A later life without children in China: a cross-sectional examination of moderators and mediators of the effects of childlessness on the well-being of elders

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A LATER LIFE WITHOUT CHILDREN IN CHINA:
A CROSS-SECTIONAL EXAMINATION OF
MODERATORS AND MEDIATORS OF
THE EFFECTS OF CHILDLINESS ON
THE WELL-BEING OF ELDERS

by

Junrong Shi

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ABSTRACT

Adult children played a primary role in support and caregiving for the fast-growing older population in China because of the core value of “filial piety” and underdeveloped formal services in the country. However, an increasing amount of Chinese people will end up with having no children in their later years, either nonparental or no children survived. It is important to understand that how the absence of children affects the health and well-being of older adults to better serve this growing vulnerable population. Limited previous studies focused on the childless older people in China, and little is known about the mechanisms through which childlessness influences older people’s lives.

Using a national survey data, Chinese Longitudinal Healthy Longevity Survey (CLHLS), this dissertation study aims to examine: a) whether being childless affects different aspects of well-being for older adults; b) whether there are differences due to type of childlessness, parent-adult children relationship, and gender of children; c) whether the effects of childlessness vary by gender, marital status, disabilities, and access to public services; and d) whether social support, participation in social and leisure activities and health behaviors mediated the effect of childlessness. Stepwise multivariate linear and logistic regression models were estimated to predict elders’ self-rated health, psychological well-being, and quality of life.

The analysis revealed that being childless was associated with poor quality of life, but not with poor self-rated health and psychological well-being, independent of demographics, socioeconomic status, health status and availability of formal or informal support. No significant
differences observed between elders who were nonparental and those who had no surviving children. For elders who had a poor relationship with children, represented by no regular contacts, their quality of life was no different from childless elders. The gender of children had no significant influence on the quality of life among those who had children. In addition, this dissertation did not find that gender, disabilities, or access to formal services moderate the effect of childlessness. Only marital status moderate the effect of childlessness on self-rated health, but not on other two dependent variables. Finally, the mediation tests revealed that being childless affects the quality of life for elderly through two essential mechanisms: social support and participation in social and leisure activities. Being childless did not influence the well-being by altering the health behaviors of people in their later life.

Altogether, the findings of this dissertation suggest that having children alive is beneficial for the quality of life among older people with the precondition that older parents had regular contacts with the children. The findings suggest that being childless had more influences on the social dimension of life for older adults. Social policies and practices need to address the psychosocial needs of childless older adults apart from financial and material needs. More serious efforts are needed to expand the provision of community and home-based social services, to increase the social and leisure facilities in different settings, and to foster the support and caregiving from informal social networks for childless older people.
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CHAPTER 1: INTRODUCTION

1.1 Aging and Childlessness: Demographic Trend

China is aging far more quickly than many other countries under the backdrop of global aging. According to the United Nations projection, by 2020, there will be 1 billion older population aged over 60 in the world, and about a quarter of them (about 240 million) living in China. In 2050, the amount of world aging population will be nearly doubled (about 2 billion). Among them, approximately 424 million (22%) will be from China (Dudley, Poston & Zeng, 2008). By that time, the aging population will also account for over a quarter of the total Chinese population, which make China an aging society. This trend puts immense pressure on China to take care the largest older population in the world.

In most countries across different economic status and welfare regimes, adult children play a critical role to support their older parents emotionally, instrumentally and financially (Wenger, Dykstra, Melkas, & Knipscheer, 2007). In places where the formal services are not available or insufficient for the elderly, the role of adult children is even more crucial (Brubaker, 1990; Shi, 1994). Studies in Asian countries have shown that 70% to 90% older people receive money or material goods from adult children (Biddlecom, Chayovan, & Ofstedal, 2002). Intergenerational support or transfers in different forms (money, time and care) are shown to have significant impacts on the health and well-being of elderly in many countries (Liang et al., 2014).

Nevertheless, not all older people have children available to help them. Demographic forecasts indicate that childlessness rate will rise in the future in many Western countries and some
developing countries like China. Because current cohort of 65 and older have higher rates of marriage and fertility than the cohort of adults who were born 30 or more years later than them (Dykstra & Hagestad, 2007; Kohli & Albertini, 2009). The childless rate for women aged 40 to 44 in the United States also increased from 10% in 1970 to 16% in 1990. It was more than 20% in 2006.

In China, the childless rate is increasing in recent years. The controversial “one-child policy” contributed to the rapid aging and the rise of childlessness. This family planning policy allows each family to have only one child with only a few exceptions (e.g., couples are minorities, or the firstborn has a severe illness). It reduced fertility rate sharply over the past three decades since 1979. The total fertility rate in China dropped from 5.8 to 2.7 in the 1970s and then fell below the replacement level (2.1) in 1991. In 2010, the fertility rate was about 1.18 (National Bureau of Statistics of China, 1999-2011). Although Chinese government overturned the one-child policy in 2016 allowing couples across the country to have two children, the impact of the policy on the society will persist for a long term.

Even though the policy allows for two children, the majority of young couples in cities choose not to have more than one child due to high child-rearing burden and costs. Moreover, a growing number of women with high educational attainment and high wages in wealthy cities decide to be “childfree” or stay single. Reports found that about 12.4% families had no child in Shanghai in 2002, and about 10% at Shenzhen in 2003 (Wang, & Xu, 2010).
The “one-child policy” also magnified the impacts of a cultural preference for sons over daughters, and caused severe gender imbalance, which led to marriage squeeze and reduced number of births. Compared with daughters, traditional Chinese society gives sons more importance for continuity of a family line. Males have many advantages in obtaining educational and productive resources, and inheriting family assets. Having a son makes the family feel stronger in terms social and economic status in the rural communities, which make this cultural preference to son still stronger there. This preference led to severe gender imbalance -- about 120 males for every 100 females at birth in 2014 compared to the world average of 103 to 107 (Jiang, Li, & Feldman, 2011). It will be harder for men to find a partner, get married and have a child in the future, particularly for the tens of millions deprived men in rural areas. The gender imbalance also accelerated the aging process.

Even for those who have a child, they could become childless in their later years due to the death of the child. With only one child, the risk of losing all children and becoming childless is higher. According to a study funded by Chinese Ministry of Labor and Social Security (2013), by 2010, there are 79.5 million one-child families in rural areas and 99.3 million one-child families in urban areas. By estimation, 2.41 million people lost their only child (1.6 million in rural and 830 thousand in urban areas), and the figure is estimated to reach 10 million by 2035 (Huang, 2012).

1.2 Cultural and Social Context of China
Chinese families traditionally take the caregiving responsibilities of their elderly family members due to a core value of “filial piety” from the Confucius culture among Han people. This value emphasizes accountability and respect to one’s parents (and other senior members), sacrifice and family harmony (Zhan, 2004). There are many specific things involved in the “filial piety” of adults children especially for son, such as taking care of the parents, burying them properly after death, and having a male descendant who carries on the family name. Older Chinese tend to have expectations of adult children, especially sons, fulfilling their filial piety responsibilities in specific ways, for instance, co-residence and providing financial support.

Childless people, regardless of the reason, are often negatively viewed by societies, and face with enormous social pressure and prejudice from others (Koropeckyj-Cox & Pendell, 2007), particularly for women in China, because they are the ones to be blamed for infertility in the traditional culture (Zhang & Liu, 2007). A survey of infertile couples in rural China found that a lot more women than men found childlessness to be a humiliating status (Lau et al., 2008).

Meanwhile, social security system and formal aging services in China are not well established, including social pensions, health insurance, and social services for the elderly, such as nursing home, assisted living, mental health services, shopping, and nutrition program. Qualified helping professionals and active social service organizations are lacking in the current system. Many capacity deficits exist regarding the coverage, affordability, sustainability, and quality. For the two third Chinese elders who are living in rural areas, the public resources and services are even rarer. Even in places where there are facilities for seniors, Chinese families are
reluctant to use the formal services unless that they have no other choices due to the traditional culture and social pressure from others. Moreover, there are obstacles for the elderly to access the limited services, for instance, the elderly have to get permission from their close relatives to get into the nursing home in some places. A study found that even in Shanghai, a place with the most developed public and community services for elderly in the country, around 90% of older adults still rely on family care (Jing, 2013). The insufficient formal support from government and communities make the family support even more vital for the elderly in China. For many childless people in China, “who will take care of me when I am old?” is a real concern or fear of them.

1.3 Childless and Well-being in Later Life

The critical role of adult children and increasing size and share of the older population without children, raised a question of how childlessness influences the lives and well-being of people in their later years when they are frailer and more dependent demanding more support. There are abundant empirical studies in the Western countries on whether and how childless affects the health and subjective well-being of elders adults with mixed results. Some studies found that childlessness reduced the social contacts and network of older adults (Pollmann-Schult, 2011), increased their risk of social isolation (Dykstra & Hagestad, 2007; McMullin & Marshall, 1996). However, other studies did not find that childless people experienced a decline in social network and support and were socially isolated (Klaus & Schnettler, 2016). Childlessness was not necessarily associated with lower life satisfaction (Koropeckyj-Cox, 1998; Zhang & Hayward, 2001). The influence of childlessness varies upon gender, marital status, the health status of the
older adults (Houser, Berkman, & Beckman, 1984; Wenger et al., 2007). For elderlies with no surviving children, the death of children will cause acute distress in short time and chronic strains over an extended period across the lifespan to the later years of parents (Espinosa & Evans, 2013; Rogers et al., 2008).

Nevertheless, the findings above may not apply to China, since the culture and social context in Western countries were very different from China. In Western culture, people value more on the development of one’s capacities and being independent, rather than the sacrifices for other individuals and groups (Nevitte & Cochrane, 2006). Also, most developed countries have well-established social security and health care system. There are excellent aging services (institutional and community and home care services) and other social services available to support the independence of older adults.

When it comes to the studies on the issues of childless older adults in China, the amount is very limited, and mostly with a small or regional sample. Unlike the findings in the Western literature, the existing studies in China showed negative impacts of childlessness to the health and well-being of the elderly (Cheng, Chan, Li, & Leung, 2014; Guo, 2014; Wang, Chen, & Han, 2014; Zhang & Liu, 2007). However, there is no study to investigate further the mechanisms through which childlessness influences the well-being of older people and the factors that can buffer the negative effects of childlessness in the Chinese context.

1.4 Summary and Statement of Problem
Adult children in China play a critical role in the well-being of their older parents compared to their Western counterparts. The absence of children means that seniors will lose one critical source of support which can affect their lives in many ways. Elderly without children are often negatively evaluated and regarded as a socially vulnerable group. They may be facing more difficulties in maintaining healthy well-being compared with those who have children (even if the children are not nearby). Considering the rapid aging trend and increasing childlessness rate in China, it is essential to examine how childlessness affects the well-being of older people in the country. Given the negative influence of childlessness identified so far by the limited number of studies on childless older adults in China, it is worthwhile to have an in-depth study on this issue. Therefore, this study aimed to further investigate the effects of childlessness, and explore what factors moderate and mediate the effects.

The finding of this study will be helpful for the social policy-making and practice targeting the childless older population. The answers to these questions can help social policymakers to determine the current and future demand for formal care services and tailor the services. Social workers and other helping professionals who work with older adults also need the knowledge to foster informal support for the elders where children’s support are absent, and to serve this group better. In addition, the findings of this study will contribute to current knowledge on impacts of childlessness by filling the research gap on this issue in a developing country with more traditional culture and underdeveloped welfare system.
CHAPTER 2: LITERATURE REVIEW

2.1 Definition

Prior to a comprehensive review of theories and empirical studies related to childlessness and well-being of people in their later years, it is important to find out first how to define the two terms: “childlessness” and “well-being.” “Well-being” is widely accepted as a multidimensional concept in literature, which includes psychological (i.e., emotions, attitudes, and self-image.), social (i.e., relationships, work, and productivity), and physical functioning (i.e., disabilities and disease) (Kinderman, Schwannauer, Pontin, & Tai, 2011). Other similar concepts include life satisfaction and quality of life which are the measure of an individual’s perceived level of well-being, achievement of life goals, and fulfillment of needs.

“Childlessness” in some studies were used interchangeably with “nonparental status,” meaning people never had a child or became a parent. It could be voluntary (often called “childfree”), involuntary “natural” due to infertility, or involuntary “coerced” by external factors. However, there is another category of childlessness caused by the death of all children due to a fatal disease or accident, or just the elders outlived their children. For the majority of childless people in current older cohorts in China, childlessness was largely an involuntary phenomenon due to infertility or death of all children, given the cultural and social emphasis on having offspring. This study tends to include both groups: people who had all children died (no surviving children) and people who never had experience of being parents (“nonparental childless”). Thus the literature review section consists of two bodies of research related to two types childlessness: one
concerns the impact of the nonparent status for older adults; another concerns the impact of children’s death.

2.2 Theories and Models

Several theories and models provide the useful frameworks to look at what child-parent relationship could bring to individual’s life. A theoretical understanding of what having children means to parents will be beneficial to understand what childless people might be missing in their system, and how the death of children may influence parents’ lives.

Filial Duty Theory

In many cultures, adult children are expected to provide a certain level of care and support to their older parents as the filial duty or obligations, which is stated in the social norms, moral practices and sometimes even in the public policy of a country. The “special goods” model of filial duty theory argues that a healthy parent-children relationship can provide “special goods.” These include unique things such as a sense of continuity and transcendence of older adults (a feeling of persisting beyond their deaths), a sense of connecting or belonging to the world, and an additional layer of protection against the adverse situations in life. It is different from the “Generic goods,” things that could be provided by other people or from other relationships (i.e., care, visits, rides to shop, material, and financial support) (Keller, 2006). It implies that having children living in the world can grant meaning to older people even if they did not receive any day-to-day support from their children. In other words, it means that childlessness should have impacts on older people’s psychological well-being or overall life satisfaction regardless other factors. Moreover, in a culture
emphasizing male descendants, sons may provide more “special goods” than daughters. Having no son or loss of a son might have stronger impacts on the older parents’ well-being.

**Attachment Theory**

Attachment theory provides a unique way to understand the dynamic of child-parent relationships and how it is associated with the well-being of both parents and children. According to the theory, the innate attachment behavioral system of people urges them to have significant others (parents, spouse, siblings, children and even friends) who can increase their sense of security and lower their distress (Bowlby, 2008). People in nonparental status will not be eligible for potential benefits or protection mechanism that associated with children. For individuals who are parents, losing children can break this child-parent bond, which will not only directly cause severe psychological distress but also indirectly influence other significant relationships (spousal relationship) (Wijngaards-de Meij et al., 2005). Gender will affect people’s responses towards the absence or loss of children regarding depth and duration. The negative impacts may be stronger for the one who usually acts as the primary caretaker and has more direct and frequent contacts with children in the family (mostly female).

**Intergenerational Transfers Theory**

Intergenerational transfers refer to the provision of different kinds of resources, varying from money or in-kind, emotional support, practical or instrumental support, to the sharing of knowledge and skills among the various generations in a family. The transfers can go “up” (from adult children or grandchildren to seniors) and “down” (from seniors to children and
grandchildren) the generational lines and may occur in public or private area (Kohli & Albertini, 2009). There are three forms of intergenerational transfers in most economic literature: financial transfer (money and goods), time transfer (care, help, and contact) and space transfer (coreidency) (Attias-Donfut et al., 2005; Bianchi, Hotz, McGarry, & Seltzer, 2006). These transfers supplement the receivers’ resources and help other generations with crises, transitions, and even long-term needs as an extra safety net.

Intergenerational transfers play an essential role in the well-being of both older people and their adult children. The effect of the transfers could be positive or negative depending on the quality of the intergenerational relationship. Good intergenerational relationship facilitates the transfers and increases the mutual benefits for both receivers and givers. In contrast, adverse intergenerational relationships will be destructive for both. Cultural context, social programs and policies, and economic development all affect the amount, type and direction of intergenerational transfers and consequently affects the well-being of all generations in different ways. In a culture encouraging downward transfers where the children are lack of resources, older adults might need to give more financial and instrumental support (e.g., paying for the house and wedding of their children, and taking care of the grandchildren) to their children, which will increase their life burden. Therefore, having no children and no intergenerational transfers could have both positive and negative effects for the childless older adults (House, Umberson, & Landis, 1988).

Studies on the intergenerational transfers in China have shown that compared with other horizontal relationships and transfers (with spouse, sibling, friends, and neighbors), the vertical
relationships and transfers have a unique role. Intergenerational support from children had a significant effect on the self-rated physical health and psychological health of older adults, yet effects of intragenerational support from spouse and sibling were not significant in rural China (Liang et al., 2014).

Social Network and Support Theory

Social support is one of the most studied psychosocial resources embedded in social networks/ties and social interaction. It is a multidimensional concept with many definitions. In general, social support refers to the resources provided to individuals by significant others, such as family, friends, coworkers, and neighbors. The concept of social support consists of three constructs: supportive behaviors or types (emotional, instrumental, financial, and informational), support networks (size of network, number of social roles, frequency of contacts with network members, type of relationship), and an appraisal of support (perceived support versus actual received support, satisfaction with social support and so forth).

Social support resources have been demonstrated to have both buffering effects in stressful situations and direct effects on the physical and mental health and well-being of people. However, the effects are complicated due to the complexity of the concept of social support. For instance, perceived emotional support has a stronger influence on mental health than the actual receiving of the support (Cohen, Underwood, & Gottlieb, 2000). Having an intimate and confiding relationship can significantly reduce the negative influence of life stressors. In general, social network size has been found to positively related to physical and mental health. However, the buffering effects are
not as well established. In addition to the direct impacts, informal social support plays essential roles in accessing to formal services.

However, like intergenerational transfers, the effects of social support could be both positive and negative. An increase of network size by having children does not necessarily indicate an increase of support received. Social interactions within the networks might be more demanding or even more destructive than helpful, which might cause more stress than support (Rook, 2014).

**Stress and Coping Theory**

Stress theory provides a useful framework to see what factors may help people to cope with the situation of childlessness. According to Pearlin (2010), stressors refer to a range of problematic conditions or experience that challenge people’s adaptivity. It could be either disruptive events or long-lasting hardships in the life course. Exposure to one stressor could cause exposure to another stressor over time, which is called “stress proliferation.” For instance, losing all children or not being able to give birth to a child as a primary stressor could lead to persistent financial and caregiving problems as secondary stressors. Eventually, childless people might be faced with a cluster of stressors and trapped in cumulative adversity (O’Rand, 1996). The burden of adaptation to various stressors places consistent pressure on people’s physical and psychological system.

Coping resources are significant moderators of the effects of life stressors. Coping resources refer to things that people can draw upon to cope with stressors, which influence the choices and efficacy of coping strategies. The resources could be social (i.e., social support, formal services), or psychological characteristics (i.e., self-esteem and mastery of life) (Pearlin, 2010).
Vulnerable groups who lack coping resources are more likely to suffer from stressors. Literature also suggests that disadvantaged social groups, women, the elderly, the unmarried, and people with low socioeconomic status, are more likely have higher psychological distress when faced with stressors (Avison & Cairney, 2003).

2.3 Nonparental Status and Well-being

Previous studies in the West have shown mixed results about the association between nonparental status and old age subjective well-being. The nonparental status can affect the lives of older adults in various ways, and the paths of effects on the social, psychological and physical well-being are very complicated.

Some studies found that older adults in nonparental status usually have smaller social networks, fewer social contacts, and less social support compared with parents (Dykstra & Hagestad, 2007; Pollmann-Schult, 2011). Because having no children not only means a loss of immediate social ties (sons- and daughters-in-law, grandchildren) but also fewer contacts with the broader social environment, such as neighborhood and social services (Wenger et al., 2007). Nonparental status was found to be associated with higher risk of loneliness or social isolation (Houser et al., 1984). Childless elders are less likely than parents to have a caregiver available in their later years and more likely to live alone or end up with institutional care (Koropeckyj-Cox, & Call, 2007; Soldo, Wolf, & Agree, 1990). The effects are stronger among those who are widowed or divorced, and those with disabilities (Wenger et al., 2007).
For the involuntary childless people, wanting children yet being unable to have them is deep distress, and this has negative effects on the well-being could persistent throughout their lives (Connidis & McMullin, 1993). Even for voluntary childless people, their psychological well-being might be affected by the regrets of being childlessness and the social stigma or negative stereotype attached to non-parenthood especially when they are growing older (Alexander, Rubinstein, Goodman, & Luborsky, 1992; Dykstra & Hagestad, 2007).

However, not all studies support the association between childlessness and worse well-being at old age. A recent study found that childless adults do not necessarily have a smaller social network size or less social support than parents do. The childless elders may substitute the missing social ties of children and grandchildren through adjustment of network composition or higher efficiency of personal ties (having more close friends or extended kins) (Schnettler & Wöhler, 2016). When concerning the quality of the social ties instead of quantity, factors such as relationship quality, the proximity of adult children, and personal expectations all may moderate the effects of parenthood. Some studies found childlessness are not socially isolated (Klaus & Schnettler, 2016). Also, there is no overall significant direct effect of childlessness (with only marginally significant effect for women) (Koropeckyj-Cox, 1998) on the level of loneliness (Zhang & Hayward, 2001) and overall level of life satisfaction (Pollmann-Schult, 2011). More significant differences were identified when interacting with factors that can magnify adverse condition or stressors, such as gender, widowhood, poor health (Houser et al., 1984; Pollmann-Schult, 2011; Zhang & Hayward, 2001).
In contrast, research on the effects of childlessness on elders’ well-being in Chinese or Chinese-culture society is very limited. Most of them found negative impacts of childlessness on the well-being of seniors. A recent study in rural China (Guo, 2014) found that childless elders are more likely to suffer from depression and have poorer life satisfaction than older parents due to the lack of monetary support from adult children. It also indicates that available formal support plays a role in the consequences of childlessness amongst Chinese elders. Compared with young-old, children played a critical role in the life satisfaction of the oldest-old Chinese whose spouse might not be able to take care of them (Wang et al., 2014). Another study conducted in a small Hongkong sample (Cheng et al., 2014) also found that childless was significantly associated with psychological well-being (depression and life satisfaction) of widowed persons after controlling the social network size. The effects of childlessness were stronger for women than for men and stronger for individuals with functional impairments. However, findings from studies conducted in Hong Kong may not necessarily apply to mainland China due to the economic and social differences.

In a large population study in China, childlessness was found significantly associated with life satisfaction, feeling of anxiety and loneliness, but not feelings of uselessness among older Chinese (Zhang & Liu, 2007). However, when controlling for demographic variables and the additional socioeconomic variables of residence, living arrangement, availability of pension and medical services, childlessness was no longer significantly related to anxiety and loneliness, and
the relationship to life satisfaction was only marginally significant. It implies that childlessness in China might be associated with deficits in certain types of support due to structural issues.

2.4 Death of Children and Well-being

Besides all the impacts for the nonparental status elaborated above, the group of childless people caused by the accidental death of all children may suffer from further pain and distress due to the loss of loved one(s). The grief of loss is very overwhelming and influences the physical, mental, and social system of the parents both during the acute phase of bereavement and for an extended period over the life course (Lohan & Murphy, 2006; Rogers et al., 2008).

Parents might also feel guilty for not being able to protect their child well. Studies have also found that bereavement in parents is associated with more psychological distress (Lohan & Murphy, 2006; Wijngaards-de Meij et al., 2005), and higher risks of mental health disorder (Li, Laursen, Precht, Olsen, & Mortensen, 2005; Li, Precht, Mortensen, & Olsen, 2003). Parents who have experience of children’s death often have lower self-rated health, higher risk of developing chronic or acute diseases, and higher mortality rate (include untimely natural death and suicides) than those who do not (Li, Hansen, Mortensen, & Olsen, 2002; Li et al., 2005; Murphy, Johnson, Wu, Fan, & Lohan, 2003; Song, Floyd, Seltzer, Greenberg, & Hong, 2010). Losing a child also will negatively affect the marital quality of a couple which can lead to a higher likelihood of divorce (Najman et al., 1993; Scharlach, Giunta, Chow, & Lehning, 2008). Parents who have more than one child and lose them all, tend to report poorer psychological well-being than those who experienced a single loss because of the “bereavement overload” (Neimeyer & Holland, 2006).
Research has also shown that gender of parents and gender of children deceased all makes a difference in term of parental well-being after children’s death. Compared with fathers, bereaved mothers tend to experience more depression (Lee, Glei, Weinstein, & Goldman, 2014; Wijngaards-de Meij et al., 2005) and global distress (Lohan & Murphy, 2006), more posttraumatic stress disorder (PTSD) (Murphy et al., 2003), lower self-rated health, and higher mortality (Espinosa & Evans, 2013; Li et al., 2002). Several studies in western countries with no son preference did not find the sex of deceased children significantly associated with mortality risk (Espinosa & Evans, 2013; Werthmann, Smits, & Li, 2010). Studies in East Asian countries have found that losing a son is associated with higher level of depression, higher suicide rate and lower self-rated health among mothers (Chen, Kuo, Wu, & Yang, 2012; Lee et al., 2014).

2.5 Other Predictors for the Well-being

Apart from the demographic factors (age, gender, ethnicity, marital status) and socioeconomic status (SES) (education, income, occupation prestige), literature also identifies other significant predictors for the well-being of elderly, which could potentially mediate or moderate the effects of childlessness.

Lifestyle-related factors

Compared with parents, childless people are more likely to develop unhealthy health behaviors (e.g., smoking, alcohol consumption, regularity of meals and sleep, physical exercise and leisure activities). Health literature revealed that unhealthy habits often lead to adverse health-related outcomes and life satisfaction (Ho et al., 1995; Kendig, Dykstra, van Gaalen, & Melkas,
2007; Thompson, Zack, Krahn, Andresen, & Barile, 2012). Being childless influences the social participation and leisure activities of people across the lifespan, which will further affect health, life satisfaction and longevity of older adults (Feng, Zhu, Zhen, & Gu, 2016; Hawkins, Foose, & Binkley, 2004; Thompson et al., 2012). Participation in social and leisure events may not only increase physical activity and social connections but also may bring enjoyment and peace at the mental or spiritual level.

