SOCIAL CAPITAL AND HEALTH IN EAST ASIA AND CHINA:

A CONCEPTUAL AND EMPIRICAL ANALYSIS

by

Wenjin Wang

A dissertation submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Sociology

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TABLE OF CONTENTS

LIST OF TABLES

ABSTRACT

Roughly defined as social networks and embedded resources, social capital and its influence on various health outcomes have been well examined over the past three decades. Higher levels of social capital are usually believed to be correlated with better physical and psychological health outcomes. However, two dimensions of social capital – "time" and "context" – are often overlooked in empirical research. First, both social capital and health are cumulative concepts, therefore the interaction between the two should be treated as a longitudinal process rather than a "point." Second, social capital is context-specific, social capital theory and measurements based on empirical data collected in Western, developed societies may not be able to fully capture the patterns of social relations that are unique to non-Western societies such as East Asian societies, hence fail to provide an accurate understanding of the link between social capital and health in those societies.

Using the 2012 East Asian Social Survey data (EASS2012) and the 2010-2018 China Family Panel Survey data (CFPS2010-2018), this dissertation examines social capital's structure in East Asian societies, its correlation with East Asian people's self-rated health, and the longitudinal and accumulative effects of social capital elements on Chinese adults' self-rated health, depression level, and chronic disease condition. Results of the Exploratory Factor Analysis models reveal a 7-factor East Asian social

capital structure that represents the structures of social capital in each of the societies. Two main factors – intimate trust and strong emphasis on network heterogeneity – are the major predictors of East Asian people's self-rated health. Multi-level analyses of the Chinese longitudinal data suggest that social capital elements have longitudinal and accumulative impacts on Chinese adults' health outcomes. Social support, strong social ties, and perceived importance of social network demonstrate longitudinal influence on Chinese people's health outcomes, while civil participation and social trust both show cumulative impacts on Chinese people's health in later life. Unlike suggested by previous research, social capital measurements about neighborhood and community involvement only play a minor role in determining East Asian and Chinese people's health conditions.

The study provides directions for future studies and policy making. First, future researchers may want to pay more attention to the longitudinal and cumulative effects of social capital on health outcomes; on the other hand, a more refined social capital theory and measurements with both commonly applicable core elements and context-specific elements is urgently needed. Finally, it would be beneficial for medical practitioners to collaborate with researchers and policy makers to design contextual intervention strategies that focus on promoting the accumulation and mobilization of social capital, which will eventually facilitate the improvement of population health.

Chapter 1

INTRODUCTION

Roughly defined as social networks and embedded resources, social capital and its influence on various health outcomes have been thoroughly studied over the past three decades. Despite the fruitful research conducted by researchers around the world, two major issues have been largely overlooked. First, the concept, theory, and measurements of social capital are developed in Western, developed societies and thus reflect their particular historical and sociocultural backgrounds. Many of the previous studies applied the theory and measurements directly to non-Western, underdeveloped societies, which neglected the unique cultural and structural contexts in those areas. Second, both social capital and health require time to develop and hence should be understood as "processes" instead of "points." Treating them as transient fails to capture the accumulative potential of social capital and its long-term impact on health outcomes. Without addressing the above-mentioned issues, it would be hard for researchers to justify the generalizability of social capital as a theory; the validity of policies employing social capital as part of the health intervention strategy will also be impaired.

Non-Western societies like China, Japan, and South Korea are different from America and other Western societies not only by their levels of development but also

by their social structures and cultural traditions. Deeply influenced by Confucianism for over a thousand years, East Asian societies have developed social relations that emphasize relatively informal, narrow and inward-oriented ties, which reflect unique compositions and mechanisms of social capital in these societies. By examining the structure of social capital as well as its influence on health outcomes in East Asian societies using cross-national, longitudinal datasets and quantitative analytic strategies, I hope to shed some new light on understanding the interaction between social capital and health from contextual and longitudinal perspectives.

After reviewing the previous social capital theories, this dissertation then explores the structures of social capital in East Asian societies, including Mainland China, Taiwan, Japan, and South Korea. These societies are selected for both theoretical and practical reasons. On the one hand, East Asian societies – Mainland China, Taiwan, Japan and South Korea – share a cultural tradition that is influenced by Confucianism, which affects the unique social relations in these societies and differentiates them from other developed, non-Eastern societies. Adding this piece to the puzzle can expand the scope and provide nuance to social capital theory, and eventually contribute to the generalizability of the theory. On the other hand, contemporary Chinese society is characterized by a significant percentage of single-child families, a rapidly increasing elderly population, and a growing number of migrant workers in labor force. The different living conditions of these populations may alter the mechanisms linking social capital to health outcomes, which further

complicates the connection between social capital and health and requires a fuller examination. Knowledge of the longitudinal interaction between social capital and health in China can be used in the policy making process to supplement the existing welfare system and to better serve vulnerable groups such as elderly people and migrants.

The 2012 East Asian Social Survey (EASS2012) data, a general-social-survey-style dataset with nationally representative samples from the four East Asian societies mentioned above, is selected for this analysis; exploratory factor analysis will be performed to delineate the structures. Although a review of the existing literature has confirmed the positive links between high levels of individual and collective social capital and health outcomes in East Asia, the concept "social capital" in these societies may consist of key elements and structures different from those in Western societies. After identifying the elements that comprise East Asian societies' social capital structures, these elements will be used to estimate self-rated health in East Asia to reveal the most salient social capital predictors as well as the similarities and differences between the East Asian model and the classic Western model.

Guided by this unique East Asian structure of social capital, the second part of my analysis centers on the long-term impact of social capital on psychological and physical health of Chinese residents. Evidence on the potential influence of childhood social capital on health in later life has been reported by previous researchers (e.g. Ferraro, Schafer, & Wilkinson, 2016), but whether this long-term effect remains

significant throughout adulthood has yet been fully examined. Using data from China Family Panel Survey (CFPS2010-2018), a longitudinal and nationally representative survey conducted in China, I test the hypothesis that, after controlling for the initial health condition and other demographic and socioeconomic factors, social capital in earlier life can still predict health outcomes in later life among Chinese adults. In addition, the interplay between social capital elements and health outcomes over time, i.e., the accumulation of social capital over time and its impact on change in health status, is also analyzed. All the analyses are performed on individual and collective levels using multilevel regression models. This is not only a strategy recommended by previous scholars (e.g. Kawashi, Subramanian, & Kim, 2008), but also a method for a more comprehensive empirical study of social capital's environmental effects, a crucial part of the social capital theory that has been fully discussed in Western, developed societies but lacks valid evidence from non-Western contexts.

All the analytic results are discussed in comparison with previous research conducted in both Western and non-Western societies; elements shared by both cultures can then be used for the construction of a more condensed social capital theory that is applicable to broader contexts. In other words, although some scholars suggested downplaying the role of specific relations in theory construction, by including new information gathered from the previously ignored East Asian societies, this research can provide further empirical evidence in support of a more refined social capital theory, and eventually contributes to the theory's generalizability and

contextuality while reducing its ambiguity. Examining the interaction between social capital and health from a longitudinal perspective can also advance the academic knowledge on social capital as a mechanism linking fundamental causes of diseases like gender and socioeconomic status to various health outcomes, thus provides a solid theoretical basis for the design and implementation of long-term social capital intervention policies, in which organizations and activities that facilitate social cohesion, mutual trust and other elements of social capital are used as effective mediums of promoting population health.

In the following chapters, I will first examine the conceptual development of social capital in sociology and summarize several of the most influential theoretical traditions; a synthesis of the studies on social capital in public health discipline based on different approaches of social capital will also be provided (Chapter 2 and 3). I will then delve into research on the interaction between social capital and health outcomes in China and other East Asian societies, with a special focus on the influence of their unique developmental trajectories and cultural traditions (Chapter 4). Next, a description of the data, analytical strategies and results will be presented (Chapter 5). Detailed discussion of the findings will be included in Chapter 6, while theoretical and practical suggestions for future research and limitations of the current research are discussed in the final chapter (Chapter 7).

Chapter 2

SOCIAL CAPITAL: TRADITION AND DEVELOPMENT

The concept and theory of "social capital" have received widespread attention over recent decades and have been applied to a variety of disciplines and contexts. In 19th century, Karl Marx (1902; 1906; 1973) proposed a classical theory of capital which conceptualizes capital as context-based surplus value rooted in economic power relations. While the original Marxian theory deals mainly with the means of production in capitalist society, certain qualities of capital, including its potential to be accumulated and invested for profit and its high dependency on social environment, capital have been adopted and developed by social scientist who are interested in not only money but also other forms of resources in the society.

Pierre Bourdieu extends the Marxian concept of capital to incorporate various forms of accumulated social resources, with social capital being one major type. According to Bourdieu (1986), social capital is produced, maintained and reproduced through connections with different people, usually via memberships in formal and informal social organizations. He also highlights the convertibility between social capital and other forms of capital, suggesting that by mobilizing social networks, individuals can gain access to economic and cultural capital that are not available in their immediate networks.

In addition to Marx and Bourdieu, many other scholars have made influential contributions to the theory of social capital. James Coleman, for example, provides a functionalist definition of social capital that emphasizes on how it is utilized. Like Bourdieu, Coleman (1990) believes that social capital needs to be understood within given social backgrounds; he also claims that social capital should be considered as public property, since it benefits not only one individual but also the group which belongs to the same social structure (Coleman, 1988). Following this direction, Robert Putnam (2000) further elaborates the public aspect of social capital by arguing that higher levels of social capital are connected with the prosperity of community and/or neighborhood, pointing out that network-based norms of reciprocity and trustworthiness are two key features characterizing social capital on individual as well as collective levels. Therefore, civic participation, which can enhance norms of reciprocity and facilitate mutual trust, is considered as crucial to the healthy development of a society.

Along with the theoretical development, various ways of measuring social capital have been proved to be effective, among which Nan Lin's operationalization of social capital on individual level is of particular importance. Although Lin acknowledges the public side of social capital, he concentrates more on understanding social capital on the individual level (1999, 2002). He differentiates social relations from the actual resources that can be mobilized through one's social network; he also claims that both the resources and the networks are determined by the broader social structure. In addition to introducing a set of individual level measurements of social

capital, Lin, like his precursors, connects social capital to a series of social outcomes, identifying social capital as one of the major contributors to social inequalities.

Among all the social inequalities that are correlated with social capital, health occupies an important position. After Durkheim published his famous work on the sociological interpretation of suicide rates (Durkheim, 1897), increasing attention has been paid to social relationships by scholars interested in the social foundation of disease and health. Multiple components of social capital proposed by previous researchers, including but not limited to trust, cohesion, and support, have been claimed to have mostly strong and beneficial effects on individual's health (e.g. Ehsan, Klaas, Bastianen, & Spini, 2019). Based on conceptualizations of social capital deriving from theories articulated by Bourdieu, Coleman, Putnam and Lin, positive correlations between a high level of social capital and better health outcomes have been discovered by researchers from societies all over the world – developed and underdeveloped, Western and Eastern. People who are more trusting, participate in more civic organizations, enjoy stronger support, and have broader networks are more likely to have better health than their counterparts; living in communities with higher levels of social cohesion, mutual trust, and various activities is also beneficial to individual health. However, recent studies are also beginning to become aware of the negative side of certain types of social capital, pointing out that close-knit intimate social relations can exert constraints on individuals by limiting their freedom and putting extra psychological and physical burdens on them, hence are detrimental to their health.

As a result of these lines of research, scholars and policymakers claim that investment in social capital is a prerequisite to the promotion of public health and the elimination of health inequality. However, studies of the connection between health and social capital are frequently criticized for their lack of a clear and consistent theoretical framework and their inaccurate measurements. Two major critiques regarding the usefulness and uniqueness of the theory and concept can be summarized from previous sociological and public health studies. First, despite the fact that multiple theorists have addressed social capital's potential for accumulation and self-reproduction over time, rarely do researchers take the longitudinal changes and impacts of social capital into consideration. Most of the existing literature lay emphasis on the "social" aspect of social capital and mainly examines the range and composition of social networks; neither the accumulation of social relations and resources nor the long-term impacts of social capital are sufficiently analyzed. This lack of attention to the long-term interaction between social capital and health is rooted in the lack of data: without high-quality longitudinal data with detailed measurements of both quantity and quality of social capital, it is essentially impossible for researchers to explore the evolution of social capital and its effects on health outcomes. Nevertheless, considering the significant findings reported by existing longitudinal studies (e.g. Ferraro, Schafer, & Wilkinson, 2016), social capital and health as processes – that is, processes of accumulation, evolution, and long-term interaction – deserve further examination.

Second, although the argument of social capital as context-specific is well-established, scholars still tend to use social capital measurements indiscriminately regardless of their social backgrounds, paying limited attention to the specific social and cultural contexts in which social capital theory and measurements are developed and applied. Social capital as a concept and theory is rooted in Western, developed societies and thus reflects their unique features, such as individualism (Choi & Han, 2011). It is very likely that very different elements are grouped under the umbrella of "social capital" in different cultures, and they exert impacts on health through very different pathways. Therefore, certain elements of social capital proved to be significantly and positively connected with health in one society may show no influence on health in another society, which does not necessarily mean that social capital itself is not related to health in that specific society. In fact, studies have already revealed that social capital can take on significantly different forms in non-Western, underdeveloped societies like East Asia (Bian & Ikeda, 2014; Chua & Wellman, 2015), which underlines the need for researchers to conceptualize and measure social capital contextually. Admittedly, including too much context can put the theory at risk of redundancy. Incorporating context-specific characteristics of a certain theory can distract scholars from the core, universally applicable theoretical framework, some may thus argue that doing so is exchanging generalizability for comprehension. However, by comparing the structures and elements of social capital in different social and cultural contexts, researchers are actually refining the theory by identifying those core components shared by societies with diverse social structures

and cultures. Analyzing the context-specific connections between social capital and health is thus theoretically as well as practically meaningful.

For a better understanding of social capital's impact on health in the long run as well as its special structure and elements in non-Western societies, the current research sought to study the connection between social capital and health in East Asia, with a focus on China. This research will first examine structures of social capital in East Asia societies and identify the key elements of social capital that contribute the most to East Asian people's health. Following the guide of this potential East Asian social capital structure, the effect of social capital on changes in health outcomes in later life and the interaction between social capital and health over time among Chinese people will be analyzed. The main hypotheses are as follows. First, the structure of social capital in East Asia, i.e.,the key elements that best represent social capital in East Asian context, is different from the general model derived from Western societies. Second, the major social capital contributors to subjective health in East Asia are different from those in Western societies. Third, social capital at an earlier stage of life can predict health outcomes in later life among Chinese people. Fourth, change in social capital over time can predict health outcomes among Chinese people.

In the following section, I will discuss the conceptual development of social capital theory. Classical works of the five scholars mentioned above, whose works have made major contributions to the development of social capital theory, will be reviewed. Discussions of their merits and defects will also be presented.

2.1 Marxian Theory of Capital

In his volume I of *Capital* and several other writings, Marx (1902; 1906; 1973) delineates a classical theory of capital and capitalist society. According to Marx, the modern history of capital started from the 16th century, when commerce and the extended markets became more prominent. The availability of free serfs as wage laborers, together with other socio-economic developments in the 15th and 16th century, contributed to the primary accumulation of capital.

In its early stage, capital took the form of money and was considered as the final product of circulation of commodities (Marx, 1906). In this circulation, wage laborers were paid in money in exchange for their labor power as a commodity. Their wages enabled them to purchase commodities to sustain their lives. The commodities produced by their labor power were sold by capitalists to gain the profit generated from surplus value. Through the continuous exchange among commodities and labor power, commodities generate capital through their production and reproduction. According to Marx (1902), capital is the totality of means of production; it is the accumulated labor power, which serves as a means of new production.

This Marxian theory of capital points to two major aspects of the concept. For one thing, capital is possessed and accumulated by certain classes – the bourgeoisie – through the exploitation of wage laborers. For another, capital in various forms is invested by capitalists on the market with the expectation of returns. Just like Marx's assertion that capital and wage labor are "two sides of one and the same relation" (Marx, 1902: 41), the existence of capital is a prerequisite of the existence of a

bourgeois production relation. This relation involves both a dominant class and a subordinate class, and the aim of the dominant capitalist class is profit-making through exploiting the working class for surplus value. Capital, as accumulated and reproduced surplus value, thus represents a group-based power and cannot be separated from given social conditions and relations.

Lin (1999) calls this capital theory proposed by Marx the "classical theory of capital" as it offers the basis for various theories on different forms and functions of capital. Although the direct connections among capital, social capital and health are not a focus of Marx's analysis, his writings provide theoretical foundations not only for subsequent scholars in social capital research, but also for researchers interested in health and medical sociology (Yuill, 2005; Scambler & Scambler, 2013). The Marxian definition of "capital" includes several important features that are of great use for the later development of socio-health theories. First, capital, in the form of monetary wealth or other types of goods, has the potential to be accumulated. In his discussion of the "Money-Commodity-Money and surplus value" circulation, Marx makes it clear that although both extremes have the same economic form (money), they are different quantitatively, and this quantitative difference – the accumulated capital – is the exact purpose of this circulation. In other words, money as well as other resources become capital only in their accumulated forms and through continuous accumulation and circulation; individuals are able to accumulate a significant amount of capital through appropriate investment and reproduction.

