profiles and depicting the patterns of mental health service utilization among Chinese Americans, I hope to provide an alternative approach to depression screening and diagnosis, and to mental health treatment, one that is culturally-sensitive, inclusive, and antireductionist.

Thirdly, I examine the effects of acculturation on depression prevalence, depressive symptoms manifestation, and mental health service use among Chinese Americans. I highlight the importance of acculturation in mental health research of an immigrant population. At the time of the 2010 Census, over 76 percent of Chinese Americans were foreign-born (Hoeffel et al. 2012). From a demographic standpoint, it is important to investigate how the multidimensional process of acculturation influences the psychological well-being and help-seeking behavioral of immigrants (Young 1998).

Last but not least, the comparison between Chinese Americans and non-Hispanic whites is meaningful demographically, epidemiologically, and sociologically. The racial/ethnic composition of the population is constantly changing, especially in the US, which is why comparative research is necessary to advance our knowledge of the distribution of health needs among the current population. With non-Hispanic whites comprising the majority (63.7%) of the US population (US Census Bureau 2016), how

ethnic minority immigrants compare to the non-Hispanic whites help us estimate the level of health status and need of the immigrant populations.

CHAPTER 2

**DEPRESSION RISKS AND CORRELATES AMONG DIFFERENT
GENERATIONS OF CHINESE AMERICANS:
THE EFFECTS OF FRIENDS AND RELATIVES RELATIONSHIPS**

Introduction

Depression is a significant contributor to the burden of disease worldwide, because of its high prevalence and its association with functional disability (Andrade et al. 2003; Üstün et al. 2004). The United States is one of the countries with the highest prevalence of depression, with an estimated lifetime prevalence of major depressive disorder of 16.6% (Kessler et al. 2012). Over the past several decades, the great burden of depression on the quality of life of individuals, healthcare expenses, and the functioning of the society has attracted increasing scholarly interest. Many empirical studies focus on immigrant minority groups because the process of migrating to a new country and adjusting to a new environment has complicated effects on the level and expression of distress, and access to and compliance with treatment (Tabora and Flaskerud 1994). Therefore, knowledge of sociocultural factors and their influence on the expression of distress and help-seeking behaviors is of primary importance in the assessments, diagnoses, and interventions made by both public and private health mental health professionals.

The present study examines the depression prevalence and predictors among Chinese Americans, using a nationally representative sample. Specifically, I examine the prevalence and predictors of depression of different generations of Chinese Americans,

using non-Hispanic whites as a comparison group. Based on the previous theories and findings, with an attempt to address the inconsistencies and gaps in the literature, I examine how chronic physical conditions, social support, and social conflict are associated with depression, while controlling for sociodemographic factors. The goal of this study is to better understand how important variables affect different generations of Chinese Americans regarding depression status. Advanced knowledge on the issue can help identify high-risk subgroups within the community of Chinese Americans, and provide important implications for depression assessment, diagnosis, and treatment.

Epidemiological studies have generally found lower rates of depression among Asian Americans than that among the predominantly white US population (Takeuchi et al. 2007). However, Asian Americans have a higher overall prevalence of depression than their overseas Asian counterparts (Chang 2002). However, the Asian American population is characterized by significant heterogeneity regarding cultural norms and socioeconomic status (Salant and Lauderdale 2003), and various health outcomes including depression (Kalibatseva and Leong 2011; Mui and Suk-Young 2006). Although studies of Asian American as one racial group are important for providing baseline data and policy implications, the complexity of the Asian American population and the nuanced mechanism through which immigration and culture affect depression call for careful examination of the intersectionality of acculturation and sociocultural factors within a specific ethnic Asian group. In this study, I focused on the largest detailed Asian group in the US—Chinese Americans, with four million individuals representing 0.9% of the total US population, according to the 2010 Census (Hoeffel et al. 2012). When referring to Chinese Americans in this study, I include both immigrants from mainland

China to the US, and Americans of Chinese descent. Studies of ethnic Chinese populations in mainland China, Hong Kong, and Taiwan are also discussed because they are relevant in cross-cultural and intergenerational comparisons. Additionally, many researchers were interested in examining the disparities between ethnic minority immigrant groups among non-Hispanic whites (e.g., Givens et al. 2007; Rhee, Chang, and Rhee 2003). Such cross-racial/ethnic studies are meaningful demographically, epidemiologically, and sociologically. The racial/ethnic composition of the population is constantly changing, especially in the US, which is why comparative research is necessary to advance our knowledge of the distribution of health needs among the current population. With non-Hispanic whites comprising the majority (63.7%) of the US population (US Census Bureau 2016), how ethnic minority immigrants compare to the non-Hispanic whites help us estimate the level of health status and need of the immigrant populations.

Although Chinese Americans are usually touted by media and the public as the high-achieving, well-adjusting “model minority” (Fong 2007), increasing evidence suggests that such public portrayals might not reflect the entire reality of their mental health conditions (Qin, Way, and Mukherjee 2008; Uba 2003) as well as the academic and socioeconomic achievement (Wong and Halgin 2006). While some researchers have found lower rates of depression among Chinese Americans than among non-Hispanic whites (Takeuchi et al. 1998), others report no difference (Chen, Roberts, and Aday 1998; Huang et al. 2006) or even the opposite (Chang 1996; Ying 1988; Young, Fang, and Zisook 2010). The inconsistencies in literature could be attributed to the existence of methodological issues such as sample representativeness (mostly college students or

community samples in California or New York), and variations in measures of depression (CES-D, PHD-9, DSM, etc.). Moreover, the growing body of depression literature has suggested significant variation of depression risks within the populations of Asian Americans, by immigration-related factors such as generational status and sociocultural factors such as social support and conflicts (Kalibatseva and Leong 2011; Shen and Takeuchi 2001). In particular, social support and conflict has received increasing scholarly attention in depression literature (Stice, Ragan, and Randall 2004; Wei et al. 2008). Their findings, though limited on conceptual and methodological fronts, suggest complicated interactions among various sociocultural factors in their impacts on depression.

In the following section, I review the existing body of literature on the prevalence and correlates of depression among Asian and Chinese Americans, focusing on previous findings on generational differences of depression, and the effects of chronic physical conditions, social support, and social conflicts. I discuss the inconsistencies and gaps in previous literature, and I form the hypotheses tested in this study.

Literature Review

Generational Differences in Depression Among Chinese Americans

Immigration literature seems to have reached the consensus that acculturation is not a linear, one-directional model where the loss of the original culture occurs through greater acculturation to the host culture, but rather, a dynamic process of negotiating between maintaining original cultural characteristics and being involved in the larger society (Berry 1990, 2003). However, the effects of the acculturation process on an individual-level on health outcomes are difficult to measure given the multifaceted and

non-linear nature of the acculturation process. These measurement difficulties have similarly limited our understanding of the impact of culture on social networks, illness careers, and help-seeking behaviors within the larger social context (Nguyen and Bornheimer 2014). One approach that medical sociologists and social epidemiologists have taken is to examine the effects of proxy measures of acculturation, such as English proficiency, US citizenship, age of immigration, length of residency in the US, and generational status. Among these factors, generational status is one of the most studied.

Immigrant generational status is usually defined by the nativity status of respondents and that of their parents. It has a strong empirical association with key direct measures of acculturation, including ethnic identification, language assimilation, inter-racial marriage and residential spatial concentration (Waters and Jiménez 2005). Immigrants who were born in a foreign country to foreign-born (first generation immigrants) are likely to have different immigrant experiences and socioeconomic trajectories, in general, compared to those who were born in the US to foreign-born parents (second generation), and to US-born individuals with US-born parents (third-or-higher generation) (Salant and Lauderdale 2003). In this sense, generational status is a concept that encompasses multiple factors related to acculturation, which means that knowledge on the generational differences in depression prevalence shed some light on the combined effect of the nativity status of an individual, nativity status of parents, English proficiency, and other sociocultural factors. Furthermore, for each specific ethnic group, differences across recent to early immigration generations presents a unique pattern and reflects the complexity of immigration history and group socioeconomic status, among other things. In my opinion, generational comparisons are more meaningful

within one detailed ethnic group (e.g., Chinese Americans) than within an aggregated group (e.g., Asian Americans, or even, non-whites).

As just mentioned, generation status is one of the most widely examined factors in depression studies among ethnic minority immigrants (Perreira et al. 2005; Portes and Rumbaut 2001), including Asian immigrants (e.g., Takeuchi et al. 2007). These studies found that foreign-born Asian immigrants, especially those who arrived as adults, were less likely than the US-born Asian Americans to have depression or depressive symptomsⁱ. Comparisons between second and third-or-higher generation immigrants have been less often studied, and their findings are less than consistent (e.g., Takeuchi et al. 2007). Nonetheless, scholars often attributed the generational disparities of depression to the difference in demographic and socioeconomic characteristics (gender, marital status, level of income/wealth, etc.). In addition, researchers noted the importance of examining how cultural factors such as health beliefs and coping resources vary across generations, and how such variation might help explain the generational difference in depression prevalence (Salant and Lauderdale 2003). Given these and other limitations discussed below, research has not yet been able to fully answer two key questions: (1) How does depression vary across different generations of immigrants? (2) Do sociodemographic and sociocultural factors predict depression in the same way for different generations?

The literature on generational difference of depression prevalence among specifically Chinese Americans is thin. Before I review literatures on generational difference among Chinese Americans, it is necessary to discuss the broader body of

ⁱ It should be noted that studies of depression among adolescents or college students tend to find poor mental health status among foreign-born Asian or Chinese immigrants than that among US-born participants (Greenberger and Chen 1996).

literature on the association between acculturation and depression in this population, because the findings may shed some light on the understanding of the generational differences in multiple demographic, socioeconomic, and cultural factors.

The acculturation-depression research could be categorized into two types. In the first type of studies, researchers were interested in directly measuring the effects of acculturation on depression. Therefore, they either examined the effects of various indicators such as language preference and usage, ethnic identification, cultural activity participation, and lifestyle-related behaviors on depression risk or constructed acculturation scales comprised of several indicators. However, their findings failed to present any obvious or consistent patterns. In some studies, acculturation was inversely associated with depression risk—a higher depression risk among those with low acculturation level—among different sub-populations, including elderly Chinese Americans in Minneapolis (Lam, Pacala, and Smith 1997), a community sample of Chinese Americans in Los Angeles (Hwang et al. 2000), and a community sample of Chinese Americans in San Francisco (Ying 1988). Other studies found positive associations, that depression risk was higher among those more acculturated into the host culture, for Chinese samples in Los Angeles County (Hwang et al. 2005; Hwang and Myers 2007), Chinese immigrants in Australia (Parker et al. 2005), and Chinese Canadians (Kuo and Guan 2006). The inconsistencies in literature were mainly due to “the difficulties in translating the complex conceptualization of acculturation into empirical research” (Shen and Takeuchi 2001:388), specifically, the different compositions of the acculturation scales, and the inclusion and exclusion of certain indicators of acculturation could result in conflicting findings.

One alternative perspective that researchers have taken is to examine some of the proxy measures of acculturation, and how they were related to depression. Previous studies have found that several of these factors were significantly associated with depression, including age of immigration (Takeuchi et al. 1998), English proficiency (Casado and Leung 2002; Lam et al. 1997), perceived racial discrimination (Juang, Syed, and Takagi 2007). As discussed in previous sections, generational status is a way of categorization that allows us the opportunity to explore the collective effects of multiple factors. Better understanding of the generational disparities of depression can help us develop a more specific focus for future research.

Predictors of Depression in the General Population

Epidemiological studies generally suggested that although depression prevalence in the US is relatively high, especially when compared to countries in Asia and Africa (Kessler et al. 2009; Moussavi et al. 2007), there are also significant ethnic disparities of depression rates within the US population (Huang et al. 2006; Kessler et al. 2012; Perreira et al. 2005). More specifically regarding Asian populations in the US, study findings are less than conclusive. While some studies found lower prevalence among various Asian ethnic groups than that among non-Hispanic whites (Breslau et al. 2005; Jackson-Triche et al. 2000; Roberts, Roberts, and Richard 1997), other studies generated opposite findings (Aldwin and Greenberger 1987; Okazaki 1997; Yeung et al. 2004; Young et al. 2010). Also, study results generally noted significant differences in the prevalence of depression among different Asian ethnic groups (Kuo 1984; Mui and Suk-Young 2006; Uba 2003), and scholars generally attribute the ethnic disparities to demographic characteristics, socioeconomic status, cultural norms, and health-related

factors such as chronic physical condition and access to health care (Alegria et al. 2004; Gold et al. 2000; Jackson et al. 2004; Salant and Lauderdale 2003), factors that have been found to be associated with depression in the general US population. In the following section, I review several areas of factors that were found to be related to depression in the general US population. These findings serve as foundations for my examination on Chinese Americans.

Demographic factors and SES. There has been a huge body of literature of depression prevalence and predictors in the US population in the past few decades. Empirical studies have found that demographic factors and socioeconomic status are associated with psychological distress and mental health conditions in the general population. Therefore, differential composition on these factors might account for some of the racial/ethnic disparities of depression. National studies have found a higher risk of depression for women (Kessler et al. 2003; Marcus et al. 2005), the age group 45 and older (Kessler et al. 2010; Mirowsky and Ross 1992), and those who were unmarried or divorced, separated, or widowed (Inaba et al. 2005; Pearlin and Johnson 1977; Williams and Umberson 2004). The sociological perspective that regards SES as a “fundamental cause of diseases,” as first proposed by Link and Phelan (1995) has been accepted in more and more research (Kim 2014). Results from a meta-analysis on fifty-six studies of socioeconomic inequality in depression show that low socioeconomic status (SES) is generally associated with higher prevalence of depression (Lorant et al. 2003). More specifically, elevated rates of depression are found among adults with lower educational attainment (Everson et al. 2002; Ross and Mirowsky 2006). Regarding the effects of income and employment, although studies found greater depression risk among those

with low income (Elliott 2001; Inaba et al. 2005), those with high financial strains (Price, Choi, and Vinokur 2002), and the unemployed (Mossakowski 2009), longitudinal studies consistently found causal effects of two of the factors, employment status and financial strains on depression (Lorant et al. 2007; Mossakowski 2009; Zimmerman and Katon 2005). Results of meta-analyses also found that unemployment is not only correlated to, but also causes depression (Paul and Moser 2009).

One process linking SES and depression is stress. Low-SES individuals generally lack the “personal resources, such as coping style, self-esteem, mastery, and locus of control, [that] buffer the impact of stress on depression and... higher-SES individuals are better endowed with such resources” (Lorant et al. 2003:107). Therefore, while research of the association between SES and depression is important in identifying at-risk groups, better understanding of the causal mechanisms of social determinants of depression requires that we examine factors related to the resources discussed above.

Chronic physical conditions. Prior research has demonstrated that depressive disorder was related to a wide range of chronic physical conditions, including heart diseases (de Miranda Azevedo et al. 2014), hypertension (Ho et al. 2015; Löwe et al. 2004), diabetes (Fisher et al. 2008), arthrites (Murphy et al. 2012), asthma, ulcer, back/neck problems, chronic headache, and multiple pains (Scott et al. 2007), as well as overall self-reported physical health status (Scott et al. 2007). Clinical and epidemiological studies found high comorbidity rates of depression and chronic conditions, ranging from 16% to 75% (Katon 2003; Matcham et al. 2013). There seems to be a mutual causality between chronic physical conditions and depression. On the one hand, chronic physical conditions decrease the functions and quality of life of individuals,

which may cause depression. On the other hand, not only does depression cause additive functional impairment (Katon 2003), with the contribution of the commonalities of depression and chronic physical conditions to functional impairment substantially exceeding the contribution of their independent parts (Löwe et al. 2008). Depression could also lead to adverse health outcomes through various neurobiological mechanisms such as neuroendocrine dysfunction and disturbances in autonomic cardiac control, inflammation, or mechanisms that involve high-risk behaviors such as smoking, lack of physical exercise, poor self-care, and nonadherence to treatment (see meta-analysis Lichtman et al. 2014). These previous findings indicate that chronic physical condition is associated with depression through complicated mechanisms, and should be taken into account in depression studies.

Social support and social conflict. Researchers have suggested that certain ethnocultural groups experience lower level of depression “because there are socially approved mechanisms that protect individuals from certain stress or their temperaments allow them to tolerate more stress” (Chen et al. 1998). Such sociocultural factors include family support, social networks, and group solidarity. There is strong evidence linking support from friends, family, relatives, and other members of social networks to a variety of health outcomes, including physical health outcomes (Berkman and Syme 1979; Uchino 2006), and mental illness such as depression (Berkman and Kawachi 2000; Cohen and Wills 1985; Peirce et al. 2000). The mechanism through which depression is linked to these health outcomes is complicated. To focus on mental health outcomes here, Lin (1986) proposed three classes of models to analyze the association between social support depression for three situations: when social support occurred before,

contemporarily with, or after stressful life events. Under each class, Lin proposed specific models where social support exerts different influence on depression through interacting with stressful life events, and the influence could be in different directions. The important theoretical contribution of this work is to indicate that the directionality and strength of the link between social support and depression is contingent upon a number of factors, including time periods (e.g., social support may provide a vulnerable context for stressful life events, which increases depression risk at a later time, which then may cause fewer social support), and the strength of prior social support (i.e. social support could decreased the risk of depression, but only if the prior social support was strong). As Lin further pointed out, the different effects of social support could co-exist, and research could actively explore it in empirical studies. His research provides a crucial analytical framework for studies on social support and depression, especially regarding the directionality and the conditions of the associations.

Another factor related to social networks is social conflict. Opposite to social support, which represents the potentially positive aspects of social relations, social conflict represented the potentially negative aspects of interpersonal relations (Abbey, Abramis, and Caplan 1985). In fact, Abbey and colleagues offered a theoretical distinction between social support and social conflict, with the former entailing expression of positive affect, assistance, and affirmation, and the latter referring to negative affect, constraints, and disconfirmation. The growing body of literature generally found elevated risk of depression and other mental disorders among those who reported high level of conflict with friends, families, and relatives (Revenson et al. 1991; Seeman et al. 2001). Moreover, this research has suggested that social conflict is not

necessarily counteract with social support, that for an individual who reported high social conflict would not necessarily be poorly supported by significant social relations, and one experiencing little social conflict could also have little social support (Seeman et al. 2001). Also, social support and social conflict are not two entirely opposite concepts: low support does not necessarily indicate high social conflict, and high support does not equal low conflict (Schaefer, Coyne, and Lazarus 1981). In other words, social support and social conflict are associated with depression in related but separate pathways. While it is apparent interpersonal relations could have beneficial or harmful effects to individuals' health, we are yet to fully understand the conditions that can lead to either way (Heller 1979). Therefore, the health effects of social support cannot be separately from those of other relational processes such as social conflict (Lakey and Cohen 2000).

In addition, previous studies found that the sources of social networks also mattered: family/relatives, peers/friends, work colleagues and other types of social seemed to affect stress and depression in distinctive ways (Almeida et al. 2009; Mulvaney-Day, Alegria, and Sribney 2007; Procidano and Heller 1983). Researchers pointed to differences in cultural emphasis on family structures and family obligation, sociocultural norms of friendships and other social network groups, as well as individual-level factors such as gender and age as potential explanations (Crockett et al. 2007; Walen and Lachman 2000). And because of the complexity of these sociocultural contexts, it is important to explore the effects of different types of social relational factors for specific cultural group; such research could contribute to our general understanding of the social determinants of health.

To summarize, previous literature indicated that several sociodemographic factors, chronic physical conditions, and social support and conflicts are important factors that should be taken into account when examining depression prevalence. In addition, research should explore how social support and social conflict interact with other factors in their associations with depression. In the next section, I review literatures on depression among Asian and Chinese Americans specifically, addressing the inconsistencies in findings, as well as several conceptual and methodological gaps, based on which I establish my study hypotheses.

Predictors of Depression Among Chinese Americans

Depression prevalence. There is a growing body of literature on depression prevalence and outcomes among individuals of Chinese cultural heritage, in mainland China, Hong Kong, Taiwan, as well Chinese immigrants in European countries, Australia, Canada, and the United States. Yet, the observed depression rates were rather inconsistent. The WHO Mental Health Survey data show that the lifetime prevalence of DSM-IV major depressive disorder is 3.5% in two major Chinese cities, Beijing and Shanghai (Lee et al. 2007), which is much lower than the 17.1% prevalence in the US (Kessler et al. 1994). Other studies also report lower rates of depression in China, compared with the US (Kleinman 1982; Leung, Chan, and Cheng 1992). Some scholars, however, found comparable or even higher level of CES-D depressive symptoms in Chinese samples than the American samples (Cheung and Bagley 1998; Lin 1989). Inconsistency also exists in the literature on depression rates among Chinese Americans in the US. Epidemiological studies have reported a lower level of depression among Chinese Americans than non-Hispanic whites or predominantly white samples. For

example, Takeuchi and colleagues (1998) reported a 6.9% lifetime prevalence of DSM-III-R major depressive disorder (MDD) among 1,747 Chinese Americans in Los Angeles County, which is much lower than a national estimate of 17.1% in the National Comorbidity Survey using the same diagnostic measure (Kessler et al. 1994). Other studies also report a lower level of depression among Chinese Americans compared to non-Hispanic whites (Kuo 1984; Lai 2004). On the contrary, Ying (1988) found that almost a quarter of her Chinese American sample were depressed, a proportion significantly higher ($p < .05$) than that among a sample of predominantly white (7.94–9.25) in Radloff's study (1977). Yeung and colleagues (2004) found that the prevalence of depression was 19.6% among Chinese Americans in the primary care setting, substantially higher than the 5 to 10% prevalence among Caucasians in similarly settings previously reported by Katon and Schulberg (1992). Additionally, Stokes et al. (2002) found higher rates of depression among immigrant Chinese American elders, compared to the older adult US population. Last but not least, Chen and colleagues (1998) reported no significant difference of depression between Chinese American adolescents and their Anglo peers. Such inconsistency in empirical findings is likely due to several critical differences in methodology and study design, including the following:

- measurement of depression, e.g., different versions of DSM, Geriatric Depression Scale (GDS), CES-D, PHQ-9;
- sampling strategies, e.g., random sampling, convenience sampling;
- sample characteristics, e.g., adolescents or college students, middle-aged women, the elderly, patients in primary care.

In the present study, I use a nationally representative sample of Chinese American adults (18 or older), so that significant findings could be generalized to the greater Chinese American population in the US.

Sociodemographic factors. Previous studies of Chinese population found several significant predictors of depression. Specifically, elevated depression risk was found among women (Lee et al. 2009), older adults (Hwang et al. 2000; Takeuchi et al. 1998), those with lower income or more financial strains (Chou, Chi, and Chow 2004; Zhang et al. 1997), and the unemployed (Takeuchi et al. 1998). The findings on the association between education and depression were less consistent. While Lai (2004) found a higher prevalence of depression among those with lower educational attainment among elderly Chinese Canadians, Mui (1999) found an association of the opposite direction of the association among elderly Chinese Americans. Previous research has found significant differences in these sociodemographic factors (e.g., Portes and Rumbaut 2001; White 2000), which is why it is necessary to control for them in this study.

Chronic physical conditions. In addition, previous studies of Chinese immigrants consistently found physical health status to be a strong predictor of depression (Lai 2004; Lee et al. 2009; Mui 1996; Wu, Tran, and Amjad 2004). Particularly noteworthy is the finding from a longitudinal study of a community sample of Chinese Americans in Los Angeles that poor physical health status “both predated and occurred concomitantly with depressive episode” (Hwang et al. 2000:142). The authors also pointed out that this finding was in line with previous hypotheses regarding the cultural variation in the depression symptomatology and somatic idioms in Chinese Americans (Kleinman 1982; Uba 2003; Zheng et al. 1997). Specifically, Chinese cultural

emphasis on the close connection between the mind and the body, and a holistic orientation in traditional Chinese health philosophy may have resulted in a particularly strong association between physical health status and depression. And since a lower level of adoption of American mainstream culture and a higher level of Chinese cultural subscription are more likely to be found among recent immigrants, I hypothesize that the association between chronic physical condition and depression should be stronger among first generation Chinese Americans than higher generation Chinese Americans and non-Hispanic whites.

Social support and social conflict. The roles of social relational factors such as support and conflict with friends, family (immediate and extended), work-related social network, and other social groups (religious group, volunteer groups, etc.) have also attracted attention from scholars in health and immigration literature. Cross-cultural findings suggest that Asian Americans are more likely than other racial/ethnic groups to engage in group recreation with friends and family (Kim and McKenry 2002). The emphasis on family support and group solidarity in Asian, including Chinese culture, provides individuals with greater coping mechanisms for psychological distress, and may cause lower comorbidity rates and older age of onset of depression (Goebert 2009; Hwu et al. 1996), which may also explain the lower prevalence of depression. At the same time, the strong cultural emphasis on solidarity and interdependence among family and peers could also lead to the family and peer group making too many demands on an individual, and/or an individual feeling compelled to fulfill obligations beyond his or her capacity. The distress caused by interpersonal relationships among family and peers plays an major role in affecting an individual's psychosocial vulnerability (Cohen and Wills

1985; Hwang et al. 2000). While some studies found that a low level of perceived social support (Gao, Chan, and Mao 2009; Hwang et al. 2000; Mui 1996; Wu et al. 2004) and a high level of social conflict (Ying and Han 2007; Zhang et al. 1997) were associated with higher depression risk, increasing evidence has suggested that the associations were more nuanced than previously thought (Abbey et al. 1985; Greenberger and Chen 1996; Tsai and Levenson 1997; Ying and Han 2007).

Specifically, two major issues should be noted. First, as discussed earlier, different types of social relationship (immediate family, extended family, peers, work relationship, etc.) might vary in how they affect distress and depression. For example, a study that compared Chinese adolescents from Tianjin, China to US adolescents found the strength of the effects of family cohesion varied by cultural setting, but the effect of perceived peer group warmth did not (Greenberger and Chen 1996). This suggests there are different mechanisms through which family and peer groups affected on mental well-being. Data on a metropolitan sample of Chinese Americans showed a significant, negative association between depression and family support, and no significant effect of support from non-family members (Lieber et al. 2001). In addition, a study of Asian Americans also found discrepancies in the effects of family strains and peer strains (Sangalang and Gee 2012). These findings indicated the necessity to examine family relationship and friend/peer relationship separately.

Second, researchers have noted that sociocultural factors and contexts could moderate the effects of social relationships on depression. The aforementioned study by Greenberger and Chen (1996) found that the quality of family relationships had a significantly stronger association among the former than among the latter. The

researchers pointed out that the strong family value in Chinese culture could explain such difference. However, it is worth noting that one study found no such cultural difference. In one comparative study between Chinese American college-aged individuals and non-Hispanic whites, researchers found no difference in the association between interpersonal conflict and depressive mood (Tsai and Levenson 1997).

In summary, previous studies suggested the need to examine social support along with social conflict while distinguished their sources, and the need to take into account the sociocultural contexts for these effects to take place. However, the existing body of literature is rather thin, and the generalizability of the study results were limited because the study samples were adolescents or college-aged individuals (Almeida et al. 2011; Greenberger and Chen 1996; Tsai and Levenson 1997), Asian Americans rather than Chinese Americans (Sangalang and Gee 2012), regional community data (Lieber et al. 2001), or the elderly (Wu et al. 2004). Furthermore, no study has compared the effects of the social relational factors on depression across different generations of Chinese Americans. As discussed in previous sections, generational status is a concept that encompasses several sociocultural factors. Chinese Americans of different generations are likely to differ on the level of adoption of American mainstream culture, the level of retaining Chinese culture, and sociodemographic characteristics, all of which, based on previous literature, could moderate the effects of social relational factors on depression.

Methods

Data Source

This study uses publicly available data from the Collaborative Psychiatric Epidemiology Surveys (CPES) funded by the National Institute of Mental Health

(NIMH). This survey joins together three nationally representative surveys: the National Comorbidity Survey Replication (NCS-R), the National Survey of American Life (NSAL), and the National Latino and Asian American Study (NLAAS). The CPES survey population includes adults age 18 and older, living in households in the 48 coterminous United States (NCS-R, NSAL), and the population for the Latino and Asian ancestry groups extends to the State of Hawaii (NLAAS). All three surveys were conducted between 2001 to 2003. Respondents in all three surveys were selected from a four-stage clustered area probability sample of households, with selection using area data from the 2000 US Census. Although each survey has unique features, they share a common core of measurements of primary mental health diagnostic symptoms, symptom severity, and mental health-related service utilization. More details on CPES sample design features are provided by Heeringa et al. (2004).

This study focuses on Chinese American respondents while using non-Hispanic white as a comparison group. The CPES data consist of 600 Chinese Americans from NLAAS, and 7,587 non-Hispanic whites from NCS-R and NSAL. Specifically, the non-Hispanic white subsample from NSAL ($n = 891$) is not considered optimal for descriptive analysis of the white adult population, or comparative analyses between whites and non-black minority groups (Jackson et al. 2004)ⁱⁱ, and is therefore dropped. Also excluded are

ⁱⁱ According to Jackson (2004) and the CPES User Guide, the NSAL national area probability sample was selected independently of the samples for the other two surveys, the NCS-R and the NLAAS. The NSAL multi-stage sample design include a special supplement sample of households in areas of higher Afro-Caribbean residential density, in addition to a core national area probability sample of households. This sample design serves solely to augment the sample size from the Afro-Caribbean survey population; it therefore does not contribute to the representative samples of the NSAL's African-American and White survey populations. The CPES User Guide can be found at

2516 non-Hispanic white cases from NCS-R Part I, who did not complete the more in-depth interview. The sampling design and interview schedule are detailed by Kessler and colleagues (Kessler et al. 2004). The procedure results in a sample of 4,180 non-Hispanic white respondents from NCS-R. The sample used in the analyses, after listwise deletion, consists of 599 Chinese Americans and 3,894 non-Hispanic whites.

Measures

Race/Ethnicity and Generation Status. Race/ethnicity was defined using the self-identified primary racial/ethnic identity. Three generation groups were identified among Chinese Americans: foreign-born to foreign-born parents (1st generation), US-born to at least one foreign-born parent (2nd generation), and US-born adults to US-born parents (3rd-or-higher generations).

Diagnostic Assessment. Prevalence of major depressive disorder in the past twelve months was measured using the World Mental Health Survey Initiative Version of the World Health Organization Composite International Diagnostic Interview (WMH-CIDI), a fully structured lay-administrated diagnostic instrument that generates both DSM-IV diagnoses and *International Classification of Diseases, 10th Revision* (Kessler et al. 2004). The DSM-IV diagnosis of MDD is used in this study. To assess depressive symptoms, CIDI included twenty-five questions which could be combined into indicators of nine specific symptoms, including depressed mood, decreased interest or pleasure, change in weight or appetite, change in sleep, change in activity, fatigue, guilt, concentration, and suicidality.

Chronic Physical Condition. Respondents were asked if they ever had cancer, headache, heart disease, high blood pressure, asthma, ulcer, or stroke. Respondents who had at least one of the six conditions were coded as “yes,” and those who did not were coded as “no.”