Formal services access

The availability and access to formal services can affect the life satisfaction of older adults. Having a social pension and health insurance provide a safety net to people in the later years when they have more health conditions and cannot work. Availability of healthcare services and ability to meet medical cost are directly related to physical health and subjective life satisfaction of elders (Thompson et al., 2012). In addition, community-based social services (e.g., home visits, personal care, shopping assistance) can also provide support to the independence of elders locally and have positive impacts on the health and well-being of older adults (Mackean & Abbott-Chapman, 2012). Studies in China found that access to health care services, availability of pension play critical roles in the health, life satisfaction and longevity of older adults’ regardless gender, place of residence, age and socioeconomic status (Gu, Zhang, & Zeng, 2009; Zhang & Liu, 2007). There are substantial needs for the community-based support services from elders in China (Zhou & Walker, 2016)

2.6 Summary
Based on the review of previous studies in both western and Chinese context, the following research gaps are identified for further study. First, the amount of studies on the childless older population in China is limited, and most studies had a small or regional sample. Secondly, limited studies tried to grasp the subtle differences among the childless group (nonparental vs. no surviving children), and compared the two childless groups with elders who poor relationship with their living children. Thirdly, few studies in China consider the gender of children when studying childlessness, despite literature that identified the value placed on having sons. Fourthly, previous literature in western countries found that widowhood and disabilities can interact with childlessness, yet few studies examined disabilities and other factors that could potentially moderate the effects of childlessness, such as access to public social security, medical resources, and community-based support services. Finally, few studies investigated how childlessness affects the social support, participation in social and leisure activities and health behaviors in later years which are associated with the well-being of people. The proposed study will try to address these gaps identified above.
CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 Research Question and Hypotheses

The research questions for this study include: 1) Does childlessness affect different aspects of well-being among older adults in China; 2) Are there any differences due to type of childlessness, child-parent relationship, and gender of children alive; 3) What factors influence the strength of the effects of childlessness (moderation); 4) What are the pathways through which childlessness influences the well-being (mediation). In specific, there are several hypotheses of interest to test based on the review of theories and current studies:

Testing for main effects

H1: For older adults, childlessness will be associated with lower well-being compared to the those who have at least one living child, controlling for other covariates;

H2: Older adults who have children but none survived are associated with lower well-being compared with those who are nonparental;

H3: Older adults who have no regular contacts with children are associated with worse well-being compared with those who are nonparental;

H4: Elders who have at least a living son will be associated with better well-being than those who have daughter(s);

Testing for moderation

H5: Childlessness has more impact on the well-being of female older adults than their male counterparts;
H6: Childlessness has less impact on the well-being of currently married older adults than the widowed, divorced, separated and never married ones;

H7: Physical disabilities have greater impacts on childless older adults than for those who have children;

H8: Cognitive impairments have greater impacts on childless older adults than for those who have children;

H9: Having access to public social security services will reduce the impact of childlessness on the well-being of elders;

H10: Having adequate medical services will reduce the impact of childlessness on the well-being of elders;

H11: Having community-based support services available in communities will reduce the impact of childlessness on the well-being of elders;

**Testing for mediation**

H12: Access to social support will mediate the effect of childlessness on the well-being of elders;

H13: Participation in social and leisure activities will mediate the effect of childlessness on the well-being of elders;

H14: Health behaviors will mediate the effect of childless on the well-being of elders.

**3.2 Data and Sample**

This study was a quantitative exploratory study using secondary data. It is better to use a large nationally representative sample to detect the complicated paths of the impact of
childlessness among elders. The design can also address the issue of small samples of previous Chinese studies. Although there are some limitations of secondary data analysis, the large established survey data have better reliabilities and validity than primary data collected by a newly designed survey in a small sample.

Data used for this research was provided by the study entitled “Chinese Longitudinal Healthy Longevity Survey” (CLHLS) managed by the Center for Healthy Aging and Development Studies, Peking University. CLHLS is supported by funds from the U.S. National Institutes on Aging (NIA), China Natural Science Foundation, China Social Science Foundation, and UNFPA.

CLHLS is a large national survey focusing on the health and longevity of older adults in China. The goal of the CLHLS is to understand the social, behavioral, biological and environmental risk factors of the healthy longevity of Chinese elders, especially the oldest-old. The respondents are older adults aged 65 and above who voluntarily agreed to participate in the study. The sampled areas cover 22 out of 31 provinces of mainland China, including Liaoning, Jilin, Heilongjiang, Hebei, Beijing, Tianjin, Shanxi, Shaanxi, Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shangdong, Henan, Hubei, Hunan, Guangdong, Guangxi, Sichuan, and Chongqing. In the sample area, the survey team randomly selected half of the counties and cities there and used proportional sampling design procedure. However, for the purpose of the study, oldest-old were over-sampled especially among males. Nearly all centenarians were interviewed in the sampled counties and cities, to avoid small sub-sample sizes for more advanced ages. Appropriate sampling weights need to be used in computing the average of the age groups below
100. CLHLS computed the age (x), sex (s), and rural-urban residence (r) specific weight \( w(x, s, r, t) \) in the survey year \( t \) as the ratio of the age distribution of the whole older population in the survey year \( t \). Then it adjusted weight as \( w'(x, s, r, t) \) to produce correct proportions, sub-sample size, and p-value for tests among various age groups (Zeng, 2012).

The questionnaire was designed based on international standards and Chinese cultural/social context and tested in China context carefully by the pilot studies and interviews. The content of questions included family structure, living arrangements and proximity with children, self-rated health, self-evaluation on life satisfaction, chronic diseases, Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL), cognitive function, medical care, social activities, health behaviors, psychological characteristics, economic resources, caregiver and family support, nutrition and some health-related conditions in early life (childhood, adulthood, and around age 60) (Zeng, 2012). Trained interviewers and medical school student conducted the home-based face-to-face interviews and health examination with the older participants. The interview refusal rate was low around 2%-3% for different waves. Many disabled respondents chose to participate in the survey with help from a proxy assistant (a close family member).

There are six waves of the data in 1998, 2000, 2002, 2005, 2008-09 and 2011-12. Each wave added new respondents with same gender and age of the deceased respondents to keep the sample size, while the survivors were re-interviewed. The quality of the CLHLS data has been assessed extensively regarding the non-response rate, sample attrition, reliability, and validity of
the main measurements, the rate of logically inconsistent answers. The results of assessment for CLHLS 2005 wave (Gu, 2008) and the 2008-2009 wave (Chen, 2010; Shen, 2010) were good compared with other studies on health and longevity. The most recent wave 2011-12 has a comparatively small total sample (9765), which lead to a very small sample of childless people. Therefore, this study used the 2008-09 wave to acquire a larger sample and enhance the power of analysis.

In the 2008-09 wave, there were 16,954 respondents. Among the sample, 9575 were female (57%), and 6988 were male (43%) (unweighted). The average age of the sample was 87 years old due to the oversample of oldest-old. The majority (94%) was Han people and only 6% from an ethnic minority. About 40% respondents were living in urban areas, and 60% were living in rural area. Only 31% were currently married and living with their spouses, while 69% were widowed, divorced or separated with their spouses.

For the purpose of this study, the sample only included the older respondents who aged 65 and above (391 respondents aged below 65, 2% of total sample), and those who had no non-biological children, such as adopted children and stepchildren (1,613 people had non-biological children, 9% of the total sample. Excluding the cases with missing values on the relevant variables (1053 cases, 6% of total sample), the sample size for the study was N = 13,897. Because having non-biological children will make it very complicated to define childlessness and categorize types of childlessness, in particular for those who have no biological children but have non-biological children alive. The sample descriptive statistics were very similar to the overall sample of the
dataset (unweighted). The majority were female (57.6%) and Han people (94.5%). The average age was 87 years old due to the oversample for oldest-old. Most of the respondents had no education (63%). Over 60% respondents were living in rural areas and 67.6% engaged in agricultural work. Most respondents (70%) were widowed, divorced or separated with their spouses. Overall 548 respondents were self-reported to have no children alive (3.9%).

3.3 Variables and Measurement

Dependent Variables

The key concept of the study, the well-being of older adults, is operationalized into three dependent variables: self-rated health, psychological well-being, and quality of life for elders. These variables reflect the subjective physical, psychological well-being and overall life satisfaction of elders in line with the multi-dimensional definition of “well-being.” This study did not treat social support and social participation as the dependent variables to represent social well-being, but rather test it as mediators for the effects of childlessness.

Self-rated Health (SRH)

This study used self-rated health (SRH) as a key dependent variable indicating the sense of the physical dimension of well-being. The original questionnaire of CLHLS asked respondents to rate their overall health in five levels: “Very bad,” “Bad,” “So-so,” “Good,” and “Very good.” This study dichotomized the responses into poor health (recoding as “very bad,” “bad” as “poor” = 0) versus good ( “so-so,” “good,” and “very good” as “good”=1). Most studies using CLHLS
(including the ones done by the primary investigators of the CLHLS) dichotomized the self-rated health in the same way for the statistic analysis (Feng et al., 2016; Gu et al., 2009; Wen & Gu, 2011; Zeng, Jr, Vlosky, & Gu, 2008). Using the same categorization will enable the comparison of findings in this study with the in previous studies.

**Psychological Well-being (PW)**

Ideally, psychological well-being should be measured by an established multi-dimensional scale or index. However, there was no such index in the survey of CLHLS. Instead, five questions in the survey were used to construct an index to measure important aspects of psychological well-being: (a) “Do you always look on the bright side of things?”; (b) “Do you often feel anxious or fearful?”; (c) “Do you often feel lonely and isolated?”; (d) “Do you feel the older you get, the more useless you are?” and (e) “Are you as happy now as when you were younger?”. For each question, five levels of responses were given, rating from 1 to 5 (from 1= “always,” 2= “often,” 3= “sometimes,” 4= “seldom,” to 5= “never.” The negative items were reversed, so the higher score of the variable indicates better or more positive psychological well-being. The summed score of five questions ranged from 5 to 25. The Cronbach’s alphas for this scale is 0.70. Studies have shown that these questions cover different essential dimensions of psychological well-being such as optimism, conscientiousness, personal control, happiness, neuroticism, loneliness, and self-esteem (Wu & Schimmele, 2006). Several previous studies using other waves of the CLHLS also adopted these items as a measure of psychological well-being (Chen & Short, 2008; Han & Shibusawa, 2015; Wang et al., 2014; Wu & Schimmele, 2006; Zhang & Liu, 2007).
Quality of Life (QoL)

The overall life satisfaction or well-being was measured the self-rated quality of life. The original question in the survey, “how do you feel about your life at present?” had five levels of responses: “very bad,” “Bad” “so-so,” “Good,” and “very good.” Similarly, this study changed the ordinal variable into a binary variable indicating whether people have a good or poor quality of life (“very bad” and “bad” were coded as “poor” = 0, while “so-so”, “good”, and “very good” were coded as “good” = 1) to account for its highly skewed distribution. Only 2.6% older adults rated their quality of life as “very bad,” and I merged the “very bad” and “bad” categories to indicate a poor satisfaction level of life. Some studies using CLHLS data also had similar categorization when measuring the life satisfaction or quality of life (Zeng, Jr, Vlosky, & Gu, 2008; Brown, & Tierney, 2009).

Independent Variables

Childlessness

The key independent variable is childlessness. As the definition indicated above, older adults who have no living children will be defined as the childlessness, which includes both those who neither give birth to any children (nonparental status) and those who become childless due to death of all children (no surviving children). The comparison group was older persons with at least one living child. In this study, childlessness was measured by a dichotomized variable coded from a
set of questions: “How many children they have ever given birth to?” and for each child, “whether he/she is alive?”.

**Types of Childlessness**

This study further divided childless elders into two categories: nonparental and having no surviving children. Nonparental status was defined by responses to the question “how many children, including those who have died, do you give birth to?”. Whether respondents had no surviving children was defined by a set of questions asking whether each child of respondents was alive or dead.

**Parent-children relationship**

The parent-adult children closeness or relationship among those who had at least a child alive were measured by whether the older parents had regular contacts with at least one of their children. The parent-children closeness or relationship was often measured by geographic/spatial proximity (a distance of the residence) and contacts (emotional ties) between parents and children (Glaser & Tomssini, 2000; Hank, 2007; Liang & Zhang, 2017). According to Silverstein and Bengston (1997), geographic proximity and contacts are indicators for two important dimensions of parent-children solidarity: structural and associational. Studies found that geographic proximity is a strong predictor of contacts and an *intimate but distant* relationship, can still allow for high-level emotional closeness and facilitate the current and future intergenerational support or transfers (Silverstein & Bengtson, 1997). Therefore this study used contacts with children to represent the
closeness of the parent-child relationship. The parent-adult children contacts were measured by questions on whether the children of the respondents visited them in-person frequently (yes/no) and whether the children contacted them regularly (by phone or other means) (yes/no). Respondents who answered “yes” to either of the two questions for at least a child will be considered having regular contacts with adult children (coded-1), otherwise considered having no regular contacts (coded-0). The functional dimension of solidarity, represented by social support, will also be included in the analysis separately.

**Gender of the children alive**

To understand whether the gender of children alive matters for the well-being of older adults, this study divided the group of elders with children alive into three categories: a) Having a living son(s) only; b) Having a living daughter(s) only; c) Have both living son(s) and daughter(s). The gender of children alive was defined by a set of questions asking whether each child of respondents was alive or dead and what was his/her gender.

**Moderating Variables**

This study tested the moderating effects of gender (female vs. male), marital status (married and live with spouse versus other conditions including being widowed, divorced, never married or separated with spouse), personal disabilities (ADL disabilities and cognitive impairments), and access to public services (access to social security services, adequacy of medical/health services, and availability of community-based support services).

**Disability Status**
As the review of literature in the west showed that childless seniors who have disabilities are more likely to have poor well-being. Because people with disabilities need more assistance in daily life, yet having no children reduced the available help for them. Therefore, having disabilities could make the effects of childless stronger than people who do not have any disabilities.

**Physical Disabilities** There are many ways to measure disabilities. This study used the ADL disabilities to represent the physical disabilities level. Respondents who answered “yes” to one of the six questions (whether respondents need assistance for bathing, dressing, going to the toilet, indoor transfer, continence, and eating) on ADL difficulties were regarded as having disabilities. Several studies used the same variable as the proxy for the disabilities (Han & Shibusawa, 2015; Lei, Feng, & Wu, 2016; Zimmer, Martin, Nagin, & Jones, 2012)

**Cognitive Impairments** The cognitive impairments are measured by the score on Mini-Mental State Examination (MMSE). In the questionnaire of CLHLS, The Mini-Mental State Examination (MMSE) was translated into the Chinese language and culturally adapted based on established international standards for the MMSE questionnaire, and carefully tested in a pilot survey (Zeng et al., 2008). It includes brief measures of orientation, registration, attention, and calculation, recall, and language, with scores ranging from 0 to 28 (total score is 30). Respondents who scored below 21 are considered a poor cognitive function or cognitively impaired. This study did not use the usual cutoff score of 24 because most of the respondents have very low (or no) education attainment. The literature on MMSE suggested a cutoff score of 21 to indicate cognitive abnormal for the 8th-grade education people (Folstein, Folstein, & McHugh, 1975).
Public Services

Access to Social Securities In China, the social security system are divided by individuals’ occupation and rural/urban residence. Individuals who work for government agencies or other public institution (schools, research institute, government-owned companies, and public hospitals) could have retirement pension and good (or free) public insurance with less cost out of pocket. In contrast, individuals who work for private companies will enroll in public old-age insurance and basic medical insurance. For people who live in rural areas, they can enroll in cooperative health insurance. Also, the government has some income subsidy or assistance to particular groups, such as veterans, centenarians, low-income urban residents, and elderlies with no family member alive. This study measured the access to social security by whether respondents have at least one type of public social security services from the following: retirement pension, public old-age insurance, public medical insurance, cooperative health insurance, basic medical insurance, severe disease insurance, and other special subsidy or assistance (1= yes; 0=No).

Adequate Medical Services This variable was measured by the answer to the question “can you get adequate medical services/treatment when you are sick?” (1= yes; 0=No).

Community-based services This variable was measured by whether at least one type of community-based formal support services were available for the respondents. In the questionnaire, respondents reported whether they had following eight types of support services offered in their communities: personal care, home visits, psychological consultation, shopping, social recreation, health education, human rights consultation, and neighborhood relationship. If a respondent
answered “yes” to any services among the eight services, he or she was considered to have community-based support services available in their community (1=yes; 0=no).

**Mediating Variables**

**Social Support**

Four questions capture the condition of social support: (1) “When you are sick, who usually takes care of you?”, (2) “To whom you usually talk frequently in daily life?”, (3) “To whom you talk first when you need to share some of your thoughts?”, and (4) “To whom you ask for help when you have problem or difficulties?”. Having access to social support means that respondents answered somebody instead of “nobody” to one of these four questions (1=yes; 0=no). Other studies also used the same variable to measure the social support (Wang et al., 2014).

**Social and Leisure Activities Participation**

Participation in social and leisure activities are measured by whether the respondents participate in at least one of the following types of activities: gardening, raising pets, reading newspaper or books, and watch TV or listening to the radio, playing cards or mah-jongg with others, and engaging into any other organized social activities (Han & Shibusawa, 2015; Feng et al., 2016). Respondents who answered “yes” to any one activity will be defined as active (1=yes), and otherwise inactive (0=no) regarding the participation in social and leisure activities.

**Health Behaviors**

Health behaviors are measured by the number of healthy health behaviors they adopted, including regular fruit and vegetable intake (eating vegetables or fruits everyday or very often),
protein intake (eating almost everyday at least one type of following food: eggs, meat, fish, milk, bean products, nuts), exercises (at past and present), non-drinking (at past and present), and non-smoking (at past and present). If they answered “yes” to one of the questions, they would get one score. The summed score represents the number of the good healthy habits for respondents. Literature across countries indicates that health habits (smoking, drinking, substance abuse, diet and nutrition, sleep and physical exercise) are related to both physical and psychological well-being and overall life satisfaction of older people (Ho, et al., 1995; Haveman-Nies, De Groot, & Van Staveren, 2003; Gu, Sautter, Huang, & Zeng, 2011; Thompson, Zack, Krahn, Andresen, & Barile, 2012;).

Covariates

Previous studies identified several predictors for the well-being of older adults, including the essential demographic factors and socioeconomic status factors (SES). Research has shown that age, gender, race/ethnicity, marital status, place of residence, education, income, and employment status could all potentially influence the parental status and well-being in both western countries and China (Avison & Cairney, 2003; W. Zhang & Liu, 2007). Therefore, this study also controls these key confounding variables.

Demographic variables included age (old-old: 65-84 vs. oldest-old: 85 and above), gender (female vs. male), ethnicity (Han vs. minorities), marital status (married and live with spouse versus other conditions including being widowed, divorced, never married or separated with spouse). Compared with those who currently married and live with a spouse, the situation of those
seniors who are never married or separated or divorced with a spouse is more similar to the seniors who are widowed.

Socioeconomic status (SES) variables included place of residence (rural vs. urban, and towns are categorized as urban areas), education (no schooling vs. one year or more schooling; 63% of the sample had no education), poverty (whether the annual per Capita income of the respondent below 2300 RMB or $383, the state poverty line in 2008), and occupation type (agricultural vs. non-agricultural). The urban-rural residence was often treated as a proxy measure of SES instead of demographic factors in Chinese literature because urban and rural areas are substantially different regarding socioeconomic development level and social welfare system in China (Gu, Yang, & Sautter, 2016).

3.4 Statistic Methods of Analysis

Descriptive statistic analysis

I first conducted descriptive univariate and bivariate analysis to show the sample characteristics. Univariate analysis provided a profile of the total sample in terms of the children conditions (childless vs non-childless, nonparental vs non-surviving children, gender of living children, contacts with living children), basic demographics, socioeconomic status, disabilities, public service access, social support, social and leisure activities and health behaviors, as well as the well-being of the Chinese older adults. Bivariate analysis showed the differences between the childless and non-childless older adults. I used Chi-square tests for the categorical variables and
two-sample t-tests for the continuous variables to test the statistic significance of the differences between the two groups. The results of the analysis were presented by childlessness conditions. In addition, I also conducted further analysis of caregiving and support network for childless elderly. For instance, who provided the social support, who would be the primary caregivers if the respondents need assistance for daily activities of living. I mapped the social support networks for older people who never gave birth to a child, who had no surviving children, and who had living children. I then compared the differences among the three groups.

Testing for Main Effects of Different Children Conditions

To understand how different factors influence the effect of different children conditions, I adopted stepwise multivariate regression analysis. I first only controlled the basic demographic factors, and then added the socioeconomic factors (and the moderating and mediating factors in the following tests) into the model step by step to examine the changes on the main effects of independent variable and covariates. Logistic regression models were used for the analysis of effects on self-rated health and quality of life, and linear regression models for the psychological well-being. All the following statistical analyses were conducted separately for each dependent variable.

After the tests of difference between childless and non-childless groups, I used the same stepwise multivariate regression for the analysis of other two independent variables, in order to further investigate whether there were differences in the well-being between nonparental childless people and people who had no surviving children, and between nonparental childless and people
who had living children yet with no regular contacts. In addition, I used the same statistical analysis method to test whether the gender of the living children matters for the well-being of elders.

**Testing for Moderating Effects**

To explore the moderating effects of gender, marital status, physical and cognitive disabilities, and access to public services, I first added the interaction term of independent variable (childlessness) and each potential moderator to the multiple regression models one by one to see if the main term and/or the interaction term were statistically significant. Then I included all the interaction terms into the regression model to see whether there were changes in the effects previously identified. In all the models, the covariates were controlled to exclude the influence of confounders.

**Testing for Mediating Effects**

I first ran a basic test by adding them into the regression models stepwise. Estimates of multiple regression models can show whether the effect of childlessness on the dependent variables changed upon adding the potential mediators to the models. I then conducted mediation test for each potential mediator controlling for the covariates to understand the mechanisms through which childlessness exerts influence on the older adults. At last, I did a multi-mediator analysis including all the potential mediators.

For the method of mediation test, Baron and Kenny (1986) proposed the widely cited method through several simple regression models (OLS regression): independent variable(X)
predicting mediators (path a), independent variable(X) predict dependent variable (Y) (path c), and both mediator (M) (path b) and independent variable X (path c’) predicting dependent variable Y. Current approach focused more on the computation of the an indirect effect coefficient (MacKinnon, 2008), the mediational path in which X leads to Y through M, by either the difference between the direct effect (c’) and total effect (c) (Judd & Kenny, 1981) or the product of two paths (ab) (Sobel, 1962), which should be equivalent. A significant indirect effect coefficient is the evidence for a mediational effect.

The three equations for mediation were as below:

\[ Y = cX + E_1 \]
\[ M = aX + E_2 \]
\[ Y = bM + c'X + E_3 \]

However, two mediators (social support and participation in leisure and social activities) and two dependent variables (self-rated health and quality of life) in this study were binary variables. The logistic regression was used to estimate the coefficients/odds ratio of the independent variable on a binary dependent variable (and a mediator), and the Sobel test using OLS regression had problems. The two methods for calculating the indirect effect (ab and c – c’) are no longer equivalent because of the different scaling. Several possible solutions to this problem were proposed (Iacobucci, 2012; Imai, Keele, & Tingley, 2010; Valeri & VanderWeele, 2013). One approach is to transform the parameter estimates by leveling the scales (MacKinnon and Dwyer, 1993). Kenny (2008) converted an unstandardized coefficient to a standardized coefficient.
(multiplied by the standard deviation of the predictor variable and divided by the standard deviation of the outcome variable). The modified three equations for mediation were as below:

\[ Y' = cX + E1 \]

\[ M' = aX + E2 \]

\[ Y'' = bM + c'X + E3 \]

The equations to compute the standard deviations of outcome variables were as below:

\[ S_{M'} = \sqrt{a^2 S_x^2 + \pi^2/3}; \]

\[ S_{Y'} = \sqrt{c^2 S_x^2 + \pi^2/3}; \]

\[ S_{Y''} = \sqrt{c'^2 S_x^2 + b^2 S_m^2 + 2bc'Cov(X,M) + \pi^2/3}; \]

This study used this method to standardize coefficients and compute the indirect effects for separate models with each potential mediator first and then for the model with multiple mediators. The standard errors and confidence intervals were computed from a bootstrap resampling approach testing the significance of the indirect effects.

All statistical analyses were conducted using Stata (version 13).

3.5 Summary

This study will test the twelve key hypotheses using the national survey data of CLHLS to answer the research questions. In Table 3-1, there is a list of all variables included in this study and descriptions. Statistic Analysis, including multiple regression models, moderation, and mediation tests will be run step by step to investigate the effects of childlessness, mediating and
moderating effect of some factors using Stata version 13. The research diagram lay out the associations of a range of variables to be tested in Figure 1, Figure 2 and Figure 3.
CHAPTER 4: PROFILE OF CHILDLESS OLDER ADULTS IN CHINA

This Chapter presents the results of univariate and bivariate analysis by Chi-square test and two-sample t-test. The data provides a specific profile of childless older adults in China compared with their counterparts who had children, in terms of demographics, socioeconomic status, health behaviors and social and leisure participation, informal social support and formal support services available, health outcomes and quality of life.

Table 4-1 presents the number of childless seniors among the total sample of the study. 548 older adults reported being childless (3.9% of the total sample). Among the total childless seniors, 278 of them are nonparental, and 270 had children, yet none was alive by the survey time. Among the 13,349 seniors with children, 1,113 had no regular contacts with their children, and 12,236 had regular contacts. About 1,208 had a daughter(s) alive only (8.7%), and 12,141 had at least a son alive. For those who had male children, 2,064 elders had a son(s) alive only, and 10,077 had both son(s) and daughter(s) alive. Majority of the sample (72%) had both sons and daughters.

When applying the adjusted age-gender-residency specific weight to the descriptive analysis, approximately 2.2% of the total Chinese older population were childless. 1.8% of the total older population were nonparental, and only 0.4% became childless due to death of all their children. For elders who had at least a child alive, most of them kept regular contacts with their children, and only 4.4% have no regular contacts with children. Approximately 6.6% of the total older population had daughters only, 14.2% had sons only, and 77% had both sons and daughter(s) alive.
4.1 Demographic and Socioeconomic Characteristics

First, the univariate analysis in Table 4-2 shows the basic demographic and socioeconomic characteristics of the older population in China. Adjusted by weight, the average age of older adults are 72.9 years old (SD = 6.3). A majority was female (52.4%), Han ethnicity (94%), married and living with spouses (61%), and rural residents (57%). Only 57% of seniors had some education, and about 30% lived in poverty (The Chinese poverty line in 2008 is having individual annual income less than 2300 RMB).

When comparing the characteristics of childless and non-childless older adults, the data show significant statistical differences in gender, age, marital status, and poverty (see Table 4-2). Adjusted by weight, most childless elders were male (76.9%). The average age of childless elders was about one year older than those who had children. Only about 16% childless seniors were married and currently live with their spouses. Over half of the childless older adults were never married, and over a quarter was widowed. The poverty rate for childless elders was 51.2% versus less than 30% for elders who had children. No significant differences were observed for ethnicity, education (or literacy), rural/urban residence, and occupation type. The illiterate rate was higher for childless people than for those who had children, though the difference between the two groups only had marginal statistical significance (p = 0.076).