Secondly, capital is context-specific. In Marx's discussion, capital emerges from the capitalist system of commodity production and is based on the capitalist expropriation (Giddens, 1971). The circulation of commodities, which is a key feature of surplus value, happens in the consumption market and between conflicting groups. Capital is "a social relation of production" that is "produced and accumulated under given social conditions, within definite special relations." (Marx, 1902: 306) Hence, it should be noted that capital in Marxian theory is discussed in broader socioeconomic context and thus in multiple spheres. Although it is commonly argued that Marx limits the discussion of capital to the economic sphere, the concept actually denotes a set of social relations and their conditions and therefore should be understood from social, cultural and symbolic perspectives as well (Desan, 2013). Moreover, since capital is at the root of various social relations and characteristics (and vice versa), it is reasonable to conclude that capital in Marxian theory can be transformed into different forms of resources. Without understanding the social, cultural and symbolic aspects of capital, it would be impossible for the subsequent scholars to develop a full understanding of various forms of capital – including social capital – on the basis of classical capital theory.

2.2 Bourdieu: From Capital to Social Capital

Bourdieu was one of the first contemporary theorists to offer a systematic analysis of social capital (Portes, 1998). Although considered by some early scholars as Marxist (Lin, 1999; Swartz, 2012; Desan, 2013), Bourdieu's theory of capital is

essentially different from that of Marx, this is reflected in both his critique to Marxian reductionism and his own illustration of the different forms of capital (Bourdieu, 1986; Beasley-Murray, 2000). He considers the Marxian definition of social space as "substantialist, economistic, objectivist" (Bourdieu, 1985) and alternatively offers a multi-dimensional definition of social space (Bourdieu, 1987).

Despite his disagreement with Marxian economism, Bourdieu develops his definition of capital largely from Marx (Beasley-Murray, 2000). According to Bourdieu, capital is accumulated labor in either materialized or embodied forms that enables individuals to appropriate "social energy in the form of reified or living labor." (Bourdieu, 1986: 241) With this definition, Bourdieu describes capital's capability to be accumulated over time, and characterized by the potentiality to produce profit as well as to reproduce itself. He further explains that capital refers to useful resources and powers; its reproduction and mobilization are limited by the laws of specific fields (Bourdieu, 1984).

Unlike Marx who emphasizes the relationship of exploitation of labor concealed by capitalism, Bourdieu focuses more on the different types of capital, arguing that it is the distribution of these forms of capital that represents the structure of the social world and the group conflicts derived from the given structure (Bourdieu, 1985, 1986; Lin, 1999). Classes are defined as "primary differences …derive[d] from the overall volume of capital, understood as the set of actually usable resources and powers." (Bourdieu, 1984: 114) Using cultural capital as an example, Bourdieu further points out that it is one's membership in certain classes that determines whether

particular habitus – the physical embodiment of cultural capital – counts as capital. The set of competencies specific to the dominant class are "misrecognized" as objective resources; these resources – cultural and other forms of capital – are thus themselves misrecognized class power (Bourdieu, 1984; Desan, 2013). Through misrecognition, the distinctions between the dominant and the subordinate classes become separated from material interests and are legitimized (Swartz, 2012), which further conceals the individual and group difference in power originating in their possession (or the lack thereof) of capital. In order to change one's social position, Bourdieu believes that the investment and conversion of capital are necessary (Bourdieu, 1984; Swartz, 2012) and instrumental.

Based on this general definition of capital and its misrecognition, Bourdieu moves on to his analysis of different forms of capital in economic, cultural and social fields. The proposition of different forms of capital broadens Marx's range of the types of labor that constitute power resources (Swartz, 2012). In Bourdieu's theory, social capital is composed of "connections" in institutionalized groups that provide members with credentials as well as access to aggregated resources (Bourdieu, 1986). In these groups, members maintain and reproduce social capital through endless exchanges as a type of investment. At the individual level, the volume of social capital possessed by agents can be measured by the size of the network and the volume of resources that can be mobilized through one's network (Bourdieu, 1986). Social relations are "instrumentalized" through people's investment and exchange. Instead of being ends themselves, social relations are treated as "means" when being considered

as “resources” that are convertible into other forms of capital (Daly & Silver, 2008); they are no longer a “natural given” but require maintenance through “investment strategies.” (Bourdieu, 1986: 247) Therefore, it is possible that possessing, or being competent to possess, certain type and amount of social capital is a competency specific to the dominant class but misrecognized as an objective resource, a symbolic capital that conceals the power dynamic between social groups.

Bourdieu’s version of social capital articulates the convertibility between different forms of capital. Social capital can be converted into economic and cultural capital under certain conditions and vice versa. Through interpersonal networks, individuals can gain access to economic and cultural resources that are otherwise unavailable to them. Possessing a large volume of economic resources is also associated with extended social networks. The convertibility of social capital bridges the gap between social network and other types of resources, making the concept applicable to various areas including the study of health outcomes (Savage, Warde, & Devine, 2005).

Several key features can be summarized from the Bourdieusian concept of social capital. First, social capital can be decomposed into two basic, measurable elements: social relationships and the amount and quality of resources that can be acquired through one’s social network (Portes, 1998). Secondly, like economic and cultural capital, social capital can also be accumulated, and its accumulation requires “endless effort… in order to produce and reproduce lasting, useful relationships that can secure material or symbolic profits.” (Bourdieu, 1986: 247) Thirdly, the

convertibility between social capital and other forms of capital is the foundation of the strategies used for capital reproduction and maintaining social position, and thus is at the root of the accumulation of capital. Lastly, capital's (and social capital's) value is determined by its "usefulness" in "the field in which it is produced and reproduced" and is limited by the specific laws regulating the field (Bourdieu, 1984: 113; Desan, 2013).

Bourdieu's theory of social capital has been criticized for its lack of clear theoretical definition and ambiguity between different levels of measurement (Beasley-Murray, 2000; Desan, 2013). Although he briefly discusses the accrued social capital at group level and connects it with group boundary, solidarity, power dynamics and conflicts (Bourdieu, 1985, 1986; Siisiainen, 2003), he fails to clearly define social capital in its collective form. Also, since Bourdieu believes that economic capital is the foundation of different forms of capital, his analysis focuses more on the convertibility between economic and other types of capital while paying limited attention to the exchange between social capital and other resources (Swartz, 2012). Lastly, though capital is generally considered as objective, power-conferring resources (Desan, 2013), Bourdieu does not provide a satisfying discussion on the power dynamic associated with unequal distribution of social capital.

Nevertheless, this instrumental definition of social capital (Portes, 2000) makes it relatively easy to be operationalized for empirical studies. Bourdieu's focus on contextual capital also contributes to the popularity of this concept in various disciplines where it can interact with field-specific structures and laws. These

advantages, together with the convertibility of social capital and the important role of structure in shaping social behaviors, transform capital from a purely economic concept as used by some Marxist political economists to a social characteristic that can be used in multi-level research. Although Bourdieu himself does not write directly on health or medical issues, his writings about lifestyle and habitus definitely include a health aspect, and the combination of capital, field and lifestyle offers a good theoretical model for health-related research (Cockerham, 2013). His theory makes the concept one of the most circulated sociological ideas over the past few decades while leading to several crucial theoretical advancements.

2.3 Coleman: Social Capital as a Collective Feature

Coleman's social capital theory is one of the most influential modifications of Bourdieu's theory. With his attempt to import the economic principle of rational action into sociological study of social systems and organizations, Coleman's theory combines Loury's economic definition with Bourdieusian theory of social capital while revealing a new aspect of the concept (Coleman, 1990).

For Coleman, social capital is defined by its functions. Social capital is created when "the relations among persons change in ways that facilitate action." (Coleman, 1990: 304) It is not a single entity but "a variety of different entities" that share two common features: on the one hand, they all incorporate certain aspects of social structure; on the other hand, for individuals within the structure, these entities facilitate their certain actions (Coleman, 1990). Social capital in Coleman's

understanding is productive as well as instrumental; actors utilize it to achieve certain ends that are otherwise unavailable. Coleman believes that social capital is activity-and-context-specific; certain forms of social capital that are valuable for some actors in a given context might be useless or even harmful to others (Coleman, 1990). Like Bourdieu, he also argues that social capital lodges in the structure of the relations among agents instead of in the agents themselves. Due to this feature, social capital exhibits characteristics of a public-good: that is, in a certain structure, social capital benefits not only the actors who invest in it but all actors who are part of the structure (Coleman, 1988, 1990). Coleman therefore argues that social capital "is not the private property of any of the persons who benefit from it." (Coleman, 1990: 315) This public-good aspect is also a chief feature that distinguishes it from other forms of capital that are private, divisible and alienable (Coleman, 1988, 1990).

Coleman's understanding of social capital follows a functionalist view and a Durkheimian tradition (Lin, 1999; Tzanakis, 2013) that emphasizes norm, control and solidarity (Portes, 2000). Coleman's theory based largely on dense social network or, in his own words, the "closure" of social relations. For Coleman, the closure of social network can cultivate "a set of effective sanctions that can monitor and guide behavior" and "the trustworthiness of social structures that allows the proliferation of obligations and expectations" (Coleman, 1988: 107) – some major aspects of "public goods." He also adopts a standpoint similar to Bourdieu, claiming that social capital is a bonding mechanism that contributes to the integration of group as well as social structure (Coleman, 1990).

Although social capital is demonstrated to have a positive influence on high school students' academic achievement (Coleman, 1988), the theory itself is criticized for its circular and tautological nature since social capital is interpreted as both cause and effect (Tzanakis, 2013). Furthermore, Coleman argues that individual social capital can transition into a collective form just like other types of capital (Coleman, 1988), but the mechanism of transition has never been clearly explained. Another major criticism is that Coleman fails to explain the difference between social networks and the agents' ability to acquire resources via the network. His emphasis on the closure of social relation and social structure is also rejected by other researchers arguing that dense social networks might sometimes be problematic (Portes, 1998; Lin, 1999; Adler & Kwon, 2002).

Despite criticisms, Coleman's social capital theory attracted wide attention in American sociology (Portes, 1998). Coleman's effort in illustrating social capital's transition from the individual to collective level makes its "public good" aspect visible to both scholars and policymakers, contributing to further research on group and regional development (Woolcock & Narayan, 2000). The social capital generating mechanisms identified by Coleman also provide new directions for subsequent researchers. For example, social capital's potential for spreading information is later examined by scholars interested in working relations as a key method of acquiring resources (Burt, 1997); social capital's ability to create human capital also attracts a significant amount of attention. Although Coleman has not explicitly explained the relation between social capital and health, two features of social capital in his

definition – activity-and-context-specific and the accumulation ability through use – are crucial to the understanding of health-related issues and thus have the potentiality to be employed in this body of literature.

2.4 Putnam: Social Capital Elevated

Putnam is one of the most well-known successors of Coleman's idea of social capital as a collective resource. Putnam first examines the preconditions for governmental reforms and imbalanced institution and community development in Italy (Putnam, 1993) and then analyzes the decline of civic community in American society (Putnam, 2000). Through these studies, Putnam extends Coleman's definition of collective social capital from community and small group to include a broader range of social organizations, cities and even nations (Tzanakis, 2013).

Part of Putnam's social capital theory can be summarized with his simple statement: "Social networks have value." (Putnam, 2000: 19) To be more accurate, social capital for him is "features of social organizations, such as networks, norms, and trust, that facilitate action and cooperation for mutual benefit." (Putnam, 1993: 35) These features are later summarized by Putnam himself as norms of reciprocity and trustworthiness developed through social networks (Putnam, Leonardi, & Nanetti, 1993; Putnam, 2001). Using this definition, Putnam discusses the structural effects of "stock of social capital" possessed by communities, cities and nations in their development, arguing that prosperous communities are characterized by rich stocks of social capital. "Working together is easier in a community blessed with a substantial

stock of social capital." (Putnam, 1993; Portes, 2000) Moreover, stocks of social capital tend to be self-reinforcing and cumulative; individuals who have social capital tend to accumulate more through constant use (Putnam 1993; Putnam, Leonardi, & Nanetti, 1993). In his empirical measurements of the concept, Putnam mainly divides social capital into three parts: positive moral values (especially general trust), social norms and obligations, and social networks developed through organizational activities such as participating in voluntary associations (Putnam, 2001).

Although Putnam, like his predecessors, agrees that social capital is a multi-dimensional concept that cannot be defined from a single perspective (Putnam, 1993, 2000, 2001; Siisiainen, 2003), his theoretical emphasis is always on social capital's "public good" aspect rather than its "private good" aspect. His standpoint is reflected in his argument that "[a] well-connected individual in a poorly connected society is not as productive as a well-connected individual in a well-connected society. And even a poorly connected individual may derive some of the spillover benefits from living in a well-connected community." (Putnam, 2000: 20) Based on this understanding of social capital as a collective feature, Putnam values communities with high levels of generalized reciprocity and trustworthiness, believing that they are more efficient than the distrustful communities (Putnam, 2000). Generally speaking, prosperous communities and civic societies would have more social capital compared to their less developed counterparts.

Putnam is considered by some scholars as "romantic functionalist and pluralist" due to his emphasis on social integration and solidarity (Siisiainen, 2003).

Like Coleman, his social capital theory relates more to the Durkheimian idea of solidarity rather than Marxian theory of class conflicts (Lin, 1999). However, Putnam's theory seems to have received greater critique than Coleman's. Criticism towards Putnam's theory focuses mainly on three aspects. First, Putnam's definition of social capital is theoretically vague and logically circular (Siisiainen, 2003; Savage, Warde, & Devine, 2005; Tzanakis, 2013). For instance, he believes that generalized social trust is a crucial component of social capital (Putnam, 1993, 2001), but he also agrees that trust is not a part of social capital's definition but only a "close consequence" that could be used as a proxy (Putnam, 2001). He also fails to articulate the difference between individual and collective social capital, though he explicitly points out that his theory of social capital deals with the concept as a public good instead of individual property (Putnam, Leonardi, & Nanetti, 1993; Portes, 2000). Second, the causal relationship involving social capital has never been theorized, which is partly due to its vagueness in the definition. Social capital as a collective trait is considered as both cause and effect (Portes, 1998; Tzanakis, 2013), and the measurement of social capital is interchangeable with the measurement of other positive social values (Lin, 1999). The third major critique is that he assumes that there exists a universal and generalized "social capital" that can explain multiple socio-economic-political outcomes while leaving little space for alternative, contextual interpretations (Portes, 1998; Tzanakis, 2013).

These deficiencies, especially the vague theoretical definition and blurred boundary between levels, result in significant problems in empirical studies adopting

Putnam's definition. For instance, since social capital on community level is considered as both "cause" and "result" (Portes, 1998) of other social inequalities, researchers adopting his theoretical framework would not be able to identify the causal relationships between social capital and social inequalities. Regardless of these critiques, Putnam's social capital theory takes up a unique position in the research of collective social capital (Tzanakis, 2013) and its association with health outcomes (Aguilar & Sen, 2009). Treating social capital as a collective trait fits Link and Phelan's (1995) argument about social conditions as "fundamental causes" of disease and health inequality. The "public good" aspect of social capital in regional development also bridges the state-level political economy and group-level inequality, making the theory popular among public policy researchers (Woolcock & Narayan, 2000; Putnam, 2004). In addition, Putnam himself does notice the connection between social capital and health; the positive effect of social capital on multiple health outcomes is examined and confirmed using different sets of data (Putnam, 2001, 2004; Helliwell & Putnam, 2004). Consequently, although Putnam's articulation of social capital is somewhat flawed, his theory is employed by subsequent researchers in an impressive number of studies and elevates collective social capital to a prominent position in understanding health outcomes.

2.5 Lin: Social Capital and Measurement

Unlike the three theorists above (i.e. Bourdieu, Coleman and Putnam) whose contributions are mainly theoretical, Lin creates a largely empirical-based definition of

social capital and operationalizes it into a set of measurements (Lin, 1999, 2002). For Lin, social capital is both a theory and a concept: as a concept, it refers to the investment in certain valuable resources in a given social structure; as a theory, it describes resources embedded in an agent's social networks that can be accessed and mobilized through relations in the network (Lin, 1999, 2008). Although Lin admits that the concept has the potential to be applied to the macro-collective level, his analytic interest is mainly on the micro-individual level (Lin, 1999; Savage, Warde, & Devine, 2005). He proposes two focal points on the micro-level study of social capital: access that refers to how individuals invest in social relations, and mobilization that describes how individuals capture the embedded resources (Lin, 1999, 2002). Like Bourdieu, Lin's theory deals with an individual's position in social structure and the opportunities as well as constraints exerted by the structure. He also realizes that inequality in social capital contributes significantly to inequality in other forms of capital (Lin, 2000). It can thus be concluded that social capital in Lin's theory is also a context-specific feature shaped by the unique social structure.

Lin lists several "elements" or functions to explain the role of social capital in an agent's instrumental actions, among which passing information, exhibiting individual's influence, suggesting individual's social credentials and reinforcing individual's identity are the most important ones (Lin, 1999). Probably because most of these elements prefer a dense social network, critics argue that Lin defines dense network as the only way of accessing resources (Portes, 2000). In fact, Lin has repeatedly mentioned in his works the potentiality of weak ties in gathering resources

(Lin, 2000, 2001, 2002, 2008). The real problem, nevertheless, is that although he states that both social networks and resources embedded in the network should be taken into consideration in any given study, his own research on the process of achieving social capital emphasizes the social network aspect more than the resource aspect. In addition, his analysis requires more attention to be paid to an agent's instrumental action. This analytic strategy assumes that the outcome of mobilization of social capital is a "point" rather than a "process," therefore allows little space for longitudinal research on the reproduction of social capital and embedded resources.

Lin's theoretical framework comes mainly from his own research on social capital and its association with different social outcomes, among which health outcomes account for a predominant part. Lin's early study finds that social support, an important component of social capital measured by a combination of social interactions and feelings about close social relations, can significantly and negatively predict unwanted psychiatric symptoms (Lin, Ensel, Simeone, & Kuo, 1979). A broader concept of social resources is later confirmed by Lin as a buffer against socio-psychological stressors (Lin & Ensel, 1989). After narrowing and refining the concept, Lin proposes that social capital's positive influence on health is significant and independent of other resources such as social support (Song & Lin, 2009). Finally, he argues that simply being aware of the fact that one possesses a certain amount of social capital can contribute to an individual's mental health (Lin, 1999). These adjustments reflect not only the evolution of conceptual definition but also a deeper understanding towards the health-social capital association. From this perspective,

Lin's theory of social capital makes a significant contribution to both social capital theory as a whole and the exploration of health-social capital association on individual level.