Social Support and Conflicts. Social support from friends and relatives was measured separately, each with three questions. Support from friends was measured on a scale consisting of three parallel items that assess how much respondents can rely on friends for emotional support. Score was *z*-standardized on the Chinese Americans and non-Hispanic whites combined, with a higher numeric value indicating higher level of friend support. I also examined how much respondents can rely on extended family for emotional support, measured on a scale consisting of three items on how often respondents talk on the phone, get together with relatives, and how often they can rely on relatives to discuss worries. Score was *z*-standardized, with a higher numeric value indicating a higher level of relative support. The answers were “not at all” “little” “some” or “a lot.” In addition, conflict with friends and relatives was assessed separately, each with two questions. Specifically, how often friends or relatives made too many demands of respondents and argue with respondents. The answers were “never” “rarely” “some” or “often.” For both friend conflict and relative conflict, the score was *z*-standardized, and a higher numeric value represented a higher level of conflict.

Sociodemographic Correlates. In regards to the measurement of race/ethnicity, when a respondent identifies with multiple race/ethnicity categories, he or she was assigned to a single category according to priority order in the NSAL and NLAAS respondent classification rules (e.g., Vietnamese over Chinese). Other sociodemographic

correlates include gender, age in years, marital status, having a college degree, work status, and family income level. Specifically, marital status was coded in three categories, never married, married/ cohabiting, and divorced/separated/widowed. Family income level was computed as the ratio of the household income to the 2001 US Department of Health and Human Services poverty guideline, accounting for number of persons in the household.

Statistical Analysis

All statistical analyses were conducted using Stata 14 (StataCorp. 2015). CPES supplied weighting was applied to all analytical procedures to adjust for the study's complex sampling methods. Binary logistic regression was used to study correlates of MDD. Multivariate significance tests were calculated using Wald tests based on coefficient variance-covariance matrices that were adjusted for design effects using the Taylor's series linearization method. Link test (Pregibon 1979) revealed no specification errors with the final model. Because sampling weights were used in the analyses, traditional tests for goodness of fit could not be used. To my best knowledge, there is currently no goodness-of-fit test for binary logistic regression analysis of complex survey data involving subpopulation estimation, hence my inability to evaluate the predictive power of the models in the multivariate analyses.

Results

Table 2-1 presents the weighted descriptive statistics of the study sample, separately for Chinese Americans in three generational groups, and non-Hispanic whites. There is a great generational difference of MDD prevalence among Chinese Americans, with second generations having the highest prevalence (9.08%), a rate even higher than

that among non-Hispanic whites (7.26%); first generation Chinese Americans have a prevalence of 3.71%, and third-or-higher generation Chinese Americans has a prevalence of 6.58%, similar to that among non-Hispanic whites (Figure 2-1). The Chinese American sample is younger, with second generations being the youngest on average (39.05), compared to the non-Hispanic white sample (46.70). Second generation Chinese Americans (40.64%) are also much more likely than first (15.92%) or third-or-higher (28.20%) generation Chinese Americans and non-Hispanic whites (19.43%) to be never married. The proportion of the college educated is much higher among Chinese Americans, especially second generations (55.88%), than non-Hispanic whites (26.84%). There is greater household income heterogeneity among Chinese Americans than non-Hispanic whites; Chinese Americans, regardless of generational status, are more likely to live under poverty line and more likely to have household income 6 or more times of poverty line, than did non-Hispanic whites. There are also significant differences in gender composition and work status among the subsamples.

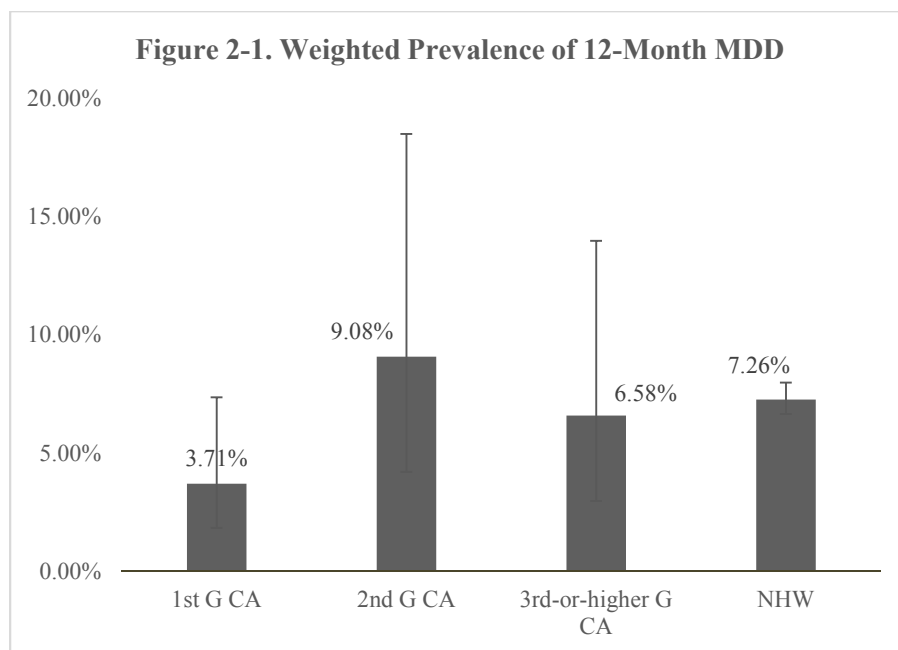


Table 2-1. Weighted Descriptive Statistics of Chinese Americans and Non-Hispanic Whites

	1st G CA % or mean (s.e.)	2nd G CA % or mean (s.e.)	3rd-or-higher G CA % or mean (s.e.)	Non-Hispanic White % or mean (s.e.)
<i>n</i>	475	74	50	3,892
DSM-IV MDD in 12 months	3.71% (.01)	9.08% (.03)	6.58% (.03)	7.26% (.003)
female	54.20% (.02)	56.47% (.07)	41.84% (.05)	51.84% (.01)
age (mean)	43.67 (1.25)	39.05 (2.89)	41.19 (1.61)	46.70 (.56)
marital status				
never married	15.92% (.02)	40.64% (.09)	28.20% (.06)	19.43% (.01)
married/cohabiting	74.16% (.02)	45.19% (.08)	50.63% (.12)	61.13% (.01)
divorced/separated/widowed	9.92% (.02)	14.17% (.05)	21.18% (.12)	19.44% (.01)
college degree	42.58% (.04)	55.88% (.06)	42.88% (.06)	26.84% (.01)
family income level				
below poverty line	21.47% (.03)	17.52% (.05)	16.19% (.06)	8.14% (.01)
1–3 times of poverty line	16.88% (.02)	15.56% (.06)	12.29% (.04)	25.44% (.01)
3–6 times of poverty line	23.18% (.02)	23.24% (.06)	21.45% (.13)	33.04% (.01)
≥ 6 times of poverty line	38.47% (.04)	43.68% (.06)	50.07% (.17)	33.38% (.02)
work status				
employed	65.08% (.03)	57.81% (.06)	68.78% (.12)	65.95% (.01)
unemployed	5.28% (.01)	4.42% (.02)	10.97% (.09)	5.07% (.01)
not in labor force	29.65% (.03)	37.77% (.06)	20.25% (.07)	28.98% (.01)
chronic physical condition	27.05% (.03)	33.40% (.07)	47.36% (.08)	50.19% (.01)
friend support (<i>z</i>)	-.40 (.06)	.30 (.09)	.31 (.14)	.29 (.02)
relative support (<i>z</i>)	-.54 (.06)	.07 (.15)	.02 (.10)	.14 (.02)
friend conflict (<i>z</i>)	-.02 (.06)	.31 (.10)	.25 (.10)	-.03 (.02)
relative conflict (<i>z</i>)	-.06 (.05)	.17 (.13)	.15 (.13)	-.13 (.02)

Regarding the main predictors of interest, the prevalence of any chronic physical conditions is much lower among first (27.05%) and second (33.40%) generation Chinese Americans than that among non-Hispanic whites (50.19%), and the prevalence is particularly low among first. Social support from friends is distinctively lower among first generation Chinese Americans (−.40) than second (.30) or third-or-higher (.31) generation Chinese Americans and non-Hispanic whites (.29). Support from relatives is generally lower among Chinese Americans, particularly so for first generations (−.54), than non-Hispanic whites (.14). Interestingly, second and third-or-higher generation Chinese American report higher levels of conflicts with friends (.31 and .25, respectively) and relatives (.17 and .15, respectively), while first generation Chinese Americans have relatively similar levels of conflicts with friends (−.02) and relatives (−.03) with non-Hispanic whites (−.06 for friend conflict, and −.13 for relative conflict). In summary, there are significant difference in the main predictors, the outcome variable, and several sociodemographic factors among the four groups.

Next I explore whether the observed differences in depression prevalence could be attributed to variations in the main predictors and covariates. Nested multivariable logistic regression is used to examine the correlates of depression, the weighted results presented in Table 2-2. In model 1, I compare three generational groups of Chinese Americans to non-Hispanic whites while controlling for sociodemographic factors. The regression coefficients show that only first generation Chinese Americans are significantly different from the reference group, non-Hispanic whites ($\beta = -.81, p < .05$). Being female, never married, and not in labor force are associated with higher

likelihood of having DSM-IV endorsed MDD in the past year. Age has a curvilinear relationship with depression, with middle age (approximately 40) having the highest predicted probability of depression.

In model 2, I included the five predictors of MDD, chronic physical condition, friend support, relative support, friend conflict, and relative support. First generation Chinese Americans are still less likely to report depression than do non-Hispanic whites ($\beta = -.83, p < .05$). Having any chronic physical conditions is associated with a higher probability of depression ($\beta = .96, p < .001$). Greater friend support ($\beta = -.21, p < .001$) and greater relative support ($\beta = -.26, p < .01$) are both associated with a lower likelihood of depression, as expected. Friend conflict ($\beta = .13, p < .05$) and relative conflict ($\beta = .18, p < .05$) are positively associated with depression. There are no major changes in the coefficients for the sociodemographic factors included.

Table 2-2. Weighted Logistic Regression Results of Twelve-Month DSM-IV MDD

	Model 1	Model 2	Model 3	Model 4
	1	1	1	1
NHW (ref)				
1st G CA	-.81 (.40)*	-.83 (.41)*	-.86 (.42)*	-.71 (.42)*
2nd G CA	.05 (.44)	.04 (.42)	-1.24 (1.14)	-.23 (1.14)
3rd-or-higher G CA	-.39 (.35)	-.41 (.37)	.73 (.68)	-.77 (.68)
chronic physical condition		.96 (.14)***	.95 (.15)***	.97 (.14)***
1st G CA * chronic			.44 (.45)	
2nd G CA * chronic			.90 (1.07)	
3rd-or-higher G CA * chronic			-2.89 (2.34)	
FS		-.21 (.06)***	-.20 (.07)**	-.30 (.09)**
RS		-.26 (.09)**	-.30 (.09)**	-.21 (.06)**
FC		.13 (.06)*	.20 (.07)**	.20 (.07)**
RC		.18 (.07)*	.12 (.07)	.12 (.07)†
1st G CA * FS			.68 (.40)†	.70 (.39)†
2nd G CA * FS			1.03 (.58)†	.72 (.42)†
3rd-or-higher G CA * FS			-.62 (1.68)	-.27 (.87)
1st G CA * RS			.07 (.17)	
2nd G CA * RS			-.78 (.54)	
3rd-or-higher G CA * RS			-.33 (.81)	
1st G CA * FC			-.60 (.30)*	-.62 (.30)*
2nd G CA * FC			-1.01 (.38)**	-.89 (.48)†
3rd-or-higher G CA * FC			.30 (.55)	.61 (.62)
1st G CA * RC			.29 (.33)	.28 (.32)
2nd G CA * RC			1.07 (.40)**	.65 (.43)
3rd-or-higher G CA * RC			-1.05 (1.45)	-1.23 (.79)
female (ref: male)	.65 (.08)***	.72 (.08)***	.71 (.08)***	.72 (.08)***
age	.11 (.03)***	.08 (.03)***	.08 (.03)**	.08 (.03)**
age^2	-.001 (.0003)***	-.001 (.0003)***	-.001 (.0003)***	-.001 (.0003)***
never married (ref)	1	1	1	1
married/cohabitating	-.68 (.18)***	-.75 (.18)***	-.73 (.18)***	-.73 (.18)***
div/sep/wid	.29 (.20)	.17 (.20)	.19 (.20)	.17 (.20)
employed (ref)	1	1	1	1
unemployed	.49 (.28)	.41 (.29)	.36 (.30)	.36 (.30)
not in labor force	.68 (.17)***	.56 (.17)***	.54 (.17)**	.53 (.17)**
college	-.06 (.13)	.12 (.13)	.11 (.13)	.12 (.13)
constant	-4.27 (.50)	-4.13 (.53)	-4.11 (.54)	-4.12 (.53)

$N = 4,491$

FS = friend support; RS = relative support; FC = friend conflict; RC = relative conflict

† $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

In Model 3 I included the interaction terms between generational status and chronic physical condition, and between generational status and each one of the four social relational factors. The main effect of being first generation Chinese American is statistically significant ($\beta = -.86, p < .05$), which means that for those with no physical condition and have a standardized score of zero on all four social relational factors, first generation Chinese Americans are less likely than non-Hispanic whites to have MDD. The main effects of having any chronic physical condition ($\beta = .95, p < .001$), friend support ($\beta = -.20, p < .01$), relative support ($\beta = -.30, p < .01$), friend conflict ($\beta = .20, p < .05$) are significant, but the main effect of relative conflict is not. Friend conflict and relative conflict both have significant interaction effects with generational status. Two of the interaction terms between friend support and generational status are only marginally significant. None of the interaction terms for relative support and chronic physical condition are significant. Wald test results indicate that the interaction between relative support and generational status, and the interaction between chronic physical condition and generational status are not significant ($p > .05$). Therefore, I exclude them in the next step of analysis. The coefficients for demographic and socioeconomic factors only changed slightly in magnitude from Model 2.

In Model 4, only three sets of interaction terms that have shown significance in Model 3 are included. They are, “friend support \times generational status” “friend conflict \times generational status” and “relative conflict \times generational status.” Wald test results show that the first two sets are both statistically significant ($p < .05$), while the third is only marginally significant ($p < .10$). The main effect of being first generation Chinese

Americans, as compared to non-Hispanic whites, is significant ($\beta = -.71, p < .05$). The interaction term “first generation Chinese American \times friend support” is marginally significant ($\beta = .70, p < .10$), and the interaction term “first generation Chinese American \times friend conflict” is also significant ($\beta = -.62, p < .05$). Together with the significant main effect of friend support ($\beta = -.30, p < .01$) and the main effect of friend conflict ($\beta = .20, p < .01$), the findings indicate that the difference between first generation Chinese Americans and non-Hispanic whites vary by the levels of friend support and friend conflict.

Specifically, among those with a standardized friend support score lower than 1.01³, first generation Chinese Americans are less likely than non-Hispanic whites to have MDD, with other variables held constant; among those with a standardized friend support score higher than 1.01, first generation Chinese Americans are more likely than non-Hispanic whites to have MDD. The two groups have the same predicted probability of having MDD when their standardized friend support score is 1.01, which is approximately one standard deviation above the sample average of friend support.

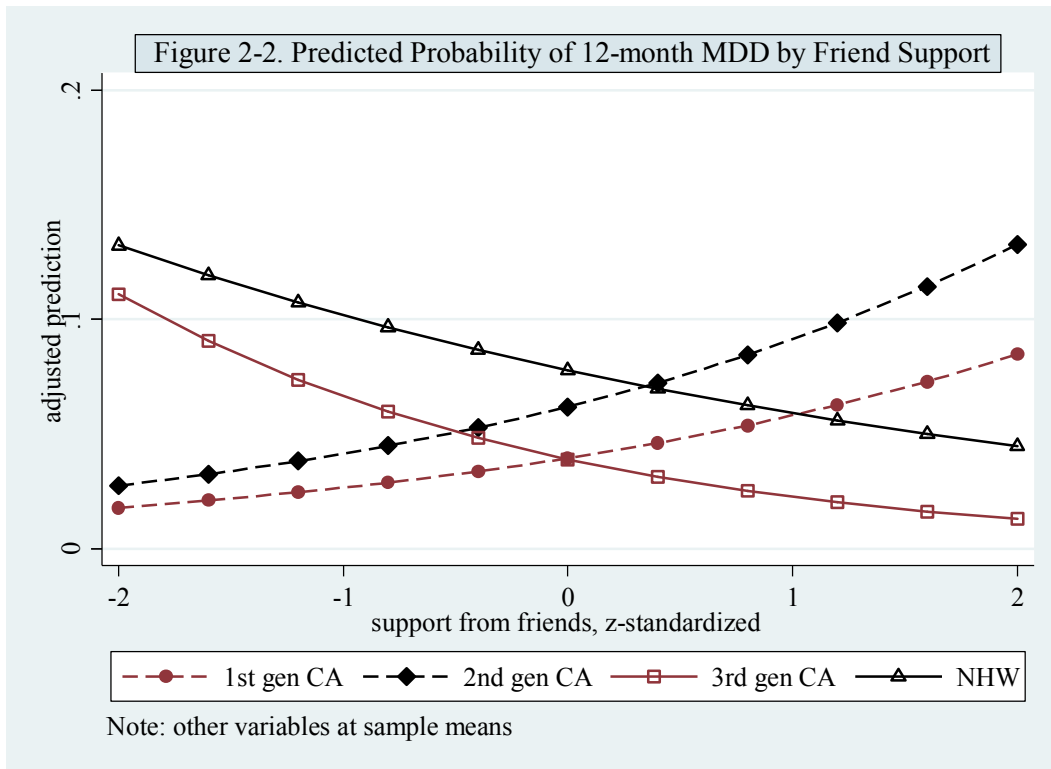
Among those with a standardized friend conflict score lower than -1.14 ⁴, first generation Chinese Americans are more likely than non-Hispanic whites to have MDD; among those with a standardized friend conflict score higher than -1.14 , first generation

³ $-(-.71)/.70=1.01$, which is -1 times the coefficient for the main effect of being first generation Chinese American divided by the coefficient for the interaction term “first generation Chinese Americans \times FS.”

⁴ $-(-.71)/-.62 = -1.14$, which is -1 times the coefficient for the main effect of being first generation Chinese American divided by the coefficient for the interaction term “first generation Chinese Americans \times FC.”

Chinese Americans with are less likely than non-Hispanic whites to have MDD. The two groups have the same predicted probability of having MDD when their standardized friend conflict score is -1.14 , which is slightly more than one standard deviation below the sample average friend conflict level.

The main effect of being second generation Chinese Americans (vs non-Hispanic white) is not significant. The interaction term terms “second generation Chinese Americans \times friend support” ($\beta = .72, p < .10$) and “second generation Chinese Americans \times friend conflict” ($\beta = -.89, p < .10$) are marginally significant. These results indicate whether second generation Chinese Americans are more than, less than, or equally as likely as non-Hispanic whites to have MDD in the past year is contingent on the levels of friend support and friend conflicts.



For those with a standardized friend support score of zero (sample average), second generation Chinese Americans do not differ significantly from non-Hispanic whites on the probability of having MDD, with other variables held constant. Among those with a standardized friend support score higher than .33⁵, second generation Chinese Americans are more likely than non-Hispanic whites to have MDD; among those with a standardized friend support score lower than .33, second generation Chinese Americans are less likely than non-Hispanic whites to have MDD (Figure 2-2).

Among those with a standardized friend conflict score of zero (sample average), second generation Chinese Americans do not differ significantly from non-Hispanic whites with the same level of friend and relative conflicts on MDD risk, with other variables held constant. Among those with a standardized friend conflict score higher than $-.26$ ⁶, second generation Chinese Americans are less likely than non-Hispanic whites to have MDD, with other variables held constant; among those with a standardized friend conflict score lower than $-.26$, second generation Chinese Americans have a higher MDD risk than that among non-Hispanic whites. The differences in MDD risk between second generation Chinese Americans and non-Hispanic white is bigger when their level of friend conflict is either very high or very low (Figure 2-3).

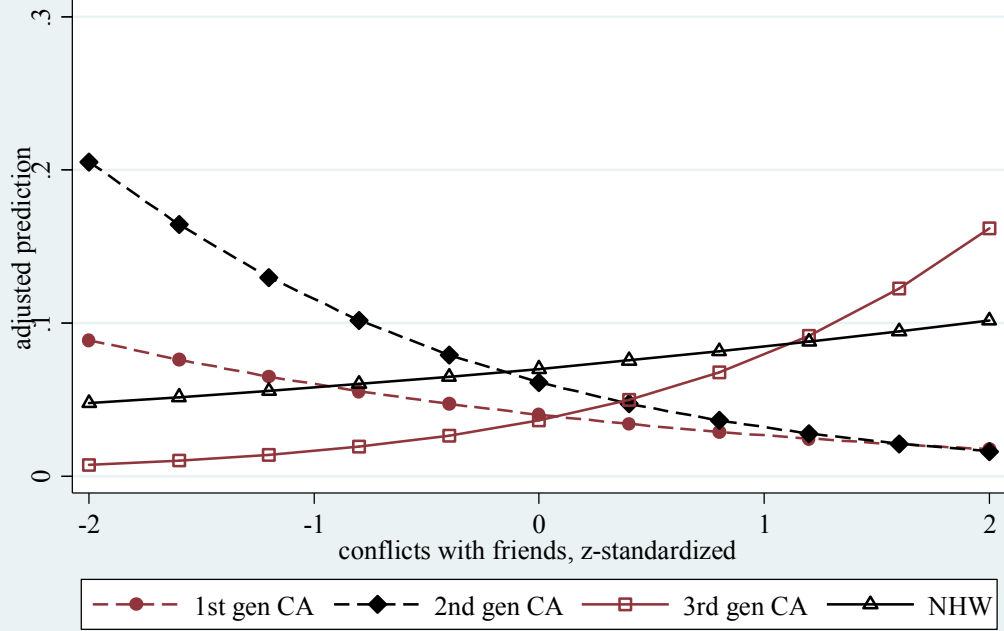
⁵ $-(-.23)/.72 = .33$, which is -1 times the coefficient for the main effect of being second generation Chinese Americans divided by the coefficient for the interaction term “second generation Chinese Americans \times FS.”

⁶ $-(-.23)/-.89 = -.26$, which is -1 times the coefficient for the main effect of being second generation Chinese Americans divided by the coefficient for the interaction term “second generation Chinese Americans \times FC.”

The main effect of being third-or-higher generation Chinese Americans (vs non-Hispanic whites) is not statistically significant, and none of its interaction terms is significant, which means that third-or-higher generation Chinese Americans are not significantly different from the non-Hispanic whites on MDD risk, regardless of the level of friend support, friend conflict, or relative conflict.

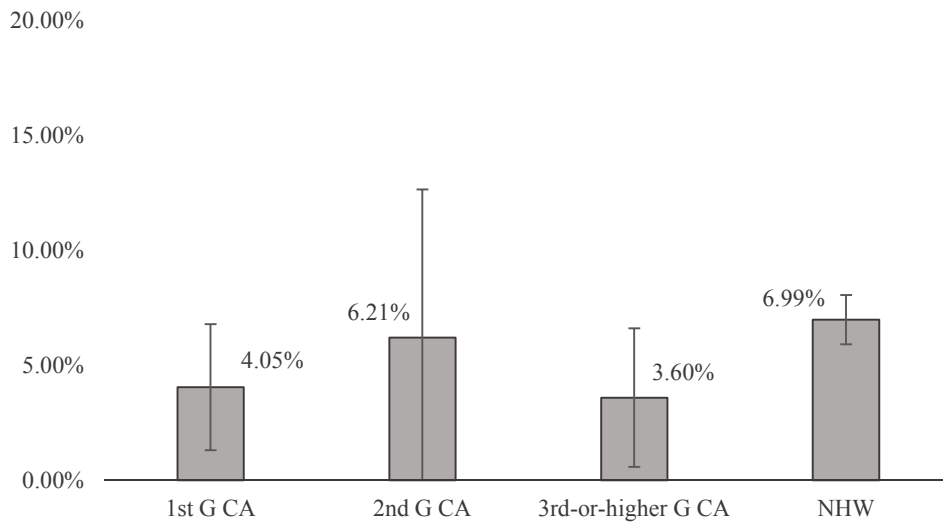
I computed the predicted probability of MDD for all four groups, with the covariates held at their sample means, the results presented in Figure 2-4. We can see that among Chinese Americans, second generations have the highest predicted probability (6.21%) of having MDD, compared to first (4.05%) and third-or-higher (3.60%) generation Chinese Americans. Generational differences notwithstanding, Chinese Americans in general have lower predicted probabilities of having MDD than did non-Hispanic whites (6.99%). Only two pairwise comparisons of the predicted probabilities are statistically significant: first generation Chinese Americans versus non-Hispanic whites, and third-or-higher generation Chinese Americans versus non-Hispanic whites.

Figure 2-3. Predicted Probability of 12-month MDD by Friend Conflict



Note: other variables at sample means

Figure 2-4. Predicted Probability of 12-Month MDD



Note: other variables set at sample mean

Having any chronic physical conditions is still positively associated with the likelihood of depression ($\beta = .95, p < .001$). It indicates that for all groups, having at least one chronic physical condition increases the likelihood of having MDD.

Friend support ($\beta = -.30, p < .01$) has a significant negative main effect on depression, while the interaction terms with first generational ($\beta = .70$) and second generation ($\beta = .72$) Chinese Americans are both marginally significant ($p < .10$). First, it means that a higher level of friend support is associated with a lower likelihood for MDD among the reference group, non-Hispanic whites. Second, this suggests a tendency that the effect of friend support among first and second generation Chinese Americans is different from that among third-or-higher generation Chinese Americans and non-Hispanic whites. As Figure 2-2 shows, the slope for first generation Chinese Americans (dash line connecting solid circles) is positive and significant ($p < .05$), and the slope for second generation (dash line connecting solid diamonds) is positive and marginally significant ($p < .10$). The effect of relative support is significant and negative ($\beta = -.21, p < .01$), which indicates that for all Chinese Americans and non-Hispanic whites, a higher level of relative support is associated with a lower likelihood of having MDD in the past twelve months.

Friend conflict has a positive main effect ($\beta = .20, p < .01$), which indicates a significant positive association between friend conflict and MDD risk among non-Hispanic whites (solid line connecting hollow triangles in Figure 2-3). The interaction term “first generation Chinese American \times friend conflict” ($\beta = -.62, p < .05$), and the interaction term “second generation Chinese American \times friend conflict” ($\beta = -.89, p <$

.10) is marginally significant. This indicates that the effects of friend conflict for first and second generations of Chinese Americans are significantly different from the friend conflict effect for non-Hispanic whites. Figure 2-3 shows the slopes of friend conflict for each of the four groups. A higher level of friend conflict is associated with a lower risk for MDD among first generation Chinese Americans; adjusted Wald test finds the effect of friend conflict among first generation Chinese Americans (the dash line connecting solid circles) significant. Similarly, friend conflict is also negatively associated with MDD risk for second generation Chinese Americans, as is shown with the solid line connecting solid diamonds in Figure 2-3; adjusted Wald test find this effect among second generation Chinese Americans marginally significant ($p < .10$).

The main effect of relative conflict is only marginally significant ($\beta = .12, p < .10$), which indicate a positive association between relative conflict and MDD risk for the reference group, non-Hispanic whites. None of the interaction terms between relative conflict and generational status is significant, indicating the effect of relative conflict have the same direction and magnitude for all four groups.

The effects of sociodemographic factors did not change much from Model 3. Women (vs. men), being never married (vs. married or cohabitating), and not being in the labor force (vs. employed) are associated with elevated likelihoods of having MDD in the past year, with other covariates held constant. Additionally, age has a curvilinear relationship with depression, with the likelihood of having MDD peaking around the age of 35, and decreasing on both ends (predicted probability of MDD by age available upon request).

Discussion

This study has several important findings on the generational differences of depression among Chinese Americans, and correlates of depression for each generation of Chinese Americans. First, first generation Chinese Americans are significantly less likely to have depression, even when I controlled for demographic, social and other variables (Figure 2-4). This indicates that in addition to the factors examined in this study, there are other factors that would explain the ethnic disparities of depression between first generation Chinese Americans and non-Hispanic whites. It could be the case that Chinese Americans benefited from the protective effects of certain factors that would help to avoid and/or alleviate distress. Previous studies have suggested that strong family cohesion is an important norm in Chinese culture that helps individuals coping with difficult situations (Armstrong, Birnie-Lefcovitch, and Ungar 2005; Juang and Alvarez 2010). It is possible that a sense of family belongingness and support from immediate family members protects Chinese Americans from distress or helps them better cope with distress. However, the lack of data on family support among non-Hispanic whites limited my ability to test this possible explanation. In the future, I intend to explore the association between family-related factors and depression among Chinese Americans.

Another possibility has to do with what medical anthropologist Arthur Kleinman referred to as “categorical fallacy,” the practice of reifying nosological categories developed for one particular cultural group and applying them to members of another cultural group (Kleinman 1987). Depression, a psychiatric disease category of Western construction, may lack validity in a non-Western cultural context. The definition of

depression is historically contingent, and culturally bounded. Some non-Western cultures—Chinese culture included—discourage emotional expression and view emotionality as being weak-willed. Scholars such as Kleinman (1977, 1982) and Marsella (1978) argued that such cultural norms may lead to “somatization,” the tendency to express more somatic symptoms such as loss of appetite or insomnia or hypersomnia, agitation or retardation, or fatigue, rather than affective symptoms such as “feeling blue.” These patterns of symptomatology of depression may lead to inaccurate estimation of the prevalence of depression among culturally non-Western populations. With approximately three quarters of the Chinese American population born outside of the US (Hoeffel et al. 2012), a high level of Chinese cultural norms and values retention could indicate a different pattern of depressive symptomatology. In that case, it is possible that the DSM are underestimating the prevalence of depression among Chinese Americans. The depression symptomatology among Chinese Americans warrant future research to advance our understanding in the expression of depression symptoms, in order to improve our depression diagnosis, assessment, and treatment.

In addition, this study found that friend conflict is negatively associated with depression among first generation Chinese Americans. This finding seems to challenge the general understanding that social conflicts tend to cause distress which may lead to depression. However, the cross-sectional nature of the data in this study invites interpretation from another causal direction. It could be the case that first generation Chinese Americans who were suffering from depression were well supported by friends, that their friends would try to avoid making too much demands or arguing with them. This finding suggest greater peer group efficacy for first generation Chinese Americans.

And this explanation is even more convincing given the marginally significant positive association between friend support and depression risk among first generation Chinese American, another finding that seems puzzling at first, but could also be interpreted as friend network's greater willingness to offer support to those who were depressed. For first generation immigrants, a friend network is the form of social network that is most feasible to establish, compared to helping the old family migrate from the countries of origin, expanding old family and making new family (such as through marriage). For example, a study of Asian immigrant young adults found friend support to be a protective factor against the effects of family conflict on depression, but only among first-generation immigrants (Obradović, Tirado-Strayer, and Leu 2013). Findings of this study expanded the existing body of literature by showing a nuanced, two-way relationship between support and conflict from friends and depression. In addition, my study findings suggest that it is more likely that friendship network serves as a source of coping for first-generation Chinese Americans who were already depressed, given a higher depression risk is associated with greater friend support and less friend conflict. In other words, the main causes of depression for this group are likely to be sources other than friendship networks; instead of causing distress, friends of first generation Chinese Americans more supportive and less confrontational or demanding when they see then first generation Chinese Americans suffering from depressed mood.

Furthermore, the negative association between relative support and depression risk among first generation Chinese Americans suggests that extended family provided the support to decrease the risk of depression. The significant effects of friend support and relative support, along with the marginally significant effect of friend conflict,

provided a complicated picture of the roles of social network in affecting the mental well-being of first generation Chinese Americans. It seems that friend network is more of a place of solace and support for those already struggling with depression, and less of a source of conflicts that causes distress. Relative network seems more like a place of emotional support that might lower the depression risk for first generation Chinese Americans. These findings have implications for depression prevention and treatment programs, which should pay close attention to the unique roles of friend and relative networks in stress management and depression treatment.