4.2 Informal Social Support and Formal Support Services.
This section describes the availability of informal social support and formal support services of childless older adults. Firstly, I investigated the living arrangement for older adults which may affect the amount of support that they may receive from others. Table 4-3 shows that most older adults lived with other household members (85%), 15% of them lived alone, and less than 1% lived in an institution. However, half of the childless seniors lived alone, and 21% lived in an institution. The living arrangement was highly correlated with children status (p < 0.001).

Secondly, I examined the social support network of older adults: whether they can get different kinds of support, and from whom. In the questionnaire, respondents picked up three key persons for the following questions: “who take care of you when you are sick?” “to whom do you usually talk most frequently in daily life?” “to whom do you talk first when you need to share some of your thoughts,” and “who do you ask first for help when you have problems/difficulties.” If there was no one there for them, they should choose “Nobody.” Based on their answers to the three questions, I identified the individuals with inadequate social support and found out the primary social ties (ranked by frequency) for people who stated to have someone to support them in specific ways (see Table 4-3). Figure 4 illustrates the social network (multiple social ties with different strength) for people who were nonparental, those who had no surviving children, and those who had at least a child. Table 4-3 shows that only 65.7% childless elders reported having any kinds of social support compared with 93.5% for elders who have children (p < 0.001). Elders with children seem to have better social support than childless elders. Furthermore, the structure of the support network differs across the three groups. For elders who have children, they received
most kinds of support from their children (predominantly sons), spouse, daughter-in-law (not so much for son-in-law), and friends or neighbors. For people who had no surviving children, they get social support from their grandchildren and spouses, friends/neighbors, and other relatives. In contrast, nonparental elders can only get social support from other relatives, friends/neighbors, spouse and social workers.

To further understand how much support that childless elders can get from their social network apart from children, I further investigated caregiving arrangements of older adults who need help for daily activities by answers to the question “who is the primary caregivers when you need assistance with bathing, dressing, toileting and indoor transferring, continence and eating?”. For most older adults who had children, the most direct kinships, sons, daughters-in-law, daughters, grandchildren, and spouse took the role of primary caregivers. For those who had no surviving children, grandchildren and their spouses, daughter-in-law’s, other relatives took the caregiving role. For the nonparental childless elders, they mainly relied on caregiving from other relatives, social services, and housekeepers. The result is very similar with above analysis, and it reveals that the social support from other relatives, friends/neighbors, and social services are critical for childless older adults, however, the support from those weak ties may not substitute the support that people usually get from children.

Apart from the informal social support, the benefits and assistance of the formal system are also an essential source of support. Table 4-3 shows that about 77.6% childless older had access to a least a type of pension or health insurance, compared to 79.2% for people who had
children. However, the difference was not significant ($p = 0.704$). Only 72.8% childless reported having adequate medical services, compared to 93.9% for people who have children with a significant difference ($p < 0.001$). At last, about 37.8% childless elders claimed that they had at least one type of support services available in their communities. Interestingly, the percentage of people who had children is lower (30.2%). The difference between the two groups was not significant ($p = 0.115$).

4.3 Lifestyle

Table 4-4 shows the overall situation of Chinese older adults regarding health behaviors and participation in social and leisure activities by childlessness status. First, older people with children adopted more healthy health behaviors than childless older adults. Overall, around 20% older people drank, 24% smoked, 40% of older people were engaged in some forms of exercises. Over 90% people ate fruits or vegetables regularly, and 60% had daily protein intake. Compared with those who had children, childless elders had a higher rate of smoking and a low rate of regular fruits or vegetable intake and proteins intake. No statistically significant differences were observed on drinking ($p = 0.098$) and exercise patterns ($p = 0.627$).

Approximately 87% of older adults participated in at least one type of social and leisure activities. Less childless seniors (73.2%) attended any social or leisure activities compared with those who had children (88%) with statistical significance ($p < 0.001$).

4.4 Health and Well-being
Finally, I examine how the childlessness affects the health and well-being of older adults. Table 4-5 compares the differences in the disability status, self-rated health, psychological well-being and quality of life for childless and non-childless older adults. The data show that 3.2% of the older population had some kinds of physical disabilities and needed ADL assistance. In contrast, about 11% of older Chinese were identified with some cognitive impairments. The prevalence rate of cognitive impairments was higher for childless elders (20.2%) than that for elders who had children (10.8%) with statistical significance (p < 0.01). However, being childless was not correlated with the high prevalence of physical disabilities (p = 0.314).

Overall only 18% of older adults reported to have bad/very bad health conditions, and 8% reported a poor or very poor quality of life. Childless elders had overall more negative psychological well-being with statistical significance (p < 0.001). More childless elders reported poor quality of life (23.5%) compared with elders who had children (7.4%), and the differences were statistically significant (p < 0.001). The data show no correlation between childlessness and self-rated health (p = 0.278).

4.5 Summary

In sum, the univariate and bivariate analysis identified several factors that were associated with the childlessness without concerning other factors. Gender, age, marital status, and household income all had a strong relationship with childlessness, which needs to be controlled for the regression analysis. Childlessness also affects the living arrangement, the structure of the social network, availability of social support, and access to the medical services. Compared with seniors
who have children, childless elders tend to smoke more, have less fruit/vegetable and protein intake, and participate less in social and leisure activities. Consequently, childless elders had a higher rate of cognitive impairments, lower psychological well-being and reduced quality of life compared with non-childless older adults. However, no association between childlessness and physical health status were identified. The associations between childless and different factors were tested further in the regression analysis in following chapters.
CHAPTER 5: CHILDLESSNESS AND SELF-RATED HEALTH

This chapter summarizes the key results related to how childlessness affects the self-rated health of older people in China. Several Logistic Regression models were constructed to test the hypotheses, and self-rated health was regressed on children status, holding the key covariates constant. Moderating and mediating effects were tested in separate models.

5.1 Childlessness and Self-Rated Health

This section focuses on whether there are differences in terms of self-rated health among the subgroups of various children conditions (See Figure 1). I first tested whether childlessness had a significant effect on the self-rated health status of older adults controlling for the demographic and socioeconomic covariates (testing the H1). Then I compared the difference in self-rated health between nonparental seniors and those who had all children died (testing the H2); and between nonparental seniors and those who had no regular contacts with their children (testing the H3). Finally, I investigated whether the gender of children matters for the self-rated health status of their older parents (testing the H4).

Table 5-1 shows no significant differences in self-rated health between childless seniors and those who had at least a child alive, controlling for the basic demographics in Model 1, controlling for the socioeconomic status factors in Model 2, or controlling for both in Model 3. Being oldest-old (OR = 0.718; p < 0.001) and Han ethnicity (OR = 0.676; p < 0.09) predicted poor self-rated health status in Model 1. Females were more likely to have poor self-rated health than their male counterparts (OR = 0.826; p < 0.05). Although married seniors were more likely to have
good self-rated health compared with seniors in other marital conditions, the difference only had marginal statistic significance (OR = 1.159; p = 0.09). Regression estimates in Model 2 show that educated seniors were more likely to have a good self-rated health (OR = 1.358; p < 0.001), while seniors who lived in rural areas (OR = 0.795; p < 0.05) and suffered from poverty (OR = 0.714; p < 0.001) were more likely to have poor self-rated health. Occupation type was not associated with self-rated health. Model 3 produced similar results as Model 1 and 2, except that the gender difference disappeared when adding socioeconomic status factors into the regression model.

Table 5-2 presents the results of a comparison among the subgroups of seniors in different children conditions in self-rated health. Compared with nonparental seniors, those who had no surviving children or had no regular contacts with their living children were more likely to have poor self-rated health; and those who had regular contacts with their children were more likely to have good self-rated health. However, all these group differences did not reach statistic significance. Post-estimation analysis using the Wald Test only found that older people who had regular contacts with their children alive were more likely to report good health conditions than those who had no regular contacts with their children (χ² = 4.940; p < 0.05) controlled both demographics and socioeconomic status factors. The regression estimates of covariates were similar to those in Table 5-1.

Table 5-3 shows the influence of children’s gender on self-rated health. Two subgroups of seniors with male children alive seem to have a higher likelihood to report good health than the childless group. The subgroup with only daughters alive was more likely to report poor health than
the childless group. However, these differences were not significant in all the three models. Post-
estimation analysis using the Wald Test found no significant difference between every two
subgroups among the four subgroups in terms of self-rated health. The regression estimates of
covariates were similar to those in Table 5-1.

5.2 Moderating Tests

This section presents results on whether gender, marital status, and disability status and
access to formal services moderate the effect of childlessness on self-rated health (see Figure 2).
I first tested each moderator separately and included all the moderators in the last model to see
how the effect of childlessness and each moderator changed when controlling for other
moderators (testing the H5~H11).

Gender and Marital Status

Table 5-4 shows that marital status modified the effect of childlessness on self-rated
health, but gender did not. In Model 1, Childlessness, female gender and an interaction term of
the two variables (OR = 0.523; p = 0.243) all had no significant effect on self-rated health,
suggesting no moderating effect of gender on the main effect of childlessness. In Model 2, both
the main effect of marital status (OR = 1.190; p < 0.05), and the interaction term of marital status
and childlessness (OR = 0.246; p < 0.05) were statistically significant (see Table 5-4). When
testing the moderating effect of gender and marital status together in Model 3, the results were
the same as to that of separate tests in Model 1 and Model 2. Older people who are currently
married and living with spouses were about 20% more likely to report good health than those who were widowed, devoiced, separated or never married among people who have children. The difference was significant between the odds ratio comparing childless older vs. non-childless in currently married seniors and the odds ratio comparing childless older vs. non-childless in widowed, divorced, separated and never married seniors. Among those who were currently married, childless elderly were more likely to report poor health than those who had children. However, amongst older adults who were widowed, divorced, separated or never married, there was no significant difference in self-rated health between childless elders and those who had children.

Disability Status

Table 5-5 shows that neither ADL disabilities nor cognitive impairments moderated the effect of childlessness with statistic significance. Having ADL disabilities (OR = 0.103; p < 0.001) and/or cognitive impairments (OR = 0.304; p < 0.001) predicted poor self-rated health (Model 1). Childlessness was negatively related to self-rated health when taking disability status into account, though the association was insignificant (OR =0.888; p = 0.666). Model 2 tested the effect of the interaction between ADL disabilities and childlessness, and Model 3 tested that of the interaction between cognitive impairments and childlessness. Model 4 tested the moderating effects of the two factors related to disability status together. None of the interaction terms of between childlessness and Disability status were significant across the three models.
Access to Formal Services

**Table 5-6** shows that access to formal services including social security, medical resources, and community-based support services did not moderate the effect of childlessness. Having access to adequate medical services (OR = 2.339; p < 0.001) and community-based support services (OR = 1.412; p < 0.001) were both associated with good self-rated health. The association between access to social security services and self-rated health was only marginally significant (OR = 0.824; p = 0.061). The effect of childlessness remained insignificant (OR = 1.027, p = 0.920) when adding the factors on formal services access. Model 2 to Model 4 tested the interaction of childlessness with each type of formal services, and Model 5 included them all. None of the three interaction terms were found to have a significant effect on self-rated health in all three models. The results of Model 5 were similar as that in Model 1. Among those who have children, access to medical services and community-based support services can predict better self-rated health.

**Table 5-7** presents the results of testing all moderators. Model 1 shows that only ADL disabilities, cognitive impairments, access to adequate medical services and community-based support services were significantly associated with self-rated health. Childlessness had no significant effect on the self-rated health of older adults (OR = 1.022; p = 0.718) when adding the disability status and access to formal services into the regression model. In Model 2, the interaction term of childlessness and marital status remained significant (OR = 0.237; p < 0.05). No other significant moderators were found.
5.3 Mediating Tests

This section summarizes the results of mediating test with and without weights (see Figure 3). The purpose of the analysis was to examine whether social support, participation in social and leisure activities, and health behaviors carry the influence of childlessness to self-rated health for older adults controlling for the covariates (testing the H12~H15).

Table 5-8 shows that social support (OR = 2.105; p < 0.001), social and leisure activity participation (OR = 2.363; p < 0.001), and the number of healthy health behaviors (OR = 1.333; p < 0.01) all had a significant association with self-rated health directly, no matter other mediators were controlled (Model 5) or not (Model 2, 3 & 4). However, in all the models, childlessness was not associated with self-rated health.

Table 5-9 presents the standardized coefficients for direct, indirect and total effects of childlessness on self-rated health through different mediators with and without applying weight. For the mediation test without weight, I controlled the three key variables that the survey used to produce weights (age, gender, and rural/urban residence). I examined the direct, indirect and total effects of each mediator separately without controlling other mediators first, and then conducted Multiple Mediation Analysis to see how much influence that all the three mediators carried for the effect of childlessness on the self-rated health. Table 5-9 also shows the confidence intervals for indirect effects using bootstrapping resampling method, and the portion of the total effect was mediated by the variables with significant indirect effect.
Social Support

Without weight, the indirect effect of childlessness through social support was -0.015 with 95% confidence interval of -0.019 to -0.011. The confidence interval did not include zero, which suggests that social support mediated the effect of childlessness on the self-rated health. The total effect was -0.022 (p < 0.05). The direct effect of childlessness on self-rated health was not significant. Childlessness predicted a lack of social support (a path: direct effect = -0.087; p < 0.001). The portion of effect mediated by social support was about 67.7%. Multiple mediation analysis shows that the indirect effect of childlessness through social support was -0.013.

When applying weight, the indirect effect of childlessness on self-rated health through social support was -0.019 with statistic significance (95% CI: -0.041 to -0.006). Childlessness predicted the absence of social support (a path: direct effect = -0.106; p < 0.001). The direct effect of childlessness on self-rated health was 0.007, and the total effect was -0.012. However, the direct and total effects were statistically insignificant and had opposite signs, which means that it might be a suppression effect (positive and negative association cancelation) for social support.

Social and Leisure Activity Participation

Without weight, childlessness had a significant indirect effect on self-rated health through the participation in social and leisure activities (indirect effect =-0.012; 95% CI: -0.018 to -0.007). Childlessness was negatively associated with the participation in social and leisure activities (a
path: direct effect = -0.048; p < 0.001). The direct effect of childlessness was -0.010, which was not significant (95% CI: -0.030 to 0.009). The total effect was -0.022 (95% CI: -0.043 to -0.003). About 54.1% total effect mediated by the social and leisure activity participation. Multiple mediation analysis shows that the indirect effect of childlessness through participation in social and leisure activities was -0.010.

Adjusted by weight, childlessness still had a significant indirect effect through the participation in social and leisure activities (indirect effect = -0.011; 95% CI: -0.028 to -0.001). The direct effect of childlessness on self-rated health was -0.008, and the total effect was -0.019. Neither the direct nor total effect of childlessness was significant. Participation in social and leisure activities did not mediate the effects of childlessness on the self-rated health.

Health Behaviors

The mediating analysis without weights show that the indirect effect of childlessness on self-rated health through health behaviors was significant (indirect effect = -0.001, p < 0.05, 95% CI: -0.003 to -0.0001). The direct effect of childlessness on self-rated health was -0.020, and the total effect was -0.021. Neither direct nor total effect of childlessness was significant. The indirect effect had a small effect size (close to zero) and less power compared with other two mediators. Only a tiny portion of effect mediated by health behaviors (6.5%). Multiple mediation analysis shows that the indirect effect of childlessness through health behaviors was close to zero.

Adjusted the results by weight, the indirect effect of childlessness through health behaviors was almost 0 with no statistical significance (indirect effect = 0; 95% CI: -0.007 to 0.096). Direct
effect was the same as the total effect (B = -0.012). Therefore, health behaviors did not mediate the effect the childlessness on self-rated health.

In sum, social support, participation in social and leisure activities, health behaviors did not mediate the effect of childlessness on self-rated health based upon the results of all mediation tests with weight adjustment.

5.4 Final Test on Effect of Childlessness

Table 5-10 presents the estimates of stepwise logistic regression models including not only the basic demographics and socioeconomic status, but also factors related to social support and lifestyle, access to formal services and health conditions. Model 1 only controlled the basic demographics and Model 2 added socioeconomic status factors. Model 3 added factors related to social and lifestyle behaviors. The data show that social support, social and leisure activities, and health behaviors all had a significant positive association with self-rated health. When social support and lifestyle behaviors were included, age, rural/urban residence, education became insignificant, while genders became significant. The effect of childlessness on self-rated health was not significant (OR = 1.148; p = 0.622).

Model 4 added factors related to formal service access into the regression. Access to adequate medical services (OR = 2.005; p < 0.001) and community-based support services (OR = 1.306; p < 0.01) both had a positive impact on self-rated health. However, access to social security services was negatively associated with self-rated health (OR = 0.792; p < 0.05). The
coefficients of other factors were very similar to Model 2. The effect of childlessness on self-rated health remained insignificant (OR = 1.279; p = 0.382).

Model 5 incorporated the factors such as disabilities and psychological well-being. The results show that having ADL disabilities (OR = 0.166; p < 0.001) and cognitive impairments (OR = 0.544; p < 0.001) predicted poor self-rated health. Older people who had positive psychological well-being were more likely to report good health conditions than those who had negative psychological well-being (OR = 1.307; p < 0.001). Gender, poverty, social and leisure activities, health behaviors were no longer associated with self-rated health. In contrast, age and marital status were associated with self-rated health again. The effect of childlessness on self-rated health was not significant (OR = 1.329; p = 0.377).

The final model (Model 6) included all interaction terms in the model. The final results were consistent with previous models. The effect of childlessness on self-rated health remains non-significant (OR = 1.288; p = 0.429) and only marital status had significant moderating effect (OR = 0.148; p < 0.01). Han ethnicity (OR = 0.588; p < 0.05), married status (OR = 0.772; p < 0.05), access to social security (OR = 0.690; p < 0.001), ADL disabilities (OR = 0.159; p < 0.001), and cognitive impairments (OR = 0.552; p < 0.001) had a negative association with self-rated health. In contrast, having social support (OR = 1.629; p < 0.01), participating into social and leisure activities (OR = 1.110, p < 0.05) healthy lifestyle (OR = 1.305; p < 0.05) and access to community-based support services (OR = 1.333; p < 0.01) were positively related to self-rated health. Interestingly, the seniors aged 85 years and above in average had better self-
reported health conditions than their counterparts aged 65 to 84 years (OR = 1.568; p < 0.001).

In addition, seniors who had positive psychological well-being were more likely to report better health status (OR = 1.309; p < 0.001).

**Table 5-11** presents the results of testing whether different types of children conditions matter for self-rated health in the full model. The results were similar to previous tests in Table 5-2. There were no differences in self-rated health between nonparental elders and those who had no surviving children. Contacts with adults children did not matter for the self-rated health of older parents. **Table 5-12** presents the results of testing whether the gender of children influences the self-rated health in the full model. No differences were identified among groups with sons only, daughters only, and both sons and daughters, which is consistent with the results in Table 5-3.

### 5.5 Summary

In sum, being childless did not have a significant influence on self-rated health for Chinese people in their later years when controlling for all the contributing factors, basic demographics, socioeconomic status, informal and formal support system, disabilities and psychological well-being. No differences were observed between subgroups of nonparental seniors and those who had no surviving children; and between nonparental seniors and those who had no regular contacts with their children. Gender of children alive did not matter for self-rated health. Only marital status was found to moderate the effect of childlessness on self-rated health.
Social support, social and leisure activity participation and health behaviors did not mediate the effect of childlessness on self-rated health.
CHAPTER 6: CHILDLINESS AND PSYCHOLOGICAL WELL-BEING

This chapter displays the findings of the relationship between being the childless and psychological well-being of older adults in China. Multiple Regression models were adopted to test the hypotheses, and psychological well-being was regressed on children status controlling for the covariates. The unstandardized coefficients were reported in the tables. Effects of potential mediators were tested in separate models with standardized coefficients reported.

6.1 Childlessness and Psychological Well-being

This section summarizes the results on the differences in psychological well-being between subgroups of older adults in different children conditions (See Figure 1). Firstly, I examined the relationship between childlessness and the psychological well-being controlling for the demographic and socioeconomic covariates (testing the $H1$). Secondly, I further compared the psychological well-being of nonparental seniors and those with no surviving children (testing the $H2$). I also compared the psychological well-being of nonparental seniors and of those who had no regular contacts with their children (testing the $H3$). Finally, I examined whether the gender of children alive matters for the psychological well-being of older adults (testing the $H4$).

Table 6-1 shows that childless older people had more negative psychological well-being compared with those who had children when controlling only basic demographics in Model 1 ($b = -1.113; p < 0.05$), or when controlling only socioeconomic status factors in Model 2 ($b = -1.242; p < 0.01$). Being female and oldest-old predicted negative psychological well-being. Han ethnicity and married status predicted more positive psychological well-being. Education was positively associated with the psychological well-being ($b = 1.029; P < 0.001$), while poverty was negatively
associated with the psychological well-being ($b = -0.666; P < 0.001$). Rural/urban residence and the occupation type had no significant effect on the psychological well-being of seniors. When controlling for both demographics and socioeconomic status in Model 3, childlessness was still negatively related to psychological well-being with marginal statistic significance ($b = -0.830; p = 0.056$). Ethnicity was no longer associated with the psychological well-being, and the effect size of education decreased.

Table 6-2 presents the results of the comparison among subgroups of seniors in different children conditions regarding the psychological well-being. In general, older persons who had no surviving children seem to report more negative psychological well-being than their nonparental counterparts. Seniors with children tended to have more positive psychological well-being, even if they had no regular contacts with their children than the nonparental seniors. However, neither the differences between the two childless subgroups nor the difference between older adults with no regular contacts with children and nonparental seniors reached statistical significance. Older people who had regular contacts with their living children reported more positive psychological well-being than those who were nonparental with statistical significance when only control demographics ($b = 1.061; p < 0.05$) or socioeconomic factors ($b = 1.111; p < 0.05$). However, the effect disappeared when controlled both demographics and socioeconomic factors.

Table 6-3 shows that the three subgroups of older adults who had at least a child alive, regardless the gender, had a more positive psychological well-being than the childless group controlling for basic demographics. If only controlling for socioeconomic factors, the difference between childless elders and those who only had daughters alive was only marginally significant ($b = 0.911; p = 0.062$). The two groups with at least a son alive all had better psychological well-being than the childless older adults. If both demographics and socioeconomic factors were
controlled, there was no difference between childless elders and those who had only daughters alive. Older adults who had only sons alive (b = 1.357; p < 0.01) or both sons and daughters alive (b = 1.248; p < 0.01) all had better psychological well-being than childless elders. While controlling for both demographic and socioeconomic factors, the difference between older people who had both female and male children alive and childless elders became only marginally significant (b = 0.828; p = 0.058). People who had only sons alive had a more positive psychological well-being than childless elders (b = 0.960; p < 0.05). The difference between childless elders and those who only had daughter alive was not significant. Post-estimation analysis using the Wald Test found no significant difference between the group having only daughters alive and the group having only sons alive ($\chi^2 = 2.09; p = 0.149$) and between the group having only daughters alive and the group having both daughters and sons alive ($\chi^2 = 1.27; p = 0.259$).

6.2 Moderating Tests

This section focuses on whether gender, marital status, and disability status and access to formal services moderate the effect of childlessness on psychological well-being (see Figure 2). I first tested the effect of each moderator separately and then added all the moderators into the regression model to see how the effect of childlessness and each moderator changed when controlling for other moderators (testing the $H5$–$H11$).

Gender and Marital Status

Table 6-4 shows that neither gender nor marital status modified the effect of childlessness on the psychological well-being. First, females had a more negative psychological well-being compared with their male counterparts among those who had children (b = -0.451; p < 0.001). However, the interaction term was not statistically significant (b = 0.565; p = 0.553),
indicating no moderating effect of gender on the main effect of childlessness. In Model 1, childlessness was not significantly associated with psychological well-being when adding the interaction term of gender and childlessness into the model. In Model 2, the effect of the interaction term between childlessness and marital status did not reach the statistical significance (b = 0.879; p = 0.461), meaning that marital status does not moderate the effect of childlessness on the psychological well-being. Being married was positively associated with psychological well-being (b = 1.138; p < 0.001) among those who had children. When adding interaction with marital status, childlessness was negatively associated with the psychological well-being (b = -0.976; p < 0.05) among those who were widowed, divorced, separated and never married. When testing the moderating effect of gender and marital status together in Model 3, among widowed, divorced, separated and never-married men, childless elderly were less likely to have positive psychological well-being (b = -1.058; p < 0.05) than those who had children. However, the effects of the two interaction terms remained insignificant.

Disability Status

Table 6-5 shows that disability status did not modify the effect of childlessness on the psychological well-being. Both ADL disabilities (b = -3.997; p < 0.001) and cognitive impairments (b = 2.606; p < 0.001) had significant negative effects on the psychological well-being without adding the interaction terms in Model 1. Model 2 and Model 3 tested the interaction of ADL disabilities and childlessness, and interaction of cognitive impairments and childlessness separately. Model 4 tested the moderating effects of the two factors on disabilities together. In Model 2, childlessness was associated with more negative psychological well-being (b = -0.865; p < 0.05) among those who had no ADL disabilities. Among those older adults who had children, people who were ADL disabled reported a significantly more negative
psychological well-being (b = -5.014; p < 0.001). In Model 3, among those older adults who had children, people who were cognitively impaired reported a significantly more negative psychological well-being (b = -3.315; p < 0.001). The results of Model 4 were very similar to other models. In all the models, the effect of the two interaction terms of childlessness and disability status were insignificant.

Access to Formal Services

Table 6-6 shows that access to formal services including social security, medical resources, and community-based support services did not moderate the effect of childlessness. In model 1, access to adequate medical services (b = 2.768; p < 0.001) and community-based support services (b = 0.237; p < 0.05) were positively associated with the psychological well-being, while access to social security did not show significant influence (b = 0.214; p = 0.154) without adding interaction terms. The effect of childlessness remains insignificant when adding the factors related to formal service access (b= -0.361, p = 0.399). In model 2, 3, and 4, I found that among older adults who had children, access to social security, medical services and community-based support services all positively associated with psychological well-being when testing their effects separately. Only in Model 4, childlessness was negatively associated with the psychological well-being (b = -1.168; p < 0.05) for people who had no access to community-based support services. In Model 5, when testing the moderating effect of all the formal services together, none of the three interaction terms were found to have a significant effect on psychological well-being, which is consistent with results in Model 2 to 4. Access to medical services was positively associated with psychological well-being when older adults had no access to social security and community-based support services.
Table 6-7 presents the results of testing all moderators together, which was the same as previous analysis. None of the interaction terms had a significant effect on the psychological well-being, meaning no moderating effects were observed gender, marital status, disabilities and access to formal services. Among people who had children, gender, marital status, ADL disabilities, cognitive impairments, access to medical services were significantly associated with psychological well-being. When adding the factors related to disability status and access to formal services into the regression model, the negative association between childlessness and psychological well-being was still insignificant (b = -0.333; p = 0.523).