The abovementioned perspectives are major aspects of social capital theory. Social capital has been examined in different disciplines by numerous scholars: definitions are presented by economists, sociologists, psychologists and philosophers (e.g. Burt, 1997; Portes, 1998; Woolock & Narayan, 2000; Farr, 2004), and measurements have been delineated at multiple levels (e.g. Lochner, Kawachi & Kennedy, 1999; Adler & Kwon, 2002). For the theorists mentioned above, while the Marxian concept of capital serves as fundamental basis for all four scholars' theories, Bourdieu and Lin are prone to study social capital at individual level and focus more on interpersonal relationships and networks, whereas Coleman and Putnam prefer to consider it as a "public good" on a collective level and emphasize public participation and general trust. Although they underline different characteristics of social capital in their respective works, all four interpretations of social capital do share some core commonalities. First and foremost, they all suggest that different forms of capital – including social capital – have the potential to be accumulated. This quality of accumulation is key to the understanding of social capital because only in its accumulated form can social capital be devoted into its reproduction and transformation, which is the second core commonality shared by all five perspectives. Theorists point out that different forms of capital are interconvertible; individuals with a large volume of social capital can thus benefit from its convertibility by transforming

it into economic or cultural capital. A third core feature of these social capital theories is that they all are based on the existence of social networks. Despite theorists' different opinions on the density of network, they all agree that memberships in formal and informal social organizations plus the social relations attached to those memberships are fundamental elements in the creation and application of social capital. Closely connected to this idea, the fourth commonality is that the resources embedded in social networks are believed to be a chief component of social capital. Since the original concept of capital deals primarily with unequal distribution of resources and the power dynamics around it, theorists argue that scholarly understanding of social capital should look beyond merely social relationships and delve into the "resource" or "capital" aspect of social capital. The Marxian idea of capital as an unequally distributed group-based social power deserves deeper exploration.

As one of the most critical social determinants of health, social capital has been frequently cited in interpretations of health inequality among social groups. In the following chapter, the application and development of social capital theory in public health research will be critically and systematically examined.

Chapter 3

SOCIAL CAPITAL AND HEALTH: EMPIRICAL EVIDENCE

With the rise of sociological understandings of health outcomes and inequality, these core commonalities of social capital, together with its different characteristics proposed by classic theorists, have become widely adopted in public health studies. This chapter reviews the application of social capital theory in public health research from five perspectives used most frequently by scholars. Theoretical development, deficiencies in existing literature and the contributions made by previous research to social capital theory are also discussed.

Though very popular, academic opinion on the usefulness of social capital theory is not uniform and fully coherent. Some scholars see social capital as an "umbrella concept" stuffed with too many sub-concepts, thus requiring a more refined definition (e.g. Adler & Kwon, 2002). Other researchers believe that social capital is only useful when employed as a qualitative concept or qualitative indicator (e.g. Coleman, 1990). Still, others simply pick up one definition from previous research (Aguilar & Sen, 2009) and use social capital as a "convenient" variable without exploring its theoretical implications. This dilemma – the conflict in the use and abuse of such a rich and popular theory – can be found in many disciplines, among which the realm of health crucially belongs.

A proper definition of the term "health" is key to our understanding of the health-social-capital complex. "Health" or "good health" is defined by the World Health Organization (1948) as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity," while "bad health" refers to the absence of well-being and/or the presence of diseases. This definition has been criticized for being outdated (e.g. Bircher, 2005) and suffering from Eurocentrism; researchers have also proposed different definitions to better theorize the concept of "health" (e.g. Hafen, 2016). However, in the absence of a more comprehensive and accurate alternative, the WHO's definition is adopted in this paper and the concept of "health" is used as a general description of an individual's general health condition. The phrase "health outcomes" represent all health-related conditions, both positive (e.g. good health or improved health condition) and negative (e.g. disease conditions).

The earliest rigorous sociological study of the association between health and social resources dates back to Durkheim's research on social integration, solidarity and suicide rates in different countries (Durkheim, 1897; Berkman, Glass, Brissette, & Seeman, 2000). Instead of treating suicide as a merely individual, psychological pathology, Durkheim recognized the social patterns of suicide rates as social fact and connected them with levels of social integration. This could be seen as the starting point for connecting health-related issues with social capital as social investment (Turner, 2003). Although he did not illustrate the direct association between health and social capital, Durkheim did realize that effective social control and norms contribute to lower suicide rates in certain societies, whereas increased suicide rates

during times of rapid social changes ("anomic suicide" as named by Durkheim) can be explained by declined social integration and regulation (Durkheim, 1897). His research is hence the "fertile ground that indicated an important relationship between social involvement and connections (social capital) with individual well-being." (Turner, 2003) This link between social cohesion and suicide is also tested and confirmed by many following scholars from the field of public health (e.g. Souêtre, Wehr, Douillet, & Darcourt, 1990).

Sociology and public health researchers in the early 20th century uncovered the link between social support, trust, social cohesion, and individual well-being. The publication of The Black Report on Britain's health inequality (Black, 1980) and the fundamental cause theory (Link & Phelan, 1995) towards the end of the 20th century accelerated research on the unequal distribution of health outcomes among different social groups (Macinko & Starfield, 2001). In their classic piece, Link and Phelan raised the point that individual-based risk factors should and must be contextualized by examining "fundamental causes of disease" that "puts people at risk of risks." (Link & Phelan, 1995) According to them, a key feature of all fundamental causes is that they all involve degree of access to resources that help people avoid diseases and negative consequences through a variety of mechanisms. These causes usually embody access to valuable resources, can affect multiple disease outcomes through multiple mechanisms, and maintain an association with diseases regardless of the changes in intervening mechanisms. Though the direct link between social capital and disease outcomes is not discussed by the authors, it is undeniable that social capital

satisfies descriptions of mechanisms linking fundamental causes to diseases – it embodies access to other forms of resources (capitals), has impact on multiple health outcomes, and maintains a stable association with health condition. Inspired by this "fundamental causes perspective," social capital as a component that is closely associated with factors that "puts people at risk of risks" has been attracting increasing attention among health researchers over the past two decades.

Public health researchers started to include elements of social capital in their research frameworks even before the popularization of the concept. For example, social support, an element that intertwines with bonding social capital, has long been proved to have positive impact on individual's health (Lin, Ensel, Simeone, & Kuo, 1979; Abel, 2007). By introducing social capital intervention strategies to the public health discipline, recent scholars are also trying to use social capital more proactively in promoting public health (Villalonga-Olives, Wind, & Kawachi, 2018). Yet, the development of this vibrant area of research is accompanied by criticism. The concept has long been criticized for its "muddle" and "under-theorized" use in health research (Kawachi, Kim, Coutts, & Subramanian, 2004; Lynch, Due, Muntaner, & Smith, 2000). Researchers either use the same name to indicate different contents or assign different names to the same measurement (Macinko & Starfield, 2001). As an umbrella concept, social capital in health research is a concept that is vaguely defined; some scholars, therefore, assert that the concept will only be used metaphorically (Hawe & Shiell, 2000) without a more systematic definition. Although only mentioned by a handful of researchers, the universal use of the same measurements and elements

of social capital in significantly different cultural contexts can be problematic as well, leading to inconsistencies in results and even misinterpretations.

Nevertheless, the connections between elements of social capital and health outcomes are undeniably strong and significant. Previous researchers have discussed these connections from different aspects. For example, Ferlander (2007) summarized a set of levels and forms of social capital employed by previous scholars: individual versus collective, horizontal versus vertical, formal versus informal, weak versus strong, and bonding versus bridging. Similarly, Murayama and colleagues (2012) divide the existing research into two types: the ones that employ a network approach, and those that employ a cohesion approach. The structural-cognitive-relational framework proposed by Nahapiet and Ghoshal (1998) has also gained its popularity among researchers from various disciplines. Based on these comprehensive summaries, the following section will examine social capital's influence on health from five aspects: individual-network approach, collective-cohesion approach, strong-bonding approach, weak-bridging approach, and structural-cognitive approach. Despite their different breakthrough points and levels of study, most of the researchers report a positive association between social capital and health outcomes; possessing high volumes of strong, bonding social capital on either an individual or a collective level is linked with better health conditions, after controlling for other socioeconomic factors. However, detailed examination of social capital's different components reveals more complicated relationships between these components and multiple health

outcomes. Important as it is, social capital can sometimes do harm to individual health under certain circumstances.

3.1 Individual-Network Approach

The individual-network approach treats social capital mainly as an individual property that resides in personal networks (Murayama, Fujiwara, & Kawachi, 2012). Studies adopting this approach usually focus on how individuals get access to a variety of returns through access to social networks. Social capital in this type of research is often measured by individual social connections and social support (Ferlander, 2007). Some scholars claim that the greater value of social capital lies in its individual and network level (Portes, 1998), and one of the most valuable returns that can be acquired via individual social capital is mental and physical well-being (Lin, 1999).

Evidence in support of the positive association between individual-level social capital and health outcomes has been widely reported. Due and colleagues (1999), for instance, found out that social relations and supports generally have a positive impact on psychological well-being; the dense social relation is associated with more instrumental support and thus leads to better mental health (Lin et al., 1979; Lin & Ensel, 1989). The same positive correlation is also found between social support and self-rated health (Poortinga, 2006a, 2006b). In a different population, Veenstra (2000) discovered that aspects of individual-level social capital, such as frequent interaction with workmates, have a strong and positive influence on overall health condition; he also pointed out that, after controlling for other indicators, civic participation – a key

measurement of collective level social capital – is unrelated to health. In general, it has been proposed that several aspects of one's individual network contribute significantly to health condition; an intimate, close core network might provide intense support to individuals (Lin et al., 1979; Szreter & Woolcock, 2004) and improve psychological condition, while a diverse network is more likely to have a positive effect on self-rated health (Moore, Bockenholt, Daniel, Frohlich, Kestens, & Richard, 2011). Situated individual social capital is proven to have the ability to buffer negative impact of neighborhood deprivation on health (Klijs, de Leon, Kibele, & Smidt, 2017).

Similar results are also found in different sub-groups such as older, younger and non-American or non-Western populations. The positive association between different aspects of individual social capital and generalized well-being of the older population is revealed by a wide range of studies; it is also pointed out that social capital is generated in the interaction between individual and collective life. Also, the immediate social network at the individual level – including family and close friends – is the key factor that contributes to well-being in older populations (Nyqvist, Forsman, Giuntoli, & Cattan 2013; Yiengprugsawan, Welsh, & Kendig, 2017). Moreover, longitudinal research suggests that a lack of social resources at an early age can negatively influence an individual's health condition decades later (Ferraro, Schafer, & Wilkinson, 2016). Rose's (2000) study of a representative Russian sample produced the same result; in his analysis, individual network shows a positive impact on an individual's subjective physical and emotional health. In European countries, the independent influence of individual social capital on health outcomes is also

confirmed. (Pinxten & Lievens, 2014; Waverijn, Wolfe, Mohnen, Rijken, Spreeuwenberg, & Groenewegen, 2014).

Qualitative researchers provide more in-depth insight into the health-social-capital connection at the individual level. Apart from the generally positive effects that individual social networks have on well-being, different structures of networks – dense or weak, homogeneous or heterogeneous – can produce different health outcomes. For instance, an extensive, homogeneous network is able to promote well-being by providing practical support or conferring identity. However, its impact might be limited in other ways (Cattell, 2001). These different network structures have impacts on health independence from social support; they might also function together with social classes and affect different groups independently (Verhaeghe, Pattyn, Bracke, Verhaeghe, & Van De Putte, 2012). Researchers, thus, suggest that health promotion strategies should focus on nurturing various forms of individual social capital and different network structures (Cohen, 2004).

In general, health research employing an individual measurement of social capital tends to adopt Bourdieu's or Lin's framework and define it as a combination of social relations and embedded resources. But the "capital" element in the original theories is downplayed to some extent. Most of the common measurements of individual social capital such as quantity of social relations, social trust and participation are reported to have positive effects on individual health. Studies in health-social-capital connection at the individual level reveal the necessity of duly considering multiple structures of social relations and networks under different

circumstances and contexts, but an operational definition with a better balance between the "social" aspect and the "capital" aspect is still urgently needed. The processes of producing, accumulation and mobilizing social resources embedded in a given social network also require further investigation.

3.2 Collective-Cohesion Approach

A collective-cohesion approach understands social capital as resources available to members of tightly knit groups. Social capital is viewed as a "public good" and its influence on individual health is analyzed contextually (Ferlander, 2007; Murayama, Fujiwara, & Kawachi, 2012). Classical indicators of collective social capital include social trust and civic participation (e.g. Putnam, 2001); recent researchers argue that reciprocity, informal social control, and collective efficacy should also be included in the measurement (Kawachi et al., 2004). It is suggested that the collective-cohesion approach is the most common approach used by social scientists to define social capital in health research (Murayama, Fujiwara, & Kawachi, 2012).

It has long been asserted that generalized trust on collective levels and participation in civic organizations might improve one's health (Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997; Kawachi, Kennedy, & Glass, 1999). Their research suggested that both mortality rate and self-rated health are associated with state-level social capital, which is measured by aggregated generalized trust and group participation; a higher level of collective social capital predicts a lower mortality rate

and better self-rated health. Similarly, Putnam's research shows that social capital at the state level has powerful influences on health and perceived happiness; more civic participation is associated with lower odds of dying over the course of next year (Putnam, 2001).

In addition to national and state-level social capital, communities and neighborhoods are also popular units of analysis in health-social-capital research. Collective social capital is believed by many to be a major determinant of community wealth and prosperity (Portes, 1998; Putnam, 2000); rich social capital at the community or neighborhood level is, thus, beneficial to the health of residents. Aspects of collective social capital, such as strong ties in communities and local organizations, prove to be good indicators of better physical and mental health (Helliwell & Putnam, 2004). The two major measurements of social capital, i.e. social participation and social trust, prove to be correlated with the overall health condition (Kim & Kawachi, 2006; Mohnen, Groenewegen, Völker, & Flap, 2011; Ahnquist, Wamala, & Lindstrom, 2012; Yiengprugsawan, Welsh, & Kendig, 2017). A higher level of community or neighborhood social capital is claimed to have moderate protective effects on health, even after controlling for individual-level indicators (Kim, Subramanian, & Kawachi, 2006; Poortinga, 2012). More detailed exploration after controlling for individual social capital found that community social capital still exerts a small yet significant positive effect on subjective health (Rocco, Fumagalli, & Suhrcke, 2014). Scholars, thus, argue that social capital on two levels might compensate to each other (Mohnen, Völker, Flap, Subramanian, & Groenewegen,

2015); a multilevel understanding towards health-social-capital complex is necessary (Murayama, Fujiwara, & Kawachi, 2012).

Other researchers confirm the above findings from slightly different perspectives while providing new insights. Although it is reported that collective social capital has its independent impact on health (Ahnquist, Wamala, & Lindstrom, 2012), residents in the neighborhoods parallel it with financial and economic capital, describing the accumulation of social capital as something valuable. Residents from neighborhoods with different socioeconomic conditions also mobilize different types of resources to improve their health. This adds to the general argument that collective social capital is positively associated with health status (Altschuler, Somkin, & Adler, 2004). The effects of collective social capital on health vary not only by socioeconomic statuses but also by age, individual health status, race/ethnicity, and nationality. Collective social capital has a stronger association with the health of older people than the younger generation (Browning, Wallace, Feinberg, & Cagney, 2006; Maass, Kloeckner, Lindstrøm, & Lillefjell, 2016; Cain, Wallace, & Ponce, 2017). Neighborhood social capital also positively influences the subjective health of people with chronic illnesses after adjusting for individual social capital (Waverijn et al., 2014). Compared with the native-born population, foreign-born and Hispanic people generally have a lower level of collective social capital and benefit less from it with respect to their overall health and mortality (Singer, McElroy, & Muennig, 2017).

Research on collective social capital and health has generated fruitful results. Multiple aspects of collective social capital, such as social support, generalized trust,

and civic participation, have all been proven to have a positive association with better health conditions. Social capital on a collective level also interacts with individual-level factors to protect individuals from disadvantageous environments. Nevertheless, several theoretical and methodological issues need to be further addressed at this level. First, the indicators of collective social capital are again not well defined; it remains unclear whether the current indicators are components of the "social capital umbrella" or just proxies for social capital that are easier to be operationalized. For instance, Waverijn and colleagues (2017) figured out that in certain contexts, the positive effects of neighborhood social capital on health actually come from an individual's egocentric social network in the neighborhood, which means that the so-called collective social capital might just be individual social capital embedded in the context of the neighborhood. Secondly, the mechanisms through which collective social capital promote or damage individual health require further illustration. Kawachi and colleagues (1999) identified several major community pathways through which social capital influences individual health, but other mechanisms are rarely specified in empirical studies. Furthermore, collective measurement of social capital, be it neighborhood, community or state, is usually the aggregation of individual measurement; this simple combination might fail to capture the uniqueness of collective social capital. A more precise measurement such as the "intrinsic" measurement of community features (Lochner, Kawachi, & Kennedy, 1999) could be adopted in future research to solve the problem.