Similar to the first generation Chinese Americans, second generation Chinese Americans saw a higher likelihood of depression associated with a higher level of friend support (Figure 2-2), and a lower level of friend conflicts (Figure 2-3). One explanation is that for second generation Chinese Americans, friendship was a particularly important social network with high efficacy, such that friends were unlikely to argue with them if they were suffering from depression. The second generation Chinese American sample reported the highest level of friend conflicts, which provided further context for this explanation: although second generation Chinese Americans generally have a high level of conflicts with friends, they are well supported when they are in poor mental health status such as depression. Social network studies among immigrants found that for second generation immigrants, peer group is also the most important forms of social network; the lack of strong cultural belonging to, or worse, the sense of alienation from either the ethnic or the mainstream culture tend to push second generation immigrants to form strong bond with people who shared similar experience and/or understood their experience (Portes and Rumbaut 2001).

Last but not least, neither the descriptive analysis nor the multivariate logistic regression analysis showed any significant difference between third-or-higher generation Chinese Americans and non-Hispanic whites. The regression coefficients reported no statistical significance among the slopes either. Such results might be due to the small sample size of the former group ($n = 50$). If this drastic, discrepancy between the two groups, albeit non-significant, did suggest a tendency of generalizable difference, it could only be explained by factors not examined in the analyses of this study, factors with protective mental health effects for third-or-higher generation Chinese Americans that could explain the much lower predicted probability. The existing body of literature, to my best knowledge, has not suggestions on what these factors could be.

This study is not without limitations. First, the use of cross-sectional survey data limited my ability to make any causal inference, hence unspecified directionality of the influences among depression, socio-demographic characteristics, chronic physical condition, and social support and conflicts. Experimental and longitudinal research effort is need to better understand how social support and conflicts interact with depression risk. Also, I was not able to include several important factors, including perceived discrimination, family cohesion, and family conflicts in my analyses because of the lack of data on these measures from the non-Hispanic white sample. Previous studies have found the effects of these factors on mental well-beings among Asian American populations to be significant yet nuanced, and the findings were less than consistent for the potential reasons regarding sampling frames and strategies (e.g., Abe-Kim et al. 2007; Gee et al. 2007; Juang et al. 2007). Furthermore, research has found variation of patterns of mental disorders within the group of Asian or Chinese Americans. For example,

Takeuchi and colleagues (2007) found that among foreign-born first generation Asian immigrants, those who arrived earlier in life were at higher risk of lifetime and twelve-month mental disorder, than those who arrived as an adult. Scholars have proposed the concept of “1.5 generation” immigrants, which refers to individuals who migrated to during their childhood or middle to late adolescence (Park 1999; Rumbaut 1994). Compared to those who migrated to a new country as an adult, the 1.5 generation immigrants tend to have different experiences and unique adaptation strategies in the process of acculturation, compared to first generation immigrants, or US-born second generation immigrants (Bartley and Spoonley 2008; Kim et al. 2003; Lee 2011). One study found significant association between adult subjective social status and depression among Asian immigrants who came to the US when they were twenty-five years old or older, not among those who migrated before the age of twenty-five (Leu et al. 2008). Future comparative studies need to examine the depression patterns and correlates among the 1.5 generations, in comparison to other generations.

Conclusion

In the present study, I examined depression prevalence and correlates among different generations of Chinese Americans, using non-Hispanic whites as a comparison group. Results of the study revealed that Chinese Americans in general have a lower risk of depression do than non-Hispanic whites. Moreover, the prevalence and correlates of depression do not show a linear trend of difference from first to second to third-or-higher generation Chinese Americans, and then to non-Hispanic whites; rather, the risk of depression and its associated with social relational factors presents in distinctive patterns for first and second generation Chinese Americans, compared to third-or-higher

generation Chinese Americans and non-Hispanic whites. Specifically, friend network and extended family network play different roles in their influence on depression risk for different generations of Chinese Americans. The findings of this study contributed to the growing body of literature on acculturation and mental health among immigrants, shedding lights on the complicated sociocultural contexts that could influence the mental well-being of individuals. Mental health services providers need to be aware of the complex and nuanced association between social relational factors and depression in their prevention, management, and treatment efforts. Researchers need to further examine the causality issues, and the impacts of other sociocultural factors such as perceive discrimination, family cohesion, and acculturative stress among Chinese Americans.

CHAPTER 3

DEPRESSION SYMPTOM PATTERNS AND SOCIAL CORRELATES AMONG CHINESE AMERICANS

Introduction

To date, most studies of depression among Chinese Americans have focused on comparing the prevalence of depression to other racial/ethnic groups (e.g., Takeuchi et al. 1998; Yeung et al. 2004), or identifying risk factors among Chinese Americans (e.g., Hwang, Myers, and Takeuchi 2000; Ying and Han 2007). In comparison, there are fewer academic studies examining the depression symptom patterns of Chinese Americans. Cultural psychiatrists such as Arthur Kleinman (Kleinman 1982, 1987; Kleinman, Eisenberg, and Good 1978) and Anthony Marsella (Marsella 1978; Marsella, Kinzie, and Gordon 1973) have asserted that Chinese in China or Taiwan, as well as Chinese Americans, express their depression or impaired mood in a distinct way, and they attribute such cultural difference of depression symptomatology to the collectivism and the philosophical orientation in traditional Chinese culture. However, empirical findings on the symptom patterns from cross-cultural comparison are thin and inconsistent.

Chinese American is among the ethnocultural groups that are understudied in depression literature (Vega and Rumbaut 1991). It deserves attention for two main reasons. First, several elements in Chinese culture, including the orientations towards collectivism, and the philosophical orientation towards holism between body and mind, man and nature, are distinct from the mainstream American culture, which is primarily Western. And these distinct cultural elements are associated with the construction,

reflection, and expression of self, which are key notions to the cause and expression of impaired mood (Marsella et al. 1973). What kind of connection between the mind and the body is held by individuals of Chinese descent influenced by Chinese culture? How do the Chinese cultural norms affect the way individuals make complaints about the impaired mood? What types of complaints are they likely to make, bodily complaints or mood complaints? And to put things in a multi-cultural societal setting, is the pattern of depressive symptoms among Chinese Americans different from that among non-Hispanic whites? The answer to this question is the first step towards more thorough understanding of the etiology and pathophysiology of depression.

Second, Chinese American is characterized with great heterogeneity with regards to social and cultural characteristics. With approximately three quarters of Chinese Americans born outside of the US, according to the 2010 US Census (Hoeffel et al. 2012), nativity status, length of residence in the US, English proficiency, and the level of Chinese culture retention and subscription to mainstream American culture differs drastically within the population. In addition, there is significant variation of socioeconomic standing within the Chinese American population (Cook et al. 2011). And these factors are associated with mental health outcomes, including depression, through various psychosocial mechanisms, such as exposure to stress, coping skills and resources (Salant and Lauderdale 2003), and as briefly mentioned earlier, reflection and expression of self, all of which relate to depressive symptomatology. While only a few studies have examined the overall depression symptomatology of Chinese Americans, even scarcer is the body of research that examines any within-group variation.

In summary, the demographic profile, socioeconomic standing, and cultural norms of Chinese Americans are overall distinct from other racial/ethnic groups in the United States, and there is significant heterogeneity within the population of Chinese Americans. It is crucial to compare the prevalence and correlates of depression between and within groups, to better understand the etiology and epidemiology of depression among Chinese Americans. In this study, I explore—beyond simply the prevalence of depression as a binary diagnosis outcome—the symptom patterns of depression. Specifically, I examine the patterns of depressive symptoms for Chinese Americans (separate by nativity status) and compare the two groups to non-Hispanic whites. I also examine how demographic characteristics and social factors are related to different dimensions of depressive symptoms for each group.

Depression is a multidimensional condition. Measurements of depression, including screening tests like the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R) (Radloff 1977), or clinical assessment criteria like the Diagnostic and Statistical Manual of Mental Disorders (DSM), all contain symptoms of various dimensions: emotional/affective symptoms (e.g., feeling blue, discouraged, happy, felt like achieved a lot), somatic symptoms (e.g., fatigue, insomnia), interpersonal relation function (e.g., feeling others are unfriendly, feeling critical of others), self-perception or existential symptoms (feeling hollow, does not respect self), and suicidality (e.g., thought about death, feeling it would be better if dead). Studies of several other widely used measures such as the Beck Depression Inventory (Storch, Roberti, and Roth 2004), and the Patient Health Questionnaire (PHQ-9) (Kroenke, Spitzer, and Williams 2001), and the Geriatric Depression Scale (Rinaldi et al. 2003) also generally confirmed the

multidimensional structure of the measurements. However, most studies of the depression did not consider the multidimensionality of depression (Hays et al. 1998). They examined either a binary outcome (depressed or not)(e.g., Kessler et al. 2012), or a unidimensional outcome of the total number of symptoms (e.g., Echeverría et al. 2008). Although findings of these studies provide important implications for identifying risk factors of depression, they might obscure any differences in depressive symptomatology between groups. Hays et al pointed out that the social environment affects depression symptomatology “not by a few powerful risk factors, but by a multiplicity of events and experiences which can exert modest effects” (Hays et al. 1998:38). When we do not disaggregate the depression measures into dimensions, we risk overlooking the modest effect certain social or cultural factors may have on one specific dimension.

Examining the different dimension of depression is important for three reasons. First, the multidimensionality of depression is an essential element of our definition and diagnosis of depression. Which dimensions are included in the measurement we use, how the frequency and severity of each dimension are emphasized, and how each item is worded in the measurement may lead to different diagnosis on the individual level, and different estimation of depression prevalence at the population-level (Startup, Rees, and Barkham 1992). This is of great relevance for comparisons of depression prevalence between groups. If individuals from one group tend to express their impaired mood in ways that fall under Dimension A, while another group shows symptoms under Dimension B, then whether and how these dimensions are measured may affect the result, that is, how depression prevalence of one group compares to that of another.

Second, on the clinical front, different dimension of symptoms might respond to different types of treatment. Psychiatrists have already been increasingly interested in the effects of treatment regarding specific types of depressive symptoms. A critical review of clinical trials found that cognitive behavioral therapy is more efficient in treating somatic symptoms than affective symptoms (Kroenke and Swindle 2000). Different dimensions of symptoms might even respond differently to different types of medications. For example, one study found that patients with primarily symptoms such as hypersomnia and increased appetite respond best to an older class of antidepressants called monoamine oxidase inhibitors rather than the selective serotonin reuptake inhibitors (SSRIs), or psychotherapy (Nemeroff et al. 2003).

Third, the multidimensional nature of depression needs to be considered in studies of the social correlates of depression. Most of the epidemiological studies have focused on identifying predictors for a binary outcome of depression. However, psychiatric literature has increasingly strong theoretical and empirical evidence that suggest the differential effects of certain sociocultural factors on different dimension of depression. Studies have found that women are likely than men to have a negative or positive affect and weight gain, and the gender difference in other dimensions are less evident (Briscoe 1982; Hays et al. 1998). Kessler et al. (1992) also found that the age effect on somatic symptoms is significant for both women and men, but the effect of age on affective symptoms is significant for women. These findings indicate that social and cultural factors may affect how depression is experienced and expressed. If different dimensions of depression are associated with different demographic, social, and cultural factors, then individuals need better understanding of such differences to cope with different

dimension of symptoms, and clinical psychiatrists need better understanding of such differences to offer targeted treatments.

In the following section, I review previous literature in three areas, 1) the distinct depressive symptomatology among Chinese Americans, 2) the multiple dimensions of depressive symptoms, and the social correlates among Chinese Americans.

Literature Review

Depression Symptomatology Among Chinese Americans

Epidemiological literature has inconsistent findings on whether Chinese Americans are less prone to depression than are non-Hispanic whites. Some studies found a higher risk of depression among Chinese Americans than that among non-Hispanic whites, after covariates are controlled for, and researchers argued that such disparities was due to racial discrimination, stress related to the process of acculturation, or lower use of mental health services (Stokes et al. 2002; Yeung et al. 2004). In contrast, many studies have reported a lower level of depression among Chinese Americans than non-Hispanic whites or predominantly white samples (Kuo 1984; Lai 2004; Takeuchi et al. 1998), and scholars attributed the lower depression risk among Chinese Americans to strong social support, family cohesion, and other sociocultural factors (see review article Salant and Lauderdale 2003). Scholars also proposed the “healthy immigrant effect,” that immigrants are on average healthier, physically and mentally, than the native-born because of the immigrants’ self-selection, where those who are healthier and wealthier are more likely to migrate to a new country (Beiser 2005; Lou and Beaujot 2005).

However, scholars have also hypothesized the difference in depression prevalence between Chinese or Chinese Americans and non-Hispanic whites is partially due to

difference in depressive symptom patterns. As previously mentioned, cultural psychiatrists have argued that cultural factors play significant influence on the way people experience and expression impaired mood (e.g., Kleinman 1982; Marsella 1978). However, in cross-cultural epidemiological studies, researchers tend to use a universal measurement or criterion to diagnose depression, which, several scholars argued, could lead to inaccurate estimation of the prevalence rates (Chan et al. 2007; Lin 1989). Under this “tyranny of diagnosis,” disease nosological labels are created, usually in Western medical settings; as they are applied to different cultural groups, they “help constitute and legitimate the reality that they discerns” (Rosenberg 2002:240). Therefore, “depression” can be considered as label invented in the Western society, and it reinforces a disease category or an illness reality upon people, regardless of their conceptions and actual experience of impaired mood, a universal emotional status by a broad definition. To go even one step further, some scholars argue that all complaints are cultural-specific, and even though certain complaints, such as impaired mood, may be found in different cultures, there may still be difference in the patterns, causes, or definitions of the complaints across different cultures (Marsella et al. 1973; Phillips and Draguns 1969).

Somatic symptoms. Empirical studies have found differences in depression symptom patterns between the Chinese population in Asia and the predominantly white Western populations, and the differences mainly lie in two dimensions, somatic complaints, and affective symptoms. Scholars have noted a tendency among the Chinese populations to somatize their psychological distress (Kleinman 1977; Marsella et al., 1973; Mezzich et al. 1999). The term somatization is used to refer to the reporting of somatic symptoms, especially medically unexplained somatic symptoms by patients with

psychiatric disorders (Kirmayer and Kirmayer 1991; Simon et al. 1999). Some scholars argue that reporting of somatic symptoms is actually the denial of psychological distress, that somatic symptoms serve as “a psychological defense against the awareness or expression of psychological distress” (Simon et al. 1999:1330).

Although epidemiological studies have found somatization in various cultural groups, relevant theoretical work indicate that the somatization tendency is particularly strong among Chinese individuals. The health beliefs in ancient Chinese medicine are based on the *yin/yang* cosmology. The human body is perceived as a mixture of *yin* and *yang*, and the balances of the two forces lead to health. In addition, the health of one body part is dependent on its relationship to other parts. Balances and harmony are the key notions in tradition Chinese medicine and health beliefs (Scheper-Hughes and Lock 1987). Imbalance of *yin* and *yang*, dissonance of man and nature would result in illness, which is rarely localized, but affects the entire human being (Veith 1955). These philosophical understanding of the body lead to the conception of a very close connection between the mind and the body, which is different from the conceptions of human body based on “absolute dichotomies and unresolvable differences” (Scheper-Hughes and Lock 1987:12).

Affective symptoms. Previous research also found that Chinese or Chinese Americans suppress the expression of emotional/affective symptoms (Tseng and Hsu 1970), or that Chinese Americans tend to express their emotional disturbances in somatic terms (Cheung, Lau, and Waldmann 1981). Chinese culture values self-control and endurance, and discourages emotional expression, especially verbal expression (Chen et al. 2005; Tseng and Hsu 1970). Displaying strong emotions is considered a weakness of

the character, and was traditionally even thought to be a cause of illness (Chen et al. 1998; Phillips et al. 2002). The Chinese culture also emphasizes group solidarity and social harmony over individual well-being. A person who explicitly expresses emotional suffering, may be perceived as “self-centered, asocial, distancing, and threatening to the social structure,” whereas expressing bodily pain that are “amenable to treatment and do not threaten social ties” is more tolerable (Kirmayer and Groleau 2001:472). Depression as an illness carries strong social stigma; it is still poorly understood in Chinese society, and is sometimes equated to lunacy and schizophrenia (Gordon Parker, Gladstone, and Chee 2001). Therefore, to “save face” for the family and the individuals, and to maintain social harmony, individuals may tend to hide their emotional/affective disturbance and report somatic symptoms instead.

Previous findings on the depressive symptom patterns of Chinese or Chinese Americans are inconsistent. Some studies found no difference in the prevalence of affective symptoms between Chinese and Western populations (Simon et al. 1999; Yap 1965). In contrast, Okazaki (2000) found a higher level affective distress among Asian American adults than that among white Americans. Additionally, one study found that the Hong Kong Chinese sample reported more somatic symptoms, and less affective symptoms than did the American sample (Lu et al. 2010). And they argued that the close mind-body connection in Chinese culture “leads Chinese people report the more normatively acceptable somatic symptoms whose cure seems more possible and contributes to the resolution of psychological symptoms” (Lu et al. 2010:61). In addition, their study found a much stronger correlation between somatic symptoms and affective symptoms among the Hong Kong Chinese respondents than that among the Americans.

Other depression dimensions. There are only a few studies that have reported any difference of other dimensions of depression between Chinese Americans and other groups. One Australian study found that the Malaysian Chinese sample significantly differed from the Caucasian Australian sample on cognitive symptoms, but not on somatic symptoms (G. Parker, Cheah, and Roy 2001). Chentsova-Dutton and Tsai (2002) also pointed out that in addition to bodily complaints, interpersonal complaints plays an important role in the conceptions of depression; Asian individuals, including Chinese, emphasize more heavily interpersonal stressors than do Western cultural groups. As for suicidal ideation, studies have examined the difference between Chinese or Chinese Americans to non-Hispanic whites, but not as a dimension of depressive symptoms, but rather, as an independent construct, and therefore fail to inform how suicidality compares to other depression dimensions.

In summary, although previous research has suggested that Chinese Americans have a distinct pattern of depression symptoms than non-Hispanic whites: less affective symptoms, more somatic symptoms, and a closer association between the two dimensions. To the best of my knowledge, no previous study has examined such patterns among a nationally representative sample of Chinese Americans. In the present study, I use factor analysis to investigate the latent structures of the twenty-four depressive symptom items in DSM-IV. Since the subscription of Chinese cultural beliefs (and adoption of Western culture) is of main interest, it is important to examine whether Chinese Americans of different levels of Chinese cultural retention differ on depression symptoms. Nativity status is a proxy measure of acculturation used most often in social epidemiological studies, which is why in this study I examine two subgroups of Chinese

Americans, the foreign-born and the US-born, and compare them to the majority of the US population, the non-Hispanic whites.

Social Correlates of Depression Dimensions Among Chinese Americans

As briefly mentioned in earlier in this chapter, various demographic and social factors influence a multiplicity of events and experiences, which then affect the expression of depression symptoms. However, our knowledge is rather limited on the effects of the sociodemographic factors on specific dimensions of depression in the general US population, and even more limited on Chinese Americans. Here I review previous theoretical and empirical findings on the social correlates of different depression symptom dimensions. Although some of the studies were conducted among Chinese people in China, Hong Kong, or Taiwan, Asian Americans, and Chinese immigrants in other Western countries, their findings are relevant with regards to how the Chinese cultural norms and beliefs may affect the expression of depressive symptoms.

The theories of development of psychiatric symptomatology (George 1996; Marjoram et al. 2005) have suggested that four types of factors service as social precursors of depressive symptoms, including (1) demographic and socioeconomic (e.g., age, gender, race, educational attainment), (2) vulnerability factors (e.g., chronic physical condition), (3) protective factors (e.g., social support), and (4) provoking factors (e.g., social conflict). Empirical studies have also examined the effects of these factors on various dimensions of depression symptoms, but mostly among exclusively or predominately non-Hispanic white populations. Below I summarize previous findings by each type of social precursors.

Demographic and socioeconomic factors. Previous studies have found some difference in the prevalence of certain dimensions of depression symptoms by gender, age, educational attainment, employment status, and nativity status. First, regarding the gender difference in depression symptomatology, two studies have found that the female preponderance in depression rates is more evident (and consistent in the literature) in negative or positive affect and weight gain than it is other dimensions of symptoms (Briscoe 1982; Hays et al. 1998). Kessler et al. (1992) also found that an older age was associated with more somatic symptoms for both men and women; however, an older age was associated with more affective symptoms for only women and not men. Their findings suggest that the age and gender impact different dimensions of depression symptoms through nuanced mechanisms. Educational attainment and employment are life-achievement variables that previous research suggests has effects on depression (Everson et al. 2002; Lorant et al. 2007; Mitchell, Mathews, and Yesavage 1993). However, these studies only examined depression as one whole disease category, and failed to explore any differences in the socioeconomic effects on different dimensions of depression symptoms.

Previous literature also suggests that nativity status is an important factor for the depression symptomatology of immigrants. For example, one study found that suicidal ideation was more prevalent in US-born Asian Americans than that among the foreign-born Asian immigrants. Additionally, suicidal ideation varied between men and women, but only among the US-born, and not among the foreign-born (Duldulao, Takeuchi, and Hong 2009). Furthermore, there are clear variations in the level of acculturation, subscription into the host culture, and retention of the heritage culture, between foreign-

born and native-born immigrants (Min 2002), and the process of negotiating between the host and the heritage culture has complex impact on psychological outcomes (Koneru et al. 2007). Therefore, it would be easier to dissect the complex social effects on depression symptomatology if we examine the foreign-born separately from the US-born. More specifically, I explore how several sociodemographic factors, including age, gender, marital status, educational attainment, and employment status are associated with each depressive symptom dimension, separately for foreign-born Chinese Americans and US-born Chinese Americans, as well as the non-Hispanic whites.

Vulnerability factors. The presence of any chronic physical conditions may cause not only functional disability, but also tremendous psychological distress (Moussavi et al. 2007), evidenced in the high co-morbidity rates of depression and numerous chronic illness or conditions such as chronic pain, diabetes or cancer (Bisschop et al. 2004; Massie 2004; Stein et al. 2006). In addition, as noted by Hays et al (1998), previous research has found the effects of chronic physical conditions across all dimensions of depression (Berkman et al. 1986; Mitchell et al. 1993). However, given the cultural influences on the expression of depression symptoms, it is necessary to examine if chronic physical conditions exert effects equally on each dimensions of depressive symptoms. In the present study, I explore the effects of having any chronic physical conditions on each depressive symptom dimension, separately for foreign-born Chinese Americans and US-born Chinese Americans, as well as the non-Hispanic whites.

Protective factors. Although social support is generally perceived to have positive effects on the psychological well-being of individuals, the effects are nuanced. Not only do source (family, friends, work relationship, etc.) and forms (emotional,

instrumental, etc.) of social support matter, it has also been suggested that the protective effects social support may vary across different dimension of depressive symptoms. For example, Blazer et al. (1992) found that although a higher level of social support was associated with more somatic symptoms and more negative affect, the effect was almost twice for somatic symptoms as it is for negative affect symptoms. Hays et al (1998), in their studies of the elderly, found that a higher level of social support was significantly associated with more negative affect symptoms and somatic symptoms, but less interpersonal problems. More specifically regarding Chinese Americans, no study has specifically examined the effects of social support across different depression dimensions. Studies on suicidal ideation consistently found significant social support effect among Chinese or Chinese Americans (Lee et al. 2006; Zhang and Norvilitis 2002). These findings suggest differential effects of social support on various depression symptom dimensions.

There are several important cultural values and beliefs in Chinese culture that link to social support and the expression of depression. For example, Chinese culture values social harmony over individual's well-being, but at the same time, it emphasizes group cohesion and the interdependency among individuals. How the complex cultural matrix may affect the specific forms of depression expression is not yet clear. In the present study, I explore how perceived supports from friends and from relatives are associated with each depressive symptom dimension, separately for foreign-born Chinese Americans and US-born Chinese Americans, as well as for non-Hispanic whites.

Provoking factors. The distress caused by interpersonal relationships among family and peers plays an major role in affecting an individual's psychosocial

vulnerability (Cohen and Wills 1985; Hwang et al. 2000). Most studies found that a higher level of social conflict was associated with a higher depression risk among Chinese Americans (Ying and Han 2007; Zhang et al. 1997). For example, Lepore (1992) found that a lower level of conflicts with friends was associated with better emotional functioning, and the association was as strong as the effects of social support among predominantly white college students in the US. Baumeister et al (2002) found a decline in cognitive performance among those reporting a higher level of social conflict. There is a richer literature on the association between greater social conflict and a higher level of suicidal ideation among the general population (Vanderhorst and McLaren 2005), and among Chinese or Chinese Americans (Sun, Hui, and Watkins 2006).

To summarize, the existing body of literature shed some light on the social correlates of depression dimensions among Chinese Americans, but two major issues are yet to be addressed. First, it is unclear what factors are associated with each specific type of depression dimensions. Second, no study has compared the patterns of social correlates between Chinese Americans and non-Hispanic whites. I hypothesize, based on previous findings, that foreign-born Chinese Americans and US-born Chinese Americans have depression symptom patterns and social correlates that are distinct from those among non-Hispanic whites. This is a very general hypothesis, which is appropriate for this study, an exploratory effort to better understand how Chinese Americans express depression symptoms.

Methods

Data Source

This study uses publicly available data from the Collaborative Psychiatric Epidemiology Surveys (CPES) funded by the National Institute of Mental Health (NIMH). This survey joins together three nationally representative surveys: the National Comorbidity Survey Replication (NCS-R), the National Survey of American Life (NSAL), and the National Latino and Asian American Study (NLAAS). The CPES survey population includes adults age 18 and older, living in households in the 48 coterminous United States (NCS-R, NSAL), and the population for the Latino and Asian ancestry groups extend to the State of Hawaii (NLAAS). All three surveys were conducted between 2001 to 2003. Respondents in all three surveys were selected from a four-stage clustered area probability sample of households, with selection using area data from the 2000 US Census. Although each survey has unique features, they share a common core of measurements of primary mental health diagnostic symptoms, symptom severity, and mental health-related service utilization. More details on CPES sample design features are provided by Heeringa et al. (2004).

This study focuses on Chinese American respondents while using non-Hispanic white as a comparison group. The CPES data consist of 600 Chinese Americans from NLAAS, and 7,587 non-Hispanic whites from NCS-R and NSAL. Specifically, the non-Hispanic white subsample from NSAL ($n = 891$) is not considered optimal for descriptive analysis of the white adult population, or comparative analyses between whites and non-black minority groups (Jackson et al. 2004), and is therefore dropped. Also excluded are 2516 non-Hispanic white cases from NCS-R Part I, who did not complete the more in-

depth interview. The sampling design and interview schedule are detailed by Kessler and colleagues (Kessler et al. 2004). The procedure results in a sample of 4,180 non-Hispanic white respondents from NCS-R. The sample used in the factor analysis, after excluding cases with missing values on depression symptoms, consists of 599 Chinese Americans and 4,032 non-Hispanic whites. In the analysis for social correlates of depression symptom dimensions, after excluding cases with missing values on all variables entered in the binary logistic regression models, the sample size is 599 for Chinese Americans (468 for the foreign-born and 121 for the US-born), and 3,749 for non-Hispanic whites⁷.

Measures

DSM-IV Major Depressive Disorder Symptoms. The diagnostic criteria of major depressive disorder include twenty-four questions which could be combined into indicators of nine specific symptoms: depressed mood, decreased interest or pleasure, change in weight or appetite, change in sleep, change in activity, fatigue, concentration, worthlessness/guilt, and suicidality. Specifically, respondents were asked if they had certain symptoms during a depressive episode, defined as the period of several days or longer during which their sadness or discouragement or lack of interest and other

⁷ One (1) US-born Chinese Americans was excluded because of missing values on the four social relational factors. Five hundred and eight-nine (589) non-Hispanic whites were excluded because of missing values on chronic physical conditions (17) or the four social relational factors (268), including 2 cases with missing values on chronic physical condition and all four social relational factors. The 589 non-Hispanic whites who were dropped due to missing values did not differ from the included (3,749) on gender composition, friend support, relative support, and relative conflict. However, the excluded cases have an older average age, a lower proportion of individuals who were married/cohabitating and a higher proportion of being divorces/separated/widowed, a lower proportion of those with a college degree, and a higher level of friend conflict, than the included.

problems were most severe and frequent. The twenty-four questions also could be put into four dimensions, based on existing literature. The four dimensions are: negative affect (seven items of depressed mood, decreased interest or pleasure, and worthlessness/guilt), somatic symptoms (seven items of change in weight or appetite, insomnia or hypersomnia, and fatigue), cognitive symptoms (five items of agitation & retardation and concentration), and suicidality (five items).

Race/ethnicity and generation status. Race/ethnicity was defined using the self-identified primary racial/ethnic identity. Three generation groups were identified among Chinese Americans: foreign-born to foreign-born parents (1st generation), US-born to at least one foreign-born parent (2nd generation), and US-born adults to US-born parents (3rd-or-higher generations).

Chronic physical condition. Respondents were asked if they ever had cancer, headaches, heart disease, high blood pressure, asthma, ulcer, or stroke. Respondents who had at least one of the six conditions were coded as “yes,” and those who did not were coded as “no.”

Social support and conflicts. Social support from friends and relatives was measured separately, each with three questions. Support from friends was measured on a scale consisting of three parallel items that assess how much respondents can rely on friends for emotional support. Scores were z-standardized on the Chinese Americans and non-Hispanic whites combined, with a higher numeric value indicating higher level of friend support. I also examined how much respondents can rely on extended family for emotional support, measured on a scale consisting of three items on how often respondents talk on the phone, get together with relatives, and how often they can rely on

relatives to discuss worries. Scores were z-standardized, with a higher numeric value indicating a higher level of relative support. The answers were “not at all” “little” “some” or “a lot.” In addition, conflict with friends and relatives were assessed separately, each with two questions. Specifically, how often friends or relatives made too many demands of respondents and argue with respondents. The answers were “never” “rarely” “some” or “often.” For friend conflict and relatives conflict, the scores were z-standardized, and a higher numeric value represented a higher level of conflict. All four scores were standardized based on the mean and standard deviation of the sample of Chinese Americans and non-Hispanic whites combined.

Sociodemographic correlates. In regards to the measurement of race/ethnicity, when a respondent identifies with multiple race/ethnicity categories, he or she was assigned to a single category according to priority order in the NSAL and NLAAS respondent classification rules (e.g., Vietnamese over Chinese). Other sociodemographic correlates include gender, age in years, marital status, having a college degree, work status, and family income level. Specifically, marital status was coded in three categories, never married, married/cohabiting, and divorced/separated/widowed. The family income level was computed as the ratio of the household income to the 2001 US Department of Health and Human Services poverty guideline.

Statistical Analysis

All statistical analyses were conducted using Stata 14 (StataCorp. 2015). The statistical analysis of this study consists of two major parts. In the first part, I conduct exploratory factor analysis on all twenty-four items of MDD symptoms, to examine the patterns of depression symptoms for three groups, foreign-born Chinese Americans, US-

born Chinese Americans, and non-Hispanic whites. In the second part, I examine the social correlates of each one of the four dimensions of depression, using logistic regressions. I present the results of the factor analysis on depressive symptom patterns in this section, because it is essentially a measurement issue. Results from the logistic regression analysis are detailed in the results part.