6.3 Mediating Tests

This section summarizes the results of mediating test with and without weight adjustment (see Figure 3). The purpose of the analysis was to see whether social support, social and leisure activities and health behaviors carry the influence of childlessness to the psychological well-being for seniors controlling for the covariates (testing the $H12$–$H15$).

Table 6-8 shows that social support (b = 1.104; p < 0.001), social and leisure activity participation (b = 2.078; p < 0.001), and the number of healthy health behaviors (b = 0.245; p < 0.001) all had a significant association with the psychological well-being directly, no matter other mediators were controlled (Model 5) or not (Model 2, 3 & 4). However, in all the models, childlessness was not associated with the psychological well-being. Only in Model 1 (b = -0.828; p = 0.056) and Model 4 (b = -0.836; p = 0.051), the effect of childlessness were marginal significant.

Table 6-9 presents the standardized coefficients for direct, indirect and total effects of childlessness on the psychological well-being through different mediators with and without applying weight. For the mediation test without weight, I controlled the three key variables that
the survey used to produce weight (age, gender, and rural/urban residence). I examined the
direct, indirect and total effects of each mediator separately without controlling other mediators
first, and then conducted Multiple Mediation Analysis to see how much influence that all the
three mediators carried for the effect of childlessness on the self-rated health. Then I tested the
mediation effects with weights. Table 6-9 also shows the confidence intervals for indirect effects
using bootstrapping resampling method, and the portion of the total effect was mediated by the
variables that had a significant indirect effect.

Social Support

Without applying weight, the indirect effect of childlessness through social support is -
0.014 (p < 0.001, 95% CI: -0.019 to -0.010), which suggests that social support mediated the
effect of childlessness on the psychological well-being. The direct effect of childlessness on
psychological well-being was -0.021 (p < 0.05). Childlessness predicted a lack of social support
(a path: direct effect = -0.087; p < 0.001). Total effect was -0.035 (p < 0.001). The portion of
effect mediated by social support was about 41%. Multiple mediation analysis shows that the
indirect effect of childlessness through health behaviors was -0.012.

Adjusted the estimates by weight, the indirect effect of childlessness through social
support was -0.174 with 95% confidence interval of -0.330 to -0.067. Childlessness predicted the
absence of social support (a path: direct effect = -0.106; p < 0.001). However, the total effect (B
= -0.704) and direct effect (B = 0.531) were insignificant and had opposite signs, indicating a
possible suppression effect of social support.
Social and Leisure Activity Participation

Without weight, the results indicate that the indirect effect of childlessness through the participation in social and leisure activities was -0.013 (p < 0.001; 95% CI: -0.019 to -0.008). It means that social and leisure activity participation mediated the relationship between childlessness and the psychological well-being. Childlessness had a significant negative effect on the psychological well-being controlling for the participation in social and leisure activities and other covariates (c’ path: direct effect = -0.022, p < 0.01). Childlessness predicted non-participation of social and leisure activities (a path: direct effect = -0.048; p < 0.001). The total effect was -0.035 (p < 0.001), and about a quarter of total effect mediated by social and leisure activity participation. Multiple mediation analysis shows that the indirect effect of childlessness through health behaviors was -0.011.

Adjusted by weight, the participation in social and leisure activities still had a significant indirect effect (indirect effect = -0.140, 95% CI: -0.302 to -0.018). Childlessness predicted non-participation of social and leisure activities (direct effect = -0.045, p < 0.05). However, the direct effect and total effect of childlessness were both negative and statistically insignificant, meaning that participation in social and leisure activities did not mediate the effect of childlessness on psychological well-being.

Health Behaviors

The mediating analysis without weight adjustment shows that the indirect effect of the number of good health behaviors was nearly zero with a 95% confidence interval from -0.002 to 0.0001. It suggests that health behaviors had almost no mediating effect and the portion of effect mediated by health behaviors was also very tiny (3.7%). Childlessness had a significant
direct effect on psychological well-being ($B = -0.031; p < 0.001$) and total effect ($B = -0.032; p < 0.001$). Childless older adults had less good health behaviors than their counterparts with children (a path: $B = -0.011; p < 0.05$). Multiple mediation analysis shows that the indirect effect of childlessness through health behaviors was close to zero.

Applying weights in multiple regressions, health behaviors had no mediating effect with statistical significance (direct effect=$-0.829$; indirect effect=$0.008$, 95% CI: $-0.074$ to $0.096$; total effect=$-0.821$). Childlessness was not significantly associated with the number of healthy health behaviors.

In sum, based on the results of tests without weight adjustment, social support and participation in social and leisure activities both mediated the effect of childlessness on the psychological well-being of older adults, but the number of healthy health behaviors did not. However, when adjusting the results by weight, no mediating roles were found for the three variables on the association between childlessness and psychological well-being.

### 6.4 Final Test on Effect of Childlessness

**Table 6-10** presents the estimates of stepwise multiple regression models including not basic demographics, socioeconomic status, factors related to social support and lifestyle, access to formal services and health conditions. Model 1 only controlled the basic demographics and Model 2 added socioeconomic status factors. Model 3 included factors such as social support, social and leisure activities, and health behaviors. All the three factors had a significant positive association with psychological well-being. When social support and lifestyle behaviors were included, ethnicity became a significant predictor ($b = 0.429; p < 0.05$). The negative effect of childlessness on the psychological well-being was not significant ($b = -0.404; p = 0.329$).
Model 4 added factors on the access to formal services. No significant effect was observed for access to social security services and community-based support services. Access to adequate medical services ($b = 2.497; p < 0.001$) had a positive impact on psychological well-being. The coefficients of other factors were very similar to Model 2. The negative effect of childlessness on psychological well-being was statistically insignificant ($b = -0.048; p = 0.906$).

Model 5 is the full model, which incorporated the factors in previous models as well as the factors related to health conditions such as disability status (objective health conditions) and self-reported health (subjective health). The data showed that ADL disabilities ($b = -2.275; p < 0.001$) and cognitive impairments ($b = -1.647; p < 0.001$) all had adverse effect on the psychological well-being. Older people who had good self-rated health conditions will be more positive in psychological well-being than those who had poor self-rated health ($b = 2.994; p < 0.001$). In this model, there was no difference in psychological well-being due to education when taking health conditions into account. The effect of social support became insignificant ($b = 290; p = 0.197$). Conversely, the effect of having social security benefits became significant ($b = 0.293; p < 0.05$). Childlessness did not have significant negative effect on psychological well-being ($b = -0.213; p = 0.543$) when controlling for health conditions.

The final model (Model 6) added interaction terms into the model to retest the potential moderating effect. The results were the same as that in previous tests. No moderating effect was identified for gender, marital status, disability status, and factors related to public services. The negative effect of childlessness on the psychological well-being remains insignificant for seniors ($b = -0.297; p = 0.541$). The results on other factors associated with the psychological well-being of older adults were the same as Model 5.
Table 6-11 presents the results of testing whether different types of children condition matter for psychological well-being in the full model. The results were similar to previous tests in Table 5-2. When controlling for the access to formal and informal support resources and physical health conditions, there were no differences in psychological well-being between nonparental elderly and those who had no surviving children; whether children kept regular contacts with their parents had no significant impact on the psychological well-being of elders. Table 6-12 presents the results of testing whether the gender of children influences the self-rated health in the full model. No differences were identified among groups with no child, sons only, daughters only, and both sons and daughters, which is consistent with the results in Table 6-3.

6.5 Summary

In sum, childless seniors did not report more negative psychological well-being than those who had children alive with statistical significance, when controlling for all the contributing factors, basic demographics, socioeconomic status, health status, and informal and formal support system. No differences were observed between subgroups of childless people (nonparental vs. no surviving children), and between nonparental elders and those who had no regular contacts with their children. Gender of the children alive did not matter for the psychological well-being of older adults. No moderating effects were found for the factors including gender, marital status, disability status and formal service access. No mediating effects were found for social support, participation in social and leisure activities, and health behaviors.
CHAPTER 7: CHILDLESSNESS AND QUALITY OF LIFE

This chapter focuses on the investigation of how childlessness affects the quality of life for Chinese older adults; and what factors moderate and mediate the effect. I adopted the stepwise multivariate logistic regression to fully understand the impacts of childlessness and other factors on the quality of life, and identify the differences due to the type of childlessness, parent-adult children relationship, and gender of children alive. I then conducted moderating and mediating tests on multiple factors.

7.1 Childlessness and Quality of Life

This section focuses on how childlessness influences the quality of life for older adults (See Figure 1). I first examined whether childlessness has significant effects on the quality of life controlling for the demographic and socioeconomic covariates (testing the H1). Then I compared the quality of life between the two childless subgroups: nonparental versus no surviving children (testing the H2). I also examined whether there are the significant differences in the quality of life between nonparental older adults and those who had no regular contacts with their children (testing the H3). Finally, I investigated whether the gender of children alive matters for the overall quality of life for older adults (testing the H4).

Table 7-1 shows that childless older people were less likely to have a good quality of life compared with those who had children, controlling for the basic demographics only in Model 1 (OR = 0.279; p < 0.001) or controlling for the socioeconomic factors alone in Model 2 (OR = 0.299; p < 0.001). All the demographic variables had a significant relationship with the quality of life. Female, oldest-old, and Han people were more likely to have a poor quality of life, while older adults who were married and lived with spouses were more likely to have a good quality of life. Education was positively related to the quality of life (OR = 1.647; P < 0.001), while poverty was
negatively related to the quality of life (OR = 0.555; P < 0.001). Rural residents were less likely to have a good quality of life compared with urban residents (OR = 0.789; p = 0.076) with marginal statistic significance. The occupation type, agricultural vs. non-agricultural, had no significant effect on quality of life. When controlling both demographic and socioeconomic factors, childlessness was still negatively associated with quality of life with decreased effect (OR = 0.335; p < 0.001). The impacts of covariates were similar with the previous analysis in Model 1 and Model 2, except that gender no longer had a significant effect on quality of life when taking socioeconomic status into account, and rural/urban residence had a significant effect when controlling demographics.

Table 7-2 presents the results of further comparison between subgroups of different children conditions. Although elders who experienced the death of all children had worse quality of life than those who had never given birth to a child, the difference between the two groups was not significant controlling all the covariates (OR = 0.702; p = 0.534). The results also show that compared with those who are nonparental, older adults who had children alive are more likely to have a good quality of life (OR = 1.860; p = 0.073) with marginal significance controlling only the demographics. However, the differences were not significant when taking socioeconomic factors into account (OR = 1.577; p = 0.183). Finally, older people who had regular contacts with their living children were about three times as likely to had a good quality of life than those who were nonparental (OR = 3.044; p < 0.001). The results for the covariates were very similar to that in the previous models.

Table 7-3 indicates that all the three subgroups of older adults who had at least a child alive, regardless the gender, had a better quality of life than the childless group, which is consistent with the results of the previous analysis. Older people who had both female and male children
alive were over three times as likely to have a good quality of life compared with childless elders (OR = 3.203; p < 0.001). Even for older people who only had children of a single gender, they were more than twice as likely to have a good quality of life compared with childless elders. Post-estimation analysis using the Wald Test found no significant difference between the group having only daughters alive and the group having at least a son alive ($\chi^2 = 0.770; p = 0.379$). The group with both sons and daughters alive was associated with better quality of life than the group with only sons alive with marginal significance ($\chi^2 = 3.78; p = 0.052$).

### 7.2 Moderating Tests

In this section, I tested the potential moderating effect of factors including gender, marital status, physical (ADL) disabilities, cognitive impairments, access to social security, adequate medical services, and availability of community-based support services (see Figure 2). I first investigated the moderating effects of the variables of interest one by one in a separate model, and then added all the moderating factors into the regression model to see how effects of childlessness and moderators changed controlling other moderators (testing the $H5$–$H11$).

#### Gender and Marital Status

In the first model at Table 7-4, the effect of the interaction term between gender and childlessness was not statistically significant (OR = 0.724; p = 0.577), indicating gender did not moderate the effect of childlessness on the quality of life. Being childless was significantly associated with the poor quality of life for older men (OR = 0.369; p < 0.01). In model 2, similarly, the effect of the interaction term of childlessness and marital status did not reach the statistical significance (OR = 0.599; p = 0.360), meaning that marital status does not moderate the effect of childlessness on the quality of life. When testing the moderating effect of gender
and marital status together in model 3, the results stay the same. Childless elderly were less likely to have a good quality of life (OR = 0.391; P < 0.01) among who were widowed, devoiced, separated or never married men. Currently married older people were 43% more likely to have a good quality of life than those who were widowed, devoiced, separated or never married (OR = 1.438; p < 0.01) among those who had children. However, the difference in the difference was still not significant, and no interactions were detected.

Disability Status

Table 7-5 shows that both ADL disabilities (OR = 0.231; P < 0.001) and cognitive impairments (OR = 0.203; P < 0.001) had significant negative effects on the quality of life without adding the interaction term (Model 1). Compared with those who had children, childless older adults still had a lower quality of life (OR = 0.319; p < 0.001). Model 2 and Model 3 tested the interaction of ADL disabilities and childlessness, and interaction of cognitive impairments and childlessness separately. Model 4 tested the moderating effects of the two factors of disabilities together. The results show that despite the significant effects of the ADL disabilities and cognitive impairments on the quality of life, no significant effect was observed for the two interaction terms. The negative impact of childlessness remains to be significant (OR = 0.283; p < 0.001) for people with no disabilities, physical or cognitive. However, disability status did not modify the effect of childlessness on the quality of life.

Formal Service Access

Table 7-6 shows the results of moderating tests on the effects of access to formal services, including social security and health insurance, medical services and community-based support services controlling for the covariates. In Model 1, access to adequate medical services
(OR = 5.343; p < 0.001), and community-based support services (OR = 1.760; p < 0.001) were both associated with better quality of life, while access to social security did not show significant impact (OR = 1.200; p = 0.173) with no interaction terms in the model. Childlessness still has a significant impact on quality of life (OR = 0.439; p < 0.001). Model 2-4 tested the interacting effect of the three factors separately. Only the interaction term between childlessness and community-based support services had a significant effect on quality of life (OR = 3.961; p < 0.001). It means that having community-based support services available can reduce the negative impacts of childlessness on the quality of life. Among those who had no access to community-based support services, childless elderly were less likely to report excellent quality of life than elderly who had children. However, social security and medical services had no such moderating effects. Model 5 included all the formal service access factors and their interaction terms with childlessness into the model, and the results are similar. Just the moderating effect of community-based support services became marginally significant (OR = 3.430; p = 0.089).

Finally, I included all the moderators into the regression models to see if the effects detached above changed. Table 7-7 shows that ADL disabilities, cognitive impairments, access to medical services, and community-based support services were significantly associated with quality of life. Childlessness was significantly associated with poor quality of life (OR = 0.412; p < 0.01) when adding the disability status and formal service access factors into the regression model. However, only the interaction between childlessness and community-based support services was significant (OR = 4.142; p < 0.05), which support the moderating effect of community-based support services on the effect of childlessness on the quality of life for older adults.

7.3 Mediating Tests
In this section, I investigated whether social support, social and leisure activities and health behaviors mediate the effects of childlessness on the quality of life (see Figure 3). At first, I added the potential mediators into the multivariate logistic regression model one by one to see whether the main effects of the childlessness changed. Then I conducted mediating test to see whether it carries the influence of the childlessness to the quality of life for older adults controlling for the covariates (testing the H12–H15). Bootstrapping method was used to test whether the indirect effects were significant.

Table 7-8 shows that all the potential mediators had significant effects on the quality of life directly when controlling for other factors (Model 5) or not (Model 2, 3 & 4). Model 2 indicates that having social support available had a strong positive influence on the quality of life for older adults (OR = 3.484; p <0.001). When taking social support into account, childlessness still had a significant impact on quality of life with decreased effect (OR = 0.445; p < 0.001). Model 3 indicates that older people who participated in social and leisure activities were almost three times as likely to have a good quality of life than those who did not (OR = 2.883; p < 0.001). Model 4 shows that older people who had healthy lifestyle were more likely to have a good quality of life than those who did not (OR = 1.292; p < 0.001). In the final model 5, when controlling other mediators, all the three mediators were had significant effects on the quality of life. The impact of childlessness remains significant but the effect size was decreased (OR = 0.459; P < 0.001)

Table 7-9 shows the mediating test without and with weights. For the test without weight, I controlled for all the covariates in the logistic regressions, including the three key variables that they used to produce weight, age, gender and rural/urban residence. I first examined the direct, indirect and total effects of each mediator separately without controlling
other mediators, and then conducted multiple mediation analysis to see how much influence that all the three mediators carried for the effect of childlessness on the quality of life.

**Social Support**

The results indicate that childlessness predicted a lack of social support (a path: direct effect = -0.087; p < 0.001). Both childlessness and social support were significantly associated with quality of life controlling for the covariates (direct effect = -0.036; indirect effect = -0.018; total effect = -0.054). The indirect effect of social support was significant with 95% confidence interval from -0.023 to -0.013, which suggests that social support mediated the effect of childlessness on the quality of life. The portion of effect mediated by social support was 33%. In the multiple mediation analysis, the indirect effect of childlessness through social support was -0.016. When applying weights to the logistic regressions, social support still had a significant mediating role for the effect of childlessness (direct effect = -0.082; indirect effect = -0.024, 95% CI: -0.049 to -0.008; total effect = -0.106). Childlessness remains a significant predictor of social support (direct effect = -0.106). However, the portion mediated by social support was 22.6%.

**Social and Leisure Activity Participation**

The data show that childlessness predicted non-participation of social and leisure activities (a path: direct effect = -0.048; p < 0.001). Both childlessness and participation in social and leisure activities were significantly associated with quality of life controlling for the covariates (direct effect = -0.041; indirect effect = -0.013; total effect = -0.054). The indirect effect of participation in social and leisure activities was significant with 95% confidence interval from -0.019 to -0.008. It means that social /leisure activity participation mediated the effect of childlessness on the quality of life. The portion of effect mediated by social support was 24.9%. Multiple mediation analysis
shows that the indirect effect of childlessness through social and leisure activities was -0.012. When applying weights to the logistic regressions, social support still had a significant mediating role for the effect of childlessness (direct effect = -0.107; indirect effect = -0.010, 95% CI: -0.024 to -0.001; total effect = -0.117). Childlessness still predicted the non-participation of social and leisure activities (direct effect = -0.045). However, the portion mediated by social and leisure activities was 9%.

Health Behaviors

The results indicate that childlessness predicted less number of healthy lifestyle behaviors (a path: direct effect = -0.011; p < 0.05). Childlessness and health behaviors were both had a significant relationship with quality of life controlling for the covariates (direct effect = -0.050; indirect effect = -0.001; total effect = -0.051). The indirect effect of participation in social and leisure activities was marginally significant with a confidence interval from -0.003 to 0, which suggests that the health behaviors have nearly no mediating role and the portion of effect mediated by social support was very small (2.9%). Multiple mediation analysis shows that the indirect effect of childlessness through health behaviors was only -0.001(almost zero). When applying weights to the logistic regressions, health behaviors no longer had a significant mediating role for the effect of childlessness on the quality of life (direct effect = -0.116; indirect effect = 0, 95% CI: -0.008 to 0.007; total effect = -0.116). Childlessness had no significant effect on the number of healthy lifestyle behaviors. Health behaviors did not mediate the relationship between childlessness and quality of life.

In sum, the results of mediation test with and without weights were similar. Social support and participation in social and leisure activities both mediated the effect of childlessness
on the quality of life for older adults, while the number of healthy lifestyle behaviors had no significant mediating role.

7.4 Final Test of Effect of Childlessness

In this section, I retested the effect of childlessness on the quality of life controlling for the covariates and all the other predictors identified in the moderating and mediating test (See Table 7-10). Model 1 only controlled for basic demographics and Model 2 included socioeconomic status factors also. In Model 3, I added social and lifestyle factors into the model given the results of mediating test. The results of the two models were the same as before. All the three factors had a significant positive association with quality of life, and the odds ratio for childlessness on the quality of life increased from 0.335 to 0.462. Interestingly, when involving social support and lifestyle behaviors, gender became a significant predictor (OR = 0.632; p < 0.01) while effects of marital status, education, rural/urban residence disappeared. It suggests that there might be some gender difference in social support or lifestyle.

Model 4 added factors related to formal service access into the regression. No significant association was observed between social security services (i.e., social pension, old age insurance, and health insurance) and quality of life. Access to adequate medical services (OR = 4.503; p < 0.001) and community-based support services (OR = 1.557; p < 0.001) both had a positive impact on quality of life. Childlessness still predict a poor quality of life, but the likelihood for childless elders to have a poor quality of life decreased (OR = 0.566; p < 0.05). The odds ratio of other factors were very similar to Model 3.

In Model 5, I included the factors related to health conditions, such as ADL disabilities, cognitive impairments. Self-rated health and psychological well-being (the other two dependent
variables) were also added to the regression model because the literature suggests that quality of life, as a measure of overall well-being, was influenced by the physical and psychological well-being. Cognitive impairments ($OR = 0.662; p < 0.01$) had a negative effect on the quality of life. Both self-rated health ($OR = 5.035; p < 0.001$) and psychological well-being ($OR = 1.311; p < 0.001$) had a substantial positive impact on the quality of life. Participation in social and leisure activities and the number of healthy behaviors no longer had the association with the quality of life. It indicated that physical and psychological well-being carried the influence of the health behaviors, social and leisure activities, and disabilities. In this model, the effect of gender and age were also insignificant, suggesting that gender and age difference in social support and lifestyle might disappear due to the presence of disabilities. Childlessness had a significant negative effect on quality of life, and the likelihood of having a poor quality of life increased when controlling for the health conditions ($OR = 0.381; p < 0.01$).

In the Model 6, I added all the interaction terms into the model to re-test the moderating factors. No moderating effect was found for the gender, marital status, disabilities and access to public services. However, when including the interaction terms into the model, the effect of childlessness on quality of life became insignificant. The results indicated that ethnicity, poverty, cognitive impairments all had a significant negative impact on quality of life while having social support, adequate medical services, and community-based support services, good self-rated health, and positive psychological well-being all predicted a good quality of life with statistical significance. Gender, age, marital status, and health behaviors had no significant influence on the quality of life, controlling for physical and psychological health status, social support, and formal services access.
Table 7-11 presents the results of tests on whether different types of childlessness and parent-children relationship matter for quality of life in the full model. The results were similar to previous tests in Table 7-2. When controlling for the access to formal and informal support resources and physical health conditions, there was no significant difference in the quality of life between elders who had no surviving children and those who were nonparental (OR = 0.807; p = 0.718). The results also show that for those who had children but no regular contacts, their quality of life were not different from those who were nonparental (OR = 1.723; p = 0.219). Only older people who had regular contacts with their children alive were more than two times as likely to have a good quality of life than those who were nonparental (OR = 2.720; p < 0.05).

Table 7-12 presents the results of tests on whether the gender of children influences the quality of life in the full model. Older people who had both female and male children alive were about three times as likely to have a good quality of life compared with childless elders (OR = 2.832; p < 0.01). For older people who only had daughters, they were more than twice as likely to have a good quality of life compared with childless elders. Post-estimation analysis using the Wald Test found no significant difference between the group having only daughters alive and the group having at least a son alive ($\chi^2 = 0.00; p = 0.986$). The group with both sons and daughters alive was associated with better quality of life than the group with only sons alive with marginal significance ($\chi^2 = 3.30; p = 0.069$). The results remained the same as previous tests in Table 7-3.

7.5 Summary

In sum, the main finding of this chapter is that childless older adults were less likely to have a good quality of life with statistical significance controlling for basic demographics, socioeconomic status, physical and psychological health status, and informal and formal support system. No differences were observed between subgroups of childless people (nonparental vs. no
surviving children). The parent-children relationship matters and no differences in quality of life between nonparental people and those who had no regular contacts with children. Gender of children did not have a significant impact on the quality of life for older adults. Availability of community-based support services moderated the effect of childlessness when only demographics and socioeconomic status were controlled. However, the moderating effect disappeared when controlling for other factors such as social support and disability status. Both social support and participation in social and leisure activities mediated some portion of the effect of childlessness on the quality of life, but the number of healthy behaviors did not.
CHAPTER 8: CONCLUSION

Using data from the CLHLS, this research investigated the impact of being childless on people’s well-being in their later years in the context of China, and what factors moderate and mediate any effect of childlessness. Chapter 4 provided an overview of the characteristics of childless older people in China and compared that with those who had children. Chapter 5 presented the analytic results of hypothesis tests on the self-rated health; Chapter 6 on the psychological wellbeing; and Chapter 7 on the quality of life. This chapter concludes the study by discussing the main findings from Chapter 4 to Chapter 7, the limitations and strengths of the study, and implications of the results for future research, social work policies, and practices.

8.1 Discussion of Major Findings

This section discusses the findings of the study, including the results of descriptive analysis on the features of childless seniors; and results of multivariate regression analysis to test the hypotheses on self-rated health, psychological well-being, and quality of life.

Characteristics of Childless Older Adults in China

The data has shown that childless elders only account for a small proportion of the total older population in China and approximately 4% of the total sample in the survey year of 2008-2009. The rate was similar to that in the previous study using the earlier wave of the CLHLS data (Zhang & Liu, 2007). In comparison with many other developed countries, the childlessness rate in China is relatively low even if taking into account the childless adults in other age groups (Koropeckyj-Cox, & Call, 2007). The social-economic and policy circumstances in the young adulthood and childbearing ages may have influenced whether people are childless or not (Rindfuss, Morgan, & Swicegood, 1988). For the oldest-old in this sample, they experienced the
World Wars II and Civil Wars of China, and the Great Chinese Famine from 1959 to 1961 in their young adulthood, which may have delayed their marriage and childbearing, and increased the child mortality rate during those difficult times. However, the old-old group aged 65 to 84 (94% of the total older population) in the sample entered adulthood after World Wars II and the establishment of People’s Republic of China. They mostly married earlier and had multiple children before the issuance of the “one-child policy.” Compared to the cohorts of the oldest-old, few of the old-old cohorts remained single or choose to be childless voluntarily reflecting traditional culture and values about marriage and children. With many children, they were less likely to become childless due to the death of all children even though they went through the Great Famine. The increased fertility rate and reduced child death in the post-war era could explain the low childlessness rate for the sample in the survey year 2008-2009.