3.3 Strong-Bonding Approach

Scholars have pointed out that both bonding and bridging, as well as strong and weak social capital, are present in the healthiest communities. Therefore, all contribute to better health status (Mitchell & LaGory, 2002; Cohen, 2004), though they do affect the health condition of residents through different pathways. Bonding social capital is usually defined as strong trust, cooperative relationships and active participation within homogeneous networks in which members share similar socio-demographic characteristics (Mitchell & LaGory, 2002; Murayama, Fujiwara, & Kawachi, 2012). The concept is similar to the idea of strong ties, but they are essentially different as bonding social capital emphasizes more on homogeneity while strong ties describe strength. However, since they both depend on close connections within a small group of familiar people, their influences on health are discussed together.

Informal and strong networks have been the main focus of health research (Lynch et al., 2000); the positive relation between a dense and strong network and well-being is demonstrated by a wide range of studies. Public health researchers believe that denser social networks and more support are related to better health; these factors protect individuals from the detrimental social environment (Lynch et al., 2000). Strong and supportive social ties are found to be associated with a lower rate of cardiac-related illness while contributing to improved overall physical health (Seeman, 1996). Subjective health condition also benefits from strong ties within family and neighborhoods (Flora, 1998; Helliwell & Putnam, 2004). In certain communities,

bonding social capital is crucial for residents to effectively respond to local problems, thus having a positive impact on health status (Guest, 2000). The level of impact of strong or bonding social capital might differ by population group. For example, disadvantaged people and areas are believed to have more bonding social capital than their wealthier counterparts. This usually has a unique impact on their mental health condition (Putnam, 2000).

Some mechanisms through which strong and bonding social capital exert their influence on health have been identified. It has been argued that strong, bonding social networks may affect health via mechanisms such as providing emotional support, enhancing self-efficacy, reducing stress and providing practical support (Cattell, 2001; Ferlander, 2007). Simply knowing the existence of a strong network makes people feel less depressed and get fewer physical diseases (Erickson, 2003). Dense and close social networks, however, can also be harmful to individual health. Caregivers such as women are more vulnerable to the "downside" of dense and close social ties (Kawachi & Berkman, 2001) due to what is characterized by some researchers as "relational strain" (Due et al., 1999). Members in small and highly integrated groups might also suffer from the negative effects of a tight social network, which instead results in more depression (Crossley, 2008). Other deleterious impacts of strong, bonding social capital include the exclusion of outsiders, restriction on individual freedom, and diffusion of unhealthy norms (Portes, 1998; Macinko & Starfield, 2001; Berkman et al., 2000). These impacts are further summarized as two patterns: social contagion and inter-level interaction (Villalonga-Olives & Kawachi, 2017).

Although these findings are useful for health researchers and policymakers, this body of literature is generally characterized by a lack of theoretical basis and mixed definitions for strong ties and bonding social capital from a mostly Western perspective. To better understand the effect of strong-bonding social capital on health at individual and community levels, a clearer, contextual theoretical framework should be established and the measurements for different concepts/levels should be clearly distinguished.

3.4 Weak-Bridging Approach

Like strong-bonding social capital, the concept of weak ties is essentially different from bridging social capital, but they are discussed together here due to their shared focus on broad, diverse and loose social networks. The weak ties theory was first proposed by Granovetter (1973); it argues that contacts maintained through weak ties in one's social networks are more likely to provide connections to socially distant groups. These connections usually possess novel and scarce resources that are unavailable in an individual's immediate networks (Aral, 2016). Bridging capital, as opposed to bonding capital, refers to the heterogeneous relations between individuals who are different in various aspects (Kawachi et al., 2004; Ferlander, 2007; Murayama, Fujiwara, & Kawachi, 2012).

The value of weak ties and bridging social capital in health promotion has been discovered in different contexts for a long time (Granovetter, 1973). For instance, a higher volume of bridging capital is mainly found in wealthier neighborhoods, which

allows the residents to better mobilize it and further improve neighborhood health conditions (Altschuler, Somkin, & Adler, 2004). In disadvantaged communities characterized by high-poverty, high-minority, and inner-city location, bridging social capital show a much smaller but still significant inverse relationship with individual distress (Mitchell & LaGory, 2002). Neighborhood and community level bridging capital can significantly and directly promote self-rated health (Moore et al., 2001; Kawachi et al., 2004; Poortinga, 2012); organizational level weak ties and bridging social capital are also suggested to be negatively associated with unwanted health outcomes (Rose, 2000; Muckenhuber, Stronegger, & Freidl, 2013).

Scholars usually agree that the potential of weak ties and bridging social capital lies in their broadness and variety (Erickson, 2003). On one hand, weak ties and bridging capital are important for disseminating information about the community and individuals as well as for obtaining outside assistance to deal with health issues (Guest & Wierzbicki, 1999; Guest, 2000). On the other hand, members embedded in bridging networks are more likely to be well-informed about health-related issues; they are also more likely to find useful contacts in their broad and heterogeneous networks (Erickson, 2003; Ferlander, 2007). In addition, bridging social capital and weak ties are argued to be able to control deviance and reinforce positive health norms in the community (Ferlander, 2007).

Apart from these findings from previous studies, research on the relation between weak-bridging social capital and health can be improved in at least two ways. First, the definition of bridging social capital needs to be further refined and better

operationalized. Current definitions of bonding and bridging capital sometimes overlap with each other, making researchers unable to capture the unique elements of bridging social capital such as the power relation between groups and the strategy adopted by agents from different positions. Second, the role of "useful contacts" or "key informants" in mobilizing bridging social capital through weak ties has been ignored. In line with Granovetter's weak ties theory, Burt's theory of structural holes (Burt 1997) focused on describing the role of structural holes in facilitating agents to get the necessary resources. Using this theory, researchers can examine the ways in which the existence/absence of "useful contacts" in individuals' social networks affect their mobilization of social capital and finally affects their health status.

3.5 Structural-Cognitive Approach

First proposed by Nahapiet and Ghoshal (1998) in their discussion of the creation of intellectual capital, the structural-cognitive approach has become one of the most popular frameworks employed by sociologists and public health researchers. The original framework proposed by Nahapiet and Ghoshal encompasses three dimensions: structural, relational, and cognitive. According to the authors (1998), the structural dimension of social capital refers to the pattern of connections among social actors. It can be assessed with the presence/absence of social ties, network patterns, and the existence of purposeful, appropriable organizations. The second dimension – the relational dimension – refers to the assets created and mobilized through social

networks, usually including trust, norms, and obligations. Lastly, the cognitive dimension describes shared meanings such as codes, language and shared narratives.

The three-dimensional framework is refined by later researchers and an alternative two-dimension framework including only structural and cognitive dimensions is created. Derose and Varda (2009) offer a succinct interpretation of the distinction between the two dimensions: the structural dimension of social capital captures what people do, while cognitive dimension (which is presumably the combination of cognitive and relational dimensions from the original three-dimensional structure) captures what people feel. In other words, structural social capital mainly measures people's actions such as civic participation, quantity, and quality of social ties, community residential stability, and racial/ethnic composition, while cognitive social capital measures feelings about social trust, norms of reciprocity, cohesion, and efficacy.

Many scholars have been attracted by the straightforwardness of this two-dimension framework, yet the results reported by their studies are highly inconsistent. Some research claims that both structural and cognitive social capital have significant impact on individual's mental and subjective well-being, while different elements are found to contribute to different health outcomes (e.g. Forsman, Nyqvist, Schierenbeck, Gustafson, & Wahlbeck, 2012; Liu, Xue, Yu, & Wang, 2016; Park, 2017; Zhu, Gao, Nie, Dai, & Fu, 2019), whereas others assert that given the specific social and environmental conditions, only one of the two dimensions can be proved to be

significantly predicting health outcomes (e.g. Fujisawa, Hamano, & Takagawa, 2009; Bertotti et al., 2013; Nyqvist, Pape, Pellfolk, Forsman, & Wahlbeck, 2014).

The inherent ambiguity of the structural-cognitive approach is partly responsible for the mixed results reported. Simple as the structure is, the structural-cognitive approach specifies neither the level of measurement nor the elements included in each dimension. Although social networks (structural), norms of reciprocity and trust (cognitive) seem to be the default composition (Ferlander, 2007), they are measured with different indicators (e.g. civic participation vs. interaction with friends and neighbors) in different studies. Researchers also realize that since no guidance has been provided regarding the level of measurement of this approach, it is very likely that cognitive as well as structural social capital function on multiple levels (Inaba, Wada, Ichida, & Nishikawa, 2015) and interact with each other (Forsman et al., 2012).

Scholars also have had a hard time fitting the structural-cognitive framework to the existing theoretical structure. Some believe that since social capital could be roughly divided into network and cohesion aspects, structural-cognitive approach should be categorized into the cohesion aspect (Maruyama, Fujisawa, & Kawachi, 2012; Moore & Kawachi, 2017), others treat structural social capital as a grouping concept of formal-informal social ties (Rostila, 2011), while still others propose a third "behavioral" dimension to complete the existing framework (Derose & Varda, 2009). Despite these contradictions, the structural-cognitive approach proves a simple yet useful frame to operationalize social capital. The structural-cognitive binary should

probably be viewed as two mutually supplementary perspectives that perpetuate all the abovementioned levels and interacts with approaches.

Overall, empirical studies on the connection between social capital and health find that a positive association between rich social capital and good health condition is general among people of different genders, ages, and socioeconomic conditions. It has been reported that on both individual and collective levels, individuals can benefit significantly from frequent civic participation and higher levels of general trust. Stronger and denser social networks can improve individual health by providing more practical support, while looser and weaker social ties offer more diverse resources and increase the probability of getting specific help. Nonetheless, research on these connections suffers from some limitations. The definition and measurement of social capital is vague in some studies largely due to the lack of a solid theoretical framework. Another consequence of failing to build a clear theoretical structure is that the relationships between different aspects of social capital are not clarified, further hindering the exploration of mechanisms through which social capital influence health on different levels. In addition, the long-term interactions between health outcomes and social capital have not yet been fully captured by existing research, the universal application of social capital frameworks and measurements in different social contexts may also impair the reliability of the findings. In the following chapter, I will briefly review the studies in social capital and health in East Asian societies; similarities, differences, and potential gaps will also be discussed.

Chapter 4

SOCIAL RELATIONS, SOCIAL CAPITAL AND HEALTH IN EAST ASIAN SOCIETIES

The unique historical, cultural and political characteristics of East Asian societies affect their specific types of social capital in ways distinct from Western societies (Chua & Wellman, 2015). This further complicates the multiple dimensions of social capital and health. The long history and profound influence of Confucian and collectivist culture, though stronger in some societies than others, has been affecting the forms and mechanisms of many East Asian people's social capital. Families, close kin and other informal, homogeneous and non-political networks are more frequently considered as closely related to the cultivation of social capital in East Asian societies (Yum, 1988; Inoguchi, Mikami, & Fujii,2007; Igarashi et al., 2008); interpersonal relationships are carefully and properly maintained by individuals belonging to these networks as sources of resources. In some cases, a special type of "collectivism" can be generated among members of selected social networks, which is usually accompanied by highly contextual ways of interaction (Yum, 1988).

Since most East Asian societies are traditionally organized by families and other small and closely knit of social relationships, these narrow social groups become the major carriers of social capital (Fukuyama, 1995). According to Bian and Ikeda (2014), structures of kinship and social network in East Asian societies are usually

highly hierarchical, prioritizing father, senior and patron over child, junior and client. The structured social network also interacts with gender stereotypes in East Asia, creating gender divisions both within and between social networks. In East Asian social hierarchies, a crucial measurement of an individual's position is the centrality of the individual in his/her social networks, i.e. his/her relative position in the social networks that he/she belongs to; the level of "linkedness" – or the possession of social relations in general – is therefore at the center of East Asian social life. Compared with their American counterparts, Chinese people mobilize fewer social resources through close social links (spouses, children, close kin and friends) but more resources through loose social links (coworkers, neighbors and distant kin), while Japanese people tend to have larger and more endurable core social networks with low frequency of interaction among network members (Bian & Ikeda, 2014). Elderly inhabitants in East Asia (Mainland China and Taiwan) also report more non-work-related as well as occupational contacts than their American counterparts, which may be due to the patriarchal culture which endows older males with more authority and respect (McDonald, Chen, & Mair, 2015).

Although the impact of the "group-based collectivism" produced by Confucian tradition has been weakened by socioeconomic developments and the establishment of modern democratic political systems, it still has a nonnegligible influence on East Asian people's social trust (Choi & Woo, 2016) – general and specific – which is a major emphasis of Confucian philosophy and a key measurement of social capital

(Tan & Tambyah, 2011). Compared with other parts of the world, East Asian societies, China and South Korea in particular, report higher levels of trust but with narrower trust radiuses, suggesting a clear in-group/out-group difference due mainly to Confucianism and economic prosperity (Delhey, Newton, & Welzel, 2011). The concept of "us" versus "them" – which is built upon the acknowledgement of inward-focued interpersonal relationship rather than shared group membership (Yuki, Maddux, Brewer, & Takemura, 2005) – may be so strong in these societies that it becomes very hard for people to trust those who belong to out-groups (Allik & Realo, 2004). This in-group/out-group difference is closely connected with the argument that the idea of "trust" in East Asian societies is rooted in relational affective properties, while trust in the Western context has its root in cognitive properties (Choi & Han, 2011). On the one hand, trust, like many other social characteristics, is relational rather than individual in East Asia. Trust is not an obtained or formed characteristic as suggested by individualistic culture, but an inherent part of personhood and can be extended through interpersonal relationships to form an ideal society. On the other hand, while it is the trustors' responsibility to act out in Western societies, East Asian people consider trustees as being responsible for acting out, i.e. expressing their trust and reliance on certain people (Choi & Han, 2011). The middle-to-high levels of trust among East Asian societies might be correlated with their high levels of homogeneity in terms of race and ethnicity composition (Delhey & Newton, 2005; Tan & Tambyah, 2011).

These characteristics of Eastern societies – Confucian and collectivist culture, hierarchical social network, different emphases on formal and informal social relations, high level of concentrated trust, low level of civic participation – contribute to a different quality of social capital among East Asian people compared to many other populations. Being aware of the importance of social context in the patterning, accumulation, role and value of social capital in East Asian societies (Chua & Wellman, 2015), researchers have started to pay special attention to both commonalities and differences between Eastern and Western societies. Large scale, cross-national research suggested that although the quantity of social capital varied across countries, East Asian societies had remarkably less social capital compared with Western Europe or North American countries, which was reflected in lower scores on social norms and social structures (Lee, Jeong, & Chae, 2011). One possible explanation raised by the researchers was that the different expectations of norms of reciprocity. Since the norms of reciprocity was usually measured by volunteering, East Asian residents who were less active in civic participation than their Western counterparts were less likely to develop high levels of sense of such norms (Lee, Jeong, & Chae, 2011; Rossteutscher, 2008; McDonald, Chen, & Mair, 2015). Similarly, compared with general trust developed in demographically and culturally heterogeneous environments, relationism (the social-structure producing mechanism involving mostly inward-oriented and informal ties) developed in close, homogeneous environments contributed more to the retention of social relationships among East Asian college students than students from Western societies (Igarashi et al., 2008).

4.1 *Guanxi*, Social Capital and Health

Despite the Western origin of social capital theory, its core components – social networks, social resources, trust, social support, and so on – can be found in various societies under different names. Among all the localized forms of social capital, the Chinese "*guanxi*" is probably the most famous one. The Chinese word "*guanxi*" is literally translated as (interpersonal) relations or connections. However, when used as an analytical category, the term can be roughly defined as one's interpersonal relationships that are used for approaching political, economic, and other forms of benefits (Fan, 2002; Ruan, 2017). These relationships are usually characterized by informality, reciprocal obligation, and unequal mutual exchange of favors (Huang & Wang, 2011; Avery, Sun, Swafford, & Prater, 2014; Li, Du, & Van de Bunt, 2016); they are also carefully constructed, maintained and calculated over the long term (Dunning & Kim, 2007; Qi, 2013; Ruan, 2017).

Mobilizing interpersonal connections for personal goals is common in Chinese history, yet the term "*guanxi*" only started to be used as a generalization of these connections in mid-1970s and later gained its popularity among Western scholars in the 1980s (Fan, 2002). Rooted in a collectivist society that is profoundly influenced by Confucian culture, *guanxi* is developed upon the understanding that an individual is an integral part of a complex and hierarchical social system (Dunning & Kim, 2007; Li, Du, & Van de Bunt, 2016), in which social stability and harmony are highly valued (Avery et al., 2014) and kinship is at the center of an individual's social network

(Bian, 1994, 2017; Chen & Wu, 2011). Early studies of *guanxi* focus mainly on its role in Chinese businesses, especially the seemingly natural connection between *guanxi* and corruption and bribery (Smart, 1993; Fan, 2002). With the development of Chinese society and the advancement of related research, new venues of *guanxi* usage emerge as the old ones decline, and the intricacy of *guanxi* as well as its wide application beyond business discipline are gradually unveiled by not only economists but also sociologists, anthropologists and psychologists (Fan, 2002; Yang, 2002). It has been summarized that, in addition to being reciprocal, *guanxi* as a relation-based asset is also utilitarian, transferable, personal, long-term oriented, and intangible (Luo, 2007); it is often mobilized by weaker parties in social interactions in order for gaining access to scarce resources held by people from a higher socioeconomic position (Dunning & Kim, 2007).

The similarity between the Chinese concept "*guanxi*" and the Western theory of social capital has been attracting increasing attention from scholars interested in comparative research. Some of them equate *guanxi* with social capital in the Bourdieusian sense, arguing that *guanxi* as a valuable resource that can be converted to economic and political capital just like social capital (Gold, Gold, Guthrie, & Wank, 2002; Huang & Wang, 2011; Ruan, 2017). Others believe that *guanxi* represents attributes that are unique to the Chinese culture and thus should be understood as an independent form of capital. Lin (2001) mentions that although *guanxi* is originally constructed and maintained as a means to an end, the pervasive role of *guanxi* in

Chinese society eventually makes it an end itself. Bian (2017) also proposes the term "*guanxi* capital" as a substitute for the Western-originated concept "social capital," arguing that *guanxi* capital is derived from an individual's reputation accumulated by fulfilling the moral obligation to family and pseudo-families.