Descriptive Statistics of the Twenty-Four Items. Before conducting the factor analysis, I examine the prevalence of all items across the three groups of interest. As Table 3-1 shows, for all but two items (“weight gain over 10 lbs” and “weight loss over 10 lbs”), the prevalence was lowest among foreign-born Chinese Americans, higher among US-born Chinese Americans, and highest among non-Hispanic whites.

One-way ANOVA results found that for all items but “weight gain over 10 lbs,” the prevalence among foreign-born Chinese Americans is significantly lower than that among non-Hispanic whites. For fourteen of the items, the prevalence among foreign-born Chinese Americans is significantly lower than that among US-born Chinese Americans. Six of the items, “felt depressed” “discouraged about things in life” “lost interest in things” “trouble sleeping” “low energy and tired without work” and “more trouble concentrating” are ones with the highest prevalence for all three groups. Five items, “larger appetite than usual” “slept more than usual” “other notice restlessness” “made suicide plan” and “attempted suicide” are the items with the lowest prevalence for all three groups. In summary, there are variations across the three groups for all items, with the differences between foreign-born Chinese and non-Hispanic whites consistently significant. However, the items with the highest or the lowest prevalence are the same

ones for all three groups. Next I investigate how the latent structure of the items, separately for each group.

Table 3-1. Nine Depression Symptoms Measured by Twenty-Four Questions in DSM-IV.

	Foreign-born Chinese Americans	US-born Chinese Americans	Non-Hispanic whites
% (n)	(468)	(122)	(4,032)
Negative Affect			
Felt depressed most days ^{αβγ}	10.04% (47)	28.86% (34)	35.62% (1,436)
Nothing could cheer you most days ^{αβ}	5.77% (27)	20.49% (25)	23.29% (939)
Discouraged about things in life most days ^{αβ}	9.40% (44)	23.77% (29)	33.28% (1,342)
Felt hopeless about future most days ^β	4.06% (19)	13.93% (17)	22.87% (922)
Lost interest in things you used to think fun ^{αβ}	7.26% (34)	22.95% (28)	28.77% (1,160)
Nothing fun though good things happening ^{αβ}	5.98% (28)	22.13% (27)	26.12% (1,053)
Worthlessness or excessive guilt ^{αβ}	3.63% (17)	15.57% (19)	15.77% (636)
Somatic Symptoms			
Small appetite most days ^{αβ}	6.62% (31)	21.31% (26)	24.55% (990)
Larger appetite than usual most days ^β	.43% (2)	2.46% (3)	5.46% (220)
Weight gain >= 10 lbs	0	0	0
Weight loss >= 10 lbs ^{αβγ}	1.28% (6)	7.38% (9)	0
Trouble sleeping most nights ^β	8.97% (42)	19.67% (24)	27.53% (1,110)
Slept more than usual most nights ^β	.64% (3)	3.28 (4)	6.37% (257)
Low energy and tired w/out work most days ^{αβ}	8.55% (40)	26.23% (32)	31.82% (1,283)
Cognitive Symptoms			
Others notice talk/move more slowly ^{αβ}	2.90% (14)	13.11% (16)	14.01% (565)
Others notice restlessness ^β	.64% (3)	.82% (1)	3.94% (159)
Slow or mix-up thoughts ^{αβ}	6.20% (29)	17.21% (21)	21.25% (857)
More trouble concentrating most days ^{αβ}	8.33% (39)	23.77% (29)	29.64% (1,195)
Unusual indecisiveness ^{βγ}	5.13% (24)	13.93% (17)	24.11% (972)
Suicidality			
Often thought of death ^{αβ}	3.63% (17)	18.03% (22)	21.80% (879)
Would be better if dead ^β	3.21% (15)	11.48% (14)	16.39% (661)
Thought about suicide ^{αβ}	1.71% (8)	9.84% (12)	12.43% (501)
Made suicide plan ^β	.43% (2)	2.46% (3)	4.07% (164)
Attempted suicide ^β	.85% (4)	1.64% (2)	3.143% (126)

^α significant difference between foreign-born and US-born Chinese Americans
^β significant difference between foreign-born Chinese Americans and non-Hispanic white
^γ significant difference between US-born Chinese Americans and non-Hispanic white

Factor analysis. All twenty-four depression symptom items are subject to a common factor analysis separately for each of the three groups. For each group, the eigenvalues of the first ten factors in the factor analysis without rotation are presented in Table 3-2, along with the proportion of variance explained by each factor. Three factors for foreign-born Chinese Americans, four factors for US-born Chinese Americans, and two factors for non-Hispanic whites have eigenvalues greater than 1.0. However, all three groups, the eigenvalue drop drastically after the second factor, and the proportions fall below 10%. For that reason, and for clearer comparison among the three groups of interest, I extracted two factors for each group. I used oblique oblimin rotation because correlated factors are hypothesized (Kim and Mueller 1978).⁸ The summaries of factor analysis for all three groups are presented in Table 3-3. Factor loadings for all items are presented in Table 3-4, with loadings greater than .40⁹ marked in bold. Figure 3-1 is a visual presentation of the factor loadings from the two factors for the three groups separately.

⁸ The results of factor analysis using orthogonal rotation are available on request.

⁹ A general rule of thumb suggests using a cutoff of .40 of for factor loadings.

Table 3-2. Eigenvalues of First Ten Factors from Initial Factor Analysis

	Foreign-born Chinese Americans		US-born Chinese Americans		Non-Hispanic Whites	
	Eigenvalue	Proportion	Eigenvalue	Proportion	Eigenvalue	Proportion
Factor 1	11.37	.66	12.3	.60	10.96	.80
Factor 2	1.99	.12	2.03	.10	1.32	.10
Factor 3	1.25	.07	1.20	.06	.88	.06
Factor 4	.96	.03	1.04	.05	.59	.04
Factor 5	.50	.03	.93	.05	.37	.03
Factor 6	.43	.02	.84	.04	.25	.03
Factor 7	.34	.02	.67	.03	.24	.02
Factor 8	.29	.01	.48	.02	.14	.02
Factor 9	.26	.01	.35	.02	.12	.02
Factor 10	.22	.01	.26	.01	.01	-.02

Table 3-3. Factor Analysis Summary

Foreign-born Chinese Americans			US-born Chinese Americans			Non-Hispanic whites		
	Variance	Proportion		Variance	Proportion		Variance	Proportion
Factor 1	10.79	.62	Factor 1	11.99	.59	Factor 1	10.80	.78
Factor 2	4.48	.26	Factor 2	4.34	.21	Factor 2	4.98	.36
Correlation	Factor 1	Factor 2	Correlation	Factor 1	Factor 2	Correlation	Factor 1	Factor 2
Factor 2	.29		Factor 2	.31		Factor 2	.51	

Principal factor method, oblique oblimin rotation

Table 3-4. DSM-IV MDD Symptoms Factor Analysis

Symptoms	#	Foreign-born Chinese Americans			US-born Chinese Americans			Non-Hispanic whites		
		Factor A1	Factor A2	Uniqueness	Factor B1	Factor B2	Uniqueness	Factor C1	Factor C2	Uniqueness
Negative Affect										
Felt depressed most days	dm1	.93	-.01	.13	.90	.04	.16	.96	-.05	.13
Nothing could cheer you most days	dm2	.74	.16	.36	.85	.14	.18	.76	.07	.36
Discouraged about things in life most days	dm3	.89	.06	.18	.87	.08	.20	.92	-.01	.16
Felt hopeless about future most days	dm4	.62	.28	.44	.75	.13	.37	.70	.19	.35
Lost interest in things you used to think fun	li1	.88	-.02	.24	.87	.09	.18	.88	-.01	.24
Nothing fun though good things happening	li2	.86	.02	.25	.84	.09	.23	.84	-.02	.30
Worthlessness or excessive guilt	wg1	.58	.35	.43	.73	.21	.32	.53	.26	.51
Somatic Symptoms										
Small appetite most days	wa1	.72	.14	.40	.90	-.20	.26	.77	-.06	.46
Larger appetite than usual most days	wa2	.12	.09	.97	-.003	.53	.72	.28	.03	.91
Weight gain >= 10 lbs	wa3	-	-	-	-	-	-	-	-	-
Weight loss >= 10 lbs	wa4	.52	-.19	.75	.58	-.09	.69	-	-	-
Trouble sleeping most nights	ih1	.88	.07	.19	.81	.02	.34	.84	-.08	.36
Slept more than usual most nights	ih2	.11	-.06	.99	.32	.09	.91	.30	.01	.91
Low energy and tired w/out work most days	fa1	.90	.03	.17	.88	.02	.21	.93	.004	.22
Cognitive Symptoms										
Others notice talk/move more slowly	ar1	.44	.31	.63	.77	.04	.38	.59	.02	.65
Others notice restlessness	ar2	.36	-.14	.88	.22	.04	.96	.23	-.10	.94
Slow or mix-up thoughts	cc1	.77	.14	.32	.86	-.04	.27	.76	-.01	.42
More trouble concentrating most days	cc2	.93	-.01	.43	.88	-.01	.24	.92	-.09	.22
Unusual indecisiveness	cc3	.74	.19	.33	.73	.10	.40	.80	-.01	.37
Suicidality										
Often thought of death	sc1	.51	.37	.49	.71	.29	.29	.55	.33	
Would be better if dead	sc2	.45	.57	.32	.41	.57	.36	.36	.56	.35
Thought about suicide	sc3	.15	.81	.25	.42	.56	.36	.19	.71	.33
Made suicide plan	sc4	-.02	.73	.48	-.02	.83	.32	.04	.71	.52
Attempted suicide	sc5	.03	.82	.31	-.09	.85	.32	.07	.66	.60

Principal factor method, oblique oblimin rotation

Among the 468 foreign-born Chinese Americans, Factor A1 accounts for 62 percent of the total variance, with an eigenvalue of 10.79 (Table 3-2).^x Seventeen items, including all seven of the negative affect items, four items of the somatic symptoms (wa1, wa4, ih1, and fa1), four items of the cognitive symptoms (ar1, cc1–3), and two suicidality items (sc1–2), load strongly onto this factor, with loading coefficients ranging from .44 to .93. There is a lack of conceptual unity among these seventeen variables. The second factor is less than half the factor size of Factor A1, explaining only 26% of the total variances, with an eigenvalue of 4.48. Four suicidality items (sc2–4) load strongly onto this factor, with loadings ranging from .57 to .82. It is worth noting that sc2, “thought would be better in dead” loaded strongly to both factors. Together the two factors explain 88 percent of the total variance among the items. The two factors are moderately correlated ($r = .29$).

Among the 122 US-born Chinese Americans, the two factors explain 80 percent of the total variance. The first factor, Factor B1, has a factor size of 59 percent of the total variance, with an eigenvalue of 11.99. Seventeen items—the same one that loads strongly onto Factor A1—also load strongly onto Factor B1, and one suicidality item sc3 “thought about death” with factor loading coefficients ranging from .41–.90. Factor B2 has an eigenvalue of 4.34, and it explains 21 percent of the total variance. Four items (sc2–5) load strongly onto Factor B2. Two of the four items, sc2 and sc3, also load strongly onto Factor B1, with loading coefficients ranging from .56 to .85. The two factors are moderately correlated ($r = .31$). The two factors, Factor B1 and Factor B2, have very

^x The proportions sum to greater than 100 percent because the factors have overlapping explanatory powers.

similar factor structure with Factor A1 and Factor A2, with only one slight difference: item sc3 loads strongly onto Factor A2, for foreign-born Chinese Americans, but it loads strongly onto both Factor B1 and B2.

Among 4,032 non-Hispanic whites, only two factors are extracted. The first one, Factor C1 (78 percent of variation) is strongly correlated with the second one, Factor C2 (36 percent of variation) ($r = .51$). Fifteen items, including seven items of negative affect, three somatic symptoms (wa1, ih1, and fa1), four cognitive symptoms (ar1, and cc1–3), and one suicidality item (sc1), load strongly onto Factor C1. Four suicidality items (sc2–5) load strongly onto Factor C2, with loading coefficients ranging from .56 to .71. In summary, Factor C1 accounts for a mixture of negative affect, somatic symptoms, cognitive symptoms, and suicidality, while Factor C2 accounts for suicidality solely.

By comparing the patterns of the patterns in the three plots of factor loading in Figure 3-1, I can conclude that there are only minor differences in the factor structures of the three groups. The US-born Chinese Americans seem to present a more clustered factor loading pattern (red diamonds in the middle plot), which indicates a slightly tighter and clearer two-factor structure, especially Factor B1 (the clustered on the right end). One other notable variation is the position of one item, wa2 “larger appetite than usual.” It loads strongly onto Factor B2 for US-born Chinese Americans, but does not load strongly onto any factor for the other two groups. Overall, the factor analysis shows factor structural similarity across the three groups.

Originally, for each one of the four depression dimensions, the social correlates of the number of specific symptoms endorsed is examined with the zero-inflate Poisson (ZIP) regression, separately for foreign-born Chinese Americans, US-born Chinese

Americans, and non-Hispanic whites. ZIP regression is used to analyze count models when the sample has an excess of zero counts. The ZIP model consists of two parts, a Poisson count model, and a logit model for predicting excess zeros. Specifically, the coefficients for the count model show the effects of each predictor on the expected number of symptoms, while the statistics for the binary model indicate the effect of each predictor on the probability that an individual will never have any symptoms under one certain dimension. The ZIP results (available upon request) found most significant coefficients in the binary model, very little significance in the count model. Therefore, I decide to use binary logistic regression to analyze, instead of the number of symptoms endorsed under each dimension, if at least one symptom is endorsed. This means the outcome variable is a dichotomous variable, hence the use of binary logistic regression.

I use binary logistic regression to examine the social correlates of the four depressive symptom dimensions created from the factor analysis for Chinese Americans. I used the CPES supplied weighting in all analytical procedures to adjust for the study's complex sampling methods using the "svy" command. Consequently, multivariate significance testing uses Wald χ^2 tests based on coefficient variance-covariance matrices that adjusted for design effects using the Taylor's series linearization method. To examine any differences of sociodemographic characteristics and depression symptom dimensions by the three groups, I conduct Rao-Scott chi-square test (Rao and Scott 1984), a design-adjusted version of the Pearson chi-square test for categorical factors (four depression dimensions, gender, marital status, having college degree, and having any chronic physical condition), and weighted linear regression for continuous factors (age, friend support, relative support, friend conflict, and relative conflict).

Results

I examine the social correlates of the dimensions of depression. Given the similarity of the factor analyses among the groups and the lack of clear conceptual distinctions among the dimensions, I chose not to use the factor analysis results for the analysis of social correlates. Instead I use four conceptually-defined dimensions of depression for my analysis of social correlates: negative affect, somatic symptoms, cognitive symptoms, and suicidality among Chinese Americans. These are valid and distinctive dimensions, conceptually and practically. They affect quality of life of individuals differently, and call for different treatment and coping mechanisms. Therefore, I investigate how some of the demographic and social factors are associated with each of the four dimensions among Chinese Americans.

Weighted descriptive statistics of the four depression dimensions and sociodemographic factors for foreign-born Chinese Americans, US-born Chinese Americans, and non-Hispanic whites are presented in Table 3-5. The presented p-values indicate whether the variable differ significantly across the three groups, while the significance of the pairwise comparisons are indicated with superscripts.

The proportions of people negative affect, somatic symptoms, cognitive symptoms, and suicidality vary significant across three groups. Specifically, for all four depression dimensions, the proportions among foreign-born Chinese Americans are significantly lower than those among US-born Chinese Americans, and significantly lower than those among non-Hispanic whites. The differences between US-born Chinese Americans and non-Hispanic whites are not significant.

US-born Chinese Americans have the lowest average age (40.00), which is significantly lower than that of foreign-born Chinese Americans (43.70) and non-Hispanic whites (46.64). The average ages of the foreign-born Chinese Americans and non-Hispanic whites are not significantly different. There is no significant gender composition difference across the three groups. Foreign-born Chinese Americans have a much higher proportion (74.68%) of the married or cohabitating, and much a lower proportion of the divorced/separated/widowed, than US-born Chinese Americans (47.20% and 17.20%) and the non-Hispanic whites (61.21% and 19.32%). The marital status composition varies significantly across the three groups. Also, foreign-born Chinese Americans (42.72%) and US-born Chinese Americans (50.37%) are significantly more likely to have a college degree than the non-Hispanic whites (26.64%).

The prevalence of any chronic physical condition is much higher in non-Hispanic whites (49.95%) than it is for foreign-born (26.81%) or US-born (39.03%) Chinese Americans. Foreign-born Chinese Americans have significantly a significantly lower level of friend support (-.65) and a significant lower level of relative support (-.60) than do US-born Chinese Americans (.09 and -.01, respectively) and non-Hispanic whites (.09 and .10, respectively). US-born Chinese Americans have much higher levels of friend conflict (-.25) or relative conflict (.17) than foreign-born Chinese Americans (-.05 and -.04, respectively) and non-Hispanic whites (-.06 and -.12, respectively). In the next step of analysis, I explore how each of these demographic and social relational factors are associated with the four depression dimensions for each group.

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Table 3-5. Weighted Descriptive Statistics of Sociodemographic Characteristics

	Foreign-born Chinese American n = 468	US-born Chinese American n = 121	Non-Hispanic White n = 3794
any negative affect ^{aβ}	10.06% (.02)	25.47% (.04) <i>p</i> < .001	25.05% (.01)
any somatic symptoms ^{aβ}	9.74% (.02)	25.47% (.04) <i>p</i> < .001	24.76% (.01)
any cognitive symptoms ^{aβ}	8.14% (.02)	22.21% (.04) <i>p</i> < .001	22.35% (.01)
any suicidality ^{aβ}	4.09% (.01)	14.99% (.03) <i>p</i> < .001	16.64% (.01)
age ^{βγ}	43.70 (1.23)	40.00 (2.09) <i>p</i> < .05	46.64 (.56)
gender			
female	54.20% (.02)	49.83% (.04)	51.51% (.01)
male	45.80% (.02)	50.17% (.04)	48.49% (.01)
		<i>not significant</i>	
marital status ^{aβγ}			
never married	15.53% (.02)	35.61% (.07)	19.47% (.01)
married/cohabitating	74.68% (.03)	47.20% (.09)	61.21% (.01)
divorced/separated/widowed	9.79% (.02)	17.20% (.05) <i>p</i> < .001	19.32% (.01)
having college degree ^{aβ}	42.72% (.04)	50.37% (.05) <i>p</i> < .001	26.64% (.01)
any chronic conditions ^{aβ}	26.81% (.03)	39.03% (.05) <i>p</i> < .001	49.95% (.01)
friend support (z) ^{aβ}	-.65 (.06)	.09 (.08) <i>p</i> < .001	.09 (.02)
relative support (z) ^{aβ}	-.60 (.06)	-.01 (.12) <i>p</i> < .001	.10 (.02)
friend conflict (z) ^{βγ}	-.05 (.06)	.25 (.08) <i>p</i> < .01	-.06 (.02)
relative conflict (z) ^{βγ}	-.04 (.05)	.17 (.10) <i>not significant</i>	-.12 (.02)

^a significant difference between foreign-born and US-born Chinese Americans
^β significant difference between foreign-born Chinese Americans and non-Hispanic white
^γ significant difference between US-born Chinese Americans and non-Hispanic white

Table 3-6. Weighted Logistic Regression on Four Dimensions of Depression Among Foreign-born Chinese Americans

	Model 1-1 Negative Affect	Model 1-2 Somatic Symptoms	Model 1-3 Cognitive Symptoms	Model 1-4 Suicidality
age	.05 (.07)	.05 (.07)	-.02 (.07)	-.03 (.11)
age^2	-.0003 (.0007)	-.0003 (.0007)	.0002 (.0007)	.001 (.001)
female (vs. male)	.37 (.32)	.35 (.33)	.28 (.35)	.35 (.52)
married/cohabitating (vs. never married)	-.95 (.60)	-.90 (.63)	-.59 (.66)	-.50 (1.10)
divorced/separated/widowed (vs. never married)	.92 (.88)	-1.24 (.93)	-.56 (1.06)	-1.54 (1.46)
college degree	.24 (.48)	.25 (.50)	.17 (.48)	.28 (.64)
chronic conditions	1.04** (.32)	1.13** (.32)	.99* (.37)	.83 (.63)
friend support (z)	.32 (.17)	.34 (.18)	.11 (.24)	.06 (.26)
relative support (z)	-.21 (.18)	-.22 (.19)	-.07 (.18)	-.0002 (.32)
friend conflict (z)	.47 (.21)	.49 (.22)	.005 (.25)	.47 (.32)
relative conflict (z)	.47* (.21)	.49* (.22)	.31 (.26)	.12 (.41)
constant	-3.65 (1.57)	-3.63 (1.62)	-2.28 (1.33)	-3.33 (2.05)

n = 468

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

The results of the weighted binary logistic regression models among foreign-born Chinese Americans (n = 468) are presented in Table 3-6. The four models, Model 1-1, 1-2, 1-3, and 1-4, are fitted to examine how the demographic and social factors are correlated with each one of the four depression dimensions. In Model 1-1, foreign-born Chinese Americans who have at least one chronic physical condition ($\beta = 1.04, p < .01$) are more likely to have any negative affect than those without. A higher level of relative conflict ($\beta = .47, p < .05$) is also related to a greater chance of having negative affect.

Similarly, the two factors are significant in Model 1-2. Among US-born Chinese Americans who have at least one chronic physical condition ($\beta = 1.13, p < .01$) are more likely to have any somatic symptoms than those without. A higher level of relative conflict ($\beta = .49, p < .05$) is also associated with a higher probability of having any

somatic symptoms. In Model 1-3, having any chronic physical conditions is the only significant predictor, with those having at least one chronic physical conditions associated with a higher likelihood of having any cognitive symptoms ($\beta = .99, p < .05$). Model 1-4 does not find any significant predictors for suicidality. In summary, having any chronic physical conditions is significantly associated with three of the four depression dimensions: negative affect, somatic symptoms, and cognitive symptoms. Relative conflict is associated with two of the dimensions: negative and somatic symptoms.

Table 3-7. Weighted Logistic Regression on Four Dimensions of Depression Among US-born Chinese Americans

	Model 2-1 Negative Affect	Model 2-2 Somatic Symptoms	Model 2-3 Cognitive Symptoms	Model 2-4 Suicidality
age	-.18 (.09)	-.18 (.09)	-.11 (.10)	.02 (.11)
age^2	.002 (.001)	.002 (.001)	.0003 (.001)	-.001 (.001)
female	1.83** (.52)	1.83** (.52)	2.07*** (.48)	1.86** (.52)
married/cohabitating (vs. never married)	-1.27 (1.19)	-1.27 (1.19)	-1.43 (1.39)	-1.43 (.97)
divorced/separated/widowed (vs. never married)	1.81 (.98)	1.81 (.98)	2.23 (1.30)	.97 (1.14)
college degree	1.35** (.42)	1.35** (.42)	.98* (.45)	.15 (.61)
chronic conditions	1.32* (.53)	1.32* (.53)	1.27* (.70)	.68 (.75)
friend support (z)	-.14 (.31)	-.14 (.31)	-.67* (.30)	-.39 (.38)
relative support (z)	.01 (.24)	.01 (.24)	.07 (.27)	.28 (.26)
friend conflict (z)	.09 (.29)	.09 (.29)	.20 (.34)	-.45 (.35)
relative conflict (z)	.75 (.36)	.75 (.36)	.67 (.40)	.68 (.37)
constant	.59 (1.60)	.59 (1.60)	-.05 (1.86)	-2.65 (2.43)

n = 121
* $p < .05$, ** $p < .01$, *** $p < .001$

The results of the weighted binary logistic regression models among US-born Chinese Americans (n = 121) are presented in Table 3-7. Three factors are significantly associated with having any negative affect among foreign-born Chinese Americans, in

Model 2-1. Specifically, among foreign-born Chinese Americans, women ($\beta = 1.83, p < .01$) are more likely than men to have any negative affect. Those with a college degree ($\beta = 1.35, p < .01$) are more likely than those without to have any negative affect. In addition, those with any chronic physical conditions ($\beta = 1.32, p < .05$) are more likely than those without to have any negative affect. The same three factors are also significant predictors of somatic symptoms among US-born Chinese Americans, in Model 2-2, with identical regression coefficients. This is because the 31 respondents with at least one negative affect symptom are the exactly same ones with at least one somatic symptom; the specific numbers of their symptoms for the two dimensions do vary (data available upon request). In Model 2-3, among US-born Chinese Americans, women ($\beta = 2.07, p < .001$) are more likely than men to have at least one cognitive symptom. Having a college degree ($\beta = .98, p < .05$) and having any chronic physical conditions ($\beta = 1.27, p < .05$) are associated with more cognitive symptoms. In addition, a lower level of friend support ($\beta = -.67, p < .05$) is associated with a higher likelihood of having any cognitive symptoms. In Model 2-4, gender is the only significant predictor of suicidality among US-born Chinese Americans, with women ($\beta = 1.86, p < .01$) more likely than men to have any suicidality symptoms. In summary, female is the only variable that is associated with all four depression dimensions. Having a college degree and having any chronic physical conditions are associated with three dimensions: negative affect, somatic symptoms, and cognitive symptoms. Friend support is only significantly associated with cognitive symptoms.

Table 3-8. Weighted Logistic Regression on Four Dimensions of Depression Among Non-Hispanic Whites

	Model 3-1 Negative Affect	Model 3-2 Somatic Symptoms	Model 3-3 Cognitive Symptoms	Model 3-4 Suicidality
age	.10*** (.02) -.001***	.10*** (.02)	.11*** (.02)	.10*** (.02) -.001***
age^2	(.0002)	-.001*** (.0002)	-.001*** (.0002)	(.0002)
female	.51*** (.09)	.53*** (.08)	.51*** (.09)	.55*** (.08)
married/cohabitating (vs. never married)	-.42** (.14)	-.41** (.15)	-.41** (.14)	-.46** (.14)
divorced/separated/widowed (vs. never married)	.20 (.16)	.21 (.16)	.22 (.15)	.13 (.17)
college degree	-.04 (.09)	-.03 (.09)	-.10 (.08)	-.14 (.09)
chronic conditions	.76*** (.08)	.77*** (.09)	.78*** (.09)	.77*** (.11)
friend support (z)	-.02 (.06)	-.02 (.06)	-.0002 (.04)	-.02 (.06)
relative support (z)	-.16*** (.04)	-.16*** (.04)	-.18*** (.04)	-.22*** (.04)
friend conflict (z)	-.002 (.04)	-.002 (.04)	.04 (.05)	.01 (.05)
relative conflict (z)	.21*** (.04)	.21*** (.04)	.21*** (.04)	.23*** (.05)
constant	-3.20 (.38)	-3.24 (.37)	-3.46 (.37)	-3.20 (.38)
n = 3,749				
* $p < .05$, ** $p < .01$, *** $p < .001$				

Table 3-8 shows the results from the weighted logistic regression of four depressive dimensions on social correlates among non-Hispanic whites. Six factors, age, gender, being married or cohabitating, having chronic physical conditions, relative support, and relative conflict, are significantly associated with all four depression dimensions. In Model 3-1, age ($\beta = .10, p < .001$) and its quadratic term ($\beta = -.001, p < .001$) are significantly associated with any negative affect, and the age effect is in a reversed U-shape. Women ($\beta = .51, p < .001$) are more likely than men to have negative affect. Those who are married or cohabitating ($\beta = -.42, p < .01$) are less likely than those who are never married to have any negative affect. Those with any chronic physical conditions ($\beta = .76, p < .001$) are more likely than those without to

have any negative affect. A higher level of relative support ($\beta = -.16, p < .01$) is related to a lower likelihood of having any negative effect, while a higher level of relative conflict ($\beta = .21, p < .001$) is associated with a higher likelihood of having any negative affect. These six factors are also significantly associated with the other three dimensions, with very similar regression coefficients.

Discussion

This study finds little differences in depression symptom patterns but clear variation in the social correlates to the four depression dimensions across the three ethnocultural groups, foreign-born Chinese Americans, US-born Chinese Americans, and non-Hispanic whites. Factor analysis revealed very little difference in depression symptoms among the three groups. Four of the suicidality items, “thought would be better if dead” “thought about suicide” “made suicide plan” and “attempted suicide” load strongly onto a factor while the rest load strongly onto another factor. In other words, for all three groups, these four items these four items seem to form a distinct construct. Several measurements of depression, including CES-D and PHQ-9 exclude suicidality as a major dimension, or include only one or two items. Some researchers distinguish suicidal ideation from depression; instead of treating suicidal ideation as a depression symptom or dimension, they consider the former a result of the latter, and therefore examine depression and other mental disorders as a risk factors (e.g., Nock et al. 2008). It seems, according to the finding of the present study, that suicidality should be considered as a distinct concept. Given that suicidal ideation and attempts tend to have more serious and immediate life-threatening outcomes, at the very least, sub-analysis should be conducted on this dimension of depression symptoms.

Although the finding of the present study, namely, very little cultural difference in depression symptom pattern, seems to endorse the reliability of the DSM-IV diagnostic criteria, it is crucial to note the lack of measurement on positive affect and interpersonal relationships. Since these two dimensions of depression have been confirmed to be an expression of impaired mood in different groups (Joiner and Timmons 2002; Klerman and Weissman 1994), not including in diagnostic criteria or screening tests would be problematic. By not measuring these two dimensions, is DSM-IV underdiagnosing depression among Chinese Americans and other cultural groups? This is a question that future research needs to answer.

Another major finding of this study is that there are differences in the social correlates of the depression dimensions across the three groups: foreign-born Chinese Americans, US-born Chinese Americans, and non-Hispanic whites. Table 3-6, 3-7, and 3-8 show clear difference in which factors are significantly associated with one or more depression dimensions. Only two factors, having any chronic physical conditions and relative conflict are significantly predictors of one or more depression dimensions for foreign-born Chinese Americans in Table 3-6. Four factors, gender, having college degree, having any chronic physical conditions, and friend support are significantly associated with one or more depression dimensions for US-born Chinese Americans in Table 3-7. Six factors, age, gender, marital status, having any chronic physical conditions, relative support, and relative conflict are significant predictors of one or more depression dimensions for non-Hispanic whites in Table 3-8.

Because the goal of this study is to examine if there are any variation of social correlates across the three groups, I do not discuss the effects of each variable and how

they changed across the three groups. Nor is there any clear major trend in the effects of the factors, as far as I am concerned. However, I note the findings that are interesting and worth further examination in future research.

First, chronic physical condition is the only significant predictor of depression dimensions for all three groups, and the associations are all positive, with having any chronic physical conditions associated with a higher probability of having certain depression dimension. However, it is not significantly associated with suicidality for the two Chinese American groups. To the best of my knowledge, no study has specifically examined the association between chronic physical condition and suicidality among Chinese Americans specifically. One study of Asian Americans (including Chinese Americans) found that the presence of chronic physical condition was a significant predictor for suicide ideation, but only among men (Cheng et al. 2010). In a study of rural residents in China, the effects of physical condition on suicidal ideation or attempt is significant even after socioeconomic factors and other covariates were controlled for (Jia et al. 2014). Researchers studying suicide in China have argued that the rapidly increasing costs of medical health care and the low insurance coverage in China may make some people with chronic illness prefer to end their lives rather than adding to the family financial and emotional burden (Phillips, Liu, and Zhang 1999).