The analysis also showed that childless elderly were more likely to be male, oldest-old, widowed/never married, and impoverished. No significant differences were observed for ethnicity, education/literacy, rural/urban residence, and occupation type between childless and non-childless groups. It suggests that age, gender, marital status, and income are correlated with childlessness. The cohort differences mentioned above could partly explain the age difference. Plus, the oldest-old group is more likely to outlive their children and became childless as their age increases. The data showed that most childless older adults were either never married or widowed. Only a tiny proportion was divorced or separated. Individuals who remain unmarried until their later years are unlikely to produce biological children since children born out of wedlock were not prevalent when these older cohorts were in their young adulthood. The data confirmed that only 2% of the individuals who never married ever gave birth to a child (0.03% of the total older population).
The gender difference found in the childlessness rate may be due to the association between gender and marital status. About 2.3% of male seniors were never married but only 0.1% of females.

Childless Chinese older adults tend to have lower income and more likely to live in poverty, which is consistent with findings in other studies in China (Guo, 2014), but contradicts results of studies in the United States which indicate that childless elders had higher income and are more wealthy than older parents (Plotnick, 2009). The positive association between childlessness and better economic status may be attributable to the absence of financial cost of children rearing and interruption of employment. However, poverty also reduces an individual’s possibility to find a partner, get married and have biological children, particularly for low-income males. Poverty also increases the risk of child death due to lack of medical resources and less access to nutritious food. Conversely, childless seniors may lack financial support from children reducing income in their later years, mainly for elderly living in rural areas who are less likely to be eligible for pensions (Guo, 2014).

Bivariate analysis found that being childless was associated with higher rates of cognitive impairments, more negative psychological well-being and more mediocre quality of life, but not with a higher rate of physical disabilities or poor self-rated health. These findings implied that being childless may have more impact on psychological or social well-being for older adults and this relationship was further tested in the multiple regression models.

Measuring Effect of Childlessness

Compared with those who had children alive, childless older adults were more likely to report poor quality of life, but not poor self-rated health or a more negative psychological well-
being. H1 was therefore supported for the quality of life, but not for self-rated health and psychological well-being.

The analytic results suggest that childlessness affects people’s overall quality of life in their later years even when controlling for socio-economic status, lifestyle, informal social support, access to formal services, disability status, and perceived physical and psychological health status. It implies that childlessness might make older adults see this as a missing part of life even if they enjoyed good socioeconomic and health status, and had sufficient informal and formal resource, meaning they had fewer needs for care or support from their children. As the “special goods” model of filial duty theory suggests, having children alive in the world gives meanings to people even if they do not need or receive any support from their children (Keller, 2006). The findings confirm the negative impacts of childlessness on the life satisfaction or quality of life that were found in previous studies (Connidis & McMullin, 1993; Guo, 2014;).

The multivariate regression analysis shows that childlessness shows a marginally negative association with psychological well-being when controlling for both demographics and socioeconomic status. When social support, lifestyle, service access, and disability status were considered, there was then no significant difference in psychological well-being due to childlessness. This implies these other factors diminished the adverse impact of childlessness. Previous studies with Chinese participants also found that childlessness was not significantly related to anxiety and loneliness in older adults when considering these other factors in the analysis (Zhang & Liu, 2007; Zhang & Hayward, 2001).

All analysis showed no significant association between childlessness and self-rated health. This suggests that the many risk factors for health status, e.g., the genetics, natural and social environment, health behaviors (diet, exercise, smoke, and drink), and access to medical
resources have a stronger effect than childlessness. Previous literature also found no significant differences in self-rated health between childless seniors and those who have children.

Although the data showed that self-rated health and psychological well-being were all significantly associated with the quality of life, it appears that satisfaction levels about life were influenced by the subjective assessment of physical and mental health and by circumstances and ability to meet personal goals and social expectations, which are often affected by the local cultural norms (Hansen et al., 2009; Schimmack, Diener, & Oishi, 2002). Nonparental childless older adults may, therefore, manage to adapt to the life without children (and mostly without a partner) and maintain physical and mental health. However, their evaluation of their life overall was still strongly influenced by the fact of being childless, since having marriage and children were still regarded as “normal” in the Chinese context. Another factor to consider is that majority of the childless elders in the sample were never-married poor males. For this group, being childless might not be the primary life stressor for them as it for other groups such as widowed women. Future studies may find more effects of childlessness on self-rated health or psychological well-being when investigating the issue separately for never-married and widowed elders given the differences between the two groups.

Types of Childlessness

H2 was not supported. There were no significant differences in self-rated health, psychological well-being and quality of life between nonparental older Chineses and those who had no surviving children. A substantial amount of literature showed tremendous and persistent negative effects on the physical and mental health of parents due to the death of children (Lohan & Murphy, 2006; Rogers, Floyd, Seltzer, Greenberg, & Hong, 2008). However, no previous studies compared those who experienced the death of all children with those who never had a
child. The result of this initial analysis suggests that there was no significant difference in the well-being between the two subgroups of childless elderly. For both groups, quality of life will be negatively affected. A possible explanation for the results is that majority of the nonparental elders became childless involuntarily (due to biological infertility) rather than chose to be childfree voluntarily. Also, when people lost all their children might also matter. A future study using more recent data should reexamine this question and also compare the differences between voluntary and involuntary nonparental elders.

**Parent-Children Relationship**

H3 was not supported. A majority of the older people had regular contacts with at least one of their children, and only 4.4% had no regular contacts with all of their children. However, the analysis showed that there were no significant differences in self-rated health, psychological well-being and quality of life between nonparental older adults and those who had no regular contacts with their living children. Instead, the subgroup of people who had regular contacts with their children reported better quality of life than the other three subgroups. This finding is consistent with previous studies (Connidis & McMullin, 1993). It suggests that older adults who maintained no regular contacts with their children, meaning little physical or emotional connections, are in a similar situation with nonparental older adults. Older people need to maintain some level of contacts with their children to be eligible for the benefits of having children. Having children alive could provide meanings to the life as the “special goods” model suggests. However, the emotional attachment or closeness with adult children based on the certain level of parent-children interactions seems to have more important influence on the satisfaction level of life among older adults as the attachment theory suggest, even if older persons perceived no needs for caregiving and support, or received no transfers from their children.
Gender of Children

H4 was not supported. Previous studies indicate that gender of the children died influences the mortality of older parents (Chen, Kuo, Wu, & Yang, 2012; Lee et al., 2014). In this study gender of children was not found to matter for the self-rated health, psychological well-being or overall quality of life. Only older adults who had sons reported more positive psychological well-being than their childless counterparts. However, for older adults having both sons and daughters, the effect was only marginally significant. Having children alive, regardless the gender, was associated with better quality of life than being childless but was not associated with self-rated health. The results indicate that even if the older adults had daughters only, the connection with their daughters had a similar meaning as for older parents with sons. It may be possible that the hypothesized son-preference is no longer as strong as before due to the “one-child” policy, particularly in urban areas. Future studies should further investigate the rural/urban differences in the effect of children’s gender on the well-being of elders given that traditional son preference is likely to be stronger there.

Moderating Effects

Gender and Marital Status

H5 was not supported. This study did not find that childlessness had more impact on the well-being of female older adults than their male counterparts. According to the attachment theory, the affection bond developed between parents and children across lifespan affects the sense of security for both children and parents (Bowlby, 2008). It seems to suggest that childlessness, especially due to the death of children, had a stronger effect on the person who had more direct
contacts with or taking the primary role of caring the children, which is usually the mother. However, findings in the literature are mixed. Some studies found that death of children had more effect on the health, psychological distress for mothers than for fathers (Lee et al., 2014; Wijngaards-de Meij et al., 2005), and childless had a stronger impact on women than men (Koropeckyj-Cox, 2002; Zhang & Hayward, 2001). However, other studies found no gender difference in the effect of childlessness (Maximova & Quesnel-Vallée, 2009). The finding here implies that having no children has a similar impact on men and women when they reach their later lives. The data of this study did not support the examination of the effect at a younger age. Even if there were some gender differences in the younger age, the differences had diminished when people remained childless until their advanced age. A study in Australia also suggests that the effect of childlessness on physical and mental health and well-being differs across the lifespan, and is stronger in the reproductive years (Graham, 2015).

H6 was not supported. Contrary to what the study hypothesized, childlessness had a stronger impact on the self-rated health of older adults who were currently married than for those who were widowed, divorced, separated and never married. Among those who were currently married, childless elderly were more likely to report poor health than those who had children. However, the same association was not observed among those who were widowed or never married. Marital status did not moderate the effect of childlessness on psychological condition and overall quality of life. Zhang and Hayward (2001) also found that being divorced, widowed or never married did not moderate the effect of childlessness on the psychological well-being of people aged 70 and above. Here, among divorced, widowed, or never married men, childlessness predicted negative psychological well-being and more mediocre quality of life. Other studies also show that among those who were divorced, widowed or never married, childless men had a higher
rate of loneliness and depression and lower level of life satisfaction (Zhang & Hayward, 2001; Cheng et al., 2014). As it stated above, future studies might need to investigate the effect of childlessness for never-married and widowed elders separately.

Disability Status

H7 and H8 were not supported. Disability status, physical or cognitive, did not appear to have a more significant impact on childless older adults than their counterparts who had children. This study had hypothesized that older persons living with disabilities often have higher needs for the care from informal support systems, and consequently, the absence of children would likely influence their lives. However, the results indicate that childless older persons with disabilities do not have poorer physical or psychological well-being and life satisfaction than those who had no disabilities. The findings of previous studies are mixed. Some studies found that the effects of childlessness were stronger for individuals with functional impairments amongst the widowed Chinese (Cheng et al., 2014). Other studies found that among older persons with disabilities, no differences in the psychological well-being were observed between childless elderly and older parents (Chang, Wilber, & Silverstein, 2010). A possible explanation is that the generation of older persons in the sample usually had multiple siblings. Childless older adults may have strong social ties with their siblings, and also children of siblings, who can provide some support to them (Ingrid Arnet Connidis & McMullin, 1994). Also, this study did not find any significant association between childlessness and incidence of physical or cognitive impairments. Thus, there was no potential mediating effect of disability status.
Access to Formal Services

H9, H10, and H11 were not supported. As children are the primary caregivers for older adults in China, older adults who had no children may rely more on formal support systems than those who had children making the access to formal support systems more critical for childless older persons. The CLHLS data showed that more childless older adults expected to use more community-based support services, particularly personal care, and home visit services, compared to their peers who had children alive. Studies in both US and China indicate that availability of healthcare resources, pension, and community-based services all have positive impact on the health and well-being of older persons (Gu, Zhang, & Zeng, 2009; Mackean & Abbott-Chapman, 2012; Thompson, Zack, Krahn, Andresen, & Barile, 2012; W. Zhang & Liu, 2007). No studies have examined the moderating role of formal services on the relationship between childlessness and well-being of older persons. This study did not find that access to social services, medical resources, and community-based support services moderated the effect of childlessness on the self-rated health, psychological well-being, or quality of life. Availability of community-based support services only moderated the effect of childlessness on the quality of life of older adults with marginal significance.

The analytic results also showed that being childless had a negative association with access to adequate medical services among older adults, but not for health insurance, pension, and community-based support services. A possible explanation could be that fewer persons available to take childless older adults to visit the doctors in hospitals reducing their awareness of and access to potential medical services. Availability of community-based support services and medical resources may also depend more on the social-economic status of the geographic areas where the older adults were living.
Mediating Effects

Social Support

H12 was partially supported. Social support mediated the effect of childlessness on the quality of life of older adults, but not on self-rated health, and psychological well-being.

Firstly, being childless was significantly associated with inadequate social support. Previous studies suggested that nonparental older adults tend to have fewer social connections and less social support compared with parents (Dykstra & Hagestad, 2007; Pollmann-Schult, 2011; Wenger, Dykstra, Melkas, & Knipscheer, 2007). The descriptive analysis in this study showed that childless older persons had a relatively smaller support network and the major support was offered by other relatives, friends, and neighbors, or by social workers due to the absence of the immediate social ties with children. For older adults who had no surviving children but grandchildren, they may have received some skip-generational support, which was not available to nonparental seniors. Childless older adults were less likely to get enough instrumental, emotional and financial support from other relationships. Furthermore, the study found that childless older persons were less likely to have a primary caregiver available when they needed ADL assistance, and they had higher chances to live alone or live in an institution, which is consistent with the findings of previous studies in other countries (Koropeckyj-Cox, & Call, 2007; Soldo et al., 1990). Other social ties, such as friends, neighbors and other relatives do not successfully substitute for the missing social ties with children in the context of China, which is different from findings of studies in western countries such as Germany (Schnettler & Wöhler, 2016).

Secondly, having adequate social support is a significant predictor of good physical and psychological well-being and overall quality of life. Many studies demonstrate that having social
support, perceived or received, has a positive association with physical and mental health, and overall quality of life (Newsom & Schulz, 1996). Studies in China also found that intergenerational social support and transfers from children to older parents did play a significant role in the physical and psychological health of older adults in rural China (Liang et al., 2014). This study confirmed that older adults who perceived they had adequate social support were more likely to report good health, positive psychological well-being and high quality of life.

Finally, adequate social support mediated approximately 23% of the effect of childlessness on quality of life. For self-rated health and psychological well-being, the direct and total effect of childlessness was not significant. No other studies have examined the mediating role of social support for the relationship between childlessness and well-being. Previous literature suggests that social support can buffer the life stressors (Thoits, 1995), and the study here found that the effect of being childless on the well-being of older adults was influenced by the level of social support they perceived.

Social and Leisure Activities

H13 was partially supported. Being childless affects the quality of life for older adults through altering the patterns of social and leisure activity participation among older adults. However, the mediating effect was not found for self-rated health and psychological well-being. First, childless elders were less likely to participate in any leisure or social activities than their counterparts who had children. Although some studies suggested that childless elderly are more likely to be socially isolated (Bachrach, 1980), no studies have investigated how childlessness affects leisure activity participation in later life. The findings of this study suggest that the absence of children reduced the older person’s interest or intention to enjoy leisure activities alone or
together with other people in organized social activities. The social stigma associated with childlessness or negative impact of children’s death may be the possible explanation of a lower rate of participation in social and leisure activities. More data are needed to support this explanation.

Secondly, participation in social and leisure activities was significantly associated with self-rated health, psychological well-being and quality of life. The review of the literature shows that involvement into different types social and leisure activities had a positive impact on the well-being, health or survival for older adults through possible physical movement involved in the events, stronger social interaction and integration, and better social support (Adams, Leibbrandt, & Moon, 2011). The study here also confirms such findings.

Finally, participation in social and leisure activities mediated the effect of childlessness on quality of life. However, the mediating effects for self-rated health and psychological well-being were not found. The indirect effect of childlessness through participation in social and leisure activities was significant for both self-rated health and psychological well-being. However, the direct and total effect of childlessness on psychological well-being were only statistically significant without weight adjustment. When results were weighted, the direct and total effect of childlessness became insignificant. The direct and total effect of childlessness on self-rated health were insignificant for both analyses with or without weighting. Overall, the results suggest that the childlessness can influence the overall quality of life for older adults through changing the pattern of their social and leisure lifestyles, but the proportion of effect mediated was less than that found for social support.
Health Behaviors

H14 was not supported. The number of healthy behaviors did not mediate the effect of childlessness on the self-rated health, psychological well-being or quality of life for older adults.

First, being childless only led to a very modest decrease in the number of healthy lifestyle behaviors and the effect was no longer significant when applying weights in the analysis. The result suggests that older people with surviving children do not live a healthier life than their childless counterparts, in terms of nutrition and diet, smoke, alcohol consumption, and physical exercises. Previous studies in Finland, Australia, and the Netherlands found that childless older persons are more likely to be current smokers, have a higher daily consumption of alcohol, and are less likely to engage in physical exercises, although patterns differed by gender and marital status (Kendig, Dykstra, van Gaalen, & Melkas, 2007). The descriptive data in this study also shown that childless elders had a higher rate of current smoking, but no significant differences were observed in the patterns of drinking and exercise. However, this regression analysis did not support that there are substantial differences regarding the number of healthy behaviors between childless individuals and those with surviving children. It is possible that the informal social control of parenthood on healthy behaviors was weakened or disappeared when adult children left home (the empty-nest families). Another possible mechanism could be that childless persons with poor health behaviors might not survive through midlife to old age leading to some health selection effects.

The number of healthy lifestyle behaviors was found to be a significant predictor of better self-rated health, psychological well-being, and quality of life. However, health behaviors did not mediate the effect of childlessness on the well-being of older adults because neither the link between childlessness and health behaviors nor did the indirect impact of childlessness through health behaviors were statistically significant.
In sum, the mediation tests found that being childless affects the quality of life of older adults through two main pathways: social support and participation in social and leisure activities; but not through changing their health behaviors.

Other Findings

Apart from childlessness, the study also examined other contributors to the well-being of older adults in China. The study found that age, ethnicity, rural/urban residence, education, poverty, access to social support and community-based services, and practice of health behaviors were associated with the improved self-rated health of older adults as the literature suggested (Kendig et al., 2007; Mackean & Abbott-Chapman, 2012; Thompson et al., 2012). For psychological well-being, being male, young-old, Han ethnicity, currently married and not impoverished all predicted a more positive psychological well-being. An initial difference due to education was no longer significant when controlling for disability status and perceived health conditions. Health behaviors, social leisure participation, access to social security and medical resources, and disability status all had a significant impact on psychological well-being. The findings were mostly consistent with previous studies (Gu et al., 2009; Mackean & Abbott-Chapman, 2012; Thompson et al., 2012; W. Zhang & Liu, 2007).

The study also found that age, ethnicity, marital status, rural/urban residence, education, and poverty were all significantly associated with quality of life among older adults controlling for demographics and socioeconomic status only. In the full model, only ethnicity, poverty, social support, access to medical and community-based services remained as having a significant impact on quality of life. This finding may be because the model included self-rated health and
psychological well-being which carried the effects of several demographic and socioeconomic factors.

For both self-rated health and quality of life, gender differences were no longer significant when adding in socioeconomic status factors to the model. However, the gender effect became significant again when social and health behaviors and informal and formal resources were added. Finally, the gender difference was insignificant when considering disabilities and psychological well-being. Taken together these findings, it implies that female elderly tend to have lower socioeconomic status, more impairments, and adverse psychological well-being, which then affects their self-rated health and overall quality of life. It also suggests that there were gender differences in access to formal and informal resources. However, being female consistently predicted more negative psychological well-being across all models.

Similarly, the effects of rural/urban residence and education on self-rated health and quality of life were no longer significant when controlling for social support, lifestyle behaviors and access to public services. These findings suggest that education and rural/urban residency influence the access to formal and informal resources for older adults and shape health and social behaviors in daily life, which in turn affects self-rated health and quality of life among older adults. In contrast, rural/urban residency did not have a significant impact on psychological well-being across all models.

Altogether, there are some theoretical implications of this study. First, the findings suggested that absence of children may shape the social life of people which consequently influence the overall satisfaction level of life as the social support theory suggested. Although the missing sense of continuity of life or other “special goods” due to the absence of children (Keller, 2006) may still count, it seems that the negative impact on the social dimension of life and social
support available play more critical role for the quality of life among older people. Secondly, the findings suggested that only older parents who had regular contacts with children perceived the better quality of life than childless elders. As the attachment theory and social support theory suggested, an emotional attachment or good relationship with children is the pre-condition for older parents to enjoy the multiple benefits of having children, such as increased sense of security, more involvement in social and leisure activities, connection to the broader social network, and stronger social support.

8.2 Limitations and Strengths

The findings in this study are subject to some limitations. First, the cross-sectional study design precluded causal inferences between childlessness and well-being of older adults. However, childlessness, nonparental or no surviving children, occurred before the survey date when data about self-rated health, psychological well-being, and quality of life were collected. Secondly, the CLHLS data on health conditions, psychological well-being and overall satisfaction level of lives were self-reported by the elderly rather than diagnosed. Also, half of the sample was the oldest-old (aged above 85 years), and cognitive concerns at these ages may have affected the accuracy of the self-reporting data. Some studies in China also suggest that there may be some rural/urban differences in defining health status and in assessing whether individuals need ADL assistance (Zhu & Xie, 2007). This study, therefore, controlled for cognitive status, and rural/urban residence in the analysis to help reduce their influences.

Measurement of availability of informal social support and formal services (e.g., medical and community-based support services) was also based on personal perception or awareness of the resources, which might not reflect the actual support or resources that were available to the elderly.
However, perceived and received social support are highly correlated and perceived social support plays a more critical role in stress coping and mental health than the support received (Wethington & Kessler, 1986).

Thirdly, due to the nature of secondary data analysis, some variables were measured by a single item or limited items. For instance, the relationship with children was measured by whether older parents had regular contacts with their children rather than the specific frequency of contacts; and the measure of social support did not include the financial support they received from their informal network. Variables using multi-dimensional items and well-established scales may have better-predicting power.

Last but not the least, the 2008 wave of CLHLS data were used to obtain a larger sample of childless elderly for the purpose of this study. Older adults aged 65 to 80 now are more likely to have only one child and have a higher risk of becoming childless due to the death of all children. However, a majority of the childless older adults are still nonparental even using the data in the later wave of the CLHLS. More recent cohorts of older persons may have better contacts with their children with the development of technology in the last decade. With more recent data, the research question might be re-examined to see whether the influence of being childless may be different over time with the change of social, economic, cultural environment in China.

Nevertheless, the study had several strengths. Using a large national sample, the results of this study are more generalizable to the older population in China. A relatively large sample of childless elderly allowed this study to explore the subtle differences between subgroups of childless older adults, those who are nonparental versus those who had no surviving children. The study also had new findings on the pathways through which childlessness affects the well-being of elderly in the context of China.
8.3 Implications for Future Studies

Future studies should address the limitations of this study. First, using multiple waves of the longitudinal data available may improve understanding of how being childless affects the well-being of older adults over time. It would be interesting, for example, to discern the immediate impacts of childlessness on people when they lose all children in their later years, compared with those who had lost children for a longer time. Secondly, future studies should incorporate community-level data, for instance, the socioeconomic status, actual availability and use of health care and social services for the older residents in the community, particularly for childless older adults. Thirdly, future studies should use more established multi-dimensional scales to measure social support and parent-children relationship. Such use will increase the validity of findings. Finally, more recent data should be used to re-visit the research question and see whether the results are consistent and sustained.

The findings of the study have further implications for future studies. Although no significant impact of childlessness on the self-rated health of older adults was found, this study cannot preclude a possible health selection effect. With a longitudinal dataset, future studies should examine whether childlessness will influence the mortality rate of people in mid and later life. Secondly, the social support network analysis identified grandchildren as a critical social tie for some childless older adults. If childless elders had grandchildren, they might find in their grandchildren the meaning that their children used to carry. Further study should explore the potential differences between childless older adults who have grandchildren and those who do not. Finally, although no rural/urban differences in the well-being of older adults were identified when controlling for socioeconomic status, and informal and formal resource available in the community, it would be worthwhile to investigate separately further the impact of childlessness
on older adults in rural China who are more likely to have son-preference, and rely more on the financial support and care from adult children compared with their urban counterparts. Future studies should also investigate the effect of children’s gender for older adults in rural areas.

In addition, qualitative studies are needed to explore further the how older people describe their paths to later-life childlessness, and how they perceive the impact of childlessness for their daily life across the lifespan. It is also important to explore whether there is an association between childlessness and elderly self-neglect or elderly abuse. Although this study found no moderating effect of gender, marital status and disabilities, it is critical to understand whether and how being childless influence the life satisfaction through diverse paths for female and male, married and non-married, disabled vs. non-disabled.

8.4 Implications for Social Work Policies and Practices

The data in this study showed that the childlessness rate in China was relatively low compared with most developed countries. However, the childlessness rate is very likely to rise in the future due to the influence of the one-child policy and rising preferences to childfree-life among younger generations. Chinese society will have a large childless older population; by one estimate, approximately 14 million childless older adults by 2050 (Sun & Wang, 2008). Compared with those who had children, childless elderly are more likely to live in poverty, suffer from depression, and have no primary caregivers (Cheng, Chan, Li, & Leung, 2014; Guo, 2014). As a growing vulnerable population in China, childless elderly will require more attention from social welfare policymakers, social workers and the public at large.

This study found that being childless lead to lower quality of life, independent of demographics, socioeconomic status, health status and availability of formal and informal support.
Although some childless seniors may adapt to the lifestyle without children or need no financial and ADL assistance, their well-being may still be negatively affected by their childless status. The Chinese government needs to consider how to address the needs of the childless elderly through the expanded social welfare programs and services.

Currently, some social welfare programs address the needs of childless older adults in China, for instance, the ‘Five Guarantees’ (‘Wubo’ in Chinese) and the ‘Minimum Living Allowance’ (‘Di Bao’ in Chinese). The ‘Five Guarantees’ (FG) as a program means that governments will take care of and subsidize food, shelter, clothing, healthcare, and burial expenses for the old, people with disabilities and children under 16 years old in rural areas, when they have no capability to work, no income, and nobody to care for them. In 2010, the number of rural residents who received benefits from the Five Guarantee Program reached 5.549 million (NBS, 2011). The ‘Minimum living Allowance’ program was designed to help the people living in extreme poverty to maintain a basic living standard. It initially only covered urban residents but extended to rural residents recently. However, both programs only provide minimal care or protection to the childless elderly (Sun & Wang, 2008). For instance, the ‘FG’ program cannot adequately cover medical care; beneficiaries of FG programs still report paying a lot out of pocket for their health care, leading to delay in use or non-use of medical care (Wu & Wang, 2017). Since 2008, some special assistance had been provided to the families who lost their only child. For couples who did not give birth to another child or adopt a child after the death of their only child, they can start to claim some cash benefits since the wife reached 49 years old. However, the amount of the “special assistance” is very limited (less than $70/month for urban residents and less than $30 for rural residents in 2014). Local governments were mainly responsible for the financing of the programs with a limited subsidy from central government. For most western and central
provinces in China, those local governments often face financial difficulties and have not been able to meet the growing needs of older adults (Zhang & Sun, 2011). The central government will need to increase the subsidies to social welfare programs. Moreover, these programs only addressed the financial or material needs of childless elderly, and limited efforts were made to address their psychological or social needs. This must also be addressed.