Nevertheless, the majority of the scholars consider *guanxi* as a variation of social capital, believing that the two are similar to each other but are not identical (Avery et al., 2014). Avery and colleagues (2014) interpret *guanxi* from a network perspective, suggesting that *guanxi* is a source of social capital that facilitates the cultivation of trust and the flow of information in business contexts. Similarly, Ruan (2017) conceptualizes *guanxi* as culture-based informal networks that can be utilized to acquire social resources. Both Qi (2013) and Lin and Si (2010) point out that social capital should be treated as a multi-dimensional concept; different societies may produce different variations of social capital, but there are some key attributes shared by all societies, including social networks, social resources, trust, reciprocity, and so forth. While Chinese *guanxi* is just one of those social capital variations, it does have its counterparts in other societies such as Japan and South Korea (Chen & Wu, 2011).

In addition to the similarities, there are also some major traits that differentiate *guanxi* from social capital. First, unlike social capital which functions on both individual and collective levels, *guanxi* is defined as an asset loaded on and mobilized by individuals. As a result, *guanxi* does not have the potentiality to become a "public good" (Qi, 2013) and benefit all the members of a given social group. Besides, while

the concept of social capital emphasizes more on how individuals accumulate and mobilize resources via their social networks, the idea of *guanxi* takes both parties of social interactions into consideration, focusing more on the process of social interaction, mutual exchange of favors, and the sense of indebtedness that are key to the maintenance of long-term relationship (Fan, 2002; Li, Du, & Van de Bunt, 2016). Last but not least, social capital theory is often criticized for its inability to interpret class conflicts and power hierarchy in a given society. On the contrary, a key element of *guanxi* is the recognition of and respect to a hierarchical social system; during a favor exchange process, without acknowledging both parties' relative statuses in the social hierarchy, it is simply impossible for them to identify and establish the flow of resource (Chen, Chen, and Huang, 2013).

In sum, *guanxi* is mostly understood as a variation of social capital with a power-and-culture-laden hierarchy and a strong emphasis on reciprocal obligations on individual level. Important as it is in Chinese people's daily life, *guanxi* has rarely been examined in relation to health practices and outcomes. In their examination of Chinese people's strategies of dealing with the health care system, Munro and colleagues (2013) find that although the use of *guanxi* is generally considered as unethical, it is believed that *guanxi*-related unethical medical practices are relatively common in China. In some circumstances, *guanxi* is also adopted by patients and their families as a proactive strategy to overcome the barriers in the health care system. Patients' use of *guanxi* as a proactive strategy is also noted by Zou and colleagues

(2018) in their study of the use and abuse of medical *guanxi* in China. Despite the popularity of medical *guanxi*, Zou and colleagues argue that the existence of medical *guanxi* is morally unjustifiable and could ultimately sabotage the patient-physician trust in Chinese medical system.

4.2 Social Capital and Health in South Korea and Japan

Similarities and differences among Eastern societies themselves are receiving increasing attention. Although East Asian societies are generally characterized by relatively high levels of collectivism (or holism), they are significantly different from each other due to their respective development levels, cultural traditions, and political regimes. Japan, Taiwan and South Korea were frequently reported to have the highest level of social capital among East Asian societies, while Vietnam and China usually ranked the lowest on the scale (Lee, Jeong, & Chae, 2011; Allik & Realo, 2004; Inoguchi, 2004). The individualistic-collectivistic inclination (Allik & Realo, 2004), political regime (Inoguchi, 2004; Ikeda, 2013), globalization (Inoguchi, Mikami, & Fujii, 2007), Confucian heritage (Inoguchi, 2004; Inoguchi, Mikami, & Fujii, 2007) and colonial heritage (Inoguchi, 2004) are all believed to have significantly influenced the volume and form of social capital in certain societies. Differences in social capital are also reflected in different levels of trust and social networks people from different countries have (Tan & Tambyah, 2011). Scholars point out that although both China and Korea are instructed by Confucianism, Chinese people and South Korean people developed distinct types of informal social networks – *guanxi* in China versus *yongo*

in South Korea – to compensate the lack of stable, authoritative formal institutions in the society (Horak & Klein, 2016). Both types of networks are built upon mutual trust and continuous, reciprocal interaction. It is relatively hard for outsiders to get access to these networks and mobilize the resources provided by the insiders, and the networks themselves are used to promote group cohesion and facilitate interpersonal relations. However, compared with *guanxi*, the *yongo* network relies more on pre-set characteristics such as hometown or family ties; it is also more exclusive in the sense that it usually declines the acceptance of outside members or the opportunity of connecting with other networks (Horak & Klein, 2016; Horak & Taube, 2016). Despite the argument that generalizability might outweight specific relations in theory construction process (Yazawa, 2006) and scholars should give limited emphasis on society-specific characteristics in expanding existing theories, these institution-and-culture-based evidences deserve more attention as their inclusion can help us with better understanding various attributes of social capital and their associations with health outcomes (Park, Smoth, & Dunkle, 2014), leading us to a more comprehensive theory with stronger explanatory power and higher generalizability.

As mentioned above, despite its highly developed, formal economics and democratic institutions, the South Korean type of informal social network *yongo* still has a significant impact on South Korean people's social capital (Horak & Klein, 2016). These specific relations among selected people, derived from and are maintained by ascribed ties such as kin, schools or regions, can sometimes overpower

formal and institutionalized rules and lubricate various forms of interaction (Yee, 2000). On the basis of close and cohesive *yongo* networks, *inmaek* – personal trust network that is composed of interactive, durable, strong, and beneficial interpersonal ties – is constructed as a higher level, while collections of *inmaek* finally form "*pabol*" – the clique, the group of interconnected networks (Yee, 2015). Even in today's highly internationalized and diverse South Korea, people belonging to these hierarchical and closely knit networks groups are still highly committed to the exclusive relations, utilize them to mobilize resources that are otherwise unavailable from formal institutions (Horak & Klein, 2016) and resist social risks such as sickness (Yee, 2015). The presence and active use of *yongo* and *inmaek* in contemporary South Korea could be seen as a good example of the country's strong cohesive culture (Kim, 2007). From a developmental perspective, the increase in the number of civic associations in South Korea after the end of the authoritarian regime in 1987 contributes to the accumulation of social capital in South Korea outside of families and kin, though the contribution is limited and does not extend to political sphere (Kim, 2004; Kim, 2005; Lee, 2008). Although the levels of social trust and participation in volunteering and other informal organizations seem to remain on medium level, it has been reported that these indicators have been declining since 1990s; the popularization of new media, as Putnam argued, also demonstrated a small yet significant negative impact on civic participation (Kim, 2007; Lee, 2008). Recent research also points out that compared with other East Asian countries, South Koreans, especially young South Koreans, are more oriented to materialism and individual success, and could receive less support

from intimate social networks (Kim & Lee, 2018). It has been argued by many scholars that South Korea might be the most individual-success-oriented society among East Asian countries, and the stock of social capital in Korean society is somewhat declining (Lee, 2008; Yee, 2015; Woo & Kim, 2018).

Studies in Japan, however, have reported mixed results on Japanese social capital. On the one hand, Japan, together with the other Eastern Asian societies, continuously stays at the lower end of social capital ranking. Although there are some similarities between Japan and Western/Nordic countries in terms of the generation of social trust (Freitag, 2003), it is the differences between the two that makes Japan a unique East Asian case requiring further study (Inoguchi, 2000; Fujisawa, Hamano, & Takegawa, 2009). Apart from the influence of in-group-oriented East Asian culture, the fact that Japanese people generally hold passive attitude towards social activities and often tend to avoid them (Inoguchi, 2000) might also contribute to their low level of social capital. On the other hand, some researchers also argue that Japanese society has "high premium on social capital" and the level of social capital in this country has been increasing since the mid-20th century (Inoguchi, 2000). As a country that is vulnerable to various disasters like earthquakes and tsunamis, the constant existence of natural threat forces individuals to connect to and cooperate with people around them (Van Houwelingen, 2012). The increasing social organizations in Japan – formal and informal, large and small (Inoguchi, 2000) – also contributes to the conservation of social capital in this society as they facilitate vertical as well as horizontal interactions

by organizing various activities for Japanese people from various occupational, gender and age groups (Inoguchi, 2000; Van Houwelingen, 2012).

As in the other parts of the world, social capital is highly associated with mental and physical health in East Asian residents. A cross-national survey in five East Asian societies (Japan, South Korea, Singapore, Mainland China, Taiwan) suggested that both life satisfaction and health status were significantly affected by such core dimensions of social capital as interpersonal trust, social support and perception of norms of reciprocity (Yamaoka, 2008). Researchers from South Korea report that, despite all the similarities shared by Eastern Asian societies, South Korean society is influenced more significantly by profound social and economic development, which results in a rapid decline in the traditional family system, complicated changes in interpersonal relations (Park, Smoth, & Dunkle, 2014; Woo & Kim, 2018), and complex relation between health and social capital. Relatively more restricted relations have been found among elderly South Korean people than in some other societies; these restricted relations, usually characterized by very limited number of friends and relatively close proximity to intimate family members like children, are significantly associated with many negative health outcomes (Park, Smoth, & Dunkle, 2014). Elderly South Koreans who have friend-, diverse-, and couple-focused types of networks are more likely to report higher levels of life satisfaction and lower levels of depression, whereas people in restricted networks are more likely to be associated with being older, male and having poor mental as well as physical health (Park, Smoth, &

Dunkle, 2014; Sohn et al., 2017). While elderly South Koreans' health is impacted by restricted social relations, young Koreans are suffering from limited effective support provided by close networks; not only do South Korean youth view status-related factors – income, perceived social status, employment status, and so on – as more important to their life satisfaction, but they also feel less happy living in neighborhoods with high levels of bonding social capital, which may be a result of South Koreans' relatively narrower and weaker social network and younger generation's perception of lower life satisfaction in neighborhood compared with their elder counterparts (Woo & Kim, 2018; Kim & Lee, 2018).

The association between social capital on community level and individual health is confirmed by some researchers (Cho, Park, & Echevarria-Cruz, 2005) but rejected by others (Han, Kim, & Lee, 2012). Other studies suggest that the role of social capital in determining Korean population health is complex and unclear. Using frequency and types of social participation as a proxy, scholars find that although social participation decreases as people age, the significance of social participation in promoting South Korean people's health increases. Higher levels of social participation is positively associated with good self-rated health for people of all ages and sexes (Han, Kim, & Lee, 2012), but the association is particularly significant for elderly Korean women (Lee, Jang, Lee, Cho, & Park, 2008). This connection between social capital and health outcomes holds both generally South Korean population and for special subgroups. Studies report that social capital, measured by social

participation and trust, is a significant predictor of good self-rated health, even after adjusting for relevant factors such as socioeconomic status and risk behaviors like smoking and drinking, among both residents in communities with poor average health (Kim, Jeong, Park, & Kang, 2012) and elderly people with disabilities (Park & Kim, 2016). Longitudinally, social capital – cognitive and structural as well – has been shown to have positive influence on psychological health; higher levels of social capital are linked not only to lower initiate level of depressive symptoms at first wave of measurement, but also to greater decrease in those symptoms over time (Park, 2017).

Based on the mixed findings on Japanese social capital as mentioned above, researchers interested in social capital's contribution to health among Japanese population have reported surprisingly consistent results. Evidences from multi-level analyses have shown that, after controlling for socioeconomic and demographic factors, community level social capital, measured by generalized trust, trust in neighbors, reciprocity, organization participation, volunteering activities, or organization membership, is usually significantly associated with subjective health as well as mental health among Japanese people (Ichiba et al., 2009; Hamano et al., 2010; Saito et al., 2017). Some other elements, such as social cohesion and life satisfaction, are also used for measuring social capital, but the positive link between high levels of social capital and good health outcomes remains (Fujisawa, Hamano, & Takegawa, 2009; Inaba, Wada, Ichiba, & Nishikawa, 2015). Research has also

suggested a triangular relation among social capital, income inequality and health of the community level; social capital is found to attenuate the relationship between income inequality and poor health, but income inequality may also impede the development of social capital (Ichida et al., 2009; Aida et al., 2011). This association between high level of social capital and better health is also found at the individual level. Individuals who participate in more organizations, do volunteer work, have access to more personal resources, and are more trusting are more likely to have better health outcomes (Hamano, et a;., 2010; Iwase et al., 2012; Kobayashi, Kawachi, Iwase, Suzuki, & Takao, 2013; Matsushima & Matsunaga, 2015). Different types of social capital, including bonding, bridging, structural, and cognitive, have been examined by Japanese researchers. Analyses report inconsistent relations between these social capital types and health outcomes, which could be partly attributed to the inconsistent measurements adopted by different researchers and partly to the unique traditional culture and interpersonal relations in this country (Fujisawa, Hamano, & Takegawa, 2009; Aida et al., 2011; Iwase et al., 2012; Inaba, Wada, Ichiba, & Nishikawa, 2015). For instance, among studies using cognitive-structural social capital to predict health outcomes, some researchers measured structural social capital with one question about volunteer participation (e.g. Aida et al., 2011), while others using more comprehensive measurements asking about respondents' participation in various social groups (e.g. Inaba, Wada, Ichiba, & Nishikawa, 2015). Meanwhile, very similar questions (group membership and in-group heterogeneity) were asked by scholars who understand social capital from bonding-bridging perspective (e.g. Iwase et al., 2012).

Similar inconsistencies in measurement can be found not only in Japanese studies but also in research from other societies; these differences in measurements should at least partly account for the complexity of associations between social capital and health reported by researchers all around the world.

4.3 Social Capital and Health in China

As the source of origin of Confucianism, China, including Taiwan and Hong Kong, is among the societies most influenced by Confucian culture and collectivist ideology. Sharing numerous similarities with other societies, China, like its other East Asian counterparts, is characterized by particular patterns of social capital and health. Among all features of Chinese social capital and social relations, the most famous one is probably *guanxi*, the "Chinese expression of social relations" that can potentially facilitate favorable exchanges among connected parties (Lin & Ikeda, 2014). As informal social relation, *guanxi* is most frequently used instrumentally to achieve certain goals like information, employment, and other opportunities (Bian & Ikeda, 2014; Bian, 2017). Bian (2017) argues that social exchanges through *guanxi* are asymmetric transactions, in which the favor receiver gains desired resources while the favor giver gains the reputation of being resourceful. In contemporary China, *guanxi* itself is often considered as a resource; the ties involved, rather than the actual favor, require constant maintenance. In this case, a large part of the value is transformed from the resources mobilized through social networks to the social ties themselves, thus *guanxi* itself becomes the end instead of the means.

The exclusive focus on *guanxi* network and capital is criticized by some other scholars as conceptually ambiguous (Shen, 2016) and too egocentric to capture the society's diverse social contexts (Lin & Si, 2010). Lin and Si (2010) claim that China's narrow trust spectrum, emphasis of family and lack of overarching norms for the society cultivate its endogenous and specific social capital, which is based on a combination of dense strong ties and sparse weak ties. They also argue that the characteristics of Chinese social capital resulted from the country's scares resources interacting with its cultural context, and this mixed type of social capital can be beneficial as well as harmful. On the collective level, lack of certain political rights, less efficient democracy and government, and great income gaps might all contribute to the lack of social capital in China (Lee, Jeong, & Chae, 2011). Without sufficient and influential social organizations and neighborhood household associations (Awaworyi Churchill & Mishra, 2017) as in South Korea and Japan, it is relatively hard for Chinese people to cultivate trust-and-participation-based community social capital.

In addition to traditional culture and rapid economic growth, several more socio-demographical characteristics further distinguish China from other East Asian and Western societies. First, largely due to China's "loose yet still restrictive" household registration policy (Palmer & Xu, 2013), a huge rural-urban gap exists not only in economic development but also in relation-based social capital. Although the central as well as local governments are starting to offer alternative types of household

registration status and other policies to better serve the large population of migrants (Chan & O'Brien, 2019), affordable public resources available to an individual are still mainly based on his/her home province/city, preventing many people from migrating to areas with abundant resources, both social and physical. Researchers have started to realize that due to the more traditional and family-centric interpersonal relation, the stock of social capital and their outcomes in rural areas might be significantly different from those in urban China. Research suggests that, although previous studies using large scale survey data reports relatively high level of generalized trust among Chinese people compared to urbanites, rural Chinese demonstrate a much lower level of general trust and even a narrower trust radius; rural residents also benefit more from bridging social capital, while bonding social capital actually shows negative impact on local development (Xia, 2014). A second characteristic that is closely associated with this rural-urban gap is the large amount of internal migrants in contemporary China. Although the government reports a declining trend of internal migration (Report on China's Migrant Population Development, National Health Commission, China, 2018), there were still nearly 2 hundred millions migrant workers in China in 2017, consisting about 12.4% of the total population (Migrant Population Service Center, National Health Commission, China, 2018). This number is close to the 14.2% internal migrants in South Korea (Statistics Korea, 2019) and significantly higher than the 3.94% reported by Japan (Statistics Bureau of Japan, 2019).