Secondly, previous findings have found that suicidal ideation or attempt is associated with female gender, marriage dissolution (Cheung et al. 2006), unemployment, financial restraints, and low social support (Chen et al. 2006) among Chinese samples in Hong Kong. A study of Asian Americans found significant effects of gender, marital status, and income level on suicidal behaviors, but only among US-born respondents

(Duldulao et al. 2009). Other than the significant gender difference of suicidality among US-born Chinese Americans, the present study fails to find other significant effects on suicidality for Chinese Americans. This could be due to differences in the measurement of suicidal ideations and sample compositions.

Last but not least, one interesting finding of the present study is that there is little difference in the social correlates for different depression dimensions within each group. For the non-Hispanic whites, the four dimensions have the almost the same size significant predictors, and the coefficients for each predictor are very similar across the four dimensions. This indicates that the depression dimensions measured by DSM-IV are very similar in terms of etiology, especially for the non-Hispanic whites.

For foreign-born and US-born Chinese Americans, negative affect and somatic symptoms have the exact same significant predictors, with very similar coefficients (even identical for the US-born). Cognitive symptom and suicidality have slightly different coefficient with the former two dimensions. Specifically regarding cognitive symptoms, the difference from the other two dimensions, negative affect and somatic symptoms lies in the effect of relative conflict and friend support. For foreign-born Chinese Americans, relative conflict is significantly associated with the first two dimensions, but not with cognitive symptoms, which suggests that although relative conflict might be a significant predictor of depression among foreign-born Chinese Americans, the distress caused by relative conflict mainly manifests in negative thoughts and somatic symptoms, not cognitive dysfunctions or suicidal thoughts or acts. For US-born Chinese Americans, friend support is only significantly associated with cognitive symptoms and no other dimensions. It is worth noting that friend support is not

significantly associated with any dimensions for either foreign-born Chinese Americans or non-Hispanic whites. In addition to highlighting the importance of friend support for US-born Chinese Americans, this finding suggests that support from friends, which includes communication on the phone and in person to discuss worries, could help prevent or decrease cognitive impairments.

Important implications could be derived from the present study. The obvious difference between foreign-born Chinese Americans, US-born Chinese Americans, and non-Hispanic whites in terms of social correlates indicate that clinicians need to take into account the sociocultural factors of patients when making diagnosis and suggesting treatments. In addition, psychiatrists, psychologists, or other mental health service providers should offer treatment and coping suggestions based on the specific symptom dimensions of patients, and patient's ethnocultural background. For example, if a first-generation Chinese immigrant patient reports a lot of somatic symptoms and at the same time a high level of conflicts with relatives, the psychiatrist should help patients make sense of the conflicts in talk or behavioral therapy, and suggest the patient make it a priority to address the relative conflicts. If a US-born Chinese American patient is showing agitation or other cognitive symptoms, the psychiatrist should encourage greater communication with friends.

This study is not without limitations. First and foremost, because of the lack of measurement on positive affect and interpersonal symptoms in DSM-IV diagnostic criteria, I was unable to examine the role of these two dimensions in the entire depressive patterns, or their social correlates. Previous findings suggest significant difference in these two dimensions between cultural groups. Furthermore, this study only examined

symptoms in the DSM-IV measurement for depressive episode and disorder. The lack of distinct symptom pattern of Chinese Americans compared to non-Hispanic white is not a full endorsement of depression as a universal and uniform experience. And the differences in the social correlates across foreign-born Chinese Americans, US-born Chinese Americans, and non-Hispanic white exactly suggest cultural influence on the etiology and epidemiology of depression. In addition, the groups of foreign-born Chinese Americans, US-born Chinese Americans have drastically smaller sample size than that of non-Hispanic whites, which could be the reason that I found much fewer significant predictors for the first two groups than for the non-Hispanic white group. The much larger sample size of non-Hispanic whites could mean much smaller standard error, and hence a coefficient that is not significant for foreign-born Chinese Americans or US-born Chinese Americans might be significant for non-Hispanic whites. In unweighted analysis of simple survey data, projected Wald chi-square could be calculated to project the result of the significant testing for the smaller group if it had the same sample size as the larger group. Specifically, the projected Wald chi-square could be calculated using the following formula:

$$\text{Wald } \chi^2 = \left[\frac{b}{\left(\frac{s.e. \times \text{degree of freedom of smaller sample}}{\text{degree of freedom of larger sample}} \right)} \right]^2$$

However, current literature is unclear on whether the projected Wald chi-square test could be applied to weighted analysis for complex survey designs, as is the same in this dissertation.

Findings of the present study provide suggestions for future research. Cultural norms regarding depression and social stigma have been theorized and hypothesized to affect the expression of depressive symptoms, yet there have been very few empirical studies that test such effects, largely due to the difficulty in operationalizing stigma and cultural norm. Findings from a few previous studies (Fogel and Ford 2005; Okazaki and Kallivayalil 2002) shed light on this topic, which merit future research. In addition, the notion of Western *psychologization* has been used as the opposite of Chinese *somatization* in cross-cultural studies that involves Chinese populations. Kleinman (1985) pointed out that psychologization is a product of the cultural transformation, shaped by modernism. The “affect” we perceive or even experience were actually defined as deep feelings and “rationalized into discretely labeled emotions... that previously were regarded and felt as principally as principally bodily experiences” (Kleinman 2004:434–435). In this way, Kleinman connected psychologization and somatization. The prevalence and the effects of these two opposite forces are still under debate. Although most studies have been more focused on understanding somatization, Kleinman argued that both are social and cultural constructs, and that given the empirical finding of the ubiquity of somatic experience worldwide, Western psychologization may be the cultural-specific dimension of depression to which studies should pay special attention.

Conclusion

The findings of this study found very similar factor structures of DSM-IV depressive symptoms among foreign-born Chinese Americans, US-born Chinese Americans, and non-Hispanic whites. For all three groups, suicidal ideation or attempt is a construct that is distinct from the rest of the symptoms items. The three groups have

different social correlates, yet there are only minor differences in the social correlates for each one of the four depression dimensions within each group. Age is significantly associated with all four dimensions for non-Hispanic whites, but not significant for Chinese Americans. The female preponderance is found for all four dimensions among US-born Chinese Americans and non-Hispanic whites. Having college degree is a unique predictor of negative affect, somatic symptoms, and cognitive symptoms, but for US-born Chinese Americans only. Non-Hispanic whites who were married or cohabitating differs significantly from those never married on negative affect, somatic symptoms, and cognitive symptoms.

Chronic physical condition is the most consistently significant predictor, for the negative affect, somatic symptoms, and cognitive symptoms among the two Chinese groups, and for all four dimensions of depression among non-Hispanic whites. In addition, relative support is significantly associated with all four dimensions for non-Hispanic whites. Relative conflict is a significant predictor for negative affect, somatic symptoms, and cognitive symptoms among foreign-born Chinese Americans, and it is significantly associated with all four dimension for non-Hispanic whites.

CHAPTER 4

**COMPLEMENTARY AND ALTERNATIVE MEDICAL SERVICE USE FOR
MENTAL HEALTH PROBLEMS AMONG CHINESE AMERICANS:
THE EFFECT OF ACCULTURATION-RELATED FACTORS**

Introduction

Complementary and alternative medicine (CAM) has been defined as “medical interventions not taught widely at U.S. medical schools or generally available at U.S. hospitals” (Eisenberg et al. 1993:246). They are, in a sociological perspective, “practices that are not in conformity with the standards of the medical community” (Eisenberg et al. 1993:246). CAM use among US adults substantially increased in the 1990s, and has remained stable for the past decade (Barnes et al. 2008; Eisenberg et al. 1998; Tindle et al. 2005). According to data from the 2012 National Health Interview Survey, approximately one third of US adults had used some type of CAM in the past twelve months (Clarke et al. 2015). Researchers have proposed several speculative explanations for the rising popularity of CAM, including

- 1) dissatisfaction with conventional Western medical service (as delivered by psychologists, psychiatrists, etc.) due to a growing emphasis on chronic illness in an aging population,
- 2) financial and language barriers to conventional services in a multi-cultural society,
- 3) a societal change towards postmodernism, individualism, and holistic philosophy of health, which entails a decline in the acceptance of traditional authority and a desire for greater autonomy and control over medical decision making, and

- 4) marketing forces of local CAM providers and insurance companies, the rise of the Internet, as well as the transmission of “foreign” CAM therapies due to globalization and migration (Astin 1998; Barnes et al. 2004; Coulter and Willis 2004).

However, researchers have found it hard to operationalize broad concepts such as “postmodern thesis” “holistic philosophy of health” and “trend of globalization” in empirical studies, which, in addition to other conceptual and methodological difficulties, limited our understanding of the prevalence, predictors, and patterns of CAM use.

One way to overcome some of the challenges is to “divide and conquer:” to examine one concept or one set of factors within one specific population. Therefore, this current study focused on the effects of acculturation-related factors on CAM use among Chinese Americans. Acculturation is generally defined “as the process by which individuals adopt the attitudes, values, customs, beliefs, and behaviors of another culture” (Abraido-Lanza et al. 2006:1342). Specifically in the context of CAM use, the concept of acculturation encompasses various barriers to conventional treatment, culturally based beliefs about health and medicine, and immigration-related factors. Therefore, it serves as the lens for a panoramic view of the issue at hand.

Research over the past three decades suggests that Asian immigrants, like other racial/ethnic minorities, are less likely than non-Hispanic white Americans to utilize health care services in general (see review article Mayberry, Mili, and Ofili 2000), and mental health-related services specifically (Harris, Edlund, and Larson 2005), even when psychiatric disorder prevalence was controlled for (Wang et al. 2005). Even among those who met the diagnostic criteria for mental disorders, the rate of using any service among

Asian Americans lags behind that of non-Hispanic whites (U.S. Department of Health and Human Services 2001). This well-documented underutilization of mental health services among Asian Americans “breeds the myth that Asian Americans are the so-called model minority and glosses over their mental health needs” (Kung 2003:110).

With four million people, Chinese American is the largest Asian group in the US, according to the 2010 US Census (Hoeffel et al. 2012). However, the literature on the mental health-related help-seeking behaviors among Chinese Americans is limited in several aspects, including the frequent use of regional community samples or college student samples, examining Asian Americans as one pan-ethnic group, and inconsistent findings on the effects of several factors including age and having health insurance, which I will discuss more in the literature review session. In addition, previous studies have yet to provide a clear demonstration of acculturation effects, especially generational differences, in the patterns of mental health service use among Chinese Americans. Although complex and nuanced effects of acculturation-related factors on the use of CAM and other mental health services have been suggested, stronger empirical evidence is much needed. Furthermore, since the acculturation phenomena results from the conjunction of two or more cultures, research on acculturation has to be comparative (Berry 1990). So far, few studies have directly compared Chinese Americans to non-Hispanic whites. Considering that non-Hispanic whites comprise the majority of the US population, such a comparison is critical for understanding the sociocultural aspects of behavioral health and informing mental health service planning in a multicultural and multi-ethnic society.

The process of migrating to a new country and adjusting to a new environment has complicated effects on the levels of distress among migrants and their access to and compliance with mental health treatment (Tabora and Flaskerud 1994). At the time of the 2010 Census, over 76 percent of Chinese Americans were foreign-born (Hoeffel et al. 2012), which means Chinese cultural values and beliefs are very likely to be prominent among the majority of Chinese Americans. It is therefore important that we understand how immigration and acculturation influences the help-seeking behaviors of this population.

In this study, I explore two research questions. First, how do Chinese Americans differ from non-Hispanic whites in their use of CAM relative to the conventional Western medical services? Second, what acculturation-related, sociodemographic, and health-related factors are associated with CAM use among Chinese Americans? To address the limitations of the previous literature, I use a nationally-representative sample of Chinese Americans, make comparisons between Chinese Americans and non-Hispanic whites, and examine the effects of multiple acculturation-related factors, sociodemographic characteristics, and other mental health-related factors on CAM use.

Literature Review

Mental Health Service Use among Chinese Americans

Empirical studies of mental health service use among Chinese Americans confirm the general trend of underutilization among racial/ethnic minorities. For example, using archival data from the Mental Health Division of Hawaii's Department of Health, Leong (1994) found that while the overall usage of mental health service is at a very low rate, Chinese American respondents (0.02%) used inpatient mental health facilities at a rate

less than one third that among the non-Hispanic white respondents (0.07%). Similarly, the former's (0.11%) utilization of outpatient facilities is only about one-quarter the rates among the latter (0.41%). In a Canadian study, Tiwari and Wang (2008) found that only 2.5% of Chinese immigrants had talked to a health professional about their emotional or mental health conditions, again, much lower than that among white Canadians (9.8%). Note that the prevalence rates vary significantly across studies because of the varying scope of service sectors examined.

Research also found significant heterogeneity of mental health service use within the populations of Asian or Chinese Americans. Several significant predictors include being female (Tata and Leong 1994), having a psychiatric disorder (Spencer and Chen 2004), and perceived discrimination (Spencer et al. 2010). Studies also found elevated likelihood of using any mental health service to be associated with being a US citizen (Jang, Lee, and Woo 1998), being US-born, higher generation (Abe-Kim et al. 2007; Le Meyer et al. 2009), better English proficiency (Kim et al. 2011), and high acculturation scores (Kung 2004).

Several limitations exist in these studies. First, from a methodological point of view, the use of regional community samples, or convenience samples of college students undermines the generalizability of the results. Secondly, many studies examined Asian Americans as one pan-ethnic group, and controlled for Asian ethnicity in their analyses (e.g., Abe-Kim et al. 2007; Kim et al. 2011). This is not enough to fully demonstrate the potentially unique pattern of service use for each Asian ethnic group. Given the unique immigration experience and cultural background of Chinese Americans, it is important to

examine a nationally representative sample of this particular ethnic group, which was not done in previous studies.

The third limitation concerns the demonstration of an acculturation effect. There seems to be a gap between the two bodies of literature, the one comparing Chinese Americans to the non-Hispanic whites, and the other examining variation among Chinese Americans. Studies in the latter body of literature found significant generational difference in mental health service use, while studies of the first type did not distinguish generational status of Chinese Americans at all. The acculturation literature suggests that “the behaviors and values of the later generations are much more similar to those of white-Americans than are those of their own parents or grandparents” (Leong 1986:198). Two comprehensive reviews of literature on immigration and assimilation, twenty-five years apart, have both supported this theory (Massey 1981; Waters and Jiménez 2005). Applying this perspective to mental health service use, one would expect greater similarity between higher generation immigrants and non-Hispanic whites than between more recent immigrants and the comparison group. Therefore, comparing different generations of Chinese Americans directly to the non-Hispanic whites would generate a clear demonstration of acculturation effects. The results would also help us identify the high-risk group, the sub-population in which “underutilization” is most acute (Abe-Kim et al. 2007).

CAM Use and Conventional Western Medical Service

While trying to differentiate individuals who use mental health service from those who do not, researchers have also come to question “whether ‘use’ is a homogeneous category” (Pescosolido et al. 1998:284). There are a wide range of sources from which

people may seek help for their mental health problems, from conventional Western health care services such as psychiatrists and psychologists, to complementary and alternative medical practitioners such as acupuncturists and chiropractors, each type with distinctive underpinnings of treatment and clientele. With the increasing popularity of CAM use in the past two decades, a growing body of literature has accumulated on the prevalence and predictors of CAM use in the US.

Several sociodemographic factors were consistently found to be associated with higher CAM use, including being female (Wolsko et al. 2002), a higher level of educational attainment (Barnes et al. 2004), higher income (Tindle et al. 2005), and poor health status (Rafferty et al. 2002). Less consistent were the findings on the effects of age and having health insurance, as well as the racial/ethnic disparities. Elevated level of CAM use was found to be associated with younger age (Wang, Kennedy, and Wu 2015), middle age (Clarke et al. 2015), and older age (Oldendick et al. 2000). Mackenzie and colleagues (2003) found the uninsured were more likely to use CAM than those with insurance, while Clarke et al. (2015) reported the highest level of CAM use among those with private health insurance, followed by the uninsured and then those with public insurance. Such inconsistency is likely due to differences in sample frame (national *versus*. limited geographic areas), and measurements of CAM use (i.e., types of CAM therapies included). In addition, although some studies found a higher rate of CAM use among non-Hispanic whites than that among Hispanics and non-Hispanic blacks (e.g., Clarke et al. 2015; Graham et al. 2005), other study results showed more complex and nuanced racial/ethnic disparities. For example, using data from the 2002 National Health Interview Survey, Tindle et al. (2005) found that the rate of CAM use among non-

Hispanic whites was slightly lower than that among the “non-Hispanic other.”

Furthermore, Kronenberg et al. (2006) found that socioeconomic factors accounted for the underutilization of CAM therapies among Mexican American women, but not for African American or Chinese American women, compared to their non-Hispanic white counterparts. Therefore, it is necessary to distinguish specific racial/ethnic groups, and to take into account the effects of sociodemographic factors on CAM use.

One salient issue regarding the study of CAM use is whether it is a replacement for or a complement to conventional Western medical services (Druss and Rosenheck 1999). Because alternative treatment such as herbal medicines could cause drug interactions with conventional Western medical treatment with potentially serious clinical consequences (Izzo and Ernst 2012), it is imperative that we understand how various types of remedies are utilized in relation to one another (Silverstein and Spiegel 2001). So far, the findings of the role of CAM in affecting the use of other sectors of mental health services among the general US population are conflicting (Berthold et al. 2007; Druss and Rosenheck 1999; U.S. Department of Health and Human Services 2001). Most of the studies focused on specialty mental health service (e.g., psychiatrists and psychologists), or conventional Western medicine in general (e.g., specialty mental health service, primary care). Le Meyer et al. (2009) summarized the two competing hypotheses as (a) the *facilitation hypothesis*, that the use of other types of services are positively associated with the use of specialty mental health services, versus (b) the *inhibition hypothesis*, that the use of other types of services inhibits the use of specialty mental health services. Several studies found support for the facilitation hypothesis among the general US population (Druss and Rosenheck 1999; Kessler et al. 2001), and Asian

Americans (Berthold et al. 2007; Le Meyer et al. 2009), as well as Chinese Americans (Ma 1999). In contrast, other researchers found that Asian Americans prefer nonprofessional services such as self-help group or traditional Chinese medicine to conventional Western mental health professionals (Chu, Hsieh, and Tokars 2011; Yang et al. 2009). Some researchers argued that people use CAM therapies in lieu of conventional Western medical services because the former are more empowering, offer more personal autonomy to patients, and acknowledged better “the role of nonphysical (mind/spirit) factors in creating health and illness” (Astin 1998:1548), while the latter was viewed as “impersonal, costly, inconvenient, unavailable, or inaccessible” (Murray and Rubel 1992:62). This perspective suggests a competing relationship between CAM therapies and conventional Western medicine, and is supported by several studies (U.S. Department of Health and Human Services 2001; Vincent and Furnham 1996).

To summarize, how CAM is used relative to conventional Western medicine remains unclear. If the majority of patients tend to seek help from alternative therapies in addition to conventional Western medical mental health treatment, then Western medical professionals need to be at least aware of, and preferably to proactively probe, CAM use in order to evaluate its potentially “dangerous” impact on Western medical treatment (Fang and Schinke 2007). If CAM use overlaps very little with the use of conventional Western medical care, then we need to identify the factors that distinguish the users of one from the users of another, in order to further understand how each sector is catering to the difference needs of people.

Acculturation and CAM Use among Chinese Americans

The body of literature on assimilation and acculturation has grown significantly in the past century. One of the most influential early models is human ecology. For example, Park's famous work (1928) on migration assumes a linear model and directional model of acculturation that the loss of the original culture occurs through greater acculturation to the host culture. Since then, the conceptual frameworks of acculturation have become more elaborated. Clark and Hofstess (1998) argued that immigrants selectively adopt the dominant cultural beliefs and practices based on various reasons, and maintain certain values of their original cultures. Berry (2003) proposed a model of orthogonal relations between the original and the host culture; acculturation was considered a dynamic process of negotiating between maintaining original cultural characteristics and being involved in the larger society. Furthermore, Berry pointed out that acculturation is influenced by group-level factors such as the national/ethnic history of immigration, and ideology, attitudes in the host society, and individual-level factors such as personality and socio-demographic characteristics (Berry 2003).

Meanwhile, empirical studies of acculturation and health seem to have lagged behind in applying this multidimensional, non-linear conceptualization of acculturation. While researchers have constructed acculturation scales with the intention of reflecting the diverse conceptualization of acculturation (language use, identity, cultural practice, etc), using such scales makes it almost impossible to capture the nuanced or potentially completely opposite effects of different factors on health beliefs and behaviors among immigrants (Abraído-Lanza et al. 2006). In fact, acculturation should be used as a "latent variable" with various indicators to reflect the cultural belief systems, values, linguistic

and other behavioral preferences, and that it should be measured “by considering factors relevant to the particular health issue at hand, rather than by a monolithic ‘acculturation’ concept” (Abraído-Lanza et al. 2006:1343). This “theory-driven model of acculturation” would help us understand how specific components of acculturation affect certain particular health behaviors.

Few researchers have tried to make sense of the conflicting findings on the role of CAM relative to conventional medical service use among ethnic minorities, though one study provided some clues. In a study of Asian American adults with psychiatric disorders, researchers found that the association between CAM use and conventional Western mental health service use was moderated by an acculturation effect. Specifically, among individuals with lower levels of English proficiency, CAM use was negatively associated with specialty mental health service use. However, for those with good or excellent English proficiency, CAM use was positively associated with the use of specialty mental health services (Le Meyer et al. 2009). This nuanced role of English proficiency, as the authors argue, may help explain the conflicting findings on the use of CAM and conventional Western medical services among different populations, and suggests the necessity to examine the effects of acculturation-related factors in mental health-related service use among immigrants.

Two empirical studies also shed light on how acculturation affects CAM use among Chinese Americans. Using survey data of Chinese American patients in three community health centers in New York City, Fang and Schinke (2007) found that although CAM users were less acculturated than the non-users, the acculturation effect on CAM use was not significant when sociodemographic factors were controlled. However,

they did not examine the use of conventional medical service at all. Another study only analyzed the use of formal mental health services (psychiatrists, psychologists, etc.). Interestingly, they found a gradation of increase in the willingness to seek help for their mental health problems as the level of Western influence increases, from Chinese students in mainland China and Hong Kong, to Chinese American (US-born and foreign-born) students, and then European American students (Chen and Mak 2008).

Pieced together, these findings seem to suggest that from lower to higher generations of Asian or Chinese Americans and then to non-Hispanic whites, the likelihood of using conventional Western medicine would increase, while the likelihood of using CAM would decrease. Additionally, how CAM is used relative to conventional Western medicine might differ by acculturation-related factors such as English proficiency. These nuanced effects have yet to be tested in empirical studies.

To address the issues discussed above, I performed two different analyses. In the first analysis I examine the differences of CAM use outcomes among different generations of Chinese Americans and non-Hispanic whites while controlling for sociodemographic and health-related factors. Specifically, I tested the hypothesis that

H1: first generation Chinese Americans are the most likely to use only CAM therapies, followed by second generation, third-or-higher generation, and then non-Hispanic whites; the rates of using any conventional Western medicine would follow an ascending trend from first, second, third-or-higher generation Chinese Americans to non-Hispanic whites.

In the second analysis, I turned my attention to the effects of three acculturation-related factors (generational status, US citizenship, and English proficiency) on CAM use outcomes among Chinese Americans alone, while controlling for sociodemographic and

health-related factors, testing the following hypotheses, controlling for other acculturation-related factors:

H2: Chinese Americans who speak good or excellent English will be less likely to use only CAM therapies, and more likely to use any conventional Western medical services, than those with fair or poor English proficiency;

H3: among Chinese Americans, US citizens are less likely to use only CAM therapies, and more likely to use any conventional Western medical services, than non-US citizens.

The following section discusses the methods used in this study, including the data and sample, measurement, and a variety of issues about statistical modeling and interpretation.

Methods

Data Source

This study uses publicly available data from the Collaborative Psychiatric Epidemiology Surveys (CPES) funded by the National Institute of Mental Health (NIMH). This survey joins together three nationally representative surveys: the National Comorbidity Survey Replication (NCS-R), the National Survey of American Life (NSAL), and the National Latino and Asian American Study (NLAAS). The CPES survey population includes adults aged 18 and older, living in households in the 48 coterminous United States (NCS-R, NSAL), and the population for the Latino and Asian ancestry groups extend to the State of Hawaii (NLAAS). Respondents in all three surveys were selected from a four-stage clustered area probability sample of households, with selection using area data from the 2000 US Census. Although each survey has unique features, they share a common core of measurements of primary mental health diagnostic

symptoms, symptom severity, and mental health-related service utilization. More details on CPES sample design features are provided by Heeringa et al. (2004). This study focuses on Chinese American respondents while using non-Hispanic white as a comparison group. The CPES data consist of 600 Chinese Americans from NLAAS, and 7,587 non-Hispanic whites from NCS-R and NSAL. The non-Hispanic white subsample from NSAL ($n = 891$) was designed for the focus of the survey, black/white contrasts, and is therefore considered not optimal for comparative analyses between whites and non-black minority groups (Jackson et al. 2004), and therefore was dropped. Also excluded are 2,516 non-Hispanic white cases from NCS-R Part I, who did not complete the more in-depth Part II interview. As a result, the sample analyzed in this study consists of 4,180 non-Hispanic white respondents from NCS-R, and 600 Chinese Americans from NLAAS.

Measures

Dependent Variable. Mental health service use was assessed with the question, “In the past 12 months, did you go to see [provider on list] for problems with your emotions, nerves, or your use of alcohol or drugs?” Four sectors of service were originally constructed: (1) specialty mental health service (psychiatrist, psychologist, social worker, counselor, any other mental health professionals, such as a psychotherapist or mental health nurse), (2) general health care service (general practitioner, family doctor, nurse, or other health professional, etc.), (3) religious or spiritual advisors, and (4) alternative medicine therapies (acupuncture, biofeedback, relaxation or meditation techniques, etc.) (Wang et al. 2005). After examining each type of service separately, I combined the first two categories into one conventional Western medical services, and

the last two into one CAM therapies due to the very limited number of respondents who used only general health care service or only religious or spiritual advisors. The outcome variable is constructed as three categories:

1. “any conventional Western medical service” being respondents who had used any conventional Western medical services in the past twelve months^{xi};
2. “CAM only” included respondents who only used the other two sectors of services;
3. “none” being those who had used none of the services for problems with their emotions, nerves, or alcohol or drug use.

This last category is used as the reference group of the outcome variable in the multinomial logistic regression models.

Acculturation-Related Factors. Three factors related to acculturation were included in the analysis. Generational status of the respondents was measured in three categories: first generation (foreign-born immigrant), second generation (born in the US with at least 1 parent being immigrant), and third-or-higher generation (born in the US and both parents born in the US). Citizenship was measured by whether respondent was a US citizen or not. English language proficiency was assessed by the question, “How well do you speak English?” The response was dichotomized as “fair/poor” or “excellent/good.”

Control Variables. Diagnostic criteria from the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) were used to assess the mental

^{xi} This category includes those who used conventional Western medical services alone or with CAM therapies.

health status of respondents. A probable DSM-IV endorsed diagnosis of any psychiatric disorder in the past 12 months was measured based on whether respondents' reported symptoms met the diagnostic criteria of any one out of the four categories: (1) depressive disorders (major depressive disorder or dysthymia), (2) anxiety disorders (panic disorder, agoraphobia without panic disorder, social phobia, generalized anxiety disorder, or posttraumatic stress disorder), (3) substance use disorders (alcohol abuse or dependence, drug abuse or dependence), or (4) impulse-control disorder (intermittent explosive disorder). Having health insurance was dichotomously coded. Other variables considered include gender, age, marital status, having a college degree, and work status. Refer to Table 4-1 for more details on how they are coded.

Statistical Analysis

All statistical analyses were conducted using Stata 14. Because my outcome consists of three nominal categories, I used multinomial logistic regression to study the correlates of service usage. I used the CPES supplied weighting in all analytical procedures to adjust for the study's complex sampling methods using the "svy" command. Consequently, multivariate significance testing uses Wald χ^2 tests based on coefficient variance-covariance matrices that adjusted for design effects using the Taylor's series linearization method. To examine any generational differences of sociodemographic and mental health-related characteristics, I conducted Rao-Scott chi-square test (Rao and Scott 1984), a design-adjusted version of the Pearson chi-square test.

For each covariate in the multinomial logistic regression models, the average of the marginal effects (AME), an increasingly preferred option used by researchers, is computed taking the average of the marginal effect of a covariate for each observation in

the estimation sample at its observed values; the computation is done with the MCHANGE command (Long and Freese 2014). Specifically, for all variables, I computed the discrete change (DC), the difference in predicted probability for each category of mental health service use between the covariate categories (e.g., men vs. women, employed vs. unemployed). For age, which is entered as a continuous variable in single and quadratic terms, discrete change was computed for the change in predicted probability for each category of the outcome variable by one standard deviation change in age. In order to compare the effect size across variables, I computed a measure of the effect size for each covariate, whether continuous or dummy variable, by taking the average of the absolute values of the discrete change for all three categories of mental health services.

For the two multinomial logistic regression models presented in Table 4-3 and Table 4-4, Wald test results^{xii} confirmed that all three categories of the dependent variable are distinguishable from each other. Also, even though Hausman-McFadden test is not available after “svy” command, I computed the odds for each pair of mental health service use outcomes for the multinomial logistic regression models in Table 4-3 and Table 4-4. I compared the odds of the full model to the ones with the third outcome

^{xii} The null hypothesis for the Wald test is that all coefficients except intercepts associated with a given pair of alternatives are 0; when null hypothesis is rejected, the test result indicates that the two categories should not be combined. For the multinomial logistic regression in Table 4-3, the Wald test result for combining “any conventional” and “CAM only” is: $F(15) = 1.67, p < .001$; for combining “any conventional” and “none”: $F(15) = 37.31, p < .001$; for combining “CAM only” and “none”: $F(15) = 36.96, p < .001$. For the multinomial logistic regression in Table 4-4, the Wald test result for combining “any conventional” and “CAM only” is: $F(16) = 5.44, p < .001$; for combining “any conventional” and “none”: $F(16) = 4.33, p < .001$; for combining “CAM only” and “none”: $F(16) = 4.59, p < .001$.

category excluded for any given pair of outcomes, the results^{xiii} of which indicated found no violation of the independence of irrelevant alternatives (IIA) assumptions in either model. It is worth noting that to my best knowledge, there is currently no goodness-of-fit test for multinomial logistic regression analysis using complex survey data, hence my inability to evaluate the power of the models in predicting the patterns of service use.

Table 4-1 presents the descriptive statistics on the socio-demographics and health-related factors for Chinese Americans weighted individually (column 1) and together with the non-Hispanic whites (column 2), and for non-Hispanic whites (column 3). The percentages computed with different weighting differ only slightly. Of the Chinese Americans, the great majority (81.02%) are foreign-born first generation immigrants. About two thirds of this subsample (67.16%) are US citizen, and slightly more than half (55.16%) report good or excellent English proficiency in speaking.

^{xiii} For both multinomial logistic regression model, I used adjusted Wald test to test the odds of “any conventional” versus “none” between the model presented in Table 4-3 and one with only “CAM only” excluded from the outcome variable, the odds of “any conventional” versus “CAM only” between the model presented in Table 4-3 and one with only “None” excluded from the outcome variable, and the odds of “CAM only” versus “none” between the model presented in Table 4-3 and one with only “any conventional” excluded from the outcome variable, all three tests returned a F-statistics of 0, and p-value of 1.00, thus retaining the null hypothesis that the odds of a given pair for the full model and limited model are the same. In other words, the odds of a given pair of outcomes are not affected by the third outcome category.