In addition, governments planned to give priority to the childless older adults, particularly those who had disabilities, to get admitted into local nursing homes. However, childless older adults are also faced with difficulties in accessing institutional care due to the limited amount of nursing homes and institutional barriers. Although it is true that some older adults or their adult children are reluctant to use nursing home care due to the social pressure from the value of “filial piety”; it is also true that many older adults do want to live in nursing homes but cannot get in, particularly childless older adults. Nursing homes often require older persons to have a legal guardian, preferably their adult children, to guarantee the payment for the living and caring expenses in the institution, and to make decisions in medical emergencies for the older adults. However, childless older adults often find it difficult to have a legal guardian: friends, neighbors, and even other relatives sometimes were not accepted by nursing homes. Furthermore, nursing homes in China provide older residents with food and basic care and have traditionally paid less attention to the emotional and social needs of older adults. Most nursing homes did not have professional social workers, and only organized a limited amount of social or leisure activities (Ouyang, Chong, Ng, & Liu, 2015). These concerns will also need to be addressed.

This study revealed two critical pathways through which childlessness negatively affects the quality of life among older adults in China: social support and participation in social and leisure activities. Apart from financial assistance, policymakers and social work practitioners should make
more efforts promote the psychological and social well-being of childless older adults by promoting their participation in social and leisure activities and fostering informal social support resources.

First, governments should have more investment in the social and leisure facilities and events at communities and nursing homes, particularly in rural areas. Comparatively, rural elderly had less recreational resources available to them than their urban counterparts, including exercise facilities, public parks, senior centers and senior schools (Su, Shen, & Wei, 2006). More social and leisure activities for seniors could be held when there are spaces and equipments available and accessible for older adults in communities as well as in institutions.

Secondly, governments should expand the provision of community and home-based social services, particularly for childless older adults, because nursing homes will not be able to meet the needs of the vast older population in the future giving the rising costs of institutional care. The data indicated over 80% older adults expected to need at least one type of social services in their community, but only 30% had community-based support services available for them. Moreover, childless older adults had higher expectations of receipt of services than their counterparts with children. The types of services that childless older adult expected most were home visits (77%), personal care (71%), psychological counseling (71%) and healthcare education services (65%). The data suggest a high level of unmet needs among childless elderly which need to be addressed by the policymakers.

Thirdly, policymakers should try to remove the barriers for childless older adults with difficulties in living independently to be admitted into nursing homes. Governments should cover the costs of living in an institution for the childless older adults who had no income and no one to care or support them, which may reduce the financial concerns of nursing homes.
Finally, governments should allocate more social workers into communities and nursing homes to address the psycho-social issues of this vulnerable group. More training should be offered to the social work practitioners in different settings on how to work with older adults, how to organize social and leisure activities, and how to mobilize the informal support to address the social and emotional needs. Community residents who have specific expertises in arts or music or martial arts, and who have interests in helping the childless elders, could also be encouraged to lead the social activities as volunteers or paid staff.

For social work practitioners in welfare institutions, nonprofit organizations, community committees and nursing homes, they also need to pay more attention to the social and psychological needs of older adults particularly the childless older adults. First, they need to be aware of the existence and situation of childless older adults in their communities (or in their nursing homes) and have an understanding of the full range of social resources available to be mobilized as social support for childless elders. Secondly, they should organize a wide range of social and leisure activities to attract more older participants, such as singing, dancing, drawing, Tai Chi, and card playing. The study also indicates that childless older adults were less likely to participate in social events. More efforts need to be made to involve this vulnerable group in the organized social or leisure events. When childless older adults have a chance to know each other in such social activities, they can talk about their feelings, share their experiences and make friends, which can add new supporting connections to their social network. For nursing home residents, particularly those who have no children or other persons visiting or supporting them, administrators and workers in institutions should try to address their emotional and social needs. It may be more convenient for nursing home residents to attend activities and social events compared with older persons living in the communities. Thirdly, support groups or mutual-help
groups among childless elderly can also be formed to meet their instrumental and emotional needs. Last but not least, for older adults who had children, social workers should also try to promote the contacts between older parents and their adult children, especially for those empty-nesters. This study showed that the parent-children contacts are critical for older adults to enjoy the benefits of having children.

Conclusion

The childless rate has been going up in many countries, though the reasons may vary. As a result of socioeconomic and demographic changes, a growing number of Chinese people will end up with having no children in later life, either nonparental or no surviving children. It is critical for policymakers and social work practitioners to understand what the presence of a child means to people in their later years or what the childless elderly miss due to the absence of children. However, most research on the impact of childlessness has been conducted in the developed and the Western world. This study extended the existing research about how childlessness affects the well-being of people in later life by using a national sample from a developing, non-western country where the social welfare system is relatively underdeveloped, and eldercare is culturally dependent on families.

Most importantly, the findings of this dissertation study had increased knowledge about the moderators and mediators for the effect of childlessness and provided some empirical evidence on how social policies and programs could better promote the well-being of vulnerable older adults without children in the context of China. More serious efforts need to be made to meet the psychological and social needs of childless older adults through expanding the provision of
organized social and leisure activities in different settings and fostering support and caregiving from informal social networks.
Table 3-1. Variables and Measurement, CLHLS 2008/2009

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
</tr>
<tr>
<td>Self-rate health</td>
<td>Binary variable (good/poor) recoded from a Likert Scale indicating five levels of health conditions.</td>
</tr>
<tr>
<td>Psychological well-being</td>
<td>Score summing a Likert scale rated from 1 to 5 on 5 statements: “look at bright side of things”, “feel fearful or anxious”, “feel lonely and isolated”, “feel useless with age”, and “be happy as younger”, The sum score ranges from 5 to 25 (α=0.66)</td>
</tr>
<tr>
<td>Quality of life</td>
<td>Binary variable (good/poor) recoded from a Likert Scale indicating five levels of quality of life.</td>
</tr>
<tr>
<td><strong>Independent variables</strong></td>
<td></td>
</tr>
<tr>
<td>Childlessness</td>
<td>Whether the elders have no children alive (1= Childless; 0= have at least one living child)</td>
</tr>
<tr>
<td>Children condition</td>
<td>1= nonparental; 2=no survival children; 3=having no regular contacts with children (no frequent visits or contacts); and 4=having regular contacts with children (have either frequent visits or contacts by other means).</td>
</tr>
<tr>
<td>Gender of children alive</td>
<td>0=Childless; 1= having living son(s) only; 2= having living daughter(s) only; 3= have both living son(s) and daughter(s).</td>
</tr>
<tr>
<td><strong>Mediating factors</strong></td>
<td></td>
</tr>
<tr>
<td>Adequate social support</td>
<td>Whether respondent had access to at least one kind of social support (1= yes; 0=No) in forms of sick care, thoughts sharing, frequent talking and assistance in their difficulties.</td>
</tr>
<tr>
<td>Social and Leisure Activity Participation</td>
<td>Whether respondents participate in any social or leisure activities including gardening, raising pets, reading newspaper or books, and watch TV or listening to the radio, playing cards or mah-jongg with others, and other organized social activities (1= yes; 0=No)</td>
</tr>
<tr>
<td>Health Behaviors</td>
<td>The number of healthy lifestyle behaviors they had, including regular fruit and vegetable intake, protein intake, exercises, drinking, and smoking. (range 0 to 5).</td>
</tr>
<tr>
<td><strong>Moderating factors</strong></td>
<td></td>
</tr>
<tr>
<td>Disability Status</td>
<td></td>
</tr>
<tr>
<td>ADL Disabilities</td>
<td>Whether respondents have at least one ADL difficulties among the six activities of daily living including bathing.</td>
</tr>
<tr>
<td>Cognitive Impairments</td>
<td>Whether respondents have cognitive impairments measured by the score on Mini-Mental State Examination (MMSE) (1 = cognitive impaired; 0 = no impairment with cutoff score = 21)</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Public Services</strong></td>
<td></td>
</tr>
<tr>
<td>Access to Social Security</td>
<td>Whether respondents have access to at least one type of public social security services, including retirement pension, public old-age insurance, public medical insurance, cooperative health insurance, basic medical insurance, severe disease insurance, and other special subsidy or assistance. (1 = yes; 0 = No)</td>
</tr>
<tr>
<td>Adequate Medical Services</td>
<td>Whether the respondents can “get adequate medical services” when they are sick. (1 = yes; 0 = No)</td>
</tr>
<tr>
<td>Availability of community-based support services</td>
<td>Whether at least one type of eight community-based formal support services was available in respondent’s community. (1 = yes; 0 = No)</td>
</tr>
<tr>
<td>Gender</td>
<td>1 = Respondent is female; 0 = Respondent is male</td>
</tr>
<tr>
<td>Marital status</td>
<td>1 = Married and living with spouses; 0 = being widowed, divorced, never married or separated with spouses</td>
</tr>
<tr>
<td><strong>Demographic characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Agegroup</td>
<td>1 = Oldest-old (aged 85 years old and above); 0 = Old-old (aged 65 to 84 years old)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>1 = Han, 0 = Other ethnic minorities</td>
</tr>
<tr>
<td><strong>Socioeconomic status (SES) characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Rural/urban Residence</td>
<td>1 = Urban (including town); 0 = Rural</td>
</tr>
<tr>
<td>Education</td>
<td>1 = Respondent has any education; 0 = No education</td>
</tr>
<tr>
<td>Occupation type</td>
<td>1 = Agricultural occupation; 0 = Other Non-agricultural occupations</td>
</tr>
<tr>
<td>Poverty</td>
<td>Annual per capita income (Household income/number of household members) below the state poverty line in 2008; 1 = income &lt; 2300 RMB; 0 = income ≥ 2300 RMB.</td>
</tr>
</tbody>
</table>
Table 4-1. *Percentage of Childless and Sonless People (N=13,897)*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number (% of Sample)</th>
<th>% (weighted)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Childless</strong></td>
<td>548 (3.9%)</td>
<td>2.2%</td>
</tr>
<tr>
<td>Nonparental</td>
<td>278 (2.0 %)</td>
<td>1.8%</td>
</tr>
<tr>
<td>No Surviving children</td>
<td>270 (1.9%)</td>
<td>0.4%</td>
</tr>
<tr>
<td><strong>Having at least a child</strong></td>
<td>13,349 (96.1%)</td>
<td>97.8%</td>
</tr>
<tr>
<td>No regular contacts with all children</td>
<td>1,113 (8.3%)</td>
<td>4.4 %</td>
</tr>
<tr>
<td>Have regular contacts with children</td>
<td>12,236 (91.7%)</td>
<td>95.6%</td>
</tr>
<tr>
<td><strong>Gender of children alive</strong></td>
<td>13,349 (96.1%)</td>
<td>97.8%</td>
</tr>
<tr>
<td>Son(s) only</td>
<td>2,064 (14.9%)</td>
<td>14.2%</td>
</tr>
<tr>
<td>Daughter(s) only</td>
<td>1,208 (8.7%)</td>
<td>6.6%</td>
</tr>
<tr>
<td>Both sons and daughters</td>
<td>10,077 (72.5%)</td>
<td>77.0 %</td>
</tr>
</tbody>
</table>
Table 4-2. Descriptive Characteristic of Older Chinese by Children Status (Weighted)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Childless</th>
<th>Having Children</th>
<th>Total</th>
<th>p-value&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Female</td>
<td>23.1%</td>
<td>53.0%</td>
<td>52.4%</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>76.9%</td>
<td>47.0%</td>
<td>47.6%</td>
<td></td>
</tr>
<tr>
<td><strong>Age (mean ± SD) (yrs.)</strong></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Old-old (65-84)</td>
<td>90.6%</td>
<td>94.5%</td>
<td>94.4%</td>
<td></td>
</tr>
<tr>
<td>Oldest-old (85+)</td>
<td>9.4%</td>
<td>5.5%</td>
<td>5.6%</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td>0.387</td>
<td></td>
</tr>
<tr>
<td>Other ethnic minorities</td>
<td>3.9%</td>
<td>5.6%</td>
<td>5.6%</td>
<td></td>
</tr>
<tr>
<td>Han</td>
<td>96.1%</td>
<td>94.4%</td>
<td>94.4%</td>
<td></td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Married and living with spouses</td>
<td>15.7%</td>
<td>61.7%</td>
<td>60.6%</td>
<td></td>
</tr>
<tr>
<td>Widowed, divorced, never married</td>
<td>84.3%</td>
<td>38.3%</td>
<td>39.4%</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td>0.076</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>48.1%</td>
<td>57.4%</td>
<td>57.2%</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>51.9%</td>
<td>42.6%</td>
<td>42.8%</td>
<td></td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td></td>
<td></td>
<td>0.818</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>41.4%</td>
<td>45.6%</td>
<td>42.6%</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>58.6%</td>
<td>57.4%</td>
<td>57.4%</td>
<td></td>
</tr>
<tr>
<td><strong>Poverty</strong></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Yes (Income &lt; 2300RMB)</td>
<td>51.2%</td>
<td>29.3%</td>
<td>29.8%</td>
<td></td>
</tr>
<tr>
<td>No (Income ≥ 2300RMB)</td>
<td>48.8%</td>
<td>70.7%</td>
<td>0.2%</td>
<td></td>
</tr>
<tr>
<td><strong>Occupation type</strong></td>
<td></td>
<td></td>
<td>0.276</td>
<td></td>
</tr>
<tr>
<td>Agricultural</td>
<td>67.4%</td>
<td>61.8%</td>
<td>61.9%</td>
<td></td>
</tr>
<tr>
<td>Non-agricultural</td>
<td>32.6%</td>
<td>38.2%</td>
<td>38.1%</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>P-value for χ² test to comparing the childless group and the group have a least one child alive.
### Table 4-3. Formal and Informal Support by Children Status (Weighted)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Childless</th>
<th>Having Children</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Living Arrangement</strong></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Living alone</td>
<td>50.0%</td>
<td>13.7%</td>
<td>14.5%</td>
<td></td>
</tr>
<tr>
<td>Living with others</td>
<td>29.2%</td>
<td>86.0%</td>
<td>84.7%</td>
<td></td>
</tr>
<tr>
<td>Living in institutions</td>
<td>20.8%</td>
<td>0.3%</td>
<td>0.7%</td>
<td></td>
</tr>
<tr>
<td><strong>Social Support</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to any social support</td>
<td>65.7%</td>
<td>93.5%</td>
<td>92.9%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Who provides the social support?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First person</td>
<td>Grandchildren and spouses</td>
<td>Son</td>
<td>Son</td>
<td></td>
</tr>
<tr>
<td>Second person</td>
<td>Other relatives</td>
<td>Spouse</td>
<td>Spouse</td>
<td></td>
</tr>
<tr>
<td>Third person</td>
<td>Friends or neighbors</td>
<td>Daughter or in-law</td>
<td>Daughters or in-law</td>
<td></td>
</tr>
<tr>
<td>Fourth person</td>
<td>Social workers</td>
<td>Friends or neighbors</td>
<td>Friends or neighbors</td>
<td></td>
</tr>
<tr>
<td>Who are the primary caregivers when they need ADL assistance?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First person</td>
<td>Grandchildren</td>
<td>Son</td>
<td>Son</td>
<td></td>
</tr>
<tr>
<td>Second person</td>
<td>Other relatives</td>
<td>Daughter-in-law</td>
<td>Daughter-in-law</td>
<td></td>
</tr>
<tr>
<td>Third person</td>
<td>Daughter-in-law</td>
<td>Daughter</td>
<td>Daughter</td>
<td></td>
</tr>
<tr>
<td>Forth person</td>
<td>Spouse</td>
<td>Grandchildren</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Formal Services</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social security</td>
<td>77.6%</td>
<td>79.2%</td>
<td>79.2%</td>
<td>0.704</td>
</tr>
<tr>
<td>Medical services</td>
<td>72.8%</td>
<td>93.9%</td>
<td>93.5%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Community based support services</td>
<td>37.8%</td>
<td>30.2%</td>
<td>30.4%</td>
<td>0.115</td>
</tr>
</tbody>
</table>
Table 4-4. *The lifestyle of Older Chinese by Children Status (Weighted)*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Childless</th>
<th>Having Children</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Health Behaviors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(mean ± SD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoke</td>
<td>37.8%</td>
<td>23.5%</td>
<td>23.8%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Drink</td>
<td>26.9%</td>
<td>19.8%</td>
<td>20.0%</td>
<td>0.098</td>
</tr>
<tr>
<td>Exercise</td>
<td>42.8%</td>
<td>40.3%</td>
<td>40.4%</td>
<td>0.627</td>
</tr>
<tr>
<td>Fruit/Vegetable Intake</td>
<td>87.3%</td>
<td>93.1%</td>
<td>93.0%</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Protein Intake</td>
<td>48.2%</td>
<td>59.9%</td>
<td>59.7%</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Social and Leisure Activities</td>
<td>73.2%</td>
<td>88.0%</td>
<td>87.7%</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 4-5. *Health and Well-being of Older Chinese by Children Status (Weighted)*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Childless</th>
<th>Having Children</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disability Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADL Disabilities</td>
<td>2.1%</td>
<td>3.2%</td>
<td>3.2%</td>
<td>0.314</td>
</tr>
<tr>
<td>Cognitive Impairments</td>
<td>20.2%</td>
<td>10.8%</td>
<td>11%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td><strong>Self-rated Health</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>78.1%</td>
<td>82.4%</td>
<td>82.3%</td>
<td>0.278</td>
</tr>
<tr>
<td>Poor</td>
<td>21.9%</td>
<td>17.6%</td>
<td>17.7%</td>
<td></td>
</tr>
<tr>
<td><strong>Psychological Well-being</strong></td>
<td>16.6 ±4.3</td>
<td>18.1 ± 3.7</td>
<td>18.1 ± 3.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>(mean ± SD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Quality of Life</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>76.5%</td>
<td>92.6%</td>
<td>92.3%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Poor</td>
<td>23.5%</td>
<td>7.4%</td>
<td>7.7%</td>
<td></td>
</tr>
</tbody>
</table>
Table 5-1. Childlessness and Self-Rated Health

<table>
<thead>
<tr>
<th>Variables</th>
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<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>(CI)</td>
<td>OR</td>
</tr>
<tr>
<td>Childlessness</td>
<td>0.782</td>
<td>[0.469,1.304]</td>
<td>0.837</td>
</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Gender</td>
<td>0.826*</td>
<td>[0.700,0.975]</td>
<td></td>
</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>0.718***</td>
<td>[0.624,0.827]</td>
<td></td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.676*</td>
<td>[0.464,0.984]</td>
<td></td>
</tr>
<tr>
<td>Currently Married</td>
<td>1.159†</td>
<td>[0.977,1.374]</td>
<td></td>
</tr>
<tr>
<td>Rural Residence</td>
<td>0.795*</td>
<td>[0.659,0.957]</td>
<td>0.776**</td>
</tr>
<tr>
<td>Education</td>
<td>1.358***</td>
<td>[1.152,1.601]</td>
<td>1.233*</td>
</tr>
<tr>
<td>Agricultural Occupation</td>
<td>1.084</td>
<td>[0.891,1.319]</td>
<td>1.085</td>
</tr>
<tr>
<td>Poverty (Income &lt; 2300)</td>
<td>0.714***</td>
<td>[0.601,0.849]</td>
<td>0.695***</td>
</tr>
</tbody>
</table>

† p<.1, * p<.05, ** p<.01, *** p<.001
Table 5-2. *Types of Childlessness, Child-parent Contact, and Self-Rated Health*

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<tr>
<th>Variables</th>
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<th></th>
<th>Model 2</th>
<th></th>
<th>Model 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>CI</td>
<td>OR</td>
<td>CI</td>
<td>OR</td>
<td>CI</td>
</tr>
<tr>
<td><em>Children conditions</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonparental childless</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>No-surviving children childless</td>
<td>0.766</td>
<td>[0.247, 2.393]</td>
<td>0.604</td>
<td>[0.202, 1.803]</td>
<td>0.652</td>
<td>[0.211, 2.022]</td>
</tr>
<tr>
<td>No regular contacts with children</td>
<td>0.918</td>
<td>[0.464, 1.651]</td>
<td>0.800</td>
<td>[0.433, 1.479]</td>
<td>0.790</td>
<td>[0.419, 1.489]</td>
</tr>
<tr>
<td>Have regular contacts with Children</td>
<td>1.264</td>
<td>[0.707, 2.259]</td>
<td>1.125</td>
<td>[0.644, 1.966]</td>
<td>1.093</td>
<td>[0.613, 1.951]</td>
</tr>
<tr>
<td><em>Covariates</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Gender</td>
<td>0.819*</td>
<td>[0.694, 0.966]</td>
<td></td>
<td></td>
<td>0.882</td>
<td>[0.736, 1.057]</td>
</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>0.731***</td>
<td>[0.633, 0.843]</td>
<td></td>
<td></td>
<td>0.767***</td>
<td>[0.663, 0.887]</td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.680*</td>
<td>[0.467, 0.989]</td>
<td></td>
<td></td>
<td>0.628*</td>
<td>[0.429, 0.920]</td>
</tr>
<tr>
<td>Currently Married</td>
<td>1.146</td>
<td>[0.966, 1.359]</td>
<td></td>
<td></td>
<td>1.148</td>
<td>[0.967, 1.363]</td>
</tr>
<tr>
<td>Rural Residence</td>
<td>0.795*</td>
<td>[0.659, 0.958]</td>
<td></td>
<td></td>
<td>0.777**</td>
<td>[0.643, 0.937]</td>
</tr>
<tr>
<td>Education</td>
<td>1.355***</td>
<td>[1.149, 1.598]</td>
<td>1.230*</td>
<td>[1.024, 1.478]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Occupation</td>
<td>1.09</td>
<td>[0.895, 1.327]</td>
<td>1.09</td>
<td>[0.895, 1.328]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poverty (Income &lt; 2300)</td>
<td>0.719***</td>
<td>[0.604, 0.855]</td>
<td>0.699***</td>
<td>[0.588, 0.832]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

† p<.1, * p<.05, ** p<.01, *** p<.001
Table 5-3. Gender of Children Alive and Self-Rated Health

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
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<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR (CI)</td>
<td>OR (CI)</td>
<td>OR (CI)</td>
</tr>
<tr>
<td>Gender of Children alive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Childlessness</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>Son(s) only</td>
<td>1.263 [0.729,2.187]</td>
<td>1.141 [0.673,1.936]</td>
<td>1.102 [0.636,1.910]</td>
</tr>
<tr>
<td>Daughter(s) only</td>
<td>1.040 [0.579,1.869]</td>
<td>0.896 [0.507,1.581]</td>
<td>0.863 [0.479,1.554]</td>
</tr>
<tr>
<td>Both Sons and Daughters</td>
<td>1.311 [0.785,2.189]</td>
<td>1.234 [0.755,2.018]</td>
<td>1.179 [0.706,1.969]</td>
</tr>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Gender</td>
<td>0.824* [0.699,0.973]</td>
<td>0.886 [0.740,1.062]</td>
<td></td>
</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>0.721*** [0.626,0.830]</td>
<td>0.757*** [0.656,0.875]</td>
<td></td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.678* [0.465,0.987]</td>
<td>0.626* [0.427,0.917]</td>
<td></td>
</tr>
<tr>
<td>Currently Married</td>
<td>1.155 [0.974,1.369]</td>
<td>1.151 [0.970,1.367]</td>
<td></td>
</tr>
<tr>
<td>Rural Residence</td>
<td></td>
<td>0.788* [0.654,0.949]</td>
<td>0.770** [0.638,0.929]</td>
</tr>
<tr>
<td>Education</td>
<td>1.361*** [1.154,1.605]</td>
<td>1.236* [1.029,1.484]</td>
<td></td>
</tr>
<tr>
<td>Agricultural Occupation</td>
<td>1.078 [0.886,1.312]</td>
<td>1.079 [0.886,1.313]</td>
<td></td>
</tr>
<tr>
<td>Poverty (Income &lt; 2300)</td>
<td>0.710*** [0.597,0.844]</td>
<td>0.691*** [0.581,0.822]</td>
<td></td>
</tr>
</tbody>
</table>

† p<.1, * p<.05, ** p<.01, *** p<.001
Table 5-4. Moderating Test of Gender and Marital Status

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
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<th>Model 2</th>
<th></th>
<th>Model 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>(CI)</td>
<td>OR</td>
<td>(CI)</td>
<td>OR</td>
<td>(CI)</td>
</tr>
<tr>
<td>Childlessness</td>
<td>1.062</td>
<td>[0.572,1.970]</td>
<td>1.162</td>
<td>[0.661,2.043]</td>
<td>1.274</td>
<td>[0.640,2.535]</td>
</tr>
<tr>
<td><strong>Main terms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Gender</td>
<td>0.904</td>
<td>[0.753,1.084]</td>
<td>0.900</td>
<td>[0.752,1.077]</td>
<td>0.909</td>
<td>[0.757,1.090]</td>
</tr>
<tr>
<td>Currently Married</td>
<td>1.167</td>
<td>[0.984,1.385]</td>
<td>1.190*</td>
<td>[1.002,1.413]</td>
<td>1.194*</td>
<td>[1.005,1.417]</td>
</tr>
<tr>
<td><strong>Interaction terms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Childlessness*Female Gender</td>
<td>0.523</td>
<td>[0.176,1.555]</td>
<td></td>
<td></td>
<td>0.680</td>
<td>[0.262,1.766]</td>
</tr>
<tr>
<td>Childlessness*Currently Married</td>
<td></td>
<td></td>
<td>0.246*</td>
<td>[0.0752,0.803]</td>
<td>0.270*</td>
<td>[0.0883,0.826]</td>
</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>0.763***</td>
<td>[0.660,0.883]</td>
<td>0.760***</td>
<td>[0.658,0.878]</td>
<td>0.765***</td>
<td>[0.662,0.884]</td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.625*</td>
<td>[0.427,0.916]</td>
<td>0.623*</td>
<td>[0.425,0.914]</td>
<td>0.624*</td>
<td>[0.425,0.914]</td>
</tr>
<tr>
<td>Rural Residence</td>
<td>1.167</td>
<td>[0.984,1.385]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>0.777**</td>
<td>[0.644,0.938]</td>
<td>0.769**</td>
<td>[0.637,0.928]</td>
<td>0.770**</td>
<td>[0.638,0.930]</td>
</tr>
<tr>
<td>Poverty (Income &lt; 2300)</td>
<td>1.083</td>
<td>[0.890,1.319]</td>
<td>1.093</td>
<td>[0.898,1.330]</td>
<td>1.091</td>
<td>[0.896,1.328]</td>
</tr>
</tbody>
</table>

† p<.1, * p<.05, ** p<.01, *** p<.001
### Table 5-5. Moderating Test of Disability Status