The direction of Chinese internal migration is usually from rural, less developed areas to urban, developed areas, which is similar to the patterns reported by South Korea and Japan in late 20th century as these countries achieved modernization and industrialization earlier than China (Yu, 1990; Mobrand, 2012; Fukurai, 1991). The Chinese migrant workers are mostly young and middle-aged people, leaving behind not only their families and friends, but also their network-based social capital. In other words, not only do migrant workers have to live alone in the destination city, but they also have to restart the accumulation of social capital, integrate into unfamiliar career and lifestyle, and struggle against the stigma attached to migrant workers by the urban natives (Li, Zhang, & Tian, 2006; Li et al., 2007; Chen et al., 2011; Chang, Wen, & Wang, 2011; Cheng & Bian, 2014; Li, 2017). The living condition of rural-urban migrant workers in China resembles that of South Korea in 1990s, when large amount of young and middle-aged, less educated yet economically active people migrated from rural to urban areas (mostly Seoul area) for more working opportunities and better education. Regionalism resulted from historical reasons led to discrimination against people from certain part of the country, which is also similar to the stigmatization of migrant workers in China (Yu, 1990). In Japan, the number of internal migrants reached its peak in 1980s largely due to the economic prosperity and expanding labor market (Yu, 1991). Since then, the proportion of internal migrants has been steadily decreasing as a response to changing demographic and economic structures. In today's Japan, around 50% people reside in three major metropolitan

areas, while migrant workers may be more vulnerable to changes brought by aging society and changing industrial structure (Dzienis, 2011).

Following Japan and South Korea, China is also beginning to adjust to a demographic structure with increasing proportion of elderly people (Chan, 2005). What makes it different from the other societies, however, is the country's recently ended one-child policy. With the first generation of singleton children stepping into their middle age, Chinese families with a "four-two-one" structure (Lin & Yi, 2013) – i.e., four grandparents, two parents, and one child – are now suffering from a lack of social capital. On the one hand, the responsibility of supporting both older parents and young children is placed fully on the adult singleton children, making them more stressful than their previous generations who could enjoy the help from their siblings (Hu & Peng, 2015). On the other hand, older parents need to be cautious as well since their elder life depends almost solely on their only child, considering the filial piety tradition requiring children to take care of the older family members and the relatively weak state welfare system providing minimum resource for long term elderly care (Doling & Ronald, 2012). What is more, the loss of the singleton children might cause unmeasurable and unrepairable damage to marital as well as family relationships (Yan Flora Lau, 2014). From this perspective, three decades of one-child policy significantly restricted Chinese people's bonding social capital by reducing their family sizes. The reduced family size, combined with the large number of migrants, contributes to the increase in the number of one-person households in today's China.

According to the 2015 Census data, about 13% of Chinese households were one-person households (National Bureau of Statistics of China); the majority of them were single or unmarried individuals, followed by those who were widowed (Yeung & Cheung, 2015). Taiwan, with 22% people reported living alone in 2013, has one of the highest proportions of one-person households among East Asian societies following Japan and South Korea (Yeung & Cheung, 2015), but the percentage in Mainland China has also been climbing up due to economic change, cultural shift, and prolonged life expectancy. Unlike Western developed societies described by Klinenberg (2013), many live-alone individuals in urban China are married young to middle-aged, working class individuals or migrants but have had to leave family members behind (Yeung & Cheung, 2015; Cheung & Yeung, 2015); in rural China, by contrast, live-alones are mainly left-behind elderly people (Hu & Peng, 2015). These individuals living by themselves are connected differently with people around them, and thus mobilizing social capital in different ways. However, knowledge about this group of people – especially the younger individuals living by themselves – is very limited.

As in other East Asian societies, the generally positive association between high levels of social capital and good health outcomes is found in China on both individual and collective levels (Shen, Yeatts, Cai, Yang, & Cready, 2014), although relations might vary due to different measurements and cultural-specific mediators. The positive connection between high levels of trust and better health is reported by multiple studies on both community and individual levels (Wang, Schlesinger, Wang,

& Hsiao, 2009; Meng & Chen, 2014; Xue & Cheng, 2017). While only urban residents benefit from high levels of bridging, general trust measured by trust in heterogeneous social groups on county level (Meng & Chen, 2014), rural Chinese who are more mistrusting are more likely than their trusting counterparts to have worse mental health (Wang et al., 2009). Specific trust, especially trust in family, demonstrate stronger connection with health outcomes than general trust among Chinese people (Awaworyi Churchill & Mishra, 2017), which confirms the low-trust-radius theory arguing that East Asian people's interpersonal trust focuses mainly on family and close friends and the extension of trust is smaller than that of Western people. Despite the fact that co-residence between generations, a common living arrangement in societies influenced by Confucianism, has been declining in East Asian societies (Lin & Yi, 2013), elders still benefit from living together with adult children (Chan, 2005). Not only can they receive emotional and practical support from their children, but they can also have access to their children's social capital, which has a significant impact on health (Cao, Li, Zhou, & Zhou, 2015) that is independent from social support (Song & Lin, 2009).

As in Japan, bonding and bridging, structural and cognitive social capital have all been found to correlate positively with good mental as well as physical health in China (Hu et al., 2015; Yuan, 2016; Zhang & Jiang, 2019). Nevertheless, some argue that the significant association between certain types of social capital and health could only be found in urban areas, which highlights the urban-rural disparity in health and

social capital: urban residents seem to benefit more from bonding, bridging and linking social capital (Norstrand & Xu, 2011) due to the more heterogeneous social context and higher residential mobility, whereas rural residents' health is more significantly influenced by bonding social capital (Chen & Meng, 2015; Zhang & Jiang, 2019) as their social networks are narrower, more homogeneous, and more stable than their urban counterparts. Despite the lack of social organizations in China, the Communist Party of China (CPC) membership is proved by many as a good predictor of health (Awaworyi Churchill & Mishra, 2017; Xue & Cheng, 2017). In contemporary China, membership in CPC is often a precondition of working as civil servant or top manager in state-owned enterprises and banks (Lei, Shen, Smith, & Zhou, 2015); CPC members usually enjoy better social welfare distributed by CPC organizations, they are also more likely than other people to have access to public resources. Participating in various activities, having more friends, exchanging gifts, and spouses living together all contribute to higher level of well-being (Lei, Shen, Smith, & Zhou, 2015), whereas migrants and people living by themselves are disadvantaged due to lack of social capital (Yeung & Cheung, 2015). Rural-urban migrant workers are more vulnerable than urban natives to negative health outcomes; stigma against them reduces their opportunity of cultivating trust and rebuilding social capital, which further jeopardizes their mental and physical health (Chen et al., 2011; Palmer & Xu, 2013). The interaction among social capital, socioeconomic condition and health have also been studied by some scholars. Among Chinese urban poor, low community social capital is a significant predictor of poor self-rated health, and social

network becomes particularly crucial to health (Sun, Rehnberg, & Meng, 2009). Good neighborhood relations, however, are important for both rich and poor in China (Yuan, 2016).

4.4 Social Capital and Health in East Asia and China: Identify the Gap

Since the early 2000s, scholars of East Asian societies have been paying increasing attention to the originally Western concept of social capital (Inaba, 2009; Shen, 2016). In spite of all the findings reported by previous research, academic knowledge about the connections among social capital, its elements, and their contribution to health in East Asia and China is still limited for several major reasons. First, only a very small number of cross-national, representative surveys are available for providing a valid context for health-social capital connection in East Asia. Other than the World Value Survey, Asian Barometer and East Asian Social Survey, rarely can researchers find publicly available data for general and comparable analysis among East Asian societies. Even with the three major data sets mentioned above, variables measuring social capital and health are inconsistent and incomplete, making comprehensive study very difficult. It is possible that, although both Western and Eastern scholars believe that their measurements of social capital are valid and reliable, the actual elements and structures considered as "social capital" by Western and Eastern societies are very different. An exploration of social capital elements and structures rooted in the East Asian context is therefore important for bridging the gap between different conceptualizations of social capital.

Secondly, although the importance of social capital accumulation and its longitudinal effect on health have been recognized by more and more scholars (Chua & Wellman, 2015), the absence of longitudinal data limits research with detailed analysis to a large extent. Scholars interested in immigrants' health contribute to the long term influence of social capital on health from a cultural and contextual perspective (e.g. Huang et al., 2012; Kim & Harris, 2013), but exploring the accumulative and longitudinal effect of social capital on health within the same population could generate more profound understanding of the specific associations between these two factors in East Asian and Chinese contexts. In addition, since the understanding of social capital among Chinese sociologists is still shifting from *guanxi* to a more comprehensive concept (Shen, 2016), empirical research on social capital and health in the Chinese context using nationally representative data is yet limited. With the changing demographic structure in contemporary Chinese society, policymakers will benefit enormously from a more thorough examination of how Chinese residents accumulate and mobilize specific types of social capital which yield better health outcomes. Social capital theory has long been criticized for being too vague and broad to maintain its explanatory power. Based on the unique Eastern cultural and social background, the current research can contribute to the generalizability of social capital theory as well as the accuracy of its context-specific measurements.

In order to fill the abovementioned gap, data collected from the East Asian Social Survey (EASS2012) and the China Family Panel Studies (CFPS2010-2018) will be analyzed using different strategies. In the following chapter, data sets and analytic strategies adopted by the current study will be introduced, followed by a description of variables, descriptive statistics, and analytic results.

Chapter 5

DATA, ANALYTIC STRATEGIES, AND RESULTS

In order to understand the structure of social capital in East Asia as well as its long-term interaction with health outcomes in Chinese context, two large scale, nationally representative data sets – the East Asian Social Survey and the Chinese Family Panel Survey – are selected for data analysis in the current study. In the following sections, I will give a detailed introduction to the histories, survey designs and data collection strategies of the two data sets, together with an illustration of my analytic strategies, the variables selected for the current analysis, and descriptive statistics. After that, exploratory factor analysis results describing the social capital compositions in the East Asian societies and their relationships with East Asian people's self-rated health will be presented, followed by a summary of multilevel regression model results describing the longitudinal relationships between social capital elements, their accumulation, and Chinese adults' health outcomes in later life.

5.1 Data

The East Asian Social Survey (EASS) is a biennial social survey launched in 2003. As a General Social Survey-type research project, the EASS collects information on multiple aspects of four representative East Asian societies – China,

Japan, South Korea, and Taiwan. Typical modules of EASS are integrated into preexisting sampling frameworks of each country (i.e. Chinese General Social Survey, Japanese General Social Survey, Korean General Social Survey, and Taiwan Social Change Survey), which guarantees the rigor and comparability of data collected in different societies. Surveys from four years featuring different social issues are currently available to the public. Data from 2012 (EASS2012) focusing on social capital in East Asian societies is used in the current study. Multi-stage Probability-Proportional-to-Size Sampling (PPS) strategy was employed by all four societies with population sizes, regional blocks and socioeconomic indicators as the main stratification variables. Apart from the face-to-face interview method employed in each of the four societies, self-administered surveys and Computer Assisted Personal Interviewing (CAPI) techniques were used in Japan and Taiwan respectively to facilitate the data collection processes. A total of 11,684 individuals participated in the EASS2012, with 5,819 from Mainland China, 2,134 from Taiwan, 2,335 from Japan, and 1,396 from South Korea.

The Chinese Family Panel Survey (CFPS) is a longitudinal general social survey project. Officially launched in 2010, the project covers over 40,000 individuals and nearly 15,000 households from 25 provinces, municipalities, and autonomous regions in Mainland, China. Using this nationally representative sample of eligible households and household members, the project collects information about Chinese residents' economic as well as non-economic wellbeing in order to document changes

in Chinese society. According to the CFPS User's Manual (3rd Edition; Xie et al., 2017), eligible household is defined as "an independent economic unit that lives in a residential community with one or more family members of Chinese nationality," while family members are defined as relatives who have lived with the sampled house for more than three consecutive months and are financially related to the household. In addition to individual and family, a third level – community level – is included in the project design in order for a multi-dimensional understanding of Chinese society (Xie & Hu, 2014). The project adopts Probability-Proportional-to-Size Sampling (PPS) strategy with administrative units and socioeconomic status (measured by local GDP per capita) as the main stratification variables. In addition to the 2010 baseline survey, four waves of follow-up data (2012, 2014, 2016, and 2018) were collected and made available to interested parties. Computer Assisted Personal Interviewing (CAPI) and Computer Assisted Telephone Interviewing (CATI) techniques were used in all five waves of surveys.

5.2 Analytic Strategies

Two major analytic techniques are employed in the current analysis; all analyses are conducted with statistical software STATA 13.1 (2013, StataCorp). First, in order to determine the underlying factors that represent the structure of East Asian people's social capital, exploratory factor analyses (EFAs) are performed using the EASS 2012 data. Separated EFA models are estimated for each society as well as for the whole East Asian sample to explore the similarity among East Asian societies;

EFA models also provide empirical evidence for the hypothesis that social capital in East Asia may take on different forms than in Western societies. After the social capital factors are structured by the EFA models, a set of linear regression models are constructed to examine the association between social capital and self-rated health in each society and among the East Asian population.

Since the EASS 2012 data include both categorical and interval measurements, EFA models based on polychoric correlations are estimated to produce better factor structures (Holgado–Tello, Chacón–Moscoso, Barbero–García, & Vila–Abad, 2010). Unlike traditional Pearson correlations which primarily deal with interval measurements, polychoric correlations assume the existence of two normally distributed latent variables underlying two ordinal variables, and the correlation itself represents the correlation ρ in bivariate normal distribution of these two latent variables (Olsson, 1979; Holgado–Tello et al., 2010; Aletras, Kostarelis, Tsitouridou, Niakas, & Nicolaou, 2010). In cases involving multiple variables, a polychoric correlation matrix is generated and used for EFA. Maximum likelihood estimates are applied to all EFA models in order to acquire favorable properties (StataCorp, 2013); rotation method is also used in the analysis to further simplify the data structure (Osborne, Costello, & Kellow, 2008) and make the results more interpretable (Williams, Onsman, & Brown, 2010). Considering that the EASS2012 survey focuses mainly on measuring ideas and behaviors related to social capital among the East Asian population, it is theoretically and methodologically reasonable to assume the

variables measured in the survey to be correlated with each other. Therefore, promax, an oblique rotation method that allows the variables to correlate, is chosen for the analysis. A set of regression models are then constructed to test the contribution of each factor to East Asian people's self-rated health.

Following the exploratory analyses of East Asian people's social capital structure as well as the social capital elements contributing to their self-rated health, a second step is to further examine the long term, hierarchical hierarchal effect of social capital on health status. Using the CFPS 2010 and 2018 data, Multi-level Models (MLMs) with random intercepts and fixed slopes are estimated to explore the longitudinal, multi-layered impacts of social capital indicators in 2010 on Chinese people's health outcomes in 2018. Apart from the 2010-2018 comparison, a different set of MLMs are conducted using CFPS data from 2010, 2012, 2014 and 2018 to map the changes in Chinese people's social capital, their health outcomes, and the association between the two.

Since the dependent variables include both continuous and binary variables, multilevel logistic, as well as linear regression models, are estimated. Three-level MLMs are presented below.

Level-1: student-level model

$$y_{ijk} = \beta_{0jk} + \beta_{1jk}\beta x_{1ijk} + \beta_{2jk}x_{2ijk} + \cdots + \beta_{ajk}x_{aijk} + e_{ijk}$$

In the student-level model with *a* level-1 variables, y_{ijk} is the measurement of health outcome of individual *i* within family *j* within community *k*, β_{0jk} is the average

health outcome of family *j* within community *k*, and the amount of change in y_{ijk} brought by individual-level variable x_{aijk} after controlling for other variables is represented by β_{ajk}. e_{ijk} is the error term describing individual deviation from the group mean.

Level-2: family-level model

$$\beta_{0jk} = \gamma_{00k} + \gamma_{01k}w_{1jk} + \gamma_{02k}w_{2jk} + \cdots + \gamma_{0bk}w_{bjk} + r_{0jk}$$

$$\beta_{1jk} = \gamma_{10k}$$

$$\beta_{2jk} = \gamma_{20k}$$

…

$$\beta_{ajk} = \gamma_{a0k}$$

In the family-level model with *b* level-2 variables, γ_{00k} is the family mean health outcome in community *k*, γ_{0bk} represents the change brought by family-level variable w_{bjk} when other variables are controlled, and r_{0jk} refers to family *j*'s mean deviation from community *k*'s mean.

Level-3: community-level model

$$\gamma_{00k} = \pi_{000} + \pi_{001}z_{1k} + \pi_{002}z_{2k} + \cdots + \pi_{00c}z_{ck} + u_{00k}$$

$$\gamma_{01k} = \pi_{010}$$

$$\gamma_{02k} = \pi_{020}$$

…

$$\gamma_{0ck} = \pi_{0c0}$$

In the community-level model with *c* level-3 variables, π_{000} is the community mean health outcome, π_{00c} indicates the amount of change brought by community-level variable z_{ck} while controlling for all other variables, and u_{00k} describes community *k*'s deviation from the average of all communities.

5.3 Measurements

The EASS2012 data are used for factor analysis on societal and East Asia levels. After excluding questions that were not asked in all societies or irrelevant to social capital and recoding variables that are not suitable for direct analysis, a total of 46 variables are included in the factor analyses. The final analytic sample includes 8,546 cases from four societies with 4,687 from Mainland China, 1,438 from Japan, 1,377 from South Korea, and 1,044 from Taiwan area. An individual's self-rated health is measured by a single question asking the respondents to rate their health status on a 5-point Likert scale ranging from "Very bad" to "Very good." Among all the East Asian respondents, 17.3% reported having "very good" health, 35.8% reported their health status as being "good," while 3.5% reported having "very bad" health. Mainland China had 20.2% respondents reporting "very good" health and 37.4% reporting "good" health, which were higher than Taiwan (8.2% "very good" and 39.0% "good"), Japan (17.3% "very good" and 34.6% "good"), and South Korea (14.6% "very good" and 29.3% "good"). Only 1.1% Japanese people reported having "very bad" health, which is the lowest among all East Asian societies, followed by

2.2% Taiwanese, 3.3% Mainland Chinese, and 7.6% South Korean. A full list of social capital/social network-related variables is included in Appendix A.