Table 4-1. Weighted Descriptive Statistics of Chinese Americans and Non-Hispanic Whites

	Chinese Americans*	Chinese Americans**	Non-Hispanic White
	% (s.e.)	% (s.e.)	% (s.e.)
<i>n</i>	580	580	3983
Mental health service use			
Any conventional	5.62% (.01)	5.42% (.01)	15.03% (.01)
CAM only	8.43% (.01)	7.81% (.01)	20.72% (.01)
None	85.95% (.02)	86.78% (.02)	64.25% (.01)
		<i>p</i> < .001	
Female	52.56% (.02)	53.59% (.02)	51.91% (.01)
		<i>p</i> > .05	
Age (mean)	40.94 (1.04)	42.60 (1.04)	46.91 (.52)
		<i>p</i> < .001	
Marital status			
Never married	24.32% (.02)	19.80% (.02)	19.24% (.01)
Married/cohabiting	65.49% (.03)	69.01% (.03)	60.04% (.01)
Divorced/separated/widowed	10.19% (.02)	11.18% (.02)	20.36% (.01)
		<i>p</i> < .001	
Education			
≤ 11 yrs	16.67% (.03)	17.90% (.03)	12.95% (.01)
12 yrs	16.27% (.02)	16.87% (.02)	31.75% (.02)
13-15 yrs	21.28% (.03)	20.98% (.03)	29.01% (.01)
≥ college	45.78% (.04)	44.26% (.04)	26.29% (.01)
		<i>p</i> < .001	
Work status			
Employed	64.72% (.03)	65.77% (.03)	65.50% (.01)
Unemployed	5.90% (.01)	5.65% (.01)	5.01% (.01)
Not in labor force	29.38% (.03)	28.57% (.03)	29.49% (.01)
		<i>p</i> > .05	
Probable DSM-IV diagnosis	12.18% (.02)	11.35% (.02)	21.07% (.01)
		<i>p</i> < .001	
Has health insurance	87.10% (.02)	86.70% (.02)	90.11% (.01)
		<i>p</i> > .05	
Generational status			
First generation	81.02% (.03)	-	-
Second generation	12.07% (.02)	-	-
Third-or-high generation	6.90% (.01)	-	-
US citizen	67.16% (.03)	-	-
Good/excellent English	55.16% (.04)	-	-

* Statistics were weighted among Chinese Americans only.

** Statistics were weighted among Chinese Americans and non-Hispanic whites together.

Results

Descriptive analyses reveal a lower level of any conventional Western mental health service use among Chinese Americans than that among non-Hispanic whites (5.42% vs. 15.03%). The disparity is even greater for the proportion having used only CAM (7.81% vs. 20.72%). Regarding the socio-demographic characteristics, the Chinese American sample, compared to the non-Hispanic white sample, have a younger average age (42.60 vs. 46.91), a higher proportion of married or cohabiting individuals (69.01% vs. 60.04%), and a much higher proportion of individuals with a college degree (44.26% vs. 26.29%). The proportion of Chinese Americans who meet the diagnostic criteria for at least one psychiatric disorder on DSM-IV is much lower than that among non-Hispanic whites (11.35% vs. 21.07%).

Table 4-2 presents a closer look at Chinese Americans' use of mental health service by acculturation-related factors. Weighted crosstabulation results show that mental health service use varied significantly by generational status and English proficiency, but not US citizenship. Specifically, first generation immigrants lag behind second, third, or higher generations, on the proportion having used any conventional Western medical health services and the proportion using CAM exclusively. Those with poor or fair English proficiency also have a significantly lower level of mental health service use of any conventional Western medicine, as well as CAM only, than those reporting speaking good or excellent English. While these bivariate results are suggestive of the potential importance of these acculturation-related factors, it is important to determine if such associations hold up while controlling for other predictors.

Using multinomial logistic regression, I examined how first, second, third-or-higher generations of Chinese Americans compare to non-Hispanic white respondents on the CAM use outcomes, controlling for socio-demographic characteristics and health-related factors. Regression coefficients and discrete changes for the covariates are represented in Table 4-3.

	Any conventional	CAM only	None
Table 4-2. Weighted Percent of Mental Health Service Use among Chinese Americans by Acculturation-Related Factors			
Generational status			
First generation	3.70%	7.14%	89.16%
Second generation	13.41%	12.11%	74.48%
Third-or-high generation	14.50%	17.16%	68.34%
		$p \leq .001$	
US citizen			
US citizen	5.72%	7.54%	86.73%
Non-US citizen	5.40%	10.25%	84.35%
		$p > .05$	
English proficiency			
Poor/fair English	3.20%	5.10%	91.70%
Good/excellent English	7.59%	11.14%	81.27%
		$p \leq .05$	
$n = 580$			

Table 4-3. Weighted Multinomial Logistic Regression Results and Average Marginal Effects (AME) of Correlates of Twelve-Month Use of Mental Health Service among Chinese Americans and Non-Hispanic Whites

	Any conventional vs. None <i>b</i> (SE)	Any conventional AME (SE)	CAM only vs. None <i>b</i> (SE)	CAM only AME (SE)
Non-Hispanic white (ref)				
First gen CA	-1.82 (.33) ‡	-.10 (.01)	-1.68 (.22) ‡	-.15 (.01)
Second gen CA	-.42 (.54)	-.02 (.05)	-.97 (.42) †	-.11 (.04)
Third-or-higher gen CA	-.51 (.37)	-.03 (.04)	-.56 (.46)	-.06 (.06)
Female (ref: male)	.63 (.10) **	.04 (.01)	.83 (.09) **	.10 (.01)
Age	.10 (.02) **	-.001 (.0003)	.03 (.02)	-.001 (.0005)
Age^2	-.001 (.0002) **	-	-.0004 (.0002)	-
Marital status (ref: never married)				
married/cohabitating	-.36 (.13) **	-.03 (.01)	-.09 (.14)	-.001 (.02)
divorced/separated/widowed	.30 (.17)	.03 (.02)	.03 (.21)	-.006 (.03)
Education (ref: ≤ 11 yrs)				
12 yrs	-.03 (.17)	-.02 (.02)	.56 (.15) **	.06 (.01)
13-15 yrs	.02 (.15)	-.01 (.02)	.68 (.18) **	.08 (.02)
≥ college	.38 (.17) *	-.001 (.02)	1.29 (.22) **	.17 (.03)
Work status (ref: employed)				
unemployed	.30 (.16)	.03 (.02)	.10 (.23)	-.005 (.03)
not in labor force	.67 (.15) **	.08 (.02)	-.01 (.13)	-.02 (.02)
Probable DSM-IV diagnosis	2.02 (.10) **	.24 (.02)	.98 (.07) **	.07 (.01)
Health insurance	.43 (.17) *	.05 (.02)	-.21 (.19)	-.05 (.03)
Intercept	-4.60 (.49)		-2.59 (.42)	
Average predicted probability		.14		.19

n = 4,535

† *p* ≤ .05, one-tailed test; ‡ *p* ≤ .01, one-tailed test

* *p* ≤ .05, two-tailed test; ** *p* ≤ .01, two-tailed test

Note: discrete changes are presented for all variables except age, for which marginal change is presented.

All covariates are significantly associated with mental health service use. First and foremost, regression coefficients from the multinomial logistic regression confirmed the underutilization of mental health service among first and second generation Chinese Americans, but not for the third-or-higher generation. The predicted probability for first generation Chinese Americans to use any conventional Western medical services is, on average, ten percentage points ($DC = -.10$) lower than that among the non-Hispanic whites. Interestingly, the disparity was even greater (15 percentage points) on the likelihood of using exclusively CAM therapies. These differences are big in magnitude, considering the sample average predicted probability of using any conventional services was .14, and .19 for only CAM use. As for second generation Chinese Americans, even though they did not differ significantly from the non-Hispanic whites on the likelihood of using any conventional services rather than none, they were less likely to use only CAM therapies than the non-Hispanic whites ($DC = -.11$). This difference is smaller than that between first generation Chinese Americans and non-Hispanic whites but still substantial in size. Third-or-higher generation Chinese Americans did not differ significantly from the non-Hispanic whites on the use of mental health services.

Women were more likely to use any conventional services ($DC = .04$), and more likely to only use CAM ($DC = .10$), compared to men. The predicted probability of using any conventional services has an inverted U-shape, peaking around middle age, and slowly decreasing on both sides. Additionally, compared to those never married, those married or cohabitating were less likely to use any conventional services ($DC = -.03$). Individuals who were not in the labor force were more likely than the employed to use any conventional services versus none ($DC = .08$). Those with a college or higher degree

were slightly less likely to use any conventional services (DC = $-.001$), and more likely to only use CAM (DC = $.17$), compared to the reference group, those with less than a high school degree; individuals with 12 years of education (DC = $.06$) or 13–15 years of education (DC = $.08$) were more likely to use only CAM, than did the reference group; they did not differ significantly on the probability of using any conventional services. Those with a probable DSM-IV diagnosis were also more likely to use any conventional services (DC = $.24$), and more likely to only use CAM (DC = $.07$), compared to those without. Health insurance also increased the likelihood of using any conventional services (DC = $.05$).

How big are the differences between first-generation Chinese Americans and non-Hispanic whites in the outcome categories? As previously noted, we can compare the average absolute discrete change across all three categories of mental health service use for this purpose. The average difference between first-generation Chinese Americans and non-Hispanic whites is $.17$, which is only slightly lower than that the average difference between having a probable diagnosis of DSM-IV psychiatric disorder versus not ($.21$).^{xiv} This indicates that the degree of difference between first-generation Chinese Americans and non-Hispanic whites is comparable in magnitude to the degree of difference between those who have a probable psychiatric disorder diagnosis and those who do not. This alarming yet not entirely unexpected finding confirms the underutilization of mental

^{xiv} The absolute differences of predicted probability (discrete change) between first-generation Chinese Americans and non-Hispanic whites are $.10$ and $.15$ for using any conventional Western medicine and using only CAM, respectively, as shown in Table 4. And the absolute value of the discrete change between the two groups for not using any services is $.25$ (not shown in Table 4). Therefore, the absolute average discrete change is computed: $(.10 + .15 + .25) \div 3 = .17$

health service use among recent immigrants, and at the same time, begs the question of what factors other than the ones already included in the current model can contribute to such ethnic disparity. In their review of the health care use among Asian immigrants, Clough, Lee, and Chae (2013) pointed out that the cultural incompetency of and discrimination in the health care system, in addition to linguistic and economic issues related to access and quality of service, are the major barriers Asian immigrants faced to participating fully in the health care system in the US. Future research should examine the effects of cultural competency and discrimination on help-seeking behaviors among Asian immigrants to help health providers develop efficiency interventions.

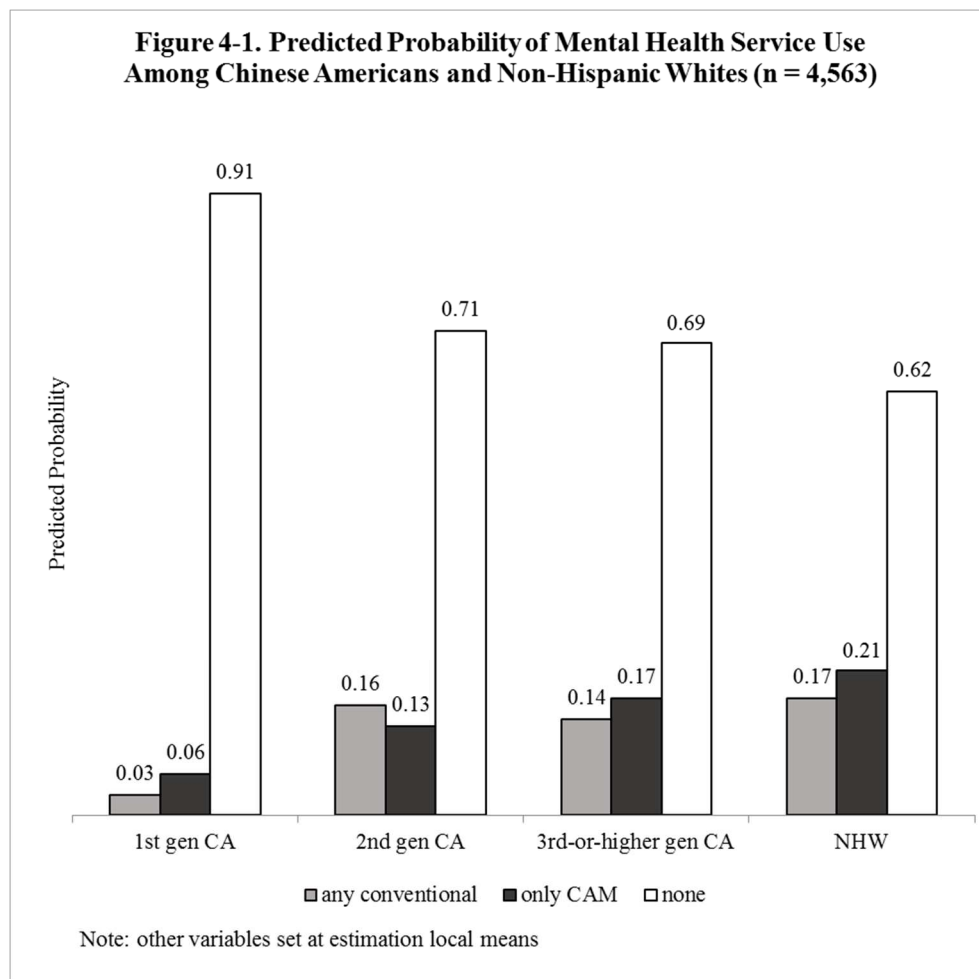


Figure 4-1 provides a visual presentation of the predicted probabilities of mental health service use among Chinese Americans of different generations, and non-Hispanic whites, when other variables were held at the mean values for each group (the local mean)^{xv}. As it shows, first generation Chinese Americans lag behind the other three groups in the use of any conventional services and exclusively CAM therapies in the past twelve months. The stacked bars formed a gradation, from first, second, third-or-higher generations Chinese Americans, to non-Hispanic whites. The predicted probabilities of not using any mental health services (the blank bars) are .91, .71, .69, to .362 respectively, with first generations significantly different from all three other groups ($p < .05$, results not shown). The predicted probabilities of exclusive CAM use (the black bars) show a similar gradation, increasing from .06, .13, .17, to .21 from left to right across the four groups, with first generation Chinese Americans significantly lower than non-Hispanic whites ($p < .05$, results not shown). As for the use of any conventional Western services (the grey bars), the predicted probability for the first generation (.03) is noticeably different from the other three groups, with the differences reaching statistical significance for the comparison with the third-or-higher generation Chinese Americans (.14), and with the non-Hispanic whites (.17).

In summary, the first part of H1 regarding CAM use is rejected, while the second part regarding the use of conventional Western medicine is confirmed. It is worth noting

^{xv} Rather than setting other variables at the estimation sample mean, the author used the local means—values more consistent with the actual observed values for the four groups, generating more realistic predictions thusly (see Long and Freese 2014).

that second generation Chinese Americans presented a distinctive pattern of service use, being the only group with a higher predicted probability of using any conventional services (.16) than that of using only CAM therapies (.13). In other words, first and third-or-higher generations of Chinese Americans, as well as non-Hispanic whites, when seeking help for their mental health problems, all tend to use exclusively CAM therapies somewhat more than any conventional Western medical services, while second generation Chinese Americans rely slightly more on at least some conventional Western medical treatment.

An important issue to consider is whether these generational differences among Chinese Americans can be explained by other indicators of acculturation. To assess this, I restricted the sample to Chinese Americans and added the other available acculturation indicators (citizenship and English proficiency) to the analysis of mental health service usage. Table 4-4 presents the results of this multinomial logistic regression analysis. The last row of the table shows that, on average, Chinese Americans have a predicted probability of .06 to use any conventional Western services, and .08 to use CAM exclusively. Generational status and English proficiency were associated with mental health service use among Chinese Americans. Compared to individuals with poor/fair English proficiency, those with good/excellent English proficiency were more likely to use any conventional services than to use no services ($DC = .04$). This confirms the impact of language barriers to conventional Western medical services. English proficiency was not significantly associated with CAM use.

Table 4-4. Weighted Multinomial Logistic Regression Results and Average Marginal Effects (AME) of Correlates of Twelve-Month Use of Mental Health Service among Chinese Americans

	Any conventional vs. None <i>b</i> (SE)	Any conventional AME (SE)	CAM only vs. None <i>b</i> (SE)	CAM only AME (SE)
First gen (ref)				
Second gen	1.64 (.75) †	.09 (.06)	.28 (.71)	.003 (.04)
Third-or-higher gen	1.03 (.59) †	.04 (.04)	1.16 (.50) †	.08 (.05)
US citizen	-.87 (.66)	-.04 (.04)	-.24 (.44)	-.01 (.03)
Good/Excellent English	.89 (.54) †	.04 (.02)	.07 (.40)	-.001 (.03)
Female (ref: male)	.09 (.52)	-.005 (.02)	1.03 (.41) *	.01 (.02)
Age	.15 (.09)	.001 (.001)	.02 (.07)	-.001 (.001)
Age^2	-.002 (.001)	-	-.0003 (.001)	-
Marital status (ref: never married)				
married/cohabitating	-1.70 (.78) *	-.07 (.05)	-1.12 (.57)	-.07 (.05)
divorced/separated/widowed	.19 (.98)	.03 (.08)	-1.06 (1.01)	-.08 (.06)
Education (ref: ≤ 11 yrs)				
12 yrs	-1.27 (.91)	-.08 (.06)	.92 (1.25)	.02 (.02)
13-15 yrs	-1.26 (.71)	-.08 (.05)	1.78 (1.32)	.05 (.03)
≥ college	-1.39 (.64) *	-.10 (.05)	2.86 (1.19) *	.13 (.02)
Work status (ref: employed)				
unemployed	-.40 (1.10)	-.02 (.03)	.96 (.43) *	.08 (.05)
not in labor force	.55 (.53)	.03 (.03)	.04 (.38)	-.002 (.02)
Probable DSM-IV diagnosis	2.51 (.45) **	.17 (.05)	1.25 (.40) **	.08 (.04)
Health insurance	.45 (1.32)	.03 (.04)	-1.00 (.53)	-.09 (.05)
Intercept	-5.65 (2.85)		-4.13 (1.78)	
Average predicted probability		.06		.08

n = 580

† *p* ≤ .05, one-tailed test; ‡ *p* ≤ .01, one-tailed test

* *p* ≤ .05, two-tailed test; ** *p* ≤ .01, two-tailed test

Note: discrete changes are presented for all variables except age, for which marginal change is presented.

Figure 4-2 shows the predicted probabilities of mental health service use by English proficiency among Chinese Americans when other variables were set at the local means. Specifically, Chinese Americans with good or excellent English proficiency are more likely to use any conventional Western medicine ($Pr = .05$) than those with poor or fair English proficiency (.02). The former also have higher predicted probability of using only CAM (.07) than the latter (.02). Therefore, the part regarding exclusive CAM use in H2 is rejected, and the part regarding conventional Western medical service use is confirmed. It is worth noting that, the pattern of service use differs by English proficiency: those with good/excellent English proficiency have a higher probability of using only CAM than the probability of using any conventional Western medical service, while those with poor/fair English proficiency have equal probabilities of the two outcomes. This result challenges the previous finding of a positive correlation between CAM use and specialty mental health service by Le Meyer and colleagues (2009). In addition, US citizenship was not a significant predictor, rejecting H3 thusly.

The association between mental health service use and another acculturation-related factor, generational status, was more complicated. Specifically, second generation Chinese Americans were more likely to use any conventional services than did first generation Chinese Americans ($DC = .09$), but they did not differ significantly on using only CAM therapies. As for third-or-higher generation Chinese Americans, they were more likely to use any conventional services ($DC = .04$) or to use only CAM therapies ($DC = .09$) than the first generation.

Figure 4-2. Predicted Probability of Mental Health Service Use By English Proficiency Among Chinese Americans (n = 580)

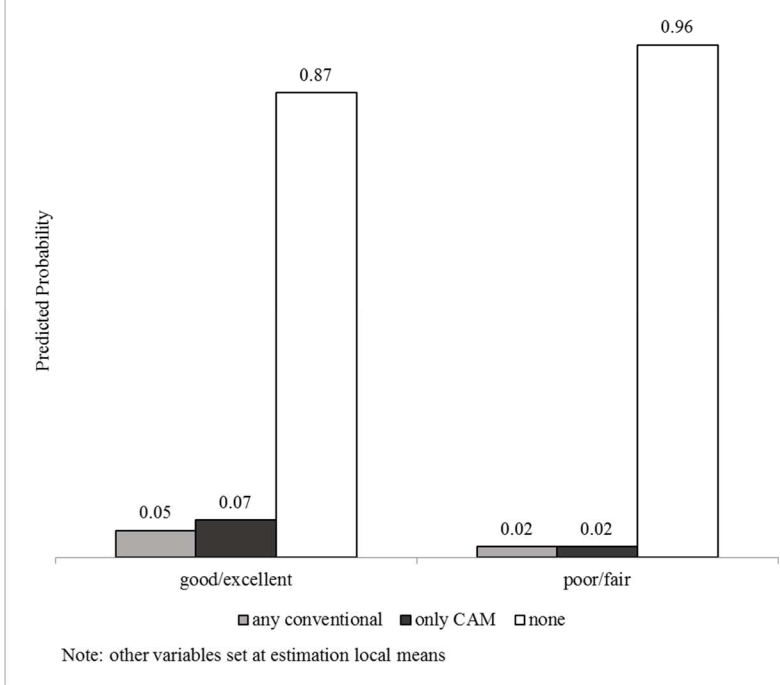


Figure 4-3. Predicted Probability of Mental Health Service Use By Generational Status Among Chinese Americans (n = 580)

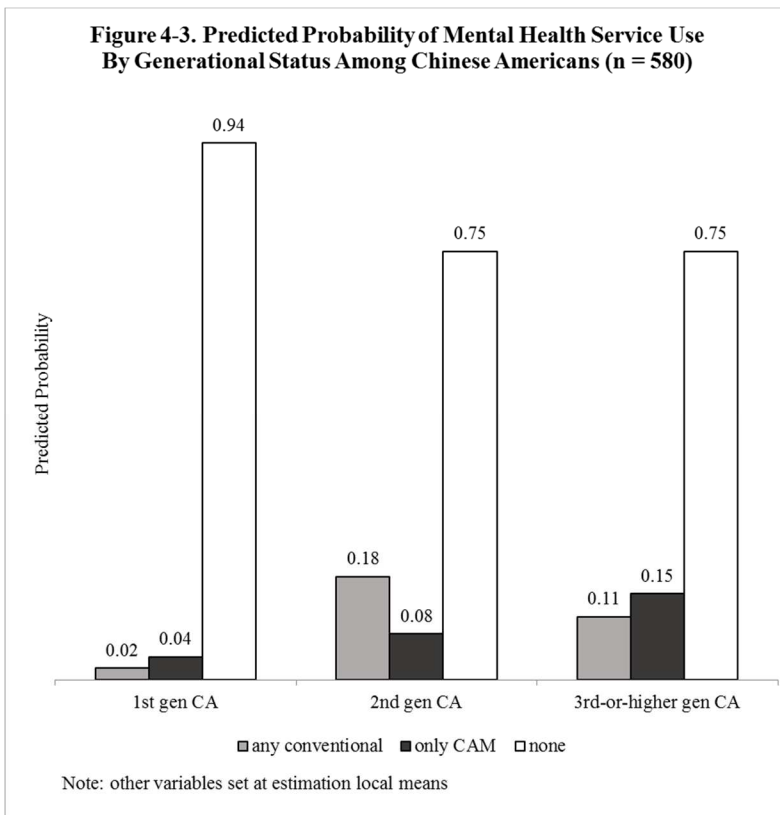


Figure 4-3 presents the predicted probabilities of twelve-month service use among Chinese Americans by generational status, when other factors were set at local means. First generation Chinese immigrants lagged behind their second and third-or-higher generation counterparts on the overall use of mental health services, which is consistent with previous findings (e.g., Kung 2004). Similar to the previous model, the predicted probability for exclusive CAM use also climbed up from .04 to .08, then to .15, from left to right across the three groups. And once again, second generation Chinese Americans showed a strong preference of using any conventional Western services (.18) to only CAM therapies (.08). Note that the predicted probabilities for the three Chinese American groups in Figure 4-3 are different from those in Figure 4-1, which is primarily due to the two extra variables—English proficiency and citizenship—that were introduced in the Chinese American-alone model, the results presented in Table 4-4.

Gender, marital status, education, work status, and having a probably DSM-IV diagnosis were found to be associated with service use among Chinese Americans. Women were more likely than men to use only CAM therapies (DC = .01). Those who were married or cohabitating were less likely than the never married to use any conventional services (DC = $-.07$). The unemployed were more likely than the employed to use only CAM therapies than (DC = .08). Individuals with college or higher degree were less likely than those with less than high school degree to use any conventional services (DC = $-.10$), and more likely to use only CAM therapies (DC = .13). Those with a probable DSM-IV diagnosis were much more likely than those without to use any conventional services (DC = .17), as well as only CAM use (DC = .08).

Discussion

This study has three major findings. First, the results confirm the overall underutilization of mental health services among Chinese Americans, compared to non-Hispanic whites. This calls for greater efforts in mental health service outreach to this ethnic minority community, including providing linguistic support given the effects for English proficiency, and more ethnic responsive services.

Secondly, this study finds that exclusive use of CAM therapies was more popular than using any conventional Western medical services, among first and third-or-higher generation of Chinese Americans, though not for second generations. This finding contradicts, partially at least, the findings of Druss and Rosenheck (1999) that alternative and complementary medicine were used as an add-on rather than an alternative to formal medical services. In addition to confirming the rising popularity of CAM therapies found in previous studies (e.g., Wolsko et al. 2002), this finding underscores the need for research to better understand the efficacy of CAM services, and the satisfaction of patients/customers with such treatments . It also highlights the need for more discussions on insurance policies regarding alternative and complementary mental health services: should health insurance be more inclusive to this sector of services, given that CAM use was more prevalent than conventional services for the majority of the Chinese American population.

Thirdly, a higher level of acculturation is associated with greater use of mental health service, overall and by sector, among Chinese Americans. First generation immigrants were the least likely to seek help for problems with their emotions, nerves, or substance use. Second generation Chinese Americans present a unique pattern of service

use; though slightly lagging behind third-or-higher generations on the overall use of mental health services, the former has a higher probability of using any conventional services than the later. What factor prompted second generation Chinese Americans to prefer using conventional services for their mental health problems? This question merits future research. Third-or-higher generations were not significantly different from their white counterparts in mental health service use pattern. To summarize, the probability of Chinese Americans using mental health services, overall and by sector, increases from lower (more recent) to higher (earlier) generations, catching up with the non-Hispanic white Americans at third generation. English proficiency proved to be a barrier of Chinese Americans to conventional Western medical services, but not CAM therapies, which was consistent with previous study results (Ying and Miller 1992).

Cultural factors play important roles in how individuals seek help for health problems (Kleinman et al. 1978; Rogler and Cortes 1993). To understand the underutilization of mental health services among Asian populations and the acculturation effects, scholars offered three general explanations: (1) difference between Asian and Western beliefs in the etiology of mental illness, (2) stigma and shame in Asian cultures, and (3) conflicts of Asian values and Western psychotherapy treatment (Chen and Mak 2008; Lau and Takeuchi 2001). Chinese culture, like other collectivist Asian cultures, regards mental health problems as personal failure, and attributes them to internal, personal causes (Tabora and Flaskerud 1994). It opposes “the values associated with Western psychotherapy... [including] open verbal communication, exploration of intrapsychic conflicts, and a focus on the individual” (Leong and Lau 2001:204). Therefore, people with strong roots in Chinese culture may choose to seek help from

alternative health services, in lieu of conventional Western mental health care, because the former was more compatible with their cultural beliefs.

A practical implication of the findings is that mental health professionals must pay attention to the socio-cultural background of those seeking help, in both identifying causes and providing treatment suggestions. In addition, public health professionals, policy makers and the whole society need to be aware of the various barriers that Chinese Americans and other ethnic minorities experience. The provision of services in ethnic languages, education to the vulnerable populations, greater outreach to ethnic minorities, making services more affordable are all essential efforts to be taken.

Furthermore, an increasing body of literature has shown a pattern of mental health service use among Asian Americans, that although the overall utilization rate is low, those who do use mental health services tend to be highly disturbed in terms of psychiatric conditions (Chu and Sue 2011). For health professionals and researchers, it is of great importance to better understand this pattern, as well as its implications. What are the factors and pathways that hold Asian Americans from seeking help for their mental health problems until the conditions are severe? Does this low-prevalence-high-severity pattern of service utilization apply to different sectors of services? These questions warrant future studies.

Several limitations should be noted. Firstly, the measures used in this study are primarily self-reported, which is subject to recall and response biases. Future studies should consider taking into account social desirability response effects by the respondents. Secondly, the CPES data are cross-sectional, hence my lack of power to establish causation between the predictors (e.g., English proficiency) and the outcome

variable, the patterns of mental health service use. This topic merits future longitudinal research. Thirdly, the acculturation-related factors, i.e., generational status and English proficiency are only proxies rather than direct measurement of acculturation. As previously discussed in this paper, the operationalization of acculturation is still under debate. To advance our knowledge of the effects of such a process on the health and help-seeking behaviors of ethnic minorities and immigrants, further refinement of measurements is necessary. Last but not least, although this study has shed light on some of the factors underlying the patterns of mental health service utilization among Chinese Americans, further research is still much needed to understand the help-seeking trajectories and the underlying factors. For example, more in-depth analyses are needed to understand the length of use and satisfaction with various types of mental health services among Chinese Americans. Also, the underlying roles of cultural factors on the perception of needs, and their influence on the help-seeking behaviors are hypothesized, but yet tested in empirical findings (Nguyen and Bornheimer 2014).

CHAPTER 5

CONCLUSION

Introduction

My dissertation addresses three sets of mental health related issues among Chinese Americans: depression prevalence, depression symptom dimensions, and mental health-related service use. My findings indicate that significant disparities between Chinese Americans and non-Hispanic whites, and among Chinese Americans, by generational status or nativity status. I find significant heterogeneity within the population of Chinese Americans, and highlight the complex and nuanced effects various factors are associated with such disparities in various mental health-related outcomes.

Specifically, foreign-born first generation Chinese Americans are significantly less likely than the other Chinese Americans and non-Hispanic whites to have depression, even when I controlled for demographic, social and other variables. They also have the fewer symptoms, under each one of the four dimensions, and less likely to use CAM or conventional Western medical services for their mental health problems. More important, the findings suggest distinct mechanisms through which various demographic, socioeconomic, and health-related factor impact their mental health conditions and help-seeking behaviors. Despite the low risk of depression among this group, greater efforts are needed to facilitate treatment-seeking behaviors.

Second generation Chinese Americans have the highest predicted probability of twelve-month depression among Chinese Americans, but they are more likely to use

mental health services than first generation Chinese Americans. These findings suggest second generation Chinese Americans face unique challenges or sources of distress.