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1 (OR)</th>
<th>Model 2 (OR)</th>
<th>Model 3 (OR)</th>
<th>Model 4 (OR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Childlessness</td>
<td>0.888</td>
<td>0.780</td>
<td>0.993</td>
<td>0.933</td>
</tr>
<tr>
<td><strong>Main terms</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>ADL Disabilities</td>
<td>0.103***</td>
<td>0.071***</td>
<td>0.228***</td>
<td></td>
</tr>
<tr>
<td>Cognitive Impairments (CI)</td>
<td>0.304***</td>
<td>0.236***</td>
<td>0.307***</td>
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</tr>
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<td><strong>Interaction term</strong></td>
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<td></td>
</tr>
<tr>
<td>Childlessness* ADL Disabilities</td>
<td>4.395</td>
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<td>6.492</td>
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</tr>
<tr>
<td>Childlessness*CI</td>
<td>0.914</td>
<td>0.720</td>
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</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Gender</td>
<td>0.899</td>
<td>0.874</td>
<td>0.918</td>
<td>0.899</td>
</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>1.354***</td>
<td>0.971</td>
<td>1.168</td>
<td>1.343***</td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.674*</td>
<td>0.657*</td>
<td>0.649*</td>
<td>0.672*</td>
</tr>
<tr>
<td>Currently Married</td>
<td>1.06</td>
<td>1.135</td>
<td>1.061</td>
<td>1.062</td>
</tr>
<tr>
<td>Rural Residence</td>
<td>0.756**</td>
<td>0.731**</td>
<td>0.803*</td>
<td>0.757**</td>
</tr>
<tr>
<td>Education</td>
<td>1.045</td>
<td>1.175</td>
<td>1.055</td>
<td>1.042</td>
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<tr>
<td>Agricultural Occupation</td>
<td>1.057</td>
<td>1.048</td>
<td>1.092</td>
<td>1.057</td>
</tr>
<tr>
<td>Poverty (Income &lt; 2300)</td>
<td>0.687***</td>
<td>0.669***</td>
<td>0.712***</td>
<td>0.686***</td>
</tr>
</tbody>
</table>

※ p<.1, *p<.05, **p<.01, *** p<.001
Table 5-6. *Moderating Test of Access to Public Services*

<table>
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<tr>
<th>Variables</th>
<th>Model 1 (OR)</th>
<th>Model 2 (OR)</th>
<th>Model 3 (OR)</th>
<th>Model 4 (OR)</th>
<th>Model 5 (OR)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main terms</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Childlessness</td>
<td>1.027</td>
<td>0.813</td>
<td>1.047</td>
<td>0.728</td>
<td>0.875</td>
</tr>
<tr>
<td>Safenet Services (SS)</td>
<td>0.824†</td>
<td>0.906</td>
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<td>0.820</td>
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<td>Medical Services (MS)</td>
<td>2.339***</td>
<td>2.258***</td>
<td>2.358***</td>
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<tr>
<td>Community-based support services (CBSS)</td>
<td>1.412***</td>
<td></td>
<td>1.382***</td>
<td>1.398***</td>
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</tr>
<tr>
<td><strong>Interaction term</strong></td>
<td></td>
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</tr>
<tr>
<td>Childlessness* SS</td>
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<td>1.107</td>
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<td>Childlessness*CBSS</td>
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<td>1.526</td>
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<tr>
<td><strong>Covariates</strong></td>
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</tr>
<tr>
<td>Female Gender</td>
<td>0.892</td>
<td>0.888</td>
<td>0.888</td>
<td>0.893</td>
<td>0.891</td>
</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>0.748***</td>
<td>0.751***</td>
<td>0.747***</td>
<td>0.759***</td>
<td>0.749***</td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.643*</td>
<td>0.615*</td>
<td>0.645*</td>
<td>0.644*</td>
<td>0.645*</td>
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<tr>
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<td>1.163</td>
<td>1.119</td>
<td>1.147</td>
<td>1.119</td>
</tr>
<tr>
<td>Rural Residence</td>
<td>0.827</td>
<td>0.777**</td>
<td>0.809*</td>
<td>0.791*</td>
<td>0.828</td>
</tr>
<tr>
<td>Education</td>
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<td>1.244*</td>
<td>1.227*</td>
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<tr>
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<td>1.08</td>
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<td>Poverty (Income &lt; 2300)</td>
<td>0.748**</td>
<td>0.694***</td>
<td>0.735***</td>
<td>0.707***</td>
<td>0.748**</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 5-7. *Moderating Test*

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<td>B (CI)</td>
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<td>Childlessness</td>
<td>1.022 [0.595,1.757]</td>
<td>1.234 [0.395,3.850]</td>
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<tr>
<td>Female</td>
<td>0.901 [0.744,1.092]</td>
<td>0.917 [0.755,1.113]</td>
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<td>Currently Married</td>
<td>1.032 [0.857,1.242]</td>
<td>1.066 [0.885,1.284]</td>
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<td>ADL Disabilities</td>
<td>0.103*** [0.072,0.147]</td>
<td>0.100*** [0.070,0.144]</td>
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<tr>
<td>Cognitive Impairments (CI)</td>
<td>0.317*** [0.256,0.393]</td>
<td>0.322*** [0.259,0.401]</td>
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<td>Safenet Services (SS)</td>
<td>0.839 [0.679,1.036]</td>
<td>0.839 [0.676,1.040]</td>
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<tr>
<td>Medical Services (MS)</td>
<td>2.184*** [1.622,2.943]</td>
<td>2.173*** [1.595,2.960]</td>
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<td>Community-based Support Services(CBSS)</td>
<td>1.342** [1.099,1.638]</td>
<td>1.322** [1.080,1.618]</td>
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<td><strong>Interaction terms</strong></td>
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<td>Childlessness*Female</td>
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<td>0.901 [0.324,2.508]</td>
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<td>Childlessness*Currently married</td>
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<td>0.237* [0.069,0.810]</td>
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<td>3.917 [0.295,10.04]</td>
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<td>0.631 [0.196,2.031]</td>
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<td>1.044 [0.398,2.742]</td>
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<td>Childlessness*MS</td>
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<td>1.089 [0.354,3.353]</td>
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<td>Childlessness*CBSS</td>
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<td>Category</td>
<td>Coefficient</td>
<td>CI</td>
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<td>-------------</td>
<td>----------------</td>
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<td>Oldest-old (85+ yrs.)</td>
<td>1.319**</td>
<td>[1.111, 1.566]</td>
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<td>Han Ethnicity</td>
<td>0.691</td>
<td>[0.467, 1.024]</td>
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<td>Rural Residence</td>
<td>0.802*</td>
<td>[0.656, 0.981]</td>
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<td>[0.862, 1.287]</td>
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<td>[0.855, 1.295]</td>
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<td>Poverty (Income &lt; 2300)</td>
<td>0.732**</td>
<td>[0.606, 0.884]</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 5-8. *Multiple Regression on Self-Rated Health with All Mediators*

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<th>Variables</th>
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<th>Model 2 (OR)</th>
<th>Model 3 (OR)</th>
<th>Model 4 (OR)</th>
<th>Model 5 (OR)</th>
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<td>1.072</td>
<td>0.957</td>
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<td><strong>Potential Mediators</strong></td>
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</tr>
<tr>
<td>Social support</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social &amp; Leisure Activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Behaviors</td>
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<td></td>
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<td><strong>Covariates</strong></td>
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<td>Female Gender</td>
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<td>0.87</td>
<td>0.882</td>
<td>0.763**</td>
<td>0.762**</td>
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<td>Oldest-old (85+ yrs.)</td>
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<td>0.745***</td>
<td>0.917</td>
<td>0.750***</td>
<td>0.899</td>
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<tr>
<td>Han Ethnicity</td>
<td>0.621*</td>
<td>0.645*</td>
<td>0.632*</td>
<td>0.621*</td>
<td>0.652*</td>
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<tr>
<td>Married and living with spouse</td>
<td>1.154</td>
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<td>1.068</td>
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<td>0.803*</td>
<td>0.813*</td>
<td>0.837*</td>
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<td>0.895</td>
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<td>Education</td>
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<td>1.224*</td>
<td>1.101</td>
<td>1.173</td>
<td>1.083</td>
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<td>Poverty (Income &lt; 2300) (yes vs. no)</td>
<td>0.704***</td>
<td>0.710***</td>
<td>0.733***</td>
<td>0.728***</td>
<td>0.756**</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
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<tr>
<th>Dependent variables</th>
<th>Predicting Variables</th>
<th>Direct Effects(^a)</th>
<th>Indirect Effects(^c)</th>
<th>Total Effects(^a)</th>
<th>% Mediated</th>
<th>95% CI (Indirect)</th>
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<td><strong>Other Mediators Not Controlled</strong></td>
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<tr>
<td>Self-rated Health</td>
<td>Social Support</td>
<td>-0.007</td>
<td>-0.015***</td>
<td>-0.022*</td>
<td>67.7%</td>
<td>(-0.019, -0.011)</td>
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<tr>
<td></td>
<td>SLA</td>
<td>-0.010</td>
<td>-0.012***</td>
<td>-0.022*</td>
<td>54.1%</td>
<td>(-0.018, -0.007)</td>
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<td></td>
<td>Health Behaviors</td>
<td>-0.020</td>
<td>-0.001*</td>
<td>-0.021</td>
<td>6.5%</td>
<td>(-0.003, -0.0001)</td>
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<td>Childlessness</td>
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<td>-0.087***</td>
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<tr>
<td>Social&amp;Leisure Activities(SLA)</td>
<td>Childlessness</td>
<td>-0.048***</td>
<td>N/A</td>
<td>-0.048***</td>
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<tr>
<td>Health Behaviors</td>
<td>Childlessness</td>
<td>-0.011*</td>
<td>N/A</td>
<td>-0.011*</td>
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<td><strong>Other Mediators Controlled</strong> (Multiple Mediation Analysis)</td>
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<tr>
<td>Self-rated Health</td>
<td>Social Support</td>
<td>0.0008</td>
<td>-0.013</td>
<td>-0.024</td>
<td>100%</td>
<td>(-0.031, -0.019)</td>
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<tr>
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<td>SLA</td>
<td>-0.010</td>
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<tr>
<td></td>
<td>Health Behaviors</td>
<td>-0.0007</td>
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<tr>
<td>Self-rated Health</td>
<td>Social Support</td>
<td>0.007</td>
<td>-0.019***</td>
<td>-0.012</td>
<td>162%</td>
<td>(-0.041,-0.006)</td>
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<tr>
<td></td>
<td>SLA</td>
<td>-0.008</td>
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<td>-0.019</td>
<td>55.8%</td>
<td>(-0.026,-0.001)</td>
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<td>0</td>
<td>-0.021</td>
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<td>(-0.007, 0.005)</td>
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<td>-0.045*</td>
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\(\dagger\) p<.1, * p<.05, ** p<.01, *** p<.001
### Table 5-10. Full Model on the effect of Childlessness on Self-Rated Health

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<th>Model 3 (OR)</th>
<th>Model 4 (OR)</th>
<th>Model 5 (OR)</th>
<th>Model 6 (OR)</th>
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<td>Childlessness</td>
<td>0.782</td>
<td>0.878</td>
<td>1.148</td>
<td>1.279</td>
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<tr>
<td>Female Gender</td>
<td>0.826*</td>
<td>0.888</td>
<td>0.755**</td>
<td>0.778*</td>
<td>0.897</td>
<td>0.924</td>
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<tr>
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<td>0.718***</td>
<td>0.754***</td>
<td>0.903</td>
<td>0.892</td>
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<td>1.568***</td>
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<tr>
<td>Han Ethnicity</td>
<td>0.676*</td>
<td>0.625*</td>
<td>0.659*</td>
<td>0.658*</td>
<td>0.587*</td>
<td>0.588*</td>
</tr>
<tr>
<td>Married and living with spouse</td>
<td>1.159</td>
<td>1.158</td>
<td>0.967</td>
<td>0.962</td>
<td>0.745**</td>
<td>0.772*</td>
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<tr>
<td>Rural Residence</td>
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<td>0.885</td>
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<td>1.602**</td>
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<td>Social &amp; Leisure Activities</td>
<td>2.369***</td>
<td>2.332***</td>
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<td>1.110*</td>
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<td>1.333**</td>
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<tr>
<td>ADL Disabilities</td>
<td>0.166***</td>
<td>0.159***</td>
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<td></td>
</tr>
<tr>
<td>Cognitive Impairments (CI)</td>
<td>0.544***</td>
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<td>Psychological Well-being</td>
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**Interaction terms**

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<th>Estimate</th>
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<td>Childlessness*Female</td>
<td>0.565</td>
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<td>Childlessness*Currently married</td>
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<tr>
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<td>Childlessness*MS</td>
<td>1.318</td>
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<td>Childlessness*CBSS</td>
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*† p<.1, * p<.05, ** p<.01, *** p<.001*
### Table 5-11. Full Model on Types of Childlessness, Parent-Children Contacts and Self-Rated Health

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1 (OR)</th>
<th>Model 2 (OR)</th>
<th>Model 3 (OR)</th>
<th>Model 4 (OR)</th>
<th>Model 5 (OR)</th>
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<td>Nonparental childless (Ref)</td>
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<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
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<td>No-surviving children childless</td>
<td>0.768</td>
<td>0.652</td>
<td>0.487</td>
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<td>0.670</td>
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<tr>
<td>No regular contacts with children</td>
<td>0.875</td>
<td>0.790</td>
<td>0.593</td>
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<tr>
<td>Have regular contacts with children</td>
<td>1.264</td>
<td>1.093</td>
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<td>0.713</td>
<td>0.712</td>
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<tr>
<td><strong>Demographics</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Gender</td>
<td>0.819*</td>
<td>0.882</td>
<td>0.755**</td>
<td>0.777*</td>
<td>0.893</td>
</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>0.731***</td>
<td>0.767***</td>
<td>0.922</td>
<td>0.909</td>
<td>1.550***</td>
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<td>Han Ethnicity</td>
<td>0.680*</td>
<td>0.628*</td>
<td>0.661*</td>
<td>0.660*</td>
<td>0.589*</td>
</tr>
<tr>
<td>Married and living with spouse</td>
<td>1.146</td>
<td>1.148</td>
<td>0.965</td>
<td>0.960</td>
<td>0.743**</td>
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<tr>
<td>Rural Residence</td>
<td>0.777**</td>
<td>0.848</td>
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<tr>
<td>Education</td>
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<td>Agricultural Occupation</td>
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<td>1.130</td>
<td>1.095</td>
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<td>Poverty (Income &lt; 2300)</td>
<td>0.699***</td>
<td>0.744**</td>
<td>0.784**</td>
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<tr>
<td><strong>Social and Lifestyle</strong></td>
<td></td>
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<tr>
<td>Social Support</td>
<td>2.083***</td>
<td>1.870***</td>
<td>1.596**</td>
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<tr>
<td>Social &amp; Leisure Activities</td>
<td>2.359***</td>
<td>2.321***</td>
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<td>1.137**</td>
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<td>1.097</td>
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**Public Services Access**

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<th>SE</th>
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<td>0.792*</td>
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<td>Medical Services</td>
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<td>1.124</td>
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<td>Community-based Support Services</td>
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<td>1.319*</td>
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**Health Conditions**

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<tr>
<td>Cognitive Impairments</td>
<td>0.545***</td>
</tr>
<tr>
<td>Psychological Well-being</td>
<td>1.306***</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 5-12. Full Model on Gender of Children and Self-Rated Health

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<th>Model 3 (OR)</th>
<th>Model 4 (OR)</th>
<th>Model 5 (OR)</th>
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<tr>
<td>Childless (Ref)</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
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<tr>
<td>Son(s) only</td>
<td>1.263</td>
<td>1.102</td>
<td>0.871</td>
<td>0.773</td>
<td>0.691</td>
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<tr>
<td>Daughter(s) only</td>
<td>1.040</td>
<td>0.863</td>
<td>0.655</td>
<td>0.586</td>
<td>0.605</td>
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<tr>
<td>Both Son and Daughter</td>
<td>1.311</td>
<td>1.179</td>
<td>0.900</td>
<td>0.810</td>
<td>0.785</td>
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<td><strong>Demographics</strong></td>
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<tr>
<td>Female Gender</td>
<td>0.824*</td>
<td>0.886</td>
<td>0.752**</td>
<td>0.774*</td>
<td>0.893</td>
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<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>0.721***</td>
<td>0.757***</td>
<td>0.908</td>
<td>0.898</td>
<td>1.541***</td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.678*</td>
<td>0.626*</td>
<td>0.659*</td>
<td>0.659*</td>
<td>0.591*</td>
</tr>
<tr>
<td>Married and living with spouse</td>
<td>1.155</td>
<td>1.151</td>
<td>0.964</td>
<td>0.959</td>
<td>0.742**</td>
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<tr>
<td><strong>Socioeconomic status</strong></td>
<td></td>
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<tr>
<td>Rural Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1.236*</td>
<td>1.112</td>
<td>1.135</td>
<td>0.997</td>
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</tr>
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<td>Agricultural Occupation</td>
<td>1.079</td>
<td>1.135</td>
<td>1.122</td>
<td>1.091</td>
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<td>Poverty (Income &lt; 2300)</td>
<td>0.691***</td>
<td>0.738***</td>
<td>0.778**</td>
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<td>0.837</td>
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<tr>
<td><strong>Social and Lifestyle</strong></td>
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<tr>
<td>Social Support</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Social &amp; Leisure Activities</td>
<td>2.075***</td>
<td>1.861***</td>
<td>1.580**</td>
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<td>Health Behaviors</td>
<td>2.371***</td>
<td>2.334***</td>
<td>1.164</td>
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<td></td>
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<tr>
<td></td>
<td>1.142**</td>
<td>1.116*</td>
<td>1.099*</td>
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</table>
**Public Services Access**

<table>
<thead>
<tr>
<th>Service</th>
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<tbody>
<tr>
<td>Social Security</td>
<td>0.791*</td>
<td>0.687**</td>
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<tr>
<td>Medical Services</td>
<td>2.003***</td>
<td>1.133</td>
</tr>
<tr>
<td>Community-based Support Services</td>
<td>1.312**</td>
<td>1.325*</td>
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**Health Conditions**

<table>
<thead>
<tr>
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<tr>
<td>ADL Disabilities</td>
<td>0.168***</td>
</tr>
<tr>
<td>Cognitive Impairments</td>
<td>0.540***</td>
</tr>
<tr>
<td>Psychological Well-being</td>
<td>1.306***</td>
</tr>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 6-1. *Childlessness and Psychological Well-being*

<table>
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<th>Model 3</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>(CI)</td>
<td>b</td>
</tr>
<tr>
<td>Childlessness</td>
<td>-1.113*</td>
<td>[-1.966,-0.261]</td>
<td>-1.242**</td>
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<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Gender</td>
<td>-0.678***</td>
<td>[-0.900,-0.456]</td>
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</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>-1.300***</td>
<td>[-1.539,-1.061]</td>
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</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.469*</td>
<td>[0.084,0.853]</td>
<td></td>
</tr>
<tr>
<td>Currently Married</td>
<td>1.184***</td>
<td>[0.948,1.420]</td>
<td></td>
</tr>
<tr>
<td>Rural Residence</td>
<td></td>
<td></td>
<td>-0.101</td>
</tr>
<tr>
<td>Education</td>
<td>1.029***</td>
<td>[0.793,1.265]</td>
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</tr>
<tr>
<td>Agricultural Occupation</td>
<td>-0.234</td>
<td>[-0.518,0.050]</td>
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<tr>
<td>Poverty (Income &lt; 2300)</td>
<td>-0.666***</td>
<td>[-0.920,-0.413]</td>
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</tbody>
</table>

† p<.1, * p<.05, ** p<.01, *** p<.001
Table 6-2. Different Types of Childlessness, Child-Parent Contact and Psychological Well-being

<table>
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<tr>
<th>Variables</th>
<th>Model 1</th>
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<th></th>
<th>Model 3</th>
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<td>(CI)</td>
<td>b</td>
<td>(CI)</td>
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<td><strong>Children conditions</strong></td>
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</tr>
<tr>
<td>Nonparental childless</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>No-surviving children childless</td>
<td>-0.694</td>
<td>[-2.452,1.064]</td>
<td>-1.097</td>
<td>[-2.688,0.493]</td>
<td>-0.999</td>
<td>[-2.691,0.692]</td>
</tr>
<tr>
<td>No regular contacts with children</td>
<td>0.401</td>
<td>[-0.637,1.440]</td>
<td>0.470</td>
<td>[-0.582,1.522]</td>
<td>0.173</td>
<td>[-0.862,1.208]</td>
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<tr>
<td>Have regular contacts with children</td>
<td>1.061*</td>
<td>[0.095,2.028]</td>
<td>1.111*</td>
<td>[0.132,2.091]</td>
<td>0.721</td>
<td>[-0.247,1.690]</td>
</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Female Gender</td>
<td>-0.692***</td>
<td>[-0.913,-0.471]</td>
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<td>-0.451***</td>
<td>[-0.690,-0.212]</td>
</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>-1.270***</td>
<td>[-1.509,-1.030]</td>
<td></td>
<td></td>
<td>-1.143***</td>
<td>[-1.385,-0.901]</td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.482*</td>
<td>[0.099,0.865]</td>
<td></td>
<td></td>
<td>0.343</td>
<td>[-0.036,0.722]</td>
</tr>
<tr>
<td>Currently Married</td>
<td>1.163***</td>
<td>[0.927,1.398]</td>
<td></td>
<td></td>
<td>1.134***</td>
<td>[0.900,1.369]</td>
</tr>
<tr>
<td>Rural Residence</td>
<td>-0.105</td>
<td>[-0.366,0.156]</td>
<td>-0.176</td>
<td>[-0.434,0.082]</td>
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<td></td>
</tr>
<tr>
<td>Education</td>
<td>1.027***</td>
<td>[0.792,1.262]</td>
<td>0.565***</td>
<td>[0.308,0.823]</td>
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</tr>
<tr>
<td>Agricultural Occupation</td>
<td>-0.222</td>
<td>[-0.506,0.063]</td>
<td>-0.120</td>
<td>[-0.402,0.162]</td>
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</tr>
<tr>
<td>Poverty (Income &lt; 2300)</td>
<td>-0.651***</td>
<td>[-0.904,-0.398]</td>
<td>-0.751***</td>
<td>[-1.000,-0.501]</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 6-3. Gender of Children Alive and Psychological Well-being

<table>
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<th>Variables</th>
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<th>Model 2</th>
<th>Model 3</th>
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<td>b (CI)</td>
<td>b (CI)</td>
<td>b (CI)</td>
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<tr>
<td>Gender of Children alive</td>
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</tr>
<tr>
<td>Childlessness</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>Son(s) only</td>
<td>1.278** [0.381, 2.175]</td>
<td>1.357** [0.453, 2.262]</td>
<td>0.960* [0.064, 1.856]</td>
</tr>
<tr>
<td>Daughter(s) only</td>
<td>0.985* [0.029, 1.941]</td>
<td>0.911† [-0.046, 1.867]</td>
<td>0.563 [-0.391, 1.517]</td>
</tr>
<tr>
<td>Both Son and Daughter</td>
<td>1.092* [0.237, 1.947]</td>
<td>1.248** [0.392, 2.104]</td>
<td>0.828† [-0.027, 1.683]</td>
</tr>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Gender</td>
<td>-0.675*** [-0.897, -0.453]</td>
<td>-0.438*** [-0.677, -0.199]</td>
<td></td>
</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>-1.294*** [-1.533, -1.055]</td>
<td>-1.164*** [-1.406, -0.923]</td>
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</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.459* [0.074, 0.844]</td>
<td>0.319 [-0.061, 0.699]</td>
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</tr>
<tr>
<td>Currently Married</td>
<td>1.187*** [0.950, 1.423]</td>
<td></td>
<td>1.150*** [0.915, 1.386]</td>
</tr>
<tr>
<td>Rural Residence</td>
<td>-0.106 [-0.367, 0.155]</td>
<td>-0.176 [-0.434, 0.082]</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1.031*** [0.796, 1.266]</td>
<td>0.569*** [0.312, 0.826]</td>
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</tr>
<tr>
<td>Agricultural Occupation</td>
<td>-0.238 [-0.522, 0.047]</td>
<td>-0.133 [-0.415, 0.149]</td>
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</tr>
<tr>
<td>Poverty (Income &lt; 2300)</td>
<td>-0.671*** [-0.924, -0.417]</td>
<td>-0.769*** [-1.018, -0.520]</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 6-4. *Moderating Test of Gender and Marital Status*

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<th>Model 3</th>
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</thead>
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<td>b    (CI)</td>
<td>b    (CI)</td>
<td>b    (CI)</td>
</tr>
<tr>
<td>Childlessness</td>
<td>-0.967 [-1.962,0.029]</td>
<td>-0.976* [-1.892,-0.059]</td>
<td>-1.058* [-2.099,-0.017]</td>
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<tr>
<td><strong>Main terms</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Gender</td>
<td>-0.451*** [-0.691,-0.211]</td>
<td>-0.446*** [-0.684,-0.208]</td>
<td>-0.454*** [-0.694,-0.214]</td>
</tr>
<tr>
<td>Currently Married</td>
<td>1.145*** [0.911,1.380]</td>
<td>1.138*** [0.902,1.373]</td>
<td>1.135*** [0.900,1.371]</td>
</tr>
<tr>
<td><strong>Interaction terms</strong></td>
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<tr>
<td>Childlessness*Female Gender</td>
<td>0.565 [-1.301,2.431]</td>
<td></td>
<td>0.414 [-1.390,2.219]</td>
</tr>
<tr>
<td>Childlessness*Currently Married</td>
<td>0.879 [-1.487,3.244]</td>
<td>0.770 [-1.547,3.087]</td>
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</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>-1.181*** [-1.424,-0.939]</td>
<td>-1.176*** [-1.418,-0.934]</td>
<td>-1.183*** [-1.425,-0.940]</td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.327 [-0.053,0.706]</td>
<td>0.328 [-0.052,0.707]</td>
<td>0.327 [-0.052,0.706]</td>
</tr>
<tr>
<td>Rural Residence</td>
<td>-0.174 [-0.432,0.083]</td>
<td>-0.169 [-0.426,0.088]</td>
<td>-0.17 [-0.427,0.087]</td>
</tr>
<tr>
<td>Education</td>
<td>0.564*** [0.307,0.822]</td>
<td>0.566*** [0.309,0.823]</td>
<td>0.564*** [0.307,0.822]</td>
</tr>
<tr>
<td>Agricultural Occupation</td>
<td>-0.129 [-0.411,0.152]</td>
<td>-0.134 [-0.416,0.147]</td>
<td>-0.133 [-0.414,0.148]</td>
</tr>
<tr>
<td>Poverty (Income &lt; 2300)</td>
<td>-0.766*** [-1.016,-0.516]</td>
<td>-0.765*** [-1.015,-0.516]</td>
<td>-0.765*** [-1.015,-0.516]</td>
</tr>
</tbody>
</table>