Table 1: Self-Rated Health in East Asian Societies

Self-rated health (%)	East Asia	China	Taiwan	Japan	South Korea
Very good	17.3	20.2	8.2	17.3	14.6
Good	35.8	37.4	39.0	34.6	29.3
So-so	29.2	25.0	42.5	36.6	25.9
Bad	14.2	14.3	8.1	10.4	22.6
Very bad	3.5	3.3	2.2	1.1	7.6

The CFPS 2010 and 2018 data are used for MLM about social capital's longitudinal effect on Chinese people's health outcomes. After excluding cases with missing values, a total of 14,465 respondents nesting within 8,017 families and 611 communities are included in the multilevel models. Three health-related measurements – change in self-rated health, depression index, and chronic disease within the past 6 months – are employed as dependent variables. Change in self-rated health is a binary variable calculated by comparing respondents' self-rated health in 2018 with their health in 2010; those whose self-rated health score decreased from 2010 to 2018 were recoded into category "Worse" and those whose health score remained the same or increased from 2010 to 2018 were recoded into category "Same or better." Among all the Chinese respondents, 78.2% had a health status in 2018

worse than 2010, among which 50.6% were women. Depression index employed in CFPS 2018 was an 8-question refined version of the Center for Epidemiologic Studies Depression Scale 20 (CESD20), which originally included 20 questions and was proved to be too long for the use of CFPS (Institute of Social Science Survey, Peking University, 2015). The index score is calculated by adding up scores of all eight items; higher scores on the index indicate higher levels of depression, while lower scores indicate lower levels of depression. The current sample reported depression scores ranging from 8 to 32 with a mean of 15.5, suggesting a medium level of depression among Chinese people in 2018. Measurement of chronic disease is a binary variable asking respondents whether they had been diagnosed with any chronic disease within the past 6 months. In 2018, 20.1% of the respondents reported being diagnosed with any chronic disease over the past half year, among which 55.2% were females.

A set of individual-, family-, and community-level variables are selected from CFPS 2010 and 2018 to predict health outcomes in later life. Individual-level control variables include demographic information such as respondent's age, gender, household registration status (*hukou*), education status, and marital status; respondent's self-rated health in 2010 is also controlled in order for a better prediction of change in health status over the years. Organization membership, the experience of giving/receiving help from others, having someone to talk to when feeling worried, having someone to turn to when having trouble or feeling sick, having someone to whom can tell everything, perception of the importance of network, and childhood

migration history are included as individual social capital predictors. On the family level, family income, family size, generations living in the same family, frequency of interaction with neighbors, relatives, and friends, and the number of friends visiting during Spring Festival are included as social capital predictors. Finally, having medical facilities in the community, having elderly care facilities in the community, residential stability, and percentage of voters in the community are used as community-level predictors of individual health (see Appendix A for descriptive statistics).

In order to examine the accumulation of social capital and its influence on health outcomes in Chinese people's later life, CFPS 2010, 2012, 2014 and 2018 data are used in the second set of MLMs. After excluding cases with missing values, the 2010-2018 analytic sample includes 16,970 individuals nested in 10,423 families, the 2012-2018 analytic sample includes 17,374 individuals nested in 9,780 families, and the 2014-2018 analytic sample includes 16,820 individual cases nested in 9,027 families. Changes in self-rated health between 2010, 2012, 2014 and 2018, 2018 depression index, and whether diagnosed with chronic diseases within the past 6 months in 2018 are calculated as dependent variables. From 2010 to 2018, 77.9% of the respondents reported a decrease in self-rated health, while 28.9% and 33.4% reported having worse health from 2012 to 2018 and from 2014 to 2018, respectively.

Age, gender, household registration status, educational level, marital status, and year-specific social capital measurements are employed as independent variables

to analyze individuals' health outcomes. For the 2010-2018 sample, two variables – difference in numbers of organizations participated and difference in ratings of the importance of networking – are calculated as measurements of social capital accumulation from 2010 to 2018. 14.3% Chinese residents reported being members of more organizations in 2018 than 2010, while 26.9% reported believing network is more important in 2018 than in 2010. For the 2012-2018 sample, difference in organization memberships and difference in levels of social trust are used as proxies of social capital accumulation. 16.9% Chinese residents belonged to more organizations in 2018 than in 2012, while 19.3% reported a higher level of social trust than in 2012. For the 2014-2018 sample, difference in organization memberships, difference in levels of social trust, difference in levels of popularity, and difference in frequencies of participating in family dinner are calculated to represent the accumulation of social capital. Among all surveyed people, 17.4% belonged to more organizations in 2018 than in 2014, 33.2% believed that they had better social skills and were more popular in 2018 than in 2014, 19.3% were more trustful in 2018 than in 2014, and 12.9% spent more nights having dinner with family in 2018 than in 2014. In addition, family size, family income (log transformed) and urban-rural residency are employed by all three samples as family-level measurements (see Appendix C for descriptive statistics).

5.4 Analytic Results

5.4.1 Social capital and health in East Asian societies

Exploratory factor analyses (EFAs) is used in the first part of the analysis to delineate the key elements and structures of social capital in the East Asian societies. EFAs by maximum likelihood is used to detect the factor structure of the 46 EASS2012 variables using Kaiser's criteria (eigenvalue >1), the Scree test (Hayton, Allen, & Scarpello, 2004; Williams, Onsman, & Brown, 2010), and theoretical validity as major thresholds of factor extraction. Seven factors on the East Asian level (i.e. all four societies combined) are generated from the 46 social capital measurements; each factor includes at least three items and only items with factor loadings higher than 0.3 are kept. Five items – number of family members and relatives who ordinarily interact with the respondent daily, social characteristics of non-kin contacts socialize on an ordinary day, trust in strangers, estimation of human nature and social trust – are omitted due to low factor loading on all factors. The results of the seven-factor East Asian social capital structure are presented in Appendix B.

After dropping low-loading items, the seven remaining factors are: 1) trust in professionals (11 items), including trust in people with different professions such as teachers, police officers, and governmental officials; 2) neighborhood networks and collective efficacy (6 items), including frequency of interaction with neighbors and

perception of neighborhood social cohesion; 3) intimate trust (4 items), including trust in family, friends and colleagues; 4) community participation (4 items), including participation in community meetings about various topics; 5) network heterogeneity (8 items), include the quantity and broadness of one's social network; 6) social tolerance (3 items), including tolerance to people of same or different social statuses; and 7) social support (5 items), including availability of help under different situations. All factors demonstrate acceptable to good internal consistency (trust in professionals = 0.88, neighborhood networks and collective efficacy = 0.76, intimate trust = 0.73, community participation = 0.88, network heterogeneity = 0.60, social tolerance = 0.75, social support = 0.53), while the internal consistency of all items included in final factor structure (alpha = 0.77) is close to the average alpha values of the individual factors.

EFA models estimated for each society suggest that all East Asian societies share a very similar social capital structure, with only small inter-society differences regarding factor numbers and factor compositions. A list of factors for all East Asian societies is presented in Table 2. At the society level, seven factors are retained for the Chinese sample, seven factors for the Taiwanese sample, nine factors for the Japanese sample, and seven factors for the South Korean sample. While all societies report highly consistent results on social support, social tolerance, community participation, and neighborhood network and collective efficacy, the major difference among the societies lies again in the perception of trust. It seems that Japanese society has the

most hierarchical trust structure; beyond the narrow radius of trust in family, friends, and colleagues, its members trust public servants (teachers, governmental officials), authority (physicians, police officers, military officers, judges), and other professionals in different ways. South Koreans, on the contrary, have a simpler trust structure as their trust in people from their core social network is clearly divided from trust in the rest of the society.

The social capital structure in Japan is similar to that in China, with only one major difference revealed by the factors. In China, people differentiate their trust in neighbors from their neighborhood social network and collective efficacy and consider trust in neighbors as part of their intimate trust. This separation may suggest different perceptions of the "private network" versus the "public good" aspects of social capital. While Japanese people believe that neighborhood network and collective efficacy share some essential commonalities, they also consider trust in neighbors as a part of the neighborhood network and collective efficacy factor rather than the intimate trust factor, which is probably a result of their highly developed neighborhood organization system. Similarly, South Korea, another society with a strong tradition of civic participation, also categorizes trust in neighbors as part of the neighborhood network and collective efficacy factor, which is a reflection of the society's belief that social capital belongs to public good.

After extracting the East Asian social capital structures from the EFA models, linear regression models estimating people's self-rated health with factors retained

from the EFA models are constructed for the East Asian sample (i.e. all four societies combined) as well as for each of the societies. Regression results are presented in Table 3. For the East Asian sample, after controlling for nationality, trust in professionals and social support demonstrate no significant correlation with health. Neighborhood network and collective efficacy and community participation are marginally connected with East Asian people's self-rated health, while intimate trust, network heterogeneity and social tolerance significantly predict self-rated health in East Asia. People who have higher level of trust in their family, friends and colleagues and people who have heterogenous social networks are more likely than the others to have better health; however, lower social tolerance to people from various social status (higher, same, lower) is associated with better health among East Asian people.

Linear regression models for each East Asian society report similar connections between social capital and health. In Mainland China, people who have higher levels of trust in their family and friends, people who participate less in community meetings, people who have more heterogenous social networks, and people who have lower social tolerance are more likely than the others to have better self-rated health. More heterogenous networks and higher levels of trust in family, friends, colleagues and some professionals are also significant predictors of Taiwanese's better self-rated health, but higher levels of neighborhood network and collective efficacy as well as support from bridging social ties also seem to be correlated with better health among Taiwan residents. For Japanese people, higher

levels of intimate trust and more heterogenous social networks are both predictors of better self-rated health, while more community participation is actually an indicator of worse self-rated health. Similarly, South Korean residents with higher level of intimate trust and more heterogenous social networks have better health; they also benefit significantly from less neighborhood networks and collective efficacy as well as lower levels of community participation.

It can be concluded from the East Asian regression results that, first, community-neighborhood level social capital plays a minor role in predicting East Asian people's self-rated health; neither neighborhood network and collective efficacy nor community participation correlate significantly with self-rated health on East Asian level, while higher level of community participation is negatively linked to Chinese, Japanese and South Korean people's self-rated health. Second, individual-level factors related to intimate, bonding relationships demonstrate a stronger correlation with health; trust in family, friends, and colleagues is proved to be able to predict better self-rated health on both East Asian level and societal level. Although the trust radius in East Asian societies is narrow, the heterogeneity of an individual's social network does play a crucial role in understanding East Asian people's health, with broader, more diverse social relationships connecting to better health. Finally, the negative correlation between social tolerance and health in East Asia might be explained by both the influence of a large Chinese sample and the high level of homogeneity in East Asian societies. Being different – be it better or worse – can negatively impact an individual's image in very homogeneous societies; staying with people who are socially similar to each other thus may function as a protective factor that prevents individuals from physically and psychologically risks.

Table 2: Factor Structures of East Asian Societies

Factor Number	Factor Name				
	East Asian	**China**	**Taiwan**	**Japan**	**South Korea**
1	Trust in professionals	Trust in professionals	Trust in professionals and intimate trust	Trust in professionals	Trust in professionals
2	Neighborhood network and collective efficacy	Intimate trust	Trust in authorities	Trust in authority	Neighborhood network and collective efficacy
3	Intimate trust	Neighborhood collective efficacy	Community participation	Neighborhood network and collective efficacy	Community participation
4	Community participation	Community participation	Neighborhood network and collective efficacy	Community participation	Social support
5	Network heterogeneity	Network heterogeneity	Network heterogeneity	Trust in public service	Intimate trust
6	Social tolerance	Social support	Social support	Network heterogeneity	Network heterogeneity
7	Social support	Social tolerance	Social tolerance	Intimate trust	Social tolerance
8				Social support	
9				Social tolerance	

Table 3: Unstandardized Linear Regression Model on Social Capital's Influence on Self-Rated Health in East Asia

	Unstandardized Coef.				
	East Asia (N=8,546)	**China** (N=4,687)	**Taiwan** (N=1,044)	**Japan** (N=1,438)	**South Korea** (N=1,377)
Nationality	-0.16**	-	-	-	-
Trust in professionals	0.02	0.03	-	-0.07	0.06
Trust in professionals and intimate trust	-	-	-0.12*	-	-
Trust in authority	-	-	0.04	0.01	-
Trust in public service	-	-	-	0.01	-
Neighborhood network & collective efficacy	0.02+	0.03	-0.09**	-0.02	0.16**
Intimate trust	-0.13**	-0.10**	-	-0.16**	-0.32**
Community participation	-0.03+	-0.05*	-0.03	-0.08*	-0.10+
Network heterogeneity	0.28**	0.33**	0.09*	0.13**	0.32**
Social support	-0.00	0.01	-0.06*	-0.01	0.03
Social tolerance	0.17**	0.18**	0.01	0.07	0.07

+ p<.1; * p<.05; ** p<0.01

5.4.2 Social capital and health in China

Informed by the East Asian social capital factors as well as their connections with East Asian people's self-rated health, the second part of my analysis examines 1) the longitudinal influence of social capital elements on Chinese adults' health outcomes in later life (longitudinal models); and 2) the accumulation of social capital elements and their interaction with Chinese adults' health outcomes over time (accumulation models).

Longitudinal models. Using CFPS 2010 and 2018 data, a set of multilevel regression models are estimated to explore the longitudinal impact of social capital elements on Chinese people's change in self-rated health, depression level and chronic diseases diagnosis in later life. The results of the multilevel models are summarized in Table 4 below.

Based on the models' results, it is reasonable to conclude that, even after controlling for the self-rated health status in 2010, social capital elements in 2010 still have some significant impacts on Chinese people's health status in 2018. First, the change in self-rated health (CSRH) measures whether the respondent's health gets worse from 2010 to 2018. According to the models, elderly people, females, people with non-rural household registration status (i.e. *hukou*), and people who are more educated are more likely to experience a decrease in self-rated health over the years. While helping people is not significantly associated with the change in health, people

who were in need of help and received the help that they needed are more likely to experience a decrease in self-rated health from 2010 to 2018. Those who have someone to turn to when in trouble are less likely to report worse health, yet people who have someone to share everything are more likely to report a decreased self-rated health. Compared to Chinese people who did not consider the network as important, those who believed that social network is crucial to a successful life in 2010 enjoy better health in their later life. None of the family and neighborhood-level social capital measurements show significant connection with the change in self-rated health in this sample.

Another measurement of health, depression in 2018, is also proved to be significantly related to some social capital elements after controlling for health in 2010. Similar to the estimation of change in self-rated health, older people and females are more likely to have a higher score on the depression index, indicating a higher level of depression in daily life. More educated people, compared to their less-educated counterparts, are less likely to feel depressed, while married people are significantly and much less likely than their not-married counterparts to feel depressed. Again, people who needed and received help show higher levels of depression. However, perceived network importance is negatively associated with depression in later life. People perceiving the social network as important are slightly more likely to have a higher score on depression index. On the community level,

living in an urban area is negatively associated with depression in later life for people in this Chinese sample.

Table 4: Multilevel Model on Social Capital's Influence on the Change in Self-Rated Health (CSRH), Depression, and Chronic Disease Among Chinese People, 2010-2018 (N=14,465)

	Variable	Exp(B) CSRH	Exp(B) Depression	Exp(B) Chro. Dis.
Individual Level (N=14,465)	Self-rated health in 2010	2.10**	0.70**	0.64**
	Age	1.03**	1.01**	1.05**
	Female	1.37**	2.07**	1.32**
	Rural *Hukou*	0.72**	0.95	0.81**
	Education	1.12**	0.85**	1.00
	Marital Status	1.10	0.46**	1.06
	Organization membership	1.00	1.04	0.97
	Gave help	1.11	1.07	1.02
	Received help	1.18**	1.36**	1.12**
	Has someone to talk to when worried	0.98	0.94	1.10*
	Has someone to turn to when in trouble	0.92*	1.03	0.95
	Has someone to turn to when sick	0.94	0.91	0.94
	Has someone to tell everything	1.06*	1.04	1.09**
	Importance of network	0.95*	1.08*	1.00
	Childhood migration	0.99	0.91	0.95
Family Level 0(N=8,017)	Family income (log)	0.10	0.94	1.05
	Family size	1.01	1.00	0.96
	Family gap	0.93	0.97	1.12*

Table 4 continued

	Frequency of interaction with neighbors	1.06	0.10	1.01
	Frequency of interaction with friends/relatives	0.97	1.00	1.01
	Number of friends visiting during Spring Festival	1.00	1.00	1.00
Community Level	Urban area	1.09	0.77**	0.97
(N=611)	Has medical facilities in community	1.00	0.89	0.98
	Has elderly care facilities in community	0.95	0.91	0.89
	Percentage of floating population	1.00	1.00	1.00
	Percentage of voters	1.00	1.00	1.00

* p<.05; ** p<0.01

In terms of being diagnosed with the chronic disease within the past 6 months, elderly people, females, and people with non-rural household registration status are more likely to suffer from chronic disease in later life. Receiving help is again a significant predictor of chronic disease, while having someone to talk to when feeling worried and having someone to share one's experience with also contribute to a higher possibility of having chronic diseases. On the family level, a large gap within the

family, that is, more generations living together, is correlated with a higher possibility of getting chronic diseases, after controlling for all other variables.

Accumulation models. Due to the fact that different measurements of social capital were employed in each wave of CFPS survey, it is practically impossible for the current analysis to include all social capital measurements in one model and calculate the accumulation of social capital elements over eight years. As an alternative, a second set of multilevel regression models are constructed using CFPS 2010-2018, 2012-2018, and 2014-2018 data respectively to examine the accumulation of different elements of social capital as well as its influence on Chinese residents' health status in later life. Results of the multilevel models are summarized in Table 5 below.