Third-or-higher generation Chinese Americans are not significantly different from the comparison group, non-Hispanic whites on depression prevalence mental health service use. In addition, they are more likely to seek help for mental health problems than are first generations, although the two groups do not differ significantly on predicted depression risk.

Limitations

It is important to note that all three of the substantive chapters of my dissertation have some limitations. First, the use of cross-sectional survey data limited my ability to make any causal inference, hence unspecified directionality of the influences among depression, socio-demographic characteristics, chronic physical condition, and social support and conflicts. Experimental and longitudinal research effort is need to better understand how social support and conflicts interact with depression risk. Also, I was unable to include certain variables in my analysis because of the limitation of the data. For example, in Chapter 2, I was not able to include several important factors, including perceived discrimination, family cohesion, and family conflicts in my analyses because of the lack of data on these measures from the non-Hispanic white sample.

Previous studies have found the effects of these factors on mental well-beings among Asian American populations to be significant yet nuanced, and the findings were less than consistent for the potential reasons regarding sampling frames and strategies (e.g., Abe-Kim et al. 2007; Gee et al. 2007; Juang et al. 2007). Furthermore, research has found variation of patterns of mental disorders within the group of Asian or Chinese

Americans. For example, Takeuchi and colleagues (2007) found that among foreign-born first generation Asian immigrants, those who arrived earlier in life were at higher risk of lifetime and twelve-month mental disorder, than those who arrived as an adult. Scholars have proposed the concept of “1.5 generation” immigrants, which refers to individuals who migrated to during their childhood or middle to late adolescence (Park 1999; Rumbaut 1994). Compared to those who migrated to a new country as an adult, the 1.5 generation immigrants tend to have different experiences and unique adaptation strategies in the process of acculturation, compared to first generation immigrants, or US-born second generation immigrants (Bartley and Spoonley 2008; Kim et al. 2003; Lee 2011). One study found significant association between adult subjective social status and depression among Asian immigrants who came to the US when they were twenty-five years old or older, not among those who migrated before the age of twenty-five (Leu et al. 2008). Future comparative studies need to examine the depression patterns and correlates among the 1.5 generations, in comparison to other generations.

In Chapter 3, I was unable to examine the role of these two dimensions in the entire depressive patterns, or their social correlates, also because of the lack of measurement on positive affect and interpersonal symptoms in DSM-IV diagnostic criteria. Previous findings suggest significant difference in these two dimension between cultural groups. Furthermore, this study only examined symptoms in the DSM-IV measurement for depressive episode and disorder. The lack of distinct symptom pattern of Chinese Americans compared to non-Hispanic white is not a full endorsement of depression as a universal and uniform experience. And the differences in the social correlates across foreign-born Chinese Americans, US-born Chinese Americans, and

non-Hispanic white exactly suggest cultural influence on the etiology and epidemiology of depression. Originally, I plan to examine Chinese Americans in three generational groups, as I do in the other two substantive chapters. However, the frequencies for almost all depression symptom items fall to very low numbers, even zero. This is because of the much small size of the second and third-or-higher generation Chinese Americans subgroups. Therefore, I divide Chinese Americans by nativity status.

In Chapter 4, the acculturation-related factors, i.e., generational status and English proficiency are only proxies rather than direct measurement of acculturation. As previously noted, the operationalization of acculturation is still under debate. To advance our knowledge of the effects of such a process on the health and help-seeking behaviors of ethnic minorities and immigrants, further refinement of measurements is necessary.

To my best knowledge, there is currently no goodness-of-fit test for multinomial logistic regression analysis using complex survey data, hence my inability to evaluate the power of the models in the weighted binary and multinomial logistic regression in all three substantive chapters. In addition, the groups of foreign-born Chinese Americans, US-born Chinese Americans have drastically smaller sample size than that of non-Hispanic whites, which could be the reason that I found much fewer significant predictors for the first two groups than for the non-Hispanic white group. The much larger sample size of non-Hispanic whites could mean much smaller standard error, and hence a coefficient that is not significant for foreign-born Chinese Americans or US-born Chinese Americans might be significant for non-Hispanic whites. In unweighted analysis of simple survey data, projected Wald chi-square could be calculated to project the result of the significant testing for the smaller group if it had the same sample size as the larger

group. However, current literature is unclear on whether the projected Wald chi-square test could be applied to weighted analysis for complex survey designs, as is the same in this dissertation.

Future Research

In addition to addressing the shortcomings of my analyses, I propose several topics for future research. First, I intend to conduct survey to collect data on depression symptoms among Chinese Americans. In particular, I would like to include extensive measures of depression symptom dimensions, including negative affect, positive affect, somatic symptoms, cognitive symptoms, suicidality, and existential ideations. Regarding mental health related service use, I would like to examine further the reasons to use various types of services, and adherence and satisfaction utilization.

Second, I would like to include measurement on cultural/ethnic identifications, cultural beliefs and behaviors, in order to better examine the association between culture and the experience of depression. Instead of using proxy-measures such as nativity status or generational status, I intend to examine how the acculturation factors are associated with various mental health related behaviors and outcomes.

Thirdly, I would also like to compare Chinese Americans to other Asian ethnic groups in the United States, on the prevalence of depression and other mental disorders, symptom patterns, and help-seeking behaviors. I believe such comparison can help us better understand how cultural and societal factors impact health outcomes.

Last but not least, I intend to further explore the application of several statistical tests in research, especially the analysis of categorical and limited dependent variables. Health research, especially mental health research, has yet to fully taken advantage of

statistical measures such as average marginal effect. Statistical tests like multinomial logistic regression, Poisson regression, or ZIP are not widely used, partially due to the difficulty of interpreting the coefficients. In my future research, I would like to explore the potential application of these statistical tests.

BIBLIOGRAPHY

- Abbey, Antonia, David J. Abramis, and Robert D. Caplan. 1985. "Effects of Different Sources of Social Support and Social Conflict on Emotional Well-Being." *Basic and Applied Social Psychology* 6(2):111–29.
- Abe-Kim, Jennifer et al. 2007. "Use of Mental Health-Related Services Among Immigrant and US-Born Asian Americans: Results from the National Latino and Asian American Study." *American Journal of Public Health* 97(1):91–98.
- Abraído-Lanza, Ana F., Adria N. Armbrister, Karen R. Flórez, and Alejandra N. Aguirre. 2006. "Toward a Theory-Driven Model of Acculturation in Public Health Research." *American Journal of Public Health* 96(8):1342–46.
- Aldwin, Carolyn and Ellen Greenberger. 1987. "Cultural Differences in the Predictors of Depression." *American Journal of Community Psychology* 15(6):789–813.
- Alegria, Margarita et al. 2004. "Considering Context, Place and Culture: The National Latino and Asian American Study." *International Journal of Methods in Psychiatric Research* 13(4):208–20.
- Almeida, Joanna, Beth E. Molnar, Ichiro Kawachi, and S. V. Subramanian. 2009. "Ethnicity and Nativity Status as Determinants of Perceived Social Support: Testing the Concept of Familism." *Social Science & Medicine* 68(10):1852–58.
- Almeida, J., S. V. Subramanian, I. Kawachi, and B. E. Molnar. 2011. "Is Blood Thicker Than Water? Social Support, Depression and the Modifying Role of Ethnicity/Nativity Status." *Journal of Epidemiology and Community Health* 65(1):51–56.
- Andrade, Laura et al. 2003. "The Epidemiology of Major Depressive Episodes: Results from the International Consortium of Psychiatric Epidemiology (ICPE) Surveys." *International Journal of Methods in Psychiatric Research* 12(1):3–21.
- Armstrong, Mary I., Shelly Birnie-Lefcovitch, and Michael T. Ungar. 2005. "Pathways Between Social Support, Family Well Being, Quality of Parenting, and Child Resilience: What We Know." *Journal of Child and Family Studies* 14(2):269–81.

- Astin, John A. 1998. "Why Patients Use Alternative Medicine: Results of a National Study." *JAMA* 279(19):1548–53.
- Barnes, Patricia M., Barbara Bloom, and Richard L. Nahin. 2008. *Complementary and Alternative Medicine Use Among Adults and Children: United States, 2007*. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics. Retrieved August 5, 2015 (<http://purl.access.gpo.gov/GPO/LPS108504>).
- Barnes, Patricia M., Eve Powell-Griner, Kim McFann, and Richard L. Nahin. 2004. "Complementary and Alternative Medicine Use Among Adults: United States, 2002." *Seminars in Integrative Medicine* 2(2):54–71.
- Bartley, Allen and Paul Spoonley. 2008. "Intergenerational Transnationalism: 1.5 Generation Asian Migrants in New Zealand." *International Migration* 46(4):63–84.
- Baumeister, Roy F., Jean M. Twenge, and Christopher K. Nuss. 2002. "Effects of Social Exclusion on Cognitive Processes: Anticipated Aloneness Reduces Intelligent Thought." *Journal of Personality and Social Psychology* 83(4):817–27.
- Beiser, Morton. 2005. "The Health of Immigrants and Refugees in Canada." *Canadian Journal of Public Health / Revue Canadienne de Sante'e Publique* 96:S30–44.
- Berkman, Lisa F. et al. 1986. "Depressive Symptoms in Relation to Physical Health and Functioning in the Elderly." *American Journal of Epidemiology* 124(3):372–88.
- Berkman, Lisa F. and Ichiro Kawachi. 2000. "Social Integration, Social Networks, Social Support, and Health." Pp. 137–73 in *Social Epidemiology*, edited by L. Berkman, and I. Kawachi. Oxford University Press.
- Berkman, Lisa F. and S. Leonard Syme. 1979. "Social Networks, Host Resistance, and Mortality: A Nine-Year Follow-up Study of Alameda County Residents." *American Journal of Epidemiology* 109(2):186–204.
- Berry, John W. 1990. "Acculturation and Adaptation: A General Framework." Pp. 90–102 in *Mental health of immigrants and refugees*, edited by W. H. Holtzman and T. H. Bornemann. Austin, TX, US: Hogg Foundation for Mental Health.

- Berry, John W. 2003. "Conceptual Approaches to Acculturation." Pp. 17–37 in *Acculturation: Advances in Theory, Measurement, and Applied Research*, edited by K. M. Chun, P. Balls Organista, and G. Marin. Washington, DC, US: American Psychological Association.
- Berthold, S. Megan et al. 2007. "U.S. Cambodian Refugees' Use of Complementary and Alternative Medicine for Mental Health Problems." *Psychiatric Services* 58(9):1212–18.
- Bisschop, M. Isabella, Didi M. W. Kriegsman, Aartjan T. F. Beekman, and Dorly J. H. Deeg. 2004. "Chronic Diseases and Depression: The Modifying Role of Psychosocial Resources." *Social Science & Medicine* 59(4):721–33.
- Blazer, Dan, Dana C. Hughes, and Linda George. 1992. "Age and Impaired Subjective Support: Predictors of Depressive Symptoms at One-Year Follow-Up." *Journal of Nervous* 180(3):172–78.
- Breslau, Joshua, Kenneth S. Kendler, Maxwell Su, Sergio Gaxiola-Aguilar, and Ronald C. Kessler. 2005. "Lifetime Risk and Persistence of Psychiatric Disorders across Ethnic Groups in the United States." *Psychological Medicine* 35(3):317–27.
- Briscoe, Monica. 1982. "Sex Differences in Psychological Well-Being." *Psychological Medicine Monograph Supplement* 1:1–46.
- Casado, Banghwa Lee and Patrick Leung. 2002. "Migratory Grief and Depression Among Elderly Chinese American Immigrants." *Journal of Gerontological Social Work* 36(1-2):5–26.
- Chan, Bibiana, Gordon Parker, Lucy Tully, and Maurice Eisenbruch. 2007. "Cross-Cultural Validation of the DMI-10 Measure of State Depression: The Development of a Chinese Language Version." *Journal of Nervous and Mental Disease* 195(1):20–25.
- Chang, Edward C. 1996. "Cultural Differences in Optimism, Pessimism, and Coping: Predictors of Subsequent Adjustment in Asian American and Caucasian American College Students." *Journal of Counseling Psychology* 43(1):113–23.

- Chang, Edward C. 2002. "Cultural Differences in Psychological Distress in Asian and Caucasian American College Students: Examining the Role of Cognitive and Affective Concomitants." *Journal of Counseling Psychology* 49(1):47–59.
- Chen, Eric Y. H. et al. 2006. "Suicide in Hong Kong: A Case-Control Psychological Autopsy Study." *Psychological Medicine* 36(6):815–25.
- Cheng, Janice Ka Yan et al. 2010. "Lifetime Suicidal Ideation and Suicide Attempts in Asian Americans." *Asian American Journal of Psychology* 1(1):18–30.
- Chen, Irene G., Robert E. Roberts, and Lu A. Aday. 1998. "Ethnicity and Adolescent Depression: The Case of Chinese Americans." *Journal of Nervous* 186(10):623–30.
- Chen, Sylvia Xiaohua, Fanny M. Cheung, Michael Harris Bond, and Jin-Pang Leung. 2005. "Decomposing the Construct of Ambivalence over Emotional Expression in a Chinese Cultural Context." *European Journal of Personality* 19(3):185–204.
- Chen, Sylvia Xiaohua and Winnie W. S. Mak. 2008. "Seeking Professional Help: Etiology Beliefs About Mental Illness Across Cultures." *Journal of Counseling Psychology* 55(4):442–50.
- Chentsova-Dutton, Yulia E. and Jeanne L. Tsai. 2002. "Understanding Depression across Cultures." Pp. 467–91 in *Handbook of depression*, edited by I. H. Gotlib and C. L. Hammen. New York, NY, US: Guilford Press.
- Cheung, Chau-Kiu and Christopher Bagley. 1998. "Validating An American Scale in Hong Kong: The Center for Epidemiological Studies Depression Scale (CES-D)." *Journal of Psychology* 132(2):169.
- Cheung, Fanny M., Bernard W. K. Lau, and Edith Waldmann. 1981. "Somatization among Chinese Depressives in General Practice." *The International Journal of Psychiatry in Medicine* 10(4):361–74.
- Cheung, Yin Bun, C. K. Law, Brandford Chan, Ka Yuet Liu, and Paul S. F. Yip. 2006. "Suicidal Ideation and Suicidal Attempts in a Population-Based Study of Chinese People: Risk Attributable to Hopelessness, Depression, and Social Factors." *Journal of Affective Disorders* 90(2):193–99.

- Chou, K. L., I. Chi, and N. W. S. Chow. 2004. "Sources of Income and Depression in Elderly Hong Kong Chinese: Mediating and Moderating Effects of Social Support and Financial Strain." *Aging & Mental Health* 8(3):212–21.
- Chu, Joyce P., Kun-Yueh Hsieh, and Di Ann Tokars. 2011. "Help-Seeking Tendencies in Asian Americans with Suicidal Ideation and Attempts." *Asian American Journal of Psychology* 2(1):25–38.
- Chu, Joyce and Stanley Sue. 2011. "Asian American Mental Health: What We Know and What We Don't Know." *Online Readings in Psychology and Culture* 3(1). Retrieved (<http://scholarworks.gvsu.edu/orpc/vol3/iss1/4>).
- Clarke, Tainya C., Lindsey I. Black, Barbara J. Stussman, Patricia M. Barnes, and Richard L. Nahin. 2015. "Trends in the Use of Complementary Health Approaches Among Adults: United States, 2002–2012." *National Health Statistics Reports* (79):1–16.
- Clark, Lauren and Lisa Hofsess. 1998. "Acculturation." Pp. 37–59 in *Handbook of Immigrant Health*, edited by S. Loue. Springer US. Retrieved October 18, 2016 (http://link.springer.com/chapter/10.1007/978-1-4899-1936-6_3).
- Clough, Juliana, Sunmin Lee, and David H. Chae. 2013. "Barriers to Health Care among Asian Immigrants in the United States: A Traditional Review." *Journal of Health Care for the Poor and Underserved* 24(1):384–403.
- Cohen, Sheldon and Thomas A. Wills. 1985. "Stress, Social Support, and the Buffering Hypothesis." *Psychological Bulletin* 98(2):310–57.
- Cook, W. K., C. Chung, and W. Tseng. 2011. "Demographic and Socioeconomic Profiles of Asian Americans, Native Hawaiians, and Pacific Islanders."
- Coulter, Ian D. and Evan M. Willis. 2004. "The Rise and Rise of Complementary and Alternative Medicine: A Sociological Perspective." *The Medical Journal of Australia* 180(11):587–89.
- Crockett, Lisa J. et al. 2007. "Acculturative Stress, Social Support, and Coping: Relations to Psychological Adjustment Among Mexican American College Students." *Cultural Diversity and Ethnic Minority Psychology* 13(4):347–55.

- Druss, Benjamin G. and Robert A. Rosenheck. 1999. "Association between Use of Unconventional Therapies and Conventional Medical Services." *JAMA* 282(7):651–56.
- Duldulao, Aileen Alfonso, David T. Takeuchi, and Seunghye Hong. 2009. "Correlates of Suicidal Behaviors Among Asian Americans." *Archives of Suicide Research* 13(3):277–90.
- Echeverría, Sandra, Ana V. Diez-Roux, Steven Shea, Luisa N. Borrell, and Sharon Jackson. 2008. "Associations of Neighborhood Problems and Neighborhood Social Cohesion with Mental Health and Health Behaviors: The Multi-Ethnic Study of Atherosclerosis." *Health & Place* 14(4):853–65.
- Eisenberg, David M. et al. 1993. "Unconventional Medicine in the United States -- Prevalence, Costs, and Patterns of Use." *The New England Journal of Medicine* 328(4):246.
- Eisenberg, David M. et al. 1998. "Trends in Alternative Medicine Use in the United States, 1990-1997: Results of A Follow-Up National Survey." *JAMA* 280(18):1569–75.
- Elliott, Marta. 2001. "Gender Differences in Causes of Depression." *Women & Health* 33(3-4):183–98.
- Everson, Susan A., Siobhan C. Maty, John W. Lynch, and George A. Kaplan. 2002. "Epidemiologic Evidence for the Relation Between Socioeconomic Status and Depression, Obesity, and Diabetes." *Journal of Psychosomatic Research* 53(4):891–95.
- Fang, Lin and Steven P. Schinke. 2007. "Complementary Alternative Medicine Use Among Chinese Americans: Findings From A Community Mental Health Service Population." *Psychiatric Services* 58(3):402–4.
- Fisher, L. et al. 2008. "A Longitudinal Study of Affective and Anxiety Disorders, Depressive Affect and Diabetes Distress in Adults With Type 2 Diabetes." *Diabetic Medicine* 25(9):1096–1101.

- Fogel, Joshua and Daniel E. Ford. 2005. "Stigma Beliefs of Asian Americans with Depression in an Internet Sample." *The Canadian Journal of Psychiatry* 50(8):470–78.
- Fong, Timothy P. 2007. *The Contemporary Asian American Experience: Beyond the Model Minority*. 3 edition. Upper Saddle River, N.J: Pearson.
- Gao, Ling-ling, Sally Wai-chi Chan, and Qing Mao. 2009. "Depression, Perceived Stress, and Social Support Among First-Time Chinese Mothers and Fathers in the Postpartum Period." *Research in Nursing & Health* 32(1):50–58.
- Gee, Gilbert C., Michael Spencer, Juan Chen, Tiffany Yip, and David T. Takeuchi. 2007. "The Association Between Self-Reported Racial Discrimination and 12-Month DSM-IV Mental Disorders Among Asian Americans Nationwide." *Social Science & Medicine* 64(10):1984–96.
- George, Linda K. 1996. "Social and Economic Factors Related to Psychiatric Disorders in Late Life." Pp. 129–53 in *The American Psychiatric Press Textbook of Geriatric Psychiatry, 2nd Ed*, edited by E. W. Busse and D. G. Blazer. Arlington, VA, US: American Psychiatric Association.
- Givens, Jane L., Thomas K. Houston, Benjamin W. Van Voorhees, Daniel E. Ford, and Lisa A. Cooper. 2007. "Ethnicity and Preferences for Depression Treatment." *General Hospital Psychiatry* 29(3):182–91.
- Goebert, Deborah. 2009. "Social Support, Mental Health, Minorities, and Acculturative Stress." Pp. 1–24 in *Determinants of Minority Mental Health and Wellness*, edited by S. Loue and M. Sajatovic. Springer New York. Retrieved October 10, 2014 (http://link.springer.com/chapter/10.1007/978-0-387-75659-2_7).
- Gold, Ellen B. et al. 2000. "Relation of Demographic and Lifestyle Factors to Symptoms in a Multi-Racial/Ethnic Population of Women 40–55 Years of Age." *American Journal of Epidemiology* 152(5):463–73.
- Graham, Robert E. et al. 2005. "Use of Complementary and Alternative Medical Therapies among Racial and Ethnic Minority Adults: Results from the 2002 National Health Interview Survey." *Journal of the National Medical Association* 97(4):535–45.

- Greenberger, Ellen and Chuansheng Chen. 1996. "Perceived Family Relationships and Depressed Mood in Early and Late Adolescence: A Comparison of European and Asian Americans." *Developmental Psychology* 32(4):707–16.
- Harris, Katherine M., Mark J. Edlund, and Sharon Larson. 2005. "Racial and Ethnic Differences in the Mental Health Problems and Use of Mental Health Care." *Medical Care* 43(8):775–84.
- Hays, Judith C. et al. 1998. "Social Correlates of the Dimensions of Depression in the Elderly." *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 53B(1):P31–39.
- Heeringa, Steven G. et al. 2004. "Sample Designs and Sampling Methods for the Collaborative Psychiatric Epidemiology Studies (CPES)." *International Journal of Methods in Psychiatric Research* 13(4):221–40.
- Heller, Kenneth. 1979. "The Effects of Social Support: Prevention and Treatment Implications." *Maximizing Treatment Gains: Transfer Enhancement in Psychotherapy* 353–82.
- Ho, Aaron K. et al. 2015. "Association of Anxiety and Depression With Hypertension Control: A US Multidisciplinary Group Practice Observational Study." *Journal of Hypertension* 33(11):2215–22.
- Hoeffel, Elizabeth M., Sonya Rastogi, Myoung Ouk Kim, and Hasan Shahid. 2012. "The Asian Population: 2010. 2010 Census Briefs." Retrieved October 13, 2014 (<http://www.census.gov/prod/cen2010/briefs/c2010br-11.pdf>).
- Huang, Frederick Y., Henry Chung, Kurt Kroenke, Kevin L. Delucchi, and Robert L. Spitzer. 2006. "Using the Patient Health Questionnaire-9 to Measure Depression Among Racially and Ethnically Diverse Primary Care Patients." *Journal of General Internal Medicine* 21(6):547–52.
- Hwang, W. C., H. F. Myers, and D. T. Takeuchi. 2000. "Psychosocial Predictors of First-Onset Depression in Chinese Americans." *Social Psychiatry and Psychiatric Epidemiology* 35(3):133–45.

- Hwang, Wei-Chin, Chi-Ah Chun, David T. Takeuchi, Hector F. Myers, and Prabha Siddarth. 2005. "Age of First Onset Major Depression in Chinese Americans." *Cultural Diversity and Ethnic Minority Psychology* 11(1):16–27.
- Hwang, Wei-Chin and Hector F. Myers. 2007. "Major Depression in Chinese Americans." *Social Psychiatry and Psychiatric Epidemiology* 42(3):189–97.
- Hwu, Hao-Gwo, I. Hao Chang, Eng-Kung Yeh, Ching-Jui Chang, and Ling-Ling Yeh. 1996. "Major Depressive Disorder in Taiwan Defined by the Chinese Diagnostic Interview Schedule." *The Journal of Nervous and Mental Disease* 184(8):497–502.
- Inaba, Akihide et al. 2005. "Depression in the United States and Japan: Gender, Marital Status, and SES Patterns." *Social Science & Medicine* 61(11):2280–92.
- Izzo, Angelo A. and Edzard Ernst. 2012. "Interactions Between Herbal Medicines and Prescribed Drugs." *Drugs* 69(13):1777–98.
- Jackson, James S. et al. 2004. "The National Survey of American Life: A Study of Racial, Ethnic and Cultural Influences on Mental Disorders and Mental Health." *International Journal of Methods in Psychiatric Research* 13(4):196–207.
- Jackson-Triche, Maga E. et al. 2000. "Depression and Health-Related Quality of Life in Ethnic Minorities Seeking Care in General Medical Settings." *Journal of Affective Disorders* 58(2):89–97.
- Jang, Michael, Evelyn Lee, and Kent Woo. 1998. "Income, Language, and Citizenship Status: Factors Affecting the Health Care Access and Utilization of Chinese Americans." *Health & Social Work* 23(2):136–45.
- Jia, Cun-Xian, Lin-Lin Wang, Ai-Qiang Xu, Ai-Ying Dai, and Ping Qin. 2014. "Physical Illness and Suicide Risk in Rural Residents of Contemporary China: A Psychological Autopsy Case-Control Study." *Crisis* 35(5):330–37.
- Joiner, Thomas E. and Katherine A. Timmons. 2002. "Depression in Its Interpersonal Context." Pp. 467–91 in *Handbook of depression*, edited by I. H. Gotlib and C. L. Hammen. New York, NY, US: Guilford Press.

- Juang, Linda P. and Alvin A. Alvarez. 2010. "Discrimination and Adjustment Among Chinese American Adolescents: Family Conflict and Family Cohesion as Vulnerability and Protective Factors." *American Journal of Public Health* 100(12):2403–9.
- Juang, Linda P. and Jeffrey T. Cookston. 2009. "Acculturation, Discrimination, and Depressive Symptoms among Chinese American Adolescents: A Longitudinal Study." *The Journal of Primary Prevention* 30(3-4):475–96.
- Juang, Linda P., Moin Syed, and Miyuki Takagi. 2007. "Intergenerational Discrepancies of Parental Control Among Chinese American Families: Links to Family Conflict and Adolescent Depressive Symptoms." *Journal of Adolescence* 30(6):965–75.
- Kalibatseva, Zornitsa and Frederick T. L. Leong. 2011. "Depression among Asian Americans: Review and Recommendations." *Depression Research and Treatment* 2011. Retrieved March 13, 2014 (<http://www.hindawi.com/journals/drt/2011/320902/abs/>).
- Katon, Wayne J. 2003. "Clinical and Health Services Relationships between Major Depression, Depressive Symptoms, and General Medical Illness." *Biological Psychiatry* 54(3):216–26.
- Katon, Wayne and Herbert Schulberg. 1992. "Epidemiology of Depression in Primary Care." *General Hospital Psychiatry* 14(4):237–47.
- Kessler, Ronald C. et al. 1994. "Lifetime and 12-Month Prevalence of DSM-III-R Psychiatric Disorders in the United States Results From the National Comorbidity Survey." *Archives of General Psychiatry* 51(1):8–19.
- Kessler, Ronald C. et al. 2001. "The Use of Complementary and Alternative Therapies to Treat Anxiety and Depression in the United States." *The American Journal of Psychiatry* 158(2):289–94.
- Kessler, Ronald C. et al. 2003. "The Epidemiology of Major Depressive Disorder: Results from the National Comorbidity Survey Replication (NCS-R)." *Journal of the American Medical Association* 289(23):3095–3105.

- Kessler, Ronald C. et al. 2004. "The US National Comorbidity Survey Replication (NCS-R): Design and Field Procedures." *International Journal of Methods in Psychiatric Research* 13(2):69–92.
- Kessler, Ronald C., Patricia Berglund, et al. 2005. "Lifetime Prevalence and Age-of-Onset Distributions of DSM-IV Disorders in the National Comorbidity Survey Replication." *Archives of General Psychiatry* 62(6):593–602.
- Kessler, Ronald C. et al. 2009. "The Global Burden of Mental Disorders: An Update from the WHO World Mental Health (WMH) Surveys." *Epidemiology and Psychiatric Sciences* 18(01):23–33.
- Kessler, Ronald C. et al. 2010. "Age Differences in Major Depression: Results from the National Comorbidity Survey Replication (NCS-R)." *Psychological Medicine* 40(02):225–37.
- Kessler, Ronald C., Wai Tat Chiu, Olga Demler, and Ellen E. Walters. 2005. "Prevalence, Severity, and Comorbidity of 12-Month DSM-IV Disorders in the National Comorbidity Survey Replication." *Archives of General Psychiatry* 62(6):617–27.
- Kessler, Ronald C., Cindy Foster, Pamela S. Webster, and James S. House. 1992. "The Relationship between Age and Depressive Symptoms in Two National Surveys." *Psychology and Aging* 7(1):119–26.
- Kessler, Ronald C., Maria Petukhova, Nancy A. Sampson, Alan M. Zaslavsky, and Hans-Ullrich Wittchen. 2012. "Twelve-Month and Lifetime Prevalence and Lifetime Morbid Risk of Anxiety and Mood Disorders in the United States." *International Journal of Methods in Psychiatric Research* 21(3):169–84.
- Kim, Bryan S. K., Bradley R. Brenner, Christopher T. H. Liang, and Penelope A. Asay. 2003. "A Qualitative Study of Adaptation Experiences of 1.5-Generation Asian Americans." *Cultural Diversity & Ethnic Minority Psychology* 9(2):156–70.
- Kim, Giyeon et al. 2011. "Limited English Proficiency as a Barrier to Mental Health Service Use: A Study of Latino and Asian Immigrants With Psychiatric Disorders." *Journal of Psychiatric Research* 45(1):104–10.

- Kim, Hyoun K. and Patrick C. McKenry. 2002. "The Relationship Between Marriage and Psychological Well-Being A Longitudinal Analysis." *Journal of Family Issues* 23(8):885–911.
- Kim, Jae-On and Charles W. Mueller. 1978. *Factor Analysis: Statistical Methods and Practical Issues*. SAGE Publications, Inc.
- Kim, Minjeong. 2014. "Racial/Ethnic Disparities in Depression and Its Theoretical Perspectives." *Psychiatric Quarterly* 85(1):1–8.
- Kirmayer, Laurence J. and Danielle Groleau. 2001. "Affective Disorders in Cultural Context." *Psychiatric Clinics of North America* 24(3):465–78.
- Kirmayer, Laurence and Laurence Ed Kirmayer. 1991. *Current Concepts of Somatization Research and Clinical Perspectives*. 1 edition. edited by L. Kirmayer. Washington, DC: American Psychiatric Press.
- Kleinman, Arthur. 1985. *Culture and Depression: Studies in the Anthropology and Cross-Cultural Psychiatry of Affect and Disorder*. University of California Press.
- Kleinman, Arthur. 2004. "Culture and Depression." *The New England Journal of Medicine* 351(10):951–53.
- Kleinman, Arthur M. 1977. "Depression, Somatization and the 'New Cross-Cultural Psychiatry.'" *Social Science & Medicine (1967)* 11(1):3–9.
- Kleinman, Arthur M. 1982. "Neurasthenia and Depression: A Study of Somatization and Culture in China." *Culture, Medicine and Psychiatry* 6(2):117–90.
- Kleinman, Arthur M. 1987. "Anthropology and Psychiatry. The Role of Culture in Cross-Cultural Research on Illness." *The British Journal of Psychiatry* 151(4):447–54.
- Kleinman, Arthur M., Leon Eisenberg, and Byron Good. 1978. "Culture, Illness, and Care: Clinical Lessons from Anthropologic and Cross-Cultural Research." *Annals of Internal Medicine* 88(2):251–58.