† p<.1, * p<.05, ** p<.01, *** p<.001
Table 6-5. *Moderating Test of Disability Status*

<table>
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<th>Variables</th>
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<th>Model 2 (B)</th>
<th>Model 3 (B)</th>
<th>Model 4 (B)</th>
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<tbody>
<tr>
<td>Childlessness</td>
<td>-0.761</td>
<td>-0.865*</td>
<td>-0.552</td>
<td>-0.590</td>
</tr>
<tr>
<td><strong>Main terms</strong></td>
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<td></td>
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</tr>
<tr>
<td>ADL Disabilities</td>
<td>-3.997***</td>
<td>-5.014***</td>
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<td>-3.973***</td>
</tr>
<tr>
<td>Cognitive impairments (CI)</td>
<td>-2.606***</td>
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<td>-3.135***</td>
<td>-2.581***</td>
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<td><strong>Interaction term</strong></td>
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</tr>
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<td>Childlessness*ADL Disabilities</td>
<td>-2.727</td>
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<td>-2.088</td>
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<td>Childlessness*CI</td>
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<td>-0.447***</td>
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<td>-0.351*</td>
<td>-0.175</td>
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<tr>
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<td>0.417*</td>
<td>0.413*</td>
<td>0.468*</td>
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<td>1.117***</td>
<td>1.007***</td>
<td>1.006***</td>
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<tr>
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<tr>
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<td>Agricultural Occupation</td>
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<td>-0.128</td>
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<td>-0.720***</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 6-6. Moderating Test of Public Services Access

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<th>Variables</th>
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<th>Model 5 (b)</th>
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<td>Agricultural Occupation</td>
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<td>-0.137</td>
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<td>-0.106</td>
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<td>-0.761***</td>
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<td>-0.581***</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
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<td>[2.085,2.933]</td>
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<td>Community-based Support Services (CBSS)</td>
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<td>Childlessness*Female</td>
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<td>Estimate</td>
<td>CI Lower</td>
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<td>----------------------------------</td>
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<td>[0.249,0.962]</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 6-8. *Multiple Regression with All Potential Mediators on Psychological Well-being*

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<th>Model 4 (b)</th>
<th>Model 5 (b)</th>
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<td>-0.636</td>
<td>-0.836†</td>
<td>-0.404</td>
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<td>1.104***</td>
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<td>2.078***</td>
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<td>Health Behaviors</td>
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<td>0.302***</td>
<td>0.245***</td>
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<td><strong>Covariates</strong></td>
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<td>Female Gender</td>
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<td>-0.725***</td>
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<td>0.523***</td>
<td>0.357**</td>
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<td>-0.776***</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
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<th>Direct Effects(^a)</th>
<th>Indirect Effects(^c)</th>
<th>Total Effects(^a)</th>
<th>% Mediate</th>
<th>CI (Indirect Effects)</th>
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<td>-0.014***</td>
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<td>-0.0007*</td>
<td>-0.032***</td>
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<td>Childlessness</td>
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<td>Childlessness</td>
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<td>Social Support</td>
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<td>-0.174***</td>
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\(^{†} p<.1, *p<.05, **p<.01, *** p<.001\)
Table 6-10. *Full Model between Childlessness and Psychological Well-being*

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<th>Variables</th>
<th>Model 1 (b)</th>
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<tr>
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<td>-0.723***</td>
<td>-0.638***</td>
<td>-0.479***</td>
<td>-0.501***</td>
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<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>-1.300***</td>
<td>-1.172***</td>
<td>-0.772***</td>
<td>-0.785***</td>
<td>-0.238*</td>
<td>-0.252*</td>
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<tr>
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<td>0.429*</td>
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<td>0.749***</td>
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<td>0.867***</td>
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<td>-0.630***</td>
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<td>0.100*</td>
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**Interaction terms**

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**Constant**

17.35*** 17.45*** 13.92*** 11.86*** 11.43*** 11.48***

† p<.1, * p<.05, ** p<.01, *** p<.001
Table 6-11. Full Model on Types of Childlessness, Parent-Children Contacts, and Psychological Well-being

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<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
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<td>No-surviving children childless</td>
<td>-0.694</td>
<td>-0.999</td>
<td>-1.443</td>
<td>-1.497</td>
<td>-0.789</td>
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<td>No regular contacts with children</td>
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<td>Have regular contacts with Children</td>
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<td>-0.161</td>
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<td><strong>Demographics</strong></td>
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<td>Female Gender</td>
<td>-0.692***</td>
<td>-0.451***</td>
<td>-0.722***</td>
<td>-0.633***</td>
<td>-0.478***</td>
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<td>Oldest-old (85+ yrs.)</td>
<td>-1.270***</td>
<td>-1.143***</td>
<td>-0.740***</td>
<td>-0.756***</td>
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<td>Han Ethnicity</td>
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<td>0.963***</td>
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</tbody>
</table>
**Public Services Access**

- Social Security: 0.150 0.289*
- Medical Services: 2.492*** 2.003***
- Community-based Support Services: 0.105 -0.043

**Health Conditions**

- ADL Disabilities: -2.303***
- Cognitive Impairments: -1.627***
- Self-rated Health: 2.983***

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<th>16.76***</th>
<th>13.77***</th>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 6-12. Full Model on Gender of Children Alive and Psychological Well-being

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<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
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<td>Son(s) only</td>
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<td>0.960*</td>
<td>0.572</td>
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<td>Both Son and Daughter</td>
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**Public Services Access**

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**Health Conditions**

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<td>Self-rated Health</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 7-1. Childlessness and Quality of Life

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<td>OR (CI)</td>
<td>OR (CI)</td>
<td>OR (CI)</td>
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<tr>
<td>Childlessness</td>
<td>0.279*** [0.163,0.478]</td>
<td>0.299*** [0.181,0.493]</td>
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<td><strong>Covariates</strong></td>
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<tr>
<td>Female Gender</td>
<td>0.738** [0.588,0.927]</td>
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<td>0.834 [0.651,1.069]</td>
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<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>0.542*** [0.452,0.650]</td>
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<td>0.578*** [0.481,0.696]</td>
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<tr>
<td>Han Ethnicity</td>
<td>0.503** [0.329,0.770]</td>
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<td>0.439*** [0.287,0.672]</td>
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<tr>
<td>Currently Married</td>
<td>1.404** [1.113,1.771]</td>
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<td>1.409** [1.115,1.782]</td>
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<tr>
<td>Rural Residence</td>
<td>0.789† [0.607,1.025]</td>
<td>0.758* [0.582,0.986]</td>
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<td>Education</td>
<td>1.647*** [1.299,2.088]</td>
<td>1.380* [1.064,1.789]</td>
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<td>1.016 [0.753,1.372]</td>
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<td>0.555*** [0.441,0.698]</td>
<td>0.526*** [0.418,0.663]</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 7-2. Different Types of Childlessness, Child-parent Contact and Quality of Life

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<tr>
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<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>No-surviving children childless</td>
<td>0.913</td>
<td>[0.292, 2.860]</td>
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<tr>
<td>No regular contacts with children</td>
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<td>Female Gender</td>
<td>0.718**</td>
<td>[0.572, 0.901]</td>
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<td>Oldest-old (85+ yrs.)</td>
<td>0.558***</td>
<td>[0.464, 0.672]</td>
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<tr>
<td>Han Ethnicity</td>
<td>0.506**</td>
<td>[0.330, 0.777]</td>
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</tr>
<tr>
<td>Currently Married</td>
<td>1.369**</td>
<td>[1.086, 1.725]</td>
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</tr>
<tr>
<td>Rural Residence</td>
<td>0.789†</td>
<td>[0.606, 1.026]</td>
<td>0.758*</td>
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<tr>
<td>Education</td>
<td>1.645***</td>
<td>[1.296, 2.087]</td>
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<td>Agricultural Occupation</td>
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<td>1.028</td>
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<td>Poverty (Income &lt; 2300)</td>
<td>0.563***</td>
<td>[0.447, 0.709]</td>
<td>0.534***</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 7-3. Gender of Children Alive and Quality of Life

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<td>OR (CI)</td>
<td>OR (CI)</td>
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<tr>
<td>Childlessness</td>
<td>Ref</td>
<td>Ref</td>
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</tr>
<tr>
<td>Son(s) only</td>
<td>2.926*** [1.614,5.303]</td>
<td>2.592*** [1.480,4.540]</td>
<td>2.368** [1.318,4.254]</td>
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<td>Daughter(s) only</td>
<td>3.314*** [1.692,6.490]</td>
<td>2.703** [1.422,5.135]</td>
<td>2.488** [1.279,4.839]</td>
</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Gender</td>
<td>0.733** [0.584,0.920]</td>
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<td>0.827 [0.646,1.058]</td>
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<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>0.543*** [0.452,0.651]</td>
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<td>0.581*** [0.482,0.699]</td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.510** [0.333,0.780]</td>
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<td>0.445*** [0.291,0.682]</td>
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<tr>
<td>Currently Married</td>
<td>1.395** [1.106,1.759]</td>
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<td>1.395** [1.104,1.762]</td>
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<tr>
<td>Rural Residence</td>
<td>0.778† [0.598,1.011]</td>
<td>0.749* [0.575,0.975]</td>
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<td>Education</td>
<td>1.649*** [1.301,2.091]</td>
<td>1.380* [1.064,1.789]</td>
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<td>Agricultural Occupation</td>
<td>1.008 [0.745,1.363]</td>
<td>1.008 [0.746,1.363]</td>
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</tr>
<tr>
<td>Poverty (Income &lt; 2300)</td>
<td>0.551*** [0.438,0.694]</td>
<td>0.524*** [0.416,0.659]</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 7-4. Moderating Test of Gender and Marital Status

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<td>OR (CI)</td>
<td>OR (CI)</td>
<td>OR (CI)</td>
</tr>
<tr>
<td>Childlessness</td>
<td>0.369** [0.198, 0.691]</td>
<td>0.370*** [0.211, 0.648]</td>
<td>0.391** [0.199, 0.767]</td>
</tr>
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</tr>
<tr>
<td>Female Gender</td>
<td>0.849 [0.661, 1.091]</td>
<td>0.843 [0.661, 1.075]</td>
<td>0.852 [0.664, 1.095]</td>
</tr>
<tr>
<td>Currently Married</td>
<td>1.421** [1.127, 1.792]</td>
<td>1.438** [1.137, 1.819]</td>
<td>1.443** [1.141, 1.826]</td>
</tr>
<tr>
<td><strong>Interaction terms</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Childlessness*Female Gender</td>
<td>0.724 [0.232, 2.257]</td>
<td></td>
<td>0.801 [0.291, 2.205]</td>
</tr>
<tr>
<td>Childlessness*Currently Married</td>
<td>0.559 [0.146, 2.132]</td>
<td>0.595 [0.173, 2.048]</td>
<td></td>
</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>0.584*** [0.485, 0.705]</td>
<td>0.582*** [0.484, 0.700]</td>
<td>0.586*** [0.486, 0.706]</td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.439*** [0.287, 0.673]</td>
<td>0.438*** [0.286, 0.671]</td>
<td>0.438*** [0.286, 0.671]</td>
</tr>
<tr>
<td>Rural Residence</td>
<td>0.759* [0.583, 0.987]</td>
<td>0.753* [0.579, 0.980]</td>
<td>0.754* [0.580, 0.982]</td>
</tr>
<tr>
<td>Education</td>
<td>1.384* [1.068, 1.795]</td>
<td>1.382* [1.067, 1.790]</td>
<td>1.385* [1.069, 1.795]</td>
</tr>
<tr>
<td>Agricultural Occupation</td>
<td>1.015 [0.752, 1.370]</td>
<td>1.021 [0.757, 1.378]</td>
<td>1.020 [0.756, 1.377]</td>
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<tr>
<td>Poverty (Income &lt; 2300)</td>
<td>0.526*** [0.418, 0.662]</td>
<td>0.526*** [0.418, 0.662]</td>
<td>0.526*** [0.418, 0.662]</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 7-5. Moderating Test of Disability Status

<table>
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<tr>
<th>Variables</th>
<th>Model 1 (OR)</th>
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<th>Model 3 (OR)</th>
<th>Model 4 (OR)</th>
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<tr>
<td>Childlessness</td>
<td>0.319***</td>
<td>0.291***</td>
<td>0.297***</td>
<td>0.283***</td>
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<tr>
<td>ADL Disabilities</td>
<td>0.231***</td>
<td>0.122***</td>
<td></td>
<td>0.228***</td>
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<tr>
<td>Cognitive Impairments (CI)</td>
<td>0.203***</td>
<td></td>
<td>0.158***</td>
<td>0.200***</td>
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<tr>
<td><strong>Interaction term</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Childlessness* ADL Disabilities</td>
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<td></td>
<td>3.198</td>
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<tr>
<td>Childlessness*CI</td>
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<td>1.319</td>
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<tr>
<td>Female Gender</td>
<td>0.860</td>
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<td>Oldest-old (85+ yrs.)</td>
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<td>0.731**</td>
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<td>Han Ethnicity</td>
<td>0.479**</td>
<td>0.457***</td>
<td>0.461***</td>
<td>0.481**</td>
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<tr>
<td>Currently Married</td>
<td>1.238</td>
<td>1.366*</td>
<td>1.236</td>
<td>1.233</td>
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<tr>
<td>Rural Residence</td>
<td>0.769</td>
<td>0.723*</td>
<td>0.807</td>
<td>0.773</td>
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<td>Education</td>
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<td>1.314*</td>
<td>1.079</td>
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<td>Agricultural Occupation</td>
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<td>0.982</td>
<td>1.025</td>
<td>1.001</td>
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<td>0.525***</td>
<td>0.505***</td>
<td>0.542***</td>
<td>0.523***</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 7-6. Moderating Test of Access to Public Services

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<th>Variables</th>
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<th>Model 2 (OR)</th>
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<th>Model 4 (OR)</th>
<th>Model 5 (OR)</th>
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<tbody>
<tr>
<td>Childlessness</td>
<td>0.439***</td>
<td>0.438†</td>
<td>0.422†</td>
<td>0.233***</td>
<td>0.351†</td>
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<td><strong>Main terms</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Safenet Services (SS)</td>
<td>1.200</td>
<td>1.501**</td>
<td></td>
<td>1.213</td>
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</tr>
<tr>
<td>Medical Services (MS)</td>
<td>5.343***</td>
<td>5.404***</td>
<td></td>
<td>5.267***</td>
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</tr>
<tr>
<td>Community-based Support Services (CBSS)</td>
<td>1.760***</td>
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<td>1.609***</td>
<td></td>
<td>1.652***</td>
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<td><strong>Interaction term</strong></td>
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</tr>
<tr>
<td>Childlessness* SS</td>
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<td>0.683</td>
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<td>0.876</td>
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<td>Childlessness*MS</td>
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<td>1.201</td>
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<td>1.093</td>
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<tr>
<td>Childlessness*CBSS</td>
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<td>3.961*</td>
<td></td>
<td>3.430†</td>
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<td>0.833</td>
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<tr>
<td>Oldest-old (85+ yrs.)</td>
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<td>0.584***</td>
<td>0.546***</td>
<td>0.583***</td>
<td>0.556***</td>
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<td>Han Ethnicity</td>
<td>0.501**</td>
<td>0.472***</td>
<td>0.466***</td>
<td>0.463***</td>
<td>0.508**</td>
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<td>1.379**</td>
<td>1.287*</td>
<td>1.395**</td>
<td>1.264†</td>
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<td>0.895</td>
<td>0.749*</td>
<td>0.87</td>
<td>0.794†</td>
<td>0.904</td>
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<td>Education</td>
<td>1.356*</td>
<td>1.332*</td>
<td>1.374*</td>
<td>1.387*</td>
<td>1.366*</td>
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<td>Agricultural Occupation</td>
<td>1.053</td>
<td>1.046</td>
<td>1.02</td>
<td>1.039</td>
<td>1.056</td>
</tr>
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<td>Poverty (Income &lt; 2300)</td>
<td>0.618***</td>
<td>0.529***</td>
<td>0.603***</td>
<td>0.536***</td>
<td>0.614***</td>
</tr>
</tbody>
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† p<.1, * p<.05, ** p<.01, *** p<.001
## Table 7-7. Moderating Test

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<th>Characteristics</th>
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<th>Model 2 (with interactions)</th>
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<td>(CI)</td>
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<td></td>
</tr>
<tr>
<td>Childlessness</td>
<td>0.412**</td>
<td>[0.237,0.717]</td>
</tr>
<tr>
<td>Female</td>
<td>0.869</td>
<td>[0.661,1.143]</td>
</tr>
<tr>
<td>Currently Married</td>
<td>1.128</td>
<td>[0.873,1.459]</td>
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<tr>
<td>ADL Disabilities</td>
<td>0.221***</td>
<td>[0.150,0.324]</td>
</tr>
<tr>
<td>Cognitive Impairments (CI)</td>
<td>0.211***</td>
<td>[0.161,0.276]</td>
</tr>
<tr>
<td>Safenet Services (SS)</td>
<td>1.283</td>
<td>[0.974,1.690]</td>
</tr>
<tr>
<td>Medical Services (MS)</td>
<td>5.298***</td>
<td>[3.770,7.445]</td>
</tr>
<tr>
<td>Community-based Support Services (CBSS)</td>
<td>1.623**</td>
<td>[1.204,2.187]</td>
</tr>
<tr>
<td><strong>Interaction terms</strong></td>
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</tr>
<tr>
<td>Childlessness*Female</td>
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<td>1.012</td>
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<td>Childlessness*Currently Married</td>
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<td>0.691</td>
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<td>Childlessness*ADL Disabilities</td>
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<td>Childlessness*CI</td>
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<td>0.824</td>
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<tr>
<td>Childlessness*SS</td>
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<td>0.612</td>
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<tr>
<td>Childlessness*MS</td>
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<td>1.348</td>
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<tr>
<td>Childlessness*CBSS</td>
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<td>4.142*</td>
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<td><strong>Covariates</strong></td>
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<td>Oldest-old (85+ yrs.)</td>
<td>1.061</td>
<td>[0.854,1.318]</td>
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<td>Category</td>
<td>Estimate</td>
<td>CI</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.537**</td>
<td>[0.340,0.850]</td>
</tr>
<tr>
<td>Rural Residence</td>
<td>0.909</td>
<td>[0.685,1.206]</td>
</tr>
<tr>
<td>Education</td>
<td>1.061</td>
<td>[0.791,1.423]</td>
</tr>
<tr>
<td>Agricultural Occupation</td>
<td>1.033</td>
<td>[0.753,1.417]</td>
</tr>
<tr>
<td>Poverty (Income &lt; 2300)</td>
<td>0.609***</td>
<td>[0.472,0.787]</td>
</tr>
</tbody>
</table>

† p<.1, * p<.05, ** p<.01, *** p<.001
Table 7-8. *Multiple Regression with All Potential Mediators*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1 (OR)</th>
<th>Model 2 (OR)</th>
<th>Model 3 (OR)</th>
<th>Model 4 (OR)</th>
<th>Model 5 (OR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Childlessness</td>
<td>0.335***</td>
<td>0.445**</td>
<td>0.359***</td>
<td>0.326***</td>
<td>0.459**</td>
</tr>
<tr>
<td><strong>Potential Mediators</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social support</td>
<td>3.484***</td>
<td></td>
<td></td>
<td></td>
<td>3.172***</td>
</tr>
<tr>
<td>Social&amp;Leisure Activities</td>
<td>2.883***</td>
<td>3.172***</td>
<td></td>
<td></td>
<td>2.629***</td>
</tr>
<tr>
<td>Health Behaviors</td>
<td>1.292***</td>
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<td></td>
<td></td>
<td>1.238***</td>
</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Gender</td>
<td>0.834</td>
<td>0.800</td>
<td>0.819</td>
<td>0.642**</td>
<td>0.635**</td>
</tr>
<tr>
<td>Oldest-old (85+ yrs.)</td>
<td>0.578***</td>
<td>0.564***</td>
<td>0.735**</td>
<td>0.576***</td>
<td>0.706**</td>
</tr>
<tr>
<td>Han Ethnicity</td>
<td>0.439***</td>
<td>0.473***</td>
<td>0.446***</td>
<td>0.439***</td>
<td>0.472***</td>
</tr>
<tr>
<td>Married and living with spouse</td>
<td>1.409***</td>
<td>1.178</td>
<td>1.269</td>
<td>1.363**</td>
<td>1.048</td>
</tr>
<tr>
<td>Rural Residence</td>
<td>0.763*</td>
<td>0.782*</td>
<td>0.814</td>
<td>0.854</td>
<td>0.908</td>
</tr>
<tr>
<td>Education</td>
<td>1.376***</td>
<td>1.412**</td>
<td>1.209</td>
<td>1.302*</td>
<td>1.189</td>
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<tr>
<td>Poverty (Income &lt; 2300) (yes vs. no)</td>
<td>0.528***</td>
<td>0.534***</td>
<td>0.554***</td>
<td>0.557***</td>
<td>0.582***</td>
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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 7-9. *Mediation Test (Standardized Coefficients*)

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<tr>
<th>Dependent variables</th>
<th>Predicting Variables</th>
<th>Direct Effects&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Indirect Effects&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Total Effects&lt;sup&gt;a&lt;/sup&gt;</th>
<th>%Mediated</th>
<th>95% CI (Indirect)</th>
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<td><strong>Test without Weights</strong></td>
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<tr>
<td>Other Mediators Not Controlled</td>
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</tr>
<tr>
<td>Quality of life</td>
<td>Social Support</td>
<td>-0.036***</td>
<td>-0.018***</td>
<td>-0.054***</td>
<td>33%</td>
<td>(-0.023, -0.013)</td>
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<tr>
<td>Social Support</td>
<td>Social&amp;Leisure Activities</td>
<td>-0.041***</td>
<td>-0.013***</td>
<td>-0.054***</td>
<td>24.9%</td>
<td>(-0.019, -0.008)</td>
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<td>Health Behaviors</td>
<td>-0.050***</td>
<td>-0.001*</td>
<td>-0.051***</td>
<td>2.9%</td>
<td>(-0.003, -0.000)</td>
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<td>Social Support</td>
<td>Childlessness</td>
<td>-0.087***</td>
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<td>-0.087***</td>
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<tr>
<td>Social&amp;Leisure Activities</td>
<td>Childlessness</td>
<td>-0.048***</td>
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<td>-0.048***</td>
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<td>Childlessness</td>
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<td><strong>Other Mediators Controlled</strong> (Multiple Mediation Analysis)</td>
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<td>Quality of life</td>
<td>Social Support</td>
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<td>(-0.036, -0.021)</td>
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<td>Social&amp;Leisure Activities</td>
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<td>Health Behaviors</td>
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<td><strong>Test with Weights</strong></td>
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<tr>
<td>Quality of life</td>
<td>Social Support</td>
<td>-0.082***</td>
<td>-0.024***</td>
<td>-0.106***</td>
<td>22.6%</td>
<td>(-0.049, -0.008)</td>
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<td>Social&amp;Leisure Activities</td>
<td>-0.107***</td>
<td>-0.010***</td>
<td>-0.117***</td>
<td>9%</td>
<td>(-0.024, -0.001)</td>
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<td>(-0.008, 0.007)</td>
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<td>Childlessness</td>
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<td>-0.106***</td>
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<sup>†</sup> p<.1, <sup>*</sup> p<.05, <sup>**</sup> p<.01, <sup>***</sup> p<.001
Table 7-10. *Full Model on Childless and Quality of Life*

<table>
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<tr>
<th>Variables</th>
<th>Model 1 (OR)</th>
<th>Model 2 (OR)</th>
<th>Model 3 (OR)</th>
<th>Model 4 (OR)</th>
<th>Model 5 (OR)</th>
<th>Model 6 (OR)</th>
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<tr>
<td><strong>Childlessness</strong></td>
<td>0.279***</td>
<td>0.335***</td>
<td>0.462***</td>
<td>0.566*</td>
<td>0.381**</td>
<td>0.617</td>
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<tr>
<td>Female Gender</td>
<td>0.738**</td>
<td>0.834</td>
<td>0.632**</td>
<td>0.697*</td>
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### Health Conditions

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### Interaction terms

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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 7-11. Full Model on Types of Childlessness, Parent-Children Contacts and Quality of Life

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<th>Variables</th>
<th>Model 1 (OR)</th>
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**Public Services Access**

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**Health Conditions**

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† p<.1, * p<.05, ** p<.01, *** p<.001
Table 7-12. Full Model on Gender of Children and Quality of Life

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<td>Both Son and Daughter</td>
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**Public Services Access**

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**Health Conditions**

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† p<.1, * p<.05, ** p<.01, *** p<.001
Appendix:

Figure 1. Research Diagram (a).

Covariates:

Demographics (age, gender, race, marital status)

Socioeconomic status (SES)
(education, rural/urban residence, occupation type, poverty)

IV:

Childlessness: Whether respondents had at least one child alive or not

Children Conditions:
  a. Nonparental status;
  b. No surviving children;
  c. Have no regular contacts with children;
  d. Have regular contacts with children;

Gender of Children Alive:
  a. Have living sons only;
  b. Have living daughters only;
  c. Have both living sons and daughters

DV:

Psychological Well-being (PW)

Self-rated Health (SRH)

Quality of Life (QoL)
Figure 2. Research Diagram (b).

Moderating Variables:
- Gender
- Marital Status
- Disabilities:
  - Physical: ADL Disabilities
  - Mental: Cognitive impairments
- Public Services:
  - Access to social security services
  - Adequate medical services
  - Availability of community-based support services

IV:
- **Childlessness**: having no child vs. having at least one child alive

DV:
- Psychological Well-being (PW)
- Self-rated Health (SRH)
- Quality of Life (QoL)
Figure 3. Research Diagram (c).

IV:

**Childlessness:** having no child vs. having at least one child alive

Mediating Variables:
- Social Support
- Participation in Social and Leisure Activities
- Health Behaviors

DV:
- Psychological Well-being (PW)
- Self-rated Health (SRH)
- Quality of Life (QoL)
Figure 4. Social Support Network for Older Adults with Different Children Conditions.
BIBLIOGRAPHY