- Klerman, Gerald L. and Myrna M. Weissman. 1994. *Interpersonal Psychotherapy of Depression: A Brief, Focused, Specific Strategy*. Jason Aronson, Incorporated.
- Koneru, Vamsi K., Amy G. Weisman de Mamani, Patricia M. Flynn, and Hector Betancourt. 2007. "Acculturation and Mental Health: Current Findings and Recommendations for Future Research." *Applied and Preventive Psychology* 12(2):76–96.
- Kroenke, K. and R. Swindle. 2000. "Cognitive-Behavioral Therapy for Somatization and Symptom Syndromes: A Critical Review of Controlled Clinical Trials." *Psychotherapy and Psychosomatics* 69(4):205–15.
- Kroenke, Kurt, Robert L. Spitzer, and Janet B. W. Williams. 2001. "The PHQ-9: Validity of A Brief Depression Severity Measure." *Journal of General Internal Medicine* 16(9):606–13.
- Kronenberg, Fredi, Linda F. Cushman, Christine M. Wade, Debra Kalmuss, and Maria T. Chao. 2006. "Race/Ethnicity and Women's Use of Complementary and Alternative Medicine in the United States: Results of a National Survey." *American Journal of Public Health* 96(7):1236–42.
- Kung, Winnie W. 2003. "Chinese Americans' Help Seeking for Emotional Distress." *Social Service Review* 77(1):110–34.
- Kung, Winnie W. 2004. "Cultural and Practical Barriers to Seeking Mental Health Treatment for Chinese Americans." *Journal of Community Psychology* 32(1):27–43.
- Kuo, Ben C. H. and Jian Guan. 2006. "Sociocultural Predictors of Depression for Chinese Immigrant Elderly in Canada: Acculturation, Relationship with Adult Children, Social Support, and Perceived Services Barriers." Pp. 373–92 in *Navigating Multiculturalism: Negotiating Change*, edited by D. Zinga. Cambridge Scholars Publishing.
- Kuo, Wen H. 1984. "Prevalence of Depression among Asian-Americans." *The Journal of Nervous and Mental Disease* 172(8):449–57.

- Lai, Daniel W. 2004. "Depression among Elderly Chinese-Canadian Immigrants from Mainland China." *Chinese Medical Journal* 117(5):677–83.
- Lakey, Brian and Sheldon Cohen. 2000. "Social Support Theory and Measurement." in *Social Support Measurement and Intervention: A Guide for Health and Social Scientists*, edited by S. Cohen, L. G. Underwood, and B. H. Gottlieb. Oxford University Press.
- Lam, Robert E., James T. Pacala, and Stanley L. Smith. 1997. "Factors Related to Depressive Symptoms in an Elderly Chinese American Sample." *Clinical Gerontologist* 17(4):57–70.
- Lau, Anna and David Takeuchi. 2001. "Cultural Factors in Help-Seeking for Child Behavior Problems: Value Orientation, Affective Responding, and Severity Appraisals Among Chinese American Parents." *Journal of Community Psychology* 29(6):675–92.
- Lee, Margaret T. Y., Betty P. Wong, Bonnie W. Y. Chow, and Catherine McBride-Chang. 2006. "Predictors of Suicide Ideation and Depression in Hong Kong Adolescents: Perceptions of Academic and Family Climates." *Suicide and Life-Threatening Behavior* 36(1):82–96.
- Lee, Minsun. 2011. "Generational Diversity Among Immigrants" edited by A. Nezu. *The Clinical Psychologist* 64(3):11–12.
- Lee, S. et al. 2007. "Lifetime Prevalence of Suicide Ideation, Plan, and Attempt in Metropolitan China." *Acta Psychiatrica Scandinavica* 116(6):429–37.
- Lee, S. et al. 2009. "The Epidemiology of Depression in Metropolitan China." *Psychological Medicine* 39(5):735–47.
- Le Meyer, Oanh, Nolan Zane, Young Il Cho, and David T. Takeuchi. 2009. "Use of Specialty Mental Health Services by Asian Americans With Psychiatric Disorders." *Journal of Consulting and Clinical Psychology* 77(5):1000–1005.
- Leong, Frederick T. L. 1986. "Counseling and Psychotherapy with Asian-Americans: Review of the Literature." *Journal of Counseling Psychology* 33(2):196–206.

- Leong, Frederick T. L. 1994. "Asian Americans' Differential Patterns of Utilization of Inpatient and Outpatient Public Mental Health Services in Hawaii." *Journal of Community Psychology* 22(2):82–96.
- Leong, Frederick T. L. and Anna S. L. Lau. 2001. "Barriers to Providing Effective Mental Health Services to Asian Americans." *Mental Health Services Research* 3(4):201–14.
- Lepore, Stephen J. 1992. "Social Conflict, Social Support, and Psychological Distress: Evidence of Cross-Domain Buffering Effects." *Journal of Personality and Social Psychology* 63(5):857–67.
- Leu, Janxin et al. 2008. "The Association Between Subjective Social Status and Mental Health Among Asian Immigrants: Investigating the Influence of Age at Immigration." *Social Science & Medicine* 66(5):1152–64.
- Leung, C. M., K. K. Chan, and K. K. Cheng. 1992. "Psychiatric Morbidity in a General Medical Ward. Hong Kong's Experience." *General Hospital Psychiatry* 14(3):196–200.
- Lichtman, Judith H. et al. 2014. "Depression as a Risk Factor for Poor Prognosis Among Patients With Acute Coronary Syndrome: Systematic Review and Recommendations." *Circulation* 129(12):1350–69.
- Lieber, Eli, Dorothy Chin, Kazuo Nihira, and Iris Tan Mink. 2001. "Holding on and Letting Go: Identity and Acculturation among Chinese Immigrants." *Cultural Diversity and Ethnic Minority Psychology* 7(3):247–61.
- Link, Bruce G. and Jo C. Phelan. 1995. "Social Conditions as Fundamental Causes of Disease." *Journal of Health and Social Behavior* 35:80.
- Lin, Nan. 1986. "Moderating the Effects of Social Support." Pp. 173–214 in *Social Support, Life Events, and Depression*. Academic Press.
- Lin, Nan. 1989. "Measuring Depressive Symptomatology in China." *Journal of Nervous and Mental Disease* 177(3):121–31.

- Long, J. Scott and Jeremy Freese. 2014. *Regression Models for Categorical Dependent Variables Using Stata*. 3rd ed. College Station, Texas: Stata Press.
- Lorant, V. et al. 2003. "Socioeconomic Inequalities in Depression: A Meta-Analysis." *American Journal of Epidemiology* 157(2):98–112.
- Lorant, Vincent et al. 2007. "Depression and Socio-Economic Risk Factors: 7-Year Longitudinal Population Study." *The British Journal of Psychiatry* 190(4):293–98.
- Lou, Yimin and Roderic Beaujot. 2005. "What Happens to the 'Healthy Immigrant Effect': The Mental Health of Immigrants to Canada." *PSC Discussion Papers Series* 19(15). Retrieved (<http://ir.lib.uwo.ca/pscpapers/vol19/iss15/1>).
- Löwe, Bernd et al. 2004. "Anxiety and Depression in Patients with Pulmonary Hypertension." *Psychosomatic Medicine* 66(6):831–36.
- Löwe, Bernd et al. 2008. "Depression, Anxiety and Somatization in Primary Care: Syndrome Overlap and Functional Impairment." *General Hospital Psychiatry* 30(3):191–99.
- Lu, Aitao, Michael Harris Bond, Michael Friedman, and Ching Chan. 2010. "Understanding Cultural Influences on Depression by Analyzing A Measure of Its Constituent Symptoms." *International Journal of Psychological Studies* 2(1):55–70.
- Mackenzie, Elizabeth R., Lynne Taylor, Bernard S. Bloom, David J. Hufford, and Jerry C. Johnson. 2003. "Ethnic Minority Use of Complementary and Alternative Medicine (CAM): A National Probability Survey of CAM Utilizers." *Alternative Therapies in Health and Medicine* 9(4):50–56.
- Ma, Grace Xueqin. 1999. "Between Two Worlds: The Use of Traditional and Western Health Services by Chinese Immigrants." *Journal of Community Health* 24(6):421–37.
- Marcus, Sheila M. et al. 2005. "Gender Differences in Depression: Findings from the STAR*D Study." *Journal of Affective Disorders* 87(2–3):141–50.

- Marjoram, Dominic et al. 2005. "Symptomatology and Social Inference: A Theory of Mind Study of Schizophrenia and Psychotic Affective Disorder." *Cognitive Neuropsychiatry* 10(5):347–59.
- Marsella, Anthony J. 1978. "Thoughts on Cross-Cultural Studies on the Epidemiology of Depression." *Culture, Medicine and Psychiatry* 2(4):343–57.
- Marsella, Anthony J., David Kinzie, and Paul Gordon. 1973. "Ethnic Variations in the Expression of Depression." *Journal of Cross-Cultural Psychology* 4(4):435–58.
- Massey, Douglas S. 1981. "Dimensions of the New Immigration to the United States and the Prospects for Assimilation." *Annual Review of Sociology* 7:57–85.
- Massie, Mary Jane. 2004. "Prevalence of Depression in Patients with Cancer." *Journal of the National Cancer Institute. Monographs* (32):57–71.
- Matcham, Faith, Lauren Rayner, Sophia Steer, and Matthew Hotopf. 2013. "The Prevalence of Depression in Rheumatoid Arthritis: A Systematic Review and Meta-Analysis." *Rheumatology* 52(12):2136–48.
- Mayberry, Robert M., Fatima Mili, and Elizabeth Ofili. 2000. "Racial and Ethnic Differences in Access to Medical Care." *Medical Care Research and Review* 57(4 suppl):108–45.
- Min, Pyong Gap. 2002. *The Second Generation: Ethnic Identity among Asian Americans*. Rowman Altamira.
- de Miranda Azevedo, R., A. M. Roest, P. W. Hoen, and P. de Jonge. 2014. "Cognitive/Affective and Somatic/Affective Symptoms of Depression in Patients With Heart Disease and Their Association With Cardiovascular Prognosis: A Meta-Analysis." *Psychological Medicine* 44(13):2689–2703.
- Mirowsky, John and Catherine E. Ross. 1992. "Age and Depression." *Journal of Health and Social Behavior* 33(3):187–205.

- Mitchell, Jim, Holly F. Mathews, and Jerome A. Yesavage. 1993. "A Multidimensional Examination of Depression among the Elderly." *Research on Aging* 15(2):198–219.
- Mossakowski, Krysia N. 2009. "The Influence of Past Unemployment Duration on Symptoms of Depression Among Young Women and Men in the United States." *American Journal of Public Health* 99(10):1826–32.
- Moussavi, Saba et al. 2007. "Depression, Chronic Diseases, and Decrements in Health: Results From the World Health Surveys." *The Lancet* 370(9590):851–58.
- Mui, Ada C. 1996. "Depression among Elderly Chinese Immigrants: An Exploratory Study." *Social Work* 41(6):633–45.
- Mui, Ada C. 1999. "Living Alone and Depression Among Older Chinese Immigrants." *Journal of Gerontological Social Work* 30(3-4):147–66.
- Mui, Ada C. and Kang Suk-Young. 2006. "Acculturation Stress and Depression among Asian Immigrant Elders." *Social Work* 51(3):243–55.
- Mulvaney-Day, Norah E., Margarita Alegría, and William Sribney. 2007. "Social Cohesion, Social Support, and Health among Latinos in the United States." *Social Science & Medicine* 64(2):477–95.
- Murphy, Louise B., Jeffrey J. Sacks, Teresa J. Brady, Jennifer M. Hootman, and Daniel P. Chapman. 2012. "Anxiety and Depression Among US Adults With Arthritis: Prevalence and Correlates." *Arthritis Care & Research* 64(7):968–76.
- Murray, Raymond H. and Arthur J. Rubel. 1992. "Physicians and Healers — Unwitting Partners in Health Care." *New England Journal of Medicine* 326(1):61–64.
- Nemeroff, Charles B. et al. 2003. "Differential Responses to Psychotherapy versus Pharmacotherapy in Patients with Chronic Forms of Major Depression and Childhood Trauma." *Proceedings of the National Academy of Sciences* 100(24):14293–96.

- Nguyen, Duy and Lindsay A. Bornheimer. 2014. "Mental Health Service Use Types Among Asian Americans with a Psychiatric Disorder: Considerations of Culture and Need." *The Journal of Behavioral Health Services & Research* 41(4):520–28.
- Nock, Matthew K. et al. 2008. "Cross-National Prevalence and Risk Factors for Suicidal Ideation, Plans and Attempts." *The British Journal of Psychiatry* 192(2):98–105.
- Obradović, Jelena, Nicole Tirado-Strayer, and Janxin Leu. 2013. "The Importance of Family and Friend Relationships for the Mental Health of Asian Immigrant Young Adults and Their Nonimmigrant Peers." *Research in Human Development* 10(2):163–83.
- Okazaki, Sumie. 1997. "Sources of Ethnic Differences between Asian American and White American College Students on Measures of Depression and Social Anxiety." *Journal of Abnormal Psychology* 106(1):52–60.
- Okazaki, Sumie. 2000. "Asian American and White American Differences on Affective Distress Symptoms Do Symptom Reports Differ Across Reporting Methods?" *Journal of Cross-Cultural Psychology* 31(5):603–25.
- Okazaki, Sumie and Diya Kallivayalil. 2002. "Cultural Norms and Subjective Disability as Predictors of Symptom Reports among Asian Americans and White Americans." *Journal of Cross-Cultural Psychology* 33(5):482–91.
- Oldendick, Robert et al. 2000. "Population-Based Survey of Complementary and Alternative Medicine Usage, Patient Satisfaction, and Physician Involvement." *Southern Medical Journal* 93(4).
- Parker, G., Y. C. Cheah, and K. Roy. 2001. "Do the Chinese Somatize Depression? A Cross-Cultural Study." *Social Psychiatry and Psychiatric Epidemiology* 36(6):287–93.
- Parker, Gordon, Bibiana Chan, Lucy Tully, and Maurice Eisenbruch. 2005. "Depression in the Chinese: The Impact of Acculturation." *Psychological Medicine* 35(10):1475–83.

- Parker, Gordon, Gemma Gladstone, and Kuan Tsee Chee. 2001. "Depression in the Planet's Largest Ethnic Group: The Chinese." *American Journal of Psychiatry* 158(6):857-64.
- Park, Kyeyoung. 1999. "I Really Do Feel I'm 1.5!': The Construction of Self and Community by Young Korean Americans." *Amerasia Journal* 25(1):139-63.
- Park, Robert E. 1928. "Human Migration and the Marginal Man." *American Journal of Sociology* 33(6):881-93.
- Paul, Karsten I. and Klaus Moser. 2009. "Unemployment Impairs Mental Health: Meta-Analyses." *Journal of Vocational Behavior* 74(3):264-82.
- Pearlin, Leonard I. and Joyce S. Johnson. 1977. "Marital Status, Life-Strains and Depression." *American Sociological Review* 42(5):704.
- Peirce, Robert S., Michael R. Frone, Marcia Russell, M. Lynne, and Pamela Mudar. 2000. "A Longitudinal Model of Social Contact, Social Support, Depression, and Alcohol Use." *Health Psychology* 19(1):28-38.
- Perreira, Krista M., Natalia Deeb-Sossa, Kathleen Mullan Harris, and Kenneth Bollen. 2005. "What Are We Measuring? An Evaluation of the CES-D Across Race/Ethnicity and Immigrant Generation." *Social Forces* 83(4):1567-1601.
- Pescosolido, Bernice A., Eric R. Wright, Margarita Alegría, and Mildred Vera. 1998. "Social Networks and Patterns of Use among the Poor with Mental Health Problems in Puerto Rico." *Medical Care* 36(7):1057-72.
- Phillips, Leslie and Juris Draguns. 1969. "Some Issues in Intercultural Research on Psychopathology." *Mental Health Research in Asia and the Pacific* 21-32.
- Phillips, Michael R., Huaqing Liu, and Yanping Zhang. 1999. "Suicide and Social Change in China." *Culture, Medicine and Psychiatry* 23(1):25-50.

- Phillips, Michael R., Veronica Pearson, Feifei Li, Minjie Xu, and Lawrence Yang. 2002. "Stigma and Expressed Emotion: A Study of People with Schizophrenia and Their Family Members in China." *The British Journal of Psychiatry* 181(6):488–93.
- Portes, Alejandro and Rubén G. Rumbaut. 2001. *Legacies: The Story of the Immigrant Second Generation*. University of California Press.
- Pregibon, Daryl. 1979. *Data Analytic Methods for Generalized Linear Models*. Thesis (Ph.D.)--University of Toronto.
- Price, Richard H., Jin Nam Choi, and Amiram D. Vinokur. 2002. "Anxiety and Depression Among US Adults With Arthritis: Prevalence and Correlates." *Journal of Occupational Health Psychology* 7(4):302–12.
- Procidano, Mary E. and Kenneth Heller. 1983. "Measures of Perceived Social Support From Friends and From Family: Three Validation Studies." *American Journal of Community Psychology* 11(1):1–24.
- Qin, Desirée Boalian, Niobe Way, and Preetika Mukherjee. 2008. "The Other Side of the Model Minority Story the Familial and Peer Challenges Faced by Chinese American Adolescents." *Youth & Society* 39(4):480–506.
- Radloff, Lenore S. 1977. "The CES-D Scale A Self-Report Depression Scale for Research in the General Population." *Applied Psychological Measurement* 1(3):385–401.
- Rafferty, Ann P., Harry B. McGee, Corinne E. Miller, and Michele Reyes. 2002. "Prevalence of Complementary and Alternative Medicine Use: State-Specific Estimates From the 2001 Behavioral Risk Factor Surveillance System." *American Journal of Public Health* 92(10):1598–1600.
- Rao, J. N. K. and A. J. Scott. 1984. "On Chi-Squared Tests for Multiway Contingency Tables with Cell Proportions Estimated from Survey Data." *The Annals of Statistics* 12(1):46–60.

- Revenson, Tracey A., Kathleen M. Schiaffino, S. Deborah Majerovitz, and Allan Gibofsky. 1991. "Social Support as a Double-Edged Sword: The Relation of Positive and Problematic Support to Depression Among Rheumatoid Arthritis Patients." *Social Science & Medicine* 33(7):807–13.
- Rhee, Siyon, Janet Chang, and Jessica Rhee. 2003. "Acculturation, Communication Patterns, and Self-Esteem Among Asian and Caucasian American Adolescents." *Adolescence* 38(152):749–68.
- Rinaldi, Patrizia et al. 2003. "Validation of the Five-Item Geriatric Depression Scale in Elderly Subjects in Three Different Settings." *Journal of the American Geriatrics Society* 51(5):694–98.
- Roberts, Robert E., Catherine R. Roberts, and Y. Richard. 1997. "Ethnocultural Differences in Prevalence of Adolescent Depression." *American Journal of Community Psychology* 25(1):95–110.
- Rogler, Lloyd H. and Dharmar E. Cortes. 1993. "Help-Seeking Pathways: A Unifying Concept in Mental Health Care." *American Journal of Psychiatry* 150(4):554–61.
- Rosenberg, Charles E. 2002. "The Tyranny of Diagnosis: Specific Entities and Individual Experience." *Milbank Quarterly* 80(2):237–60.
- Ross, Catherine E. and John Mirowsky. 2006. "Sex Differences in the Effect of Education on Depression: Resource Multiplication or Resource Substitution?" *Social Science & Medicine* 63(5):1400–1413.
- Rumbaut, Ruben G. 1994. "The Crucible within: Ethnic Identity, Self-Esteem, and Segmented Assimilation among Children of Immigrants." *The International Migration Review* 28(4):748–94.
- Sakamoto, Arthur, Kimberly A. Goyette, and Chang Hwan Kim. 2009. "Socioeconomic Attainments of Asian Americans." *Annual Review of Sociology* 35:255–76.
- Salant, Talya and Diane S. Lauderdale. 2003. "Measuring Culture: A Critical Review of Acculturation and Health in Asian Immigrant Populations." *Social Science & Medicine* 57(1):71–90.

- Sangalang, Cindy C. and Gilbert C. Gee. 2012. "Depression and Anxiety among Asian Americans: The Effects of Social Support and Strain." *Social Work* 57(1):49–60.
- Schaefer, Catherine, James C. Coyne, and Richard S. Lazarus. 1981. "The Health-Related Functions of Social Support." *Journal of Behavioral Medicine* 4(4):381–406.
- Scheper-Hughes, Nancy and Margaret M. Lock. 1987. "The Mindful Body: A Prolegomenon to Future Work in Medical Anthropology." *Medical Anthropology Quarterly* 1(1):6–41.
- Schmid, Carol L. 2001. "Educational Achievement, Language-Minority Students, and the New Second Generation." *Sociology of Education* 74:71–87.
- Scott, Kate M. et al. 2007. "Depression–Anxiety Relationships with Chronic Physical Conditions: Results from the World Mental Health Surveys." *Journal of Affective Disorders* 103(1):113–20.
- Seeman, Teresa E., Tina M. Lusignolo, Marilyn Albert, and Lisa Berkman. 2001. "Social Relationships, Social Support, and Patterns of Cognitive Aging in Healthy, High-Functioning Older Adults: MacArthur Studies of Successful Aging." *Health Psychology* 20(4):243–55.
- Shen, Biing-Jiun and David T. Takeuchi. 2001. "A Structural Model of Acculturation and Mental Health Status Among Chinese Americans." *American Journal of Community Psychology* 29(3):387–418.
- Silverstein, Daniel D. and Allen D. Spiegel. 2001. "Are Physicians Aware of the Risks of Alternative Medicine?" *Journal of Community Health* 26(3):159–74.
- Simon, Gregory E., Michael VonKorff, Marco Piccinelli, Claudio Fullerton, and Johan Ormel. 1999. "An International Study of the Relation between Somatic Symptoms and Depression." *New England Journal of Medicine* 341(18):1329–35.
- Spencer, Michael S. and Juan Chen. 2004. "Effect of Discrimination on Mental Health Service Utilization Among Chinese Americans." *American Journal of Public Health* 94(5):809–14.

- Spencer, Michael S., Juan Chen, Gilbert C. Gee, Cathryn G. Fabian, and David T. Takeuchi. 2010. "Discrimination and Mental Health-Related Service Use in a National Study of Asian Americans." *American Journal of Public Health* 100(12):2410–17.
- Startup, Mike, Anne Rees, and Michael Barkham. 1992. "Components of Major Depression Examined via the Beck Depression Inventory." *Journal of Affective Disorders* 26(4):251–59.
- StataCorp. 2015. *Stata Statistical Software: Release 14*. College Station, TX: StataCorp LP.
- Stein, Murray B., Brian J. Cox, Tracie O. Afifi, Shay-Lee Belik, and Jitender Sareen. 2006. "Does Co-Morbid Depressive Illness Magnify the Impact of Chronic Physical Illness? A Population-Based Perspective." *Psychological Medicine* 36(5):587–96.
- Stice, Eric, Jennifer Ragan, and Patrick Randall. 2004. "Prospective Relations Between Social Support and Depression: Differential Direction of Effects for Parent and Peer Support?" *Journal of Abnormal Psychology* 113(1):155–59.
- Stokes, Sandy Chen, Larry W. Thompson, Susan Murphy, and Dolores Gallagher-Thompson. 2002. "Screening for Depression in Immigrant Chinese-American Elders." *Journal of Gerontological Social Work* 36(1-2):27–44.
- Storch, Eric A., Jonathan W. Roberti, and Deborah A. Roth. 2004. "Factor Structure, Concurrent Validity, and Internal Consistency of the Beck Depression Inventory-Second Edition in a Sample of College Students." *Depression and Anxiety* 19(3):187–89.
- Sun, Rachel C. F., Eadaoin K. P. Hui, and David Watkins. 2006. "Towards a Model of Suicidal Ideation for Hong Kong Chinese Adolescents." *Journal of Adolescence* 29(2):209–24.
- Tabora, Betty and Jacquelyn H. Flaskerud. 1994. "Depression Among Chinese Americans: A Review of the Literature." *Issues in Mental Health Nursing* 15(6):569–84.

- Takeuchi, David T. et al. 1998. "Lifetime and Twelve-Month Prevalence Rates of Major Depressive Episodes and Dysthymia Among Chinese Americans in Los Angeles." *American Journal of Psychiatry* 155(10):1407–14.
- Takeuchi, David T. et al. 2007. "Immigration-Related Factors and Mental Disorders Among Asian Americans." *American Journal of Public Health* 97(1):84–90.
- Tata, Shiraz Piroshaw and Frederick T. L. Leong. 1994. "Individualism-Collectivism, Social-Network Orientation, and Acculturation as Predictors of Attitudes toward Seeking Professional Psychological Help among Chinese Americans." *Journal of Counseling Psychology* 41(3):280–87.
- Tindle, Hilary A., Roger B. Davis, Russell S. Phillips, and David M. Eisenberg. 2005. "Trends in the Complementary and Alternative Medicine by US Adults: 1997-2002." *Alternative Therapies in Health and Medicine* 11(1):42–49.
- Tsai, Jeanne L. and Robert W. Levenson. 1997. "Cultural Influences on Emotional Responding Chinese American and European American Dating Couples During Interpersonal Conflict." *Journal of Cross-Cultural Psychology* 28(5):600–625.
- Tseng, Wen-Shing and Jing Hsu. 1970. "Chinese Culture, Personality Formation and Mental Illness." *International Journal of Social Psychiatry* 16(1):5–14.
- Uba, Laura. 2003. *Asian Americans: Personality Patterns, Identity, and Mental Health*. Guilford Press.
- Uchino, Bert N. 2006. "Social Support and Health: A Review of Physiological Processes Potentially Underlying Links to Disease Outcomes." *Journal of Behavioral Medicine* 29(4):377–87.
- US Census Bureau. 2016. "Population Estimates, July 1, 2015, (V2015)." *QuickFacts United States*. Retrieved October 9, 2016 (www.census.gov/quickfacts/).

- U.S. Department of Health and Human Services. 2001. *Mental Health: Culture, Race, and Ethnicity: A Supplement to Mental Health: A Report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services. Retrieved April 17, 2016 (<http://www.ncbi.nlm.nih.gov/books/NBK44243/>).
- Üstün, T. Bedirhan, Joseph L. Ayuso-Mateos, Somnath Chatterji, Colin Mathers, and Christopher J.L. Murray. 2004. "Global Burden of Depressive Disorders in the Year 2000." *The British Journal of Psychiatry* 184(5):386–92.
- Vanderhorst, R. K. and S. McLaren. 2005. "Social Relationships as Predictors of Depression and Suicidal Ideation in Older Adults." *Aging & Mental Health* 9(6):517–25.
- Vega, William A. and Rubén G. Rumbaut. 1991. "Ethnic Minorities and Mental Health." *Annual Review of Sociology* 17(1):351–83.
- Veith, Ilza. 1955. "Psychiatric Thought in Chinese Medicine." *Journal of the History of Medicine and Allied Sciences* X(3):261–68.
- Vincent, Charles and Adrian Furnham. 1996. "Why Do Patients Turn to Complementary Medicine? An Empirical Study." *British Journal of Clinical Psychology* 35(1):37–48.
- Walen, Heather R. and Margie E. Lachman. 2000. "Social Support and Strain from Partner, Family, and Friends: Costs and Benefits for Men and Women in Adulthood." *Journal of Social and Personal Relationships* 17(1):5–30.
- Wang, Chi-Chuan, Jae Kennedy, and Chung-Hsuen Wu. 2015. "Alternative Therapies as a Substitute for Costly Prescription Medications: Results from the 2011 National Health Interview Survey." *Clinical Therapeutics* 37(5):1022–30.
- Wang, Philip S. et al. 2005. "Twelve-Month Use of Mental Health Services in the United States: Results from the National Comorbidity Survey Replication." *Archives of General Psychiatry* 62(6):629–40.

- Waters, Mary C. and Tomás R. Jiménez. 2005. "Assessing Immigrant Assimilation: New Empirical and Theoretical Challenges." *Annual Review of Sociology* 31:105–25.
- Wei, Meifen, Tsun-Yao Ku, Daniel W. Russell, Brent Mallinckrodt, and Kelly Yu-Hsin Liao. 2008. "Moderating Effects of Three Coping Strategies and Self-Esteem on Perceived Discrimination and Depressive Symptoms: A Minority Stress Model for Asian International Students." *Journal of Counseling Psychology* 55(4):451–62.
- White, Michael J. 2000. "Generation Status, Social Capital, and the Routes Out of High School." *Sociological Forum* 15(4):671–91.
- Williams, Kristi and Debra Umberson. 2004. "Marital Status, Marital Transitions, and Health: A Gendered Life Course Perspective." *Journal of Health and Social Behavior* 45(1):81–98.
- Wolsko, Peter M., David M. Eisenberg, Roger B. Davis, Susan L. Ettner, and Russell S. Phillips. 2002. "Insurance Coverage, Medical Conditions, and Visits to Alternative Medicine Providers: Results of a National Survey." *Archives of Internal Medicine* 162(3):281–87.
- Wong, Frieda and Richard Halgin. 2006. "The 'Model Minority': Base or Blessing for Asian Americans." *Journal of Multicultural Counseling and Development* 34(1):38–49.
- Wu, Bei, Thanh V. Tran, and Quartel-Ayne Amjad. 2004. "Chronic Illnesses and Depression Among Chinese Immigrant Elders." *Journal of Gerontological Social Work* 43(2-3):79–95.
- Yang, Lawrence H., Serena Corsini-Munt, Bruce G. Link, and Jo C. Phelan. 2009. "Beliefs in Traditional Chinese Medicine Efficacy Among Chinese Americans: Implications for Mental Health Service Utilization." *The Journal of Nervous and Mental Disease* 197(3):207–10.
- Yap, P. M. 1965. "Phenomenology of Affective Disorder in Chinese and Other Cultures." Pp. 84–114 in *Ciba Foundation Symposium - Transcultural Psychiatry*, edited by A. V. S. de Reuck and R. Porter. John Wiley & Sons, Ltd. Retrieved October 17, 2014 (<http://onlinelibrary.wiley.com/doi/10.1002/9780470719428.ch5/summary>).

- Yeung, Albert et al. 2004. "Prevalence of Major Depressive Disorder among Chinese-Americans in Primary Care." *General Hospital Psychiatry* 26(1):24–30.
- Ying, Yu-Wen. 1988. "Depressive Symptomatology among Chinese-Americans as Measured by the CES-D." *Journal of Clinical Psychology* 44(5):739–46.
- Ying, Yu-Wen and Meekyung Han. 2007. "The Longitudinal Effect of Intergenerational Gap in Acculturation on Conflict and Mental Health in Southeast Asian American Adolescents." *American Journal of Orthopsychiatry* 77(1):61–66.
- Young, Christina B., Daniel Z. Fang, and Sidney Zisook. 2010. "Depression in Asian-American and Caucasian Undergraduate Students." *Journal of Affective Disorders* 125(1):379–82.
- Zhang, Amy Y. et al. 1997. "Family and Cultural Correlates of Depression Among Chinese Elderly." *International Journal of Social Psychiatry* 43(3):199–212.
- Zhang, Jie and Jill M. Norvilitis. 2002. "Measuring Chinese Psychological Well-Being With Western Developed Instruments." *Journal of Personality Assessment* 79(3):492–511.
- Zheng, Yan-Ping et al. 1997. "An Epidemiological Study of Neurasthenia in Chinese-Americans in Los Angeles." *Comprehensive Psychiatry* 38(5):249–59.
- Zimmerman, Frederick J. and Wayne Katon. 2005. "Socioeconomic Status, Depression Disparities, and Financial Strain: What Lies Behind the Income-Depression Relationship?" *Health Economics* 14(12):1197–1215.