Although a clear causal relationship between the accumulation of social capital and health outcomes cannot be confirmed without consistent measurements and fixed timeframe, the findings still provide some insight into the interaction between social capital and health over time. For the 2010-2018 model, after controlling for Chinese residents' baseline self-rated health, depression level and chronic disease condition, older people are more likely to experience a decrease in self-rated health, lower level of depression, and higher possibility of having chronic diseases in 2018. Compared with males, females are more likely to suffer from worse health, higher levels of depression and chronic diseases. Having rural household registration status is significantly associated with better self-rated health, higher level of depression and

lower likelihood to be diagnosed with chronic diseases. Higher level of education is associated with worse self-rated health and lower level of depression, while being married is linked to a significantly lower level of depression. On the family level, both family size and family income are negatively associated with level of depression; living in a bigger family and having higher family income both contributed to a lower level of depression. While living in an urban area is correlated with a lower level of depression and lower likelihood of being diagnosed with chronic diseases, it does contribute to a worse self-rated health. In terms of the 2 social capital elements measured in this model – organization membership difference and difference in attitude towards the importance of social network – only the membership difference measurement shows significant correlation with health outcomes in later life. Compared to 2010, people belonging to more social and/or political organizations in 2018 are 13% less likely to have worse self-rated health than their counterparts but are 25% more likely to be diagnosed with chronic diseases. People who belong to more organizations are also 17% more likely to have higher level of depression, but the correlation is only marginally significant.

The 2012-2018 model reports some similar findings. After controlling for baseline health outcomes, age and gender demonstrate similar connection to health outcomes as in the 2010-2018 model; older people have worse self-rated health, better mental health, and higher likelihood of suffering from chronic disease, while being female means having worse health on all three dimensions. People with rural

household registration status are more likely to have worse mental health but are less likely to be diagnosed with chronic diseases, and both more educated people and people who are married enjoy a better mental health. On family level, living in a big family and having a high family income are both protective factors against depression. High family income is also linked to lower likelihood of having worse self-rated health, while urban residents are again less likely to have a high level of depression. Regarding measurements of social capital, membership difference between 2012 and 2018 again predicts changes in health outcomes. People who belong to more organizations in 2018 are 18% more likely to be diagnosed with chronic diseases; membership difference is also marginally correlated with higher level of depression in later life. Another social capital measurement – general social trust – also demonstrates significant connection with health. People who are more trustful in 2018 than 6 years ago are 14% less likely to have worse self-rated health and are 32% less likely to have a higher level of depression; they are also 10% less likely to be diagnosed with chronic diseases than their counterparts, but the relationship is marginally significant.

Table 5: Multilevel Model on the Accumulation of Social Capital and Its Influence on the Change in Self-Rated Health (CSRH), Depression, and Chronic Disease Among Chinese People (2010, 2012, 2014, and 2018)

Variables	**Exp(B)**		
		2010-2018	
	CSRH	**Depression**	**Chro. Dis.**

Table 5 continued

Individual Level (N=16,970)	2010 CSRH / Depression/ Chro. Dis.	2.01**	2.42**	2.60**
	Age	1.02**	0.99**	1.04*
	Female	1.31**	2.52**	1.50**
	Rural *Hukou*	0.78**	1.31**	0.81**
	Education level	1.16**	0.68**	0.98
	Marital status	1.07	0.26**	1.06
	More membership	0.87*	1.17+	1.25**
	Network more important	1.05	1.10	0.99
Family Level (N=10,423)	Family size	0.98	0.95*	0.99
	Family income (log)	0.97	0.81**	0.98
	Urban area	1.13*	0.67**	0.89*
		2012-2018		
		CSRH	**Depression**	**Chro. Dis.**
Individual Level (N=17,374)	2012 CSRH / Depression/ Chro. Dis.	3.51**	1.21**	3.04**
	Age	1.02**	0.99**	1.04**
	Female	1.26**	1.78**	1.48**
	Rural *Hukou*	1.07	1.19*	0.85*
	Education level	0.96+	0.81**	0.96+
	Marital status	0.96	0.36**	1.06
	More membership	0.98	1.14+	1.18**
	More trustful	0.86**	0.68**	0.90+
Family Level (N=9,780)	Family size	0.99	0.93**	0.99
	Family income (log)	0.93**	0.89**	0.98
	Urban area	1.09+	0.73**	0.91
		2014-2018 Independent Variables		
		CSRH	**Depression**	**Chro. Dis.**
Individual Level (N=16,820)	2014 CSRH / Depression/ Chro. Dis.	3.36**	1.37**	3.71**
	Age	1.02**	1.00	1.04**
	Female	1.27**	2.15**	1.42**
	Rural *Hukou*	0.95	1.39**	0.84**
	Education level	0.94**	0.78**	0.97

Table 5 continued

	Marital status	0.95	0.40**	0.97
	More membership	0.94	1.22*	1.20**
	More trustful	0.91+	0.78**	0.91
	More popular	0.89**	0.82**	1.04
	More dinner with family	1.18**	1.11	0.98
Family Level (N=9,027)	Family size	1.00	0.95**	0.99
	Family income (log)	0.97+	0.87**	0.98
	Urban area	1.04	0.71**	0.90+

+ p<.10; * p<.05; ** p<0.01

When baseline health outcomes are held constant, the 2014-2018 model also indicates some positive associations between accumulated social capital and health outcomes in later life. Demographic characteristics are connected to health outcomes in similar ways as reported in previous models. Older people are more likely to have worse self-rated health and chronic diseases, people with rural household registration status are more likely to have higher level of depression and are less likely to be diagnosed with chronic diseases, people with higher level of education are more likely to have worse self-rated health and lower level of depression, and people who are married are less likely to have a high level of depression. Being female is again associated with worse self-rated health, higher level of depression, and higher likelihood of being diagnosed with chronic diseases. On a family level, living in a bigger family, having high family income, and living in urban area all predict lower level of depression, while urban residents are also marginally less likely to be diagnosed with chronic diseases. After

controlling for all other variables, accumulated social capital has significant impacts on health outcomes in later life. Over a 4-year period, people who participate in more organizations are 22% more likely to have higher level of depression and 20% more likely to be diagnosed with chronic disease. People who are more trustful are 22% less likely than their less trustful counterparts to have higher levels of depression, they are also marginally less likely to report worse health in later life. People who accumulated better social skills over the years – people who consider them to be more popular in 2018 than 4 years ago – are 11% less likely than the others to report worse health and are 18% less likely to have high levels of depression in later life. On the contrary, people who spend more time with family – measured by frequency of having dinner with family per week – are 17% more likely to report worse health in later life.

In sum, although direct inter-model comparison is impossible, the findings reveal some consistent connections between the accumulation of social capital elements and health outcomes over time. First of all, more civic participation – measured by being a member of more social/political organizations – consistently predicts higher levels of depression and higher likelihood of being diagnosed with chronic diseases in later life. Over an eight-year period, more civic participation is also linked with lower possibility of a decreased self-rated health. However, network importance, a measurement that significantly predicts health outcomes in the long run, show no accumulated impact on health in the current models. Secondly, an increased level of general social trust is proved to be associated with significantly lower levels

of depression and, to a lesser extent, less likelihood of having worse health in later life. In addition, having a stronger confidence in one's social skill – measured by one's self-rated popularity – predicts a lower level of depression and a lower likelihood of having worse health, while having a closer connection with family predicts a higher likelihood of having worse health in later life. Significant as they are, the last two connections are only found over a four-year period.

In the following chapter, a more fully developed discussion of the abovementioned East Asian social capital structures, as well as the connections between social capital elements and health outcomes in China, will be provided.

Chapter 6

THE HEALTH-SOCIAL CAPITAL COMPLEX IN EAST ASIA AND CHINA: A DISCUSSION

The relationships among social capital and various health outcomes have been attracting attention from international researchers, but the context-specific application of social capital theory and measurements as well as its longitudinal, accumulative impact on health outcomes require more thorough study. Using nationally representative data collected from East Asian societies, the current research examined the compositional structure of social capital in East Asia, followed by an exploration of the long-term interaction between social capital elements and health outcomes among Chinese residents. This chapter will discuss some most significant findings on the connection between social capital and health outcomes; limitations and implications for future research will also be provided.

6.1 Social Capital and Health in East Asian Societies: Similar Elements, Different Structure and Connection?

6.1.1 Elements and structure of social capital in East Asian societies

Exploratory factor analysis of the 46 social-capital-related questions in the 2012 East Asian Social Survey reported a seven-factor social capital structure on East

Asia level. The result features trust in different social groups, network heterogeneity, and neighborhood and community participation. Further analysis of the society-specific data also found very similar factor structures in Mainland Chinese, Taiwanese, Japanese and South Korean societies, supporting the view that there is a consistent social capital structure in East Asian societies. Although most of the variables contributing to East Asian societies' social capital are also proved to be significant social capital predictors in Western societies, they are grouped into slightly different structures in East Asian societies, indicating that there are differences between social capital structures in East Asian and Western societies that may be the focus of comparative study.

Several features of social capital in East Asia can be summarized from the EFA result. First, results of the current analysis confirm the narrow trust radius in East Asian societies proposed by previous scholars (e.g. Fukuyama, 1995; Delhey, Newton, & Welzel, 2011). The way East Asian residents trust their family, friends and colleagues is significantly different from the way they trust the rest of the society; the former usually enjoys a high level of trust, while the latter is trusted to a relatively limited degree. This can be understood from multiple perspectives. On the one hand, the differentiation between intimate trust – trust in family, friends and colleagues – and trust in professionals such as authorities and public service agents reflects the "us vs. them" mentality among East Asian people. On the other hand, although family, friends and colleagues are three key elements of intimate trust, the trust radius is

slightly different in each society. Compared to Japan and South Korean, Mainland Chinese respondents reported wider trust radius, while Taiwanese had the widest range of intimate trust. This difference may be explained by each society's political regime type: a society with traditional authority may value a narrower trust radius with high level of trust only in family, friends and colleagues, while a society with legal-rational authority may have a wider trust radius including not only family and friends but also certain social institutions (Bian & Ikeda, 2014).

In addition, it seems that East Asian people's high level of trust in a small yet intimate group of people does not contribute to their trust in the general population. Social trust, a measurement of the general, population-level trust and a key factor of social capital measurement in Western societies, cannot be loaded together with any group of trust measurements produced by this East Asian sample. One possible explanation is that the role of social trust is unique and independent of other types of trust. Bian and Ikeda (2014) categorize all EASS2012 trust measurements into three types: particular trust in specific people and ties, institutional trust in institutions and agents, and universal trust in strangers. However, although this "tripartite typology" supports the low factor loading of the variable "trust in strangers" – what the authors call "universal trust" – on East Asian level, it fails to account for the low factor loading of the variable "social trust," as in the question asking participants "would you say that most people can be trusted." Therefore, the role of social trust in East Asian people's social capital structure lacks adequate explanation.

Another interesting feature revealed by the factors is the separation of "neighborhood" from "community." Recent scholars have realized that concepts like neighborhood and community carry not only geographical but also social meanings; residents may define the boundaries of neighborhood and community differently than the census (Chaskin, 1997; Coulton, Korbin, Chan, & Su, 2001). Nevertheless, despite the differences in original meaning and question wording that may lead to different understandings of the two terms, East Asian people seem to conceptualize daily interaction between neighbors as closer to the bonding end of the social capital spectrum, while community participation is perceived as closer to the bridging end. When asked about daily interaction and collaboration in emergent situations, the people who come up in Asian residents' mind are their neighbors who live close to them and are recognizable to them. This three-level structure encompassing individual/family, neighborhood, and community is in line with the layered trust structure mentioned above and is very different from the individual/family-community/neighborhood binary commonly seen in research on Western societies (e.g. Stone, 2001).

Moreover, in this East Asian sample, participating in social/political organizations and volunteering are not treated as part of civic participation as they were in previous research. Instead, they are grouped together with measurements of network broadness and heterogeneity. For instance, social eating (frequency of eating out with non-kin others) is strongly associated with Chinese informal social relations

(*guanxi*) and has been considered by many as a good indicator of an individual's level of connectedness in a given society (Chen & Wu, 2011; Bian, 2017; Zou, Cheng, & Nie, 2018). Having overseas contacts, another indicator of the diversity of one's social network, is also included in the same factor. Grouping these measurements together indicates that for East Asian people, participating in social organizations and volunteering are less about fostering trust and reciprocity (e.g. Putnam, 2001) but are more related to developing and maintaining their social ties as a part of the social capital accumulation process. These shared experiences and memberships function as a basis for the construction of shared identity, which allows East Asian people to transform random interpersonal connections into potentially resourceful, pseudo-family relations (Lin, 2001).

6.1.2 Social capital and health in East Asian societies

This East Asian social capital structure also shed some light on the correlation between social capital and health in East Asian societies. Previous studies have suggested that higher level of trust (e.g. Yiengprugsawan, Welsh, & Kendig, 2017), higher level of neighborhood collective efficacy (e.g. Kawachi et al., 2004), frequent civic participation (e.g. Kawachi et al., 1997), diverse social network (e.g. Altschuler, Somkin, & Adler, 2004), and higher level of social support (e.g. Poortinga, 2006a, 2006b) all significantly contribute to better health outcomes. Findings of the current analysis of East Asian sample partially support these earlier studies while providing

some new perspectives of understanding the relationship between social capital elements and health in East Asian societies.

First, network heterogeneity, a measurement of the density and diversity of one's social network, indicates constant and significant positive impact on East Asian residents' self-rated health. People who interact frequently with acquaintances, actively participate in various social/political organizations, and know people of different professions are more likely than the others to report a better health status. This connection confirms the findings reported by scholars adopting a weak-bridging approach, suggesting that people can benefit significantly from diverse and broad social networks. For East Asian people, joining multiple organizations may not be able to cultivate a higher level of trust or sense of reciprocity, but it does have the potential of improving their health by providing various social ties, in which health-related resources are embedded. When formal, stable institutions are not available, people in a given society tend to resort to informal social networks for resources and supports (Qi, 2013; Horak & Klein, 2016). Although East Asian societies have more or less established modern legal-rational institutions, their strong rational collectivist tradition (Herrmann-Pillath, 2010) makes diverse and broad social networks a must-have for achieving a variety of goals, good health status included.

While a higher level of trust is not necessarily a product of civic participation in East Asia, trust itself remains a significant predictor of self-rated health. In all East Asian societies, higher levels of trust are associated with better self-rated health.

Nevertheless, this association is only limited to trust in family, friends and colleagues. Neither trust in professionals nor social trust shows significant correlation with self-rated health in East Asia. The insignificant role of trust in professionals is probably a consequence of the narrow trust radius in East Asia, in which only a limited number of people from one's core social network are deemed as important and highly trustworthy, therefore have more direct influence on one's health status. It is also likely that the link between East Asian people's health and their trust in professionals and institutions is mediated by some other social capital elements in the model, which suggests a more distant and complicated relationship between health and various forms of trust in East Asia. In addition, the role of social trust – the perceived trustworthiness of most people in a society – remains unclear in the current analysis. Result of a test model suggests that after controlling for all social capital factors, the connection between social trust and self-rated health on East Asian level is not significant. In other words, when other social capital factors are held constant, social trust fails to significantly predict East Asian people's self-rated health. Previous research suggests that generalized trust cannot be used as a proxy of other elements of social capital (Moore & Carpiano, 2019), yet a possible explanation here is that social trust's impact on self-rated health is mediated by other forms of trust such as intimate trust; however, no conclusion can be drawn without further examination.

In contrast to many previous studies (e.g. Sun, Rehnberg, & Meng, 2009; Chen & Meng, 2015), neighborhood and community involvement shows minor correlation

with East Asian people's self-rated health. While the factor shows no significant association to self-rated health on East Asian level and in China and Japan, dense neighborhood network and high level of neighborhood collective efficacy only associate with better health in Taiwan society. In South Korea, dense networks and high levels of collective efficacy in the neighborhood are actually linked to lower self-rated health. In terms of community participation, only the Chinese sample reports a link between frequent community participation and lower level of self-rated health; both the East Asian sample and samples from other societies show no correlation between the two.

This lack of positive impact of neighborhood and community involvement in East Asian societies may be explained by the weak tie theory (Granovetter, 1983). Although weak ties have the advantage of providing scarce information and resources that are not immediately available to an individual and thus can improve one's health in the long run, when it comes to measuring the comprehensive health status, one's evaluation of their health status is more strongly influenced by the availability and quality of strong ties, i.e. support from family and friends. Neighborhood network and collective efficacy may function as protective factors on collective level, but perceived dense and close networks in one's neighborhood can also result in a sense of strain and thus endangers one's health (Due et al., 1999). Moreover, the community participation measurements in EASS2012 asked participants about their frequency of participating in community meetings for a variety of issues like environment and education. In this

case, people who frequently participate in community meetings may not only include people who are really concerned about their community, but also people who live in less developed, more disadvantaged communities with a lot of social issues. From this perspective, the current measurement of community participation should be better considered as a proxy rather than an accurate measurement of social capital.

Another measurement that deserves noticing is social support. As a core element of social capital that has been repeatedly proven to have strong positive influence on individuals' health, social support's lack of significant impact in the current analysis may be explained by its measurement structure. The original variables measuring availability of different types of help are recoded into measurements with four answer options: help not available, linking ties available, bridging ties available, and bonding ties available. This categorization may not be the best way of capturing the variance among different types of social ties and therefore fails to provide an accurate estimation of its contribution to East Asian people's health. In addition, social tolerance, a factor measuring individuals' tolerance to people from each social class, is negatively connected with self-rated health in the East Asian sample as well as in the Chinese sample. Whist the East Asian result may be biased by the large Chinese sample size (49.8% of the East Asian sample are from China), this connection between low social tolerance and high self-rated health may be understood by East Asian societies, and especially Chinese society's, high levels of homogeneity. In highly homogenous societies, simply the presence of a "different group" – be it social class,

sexuality or ethnicity – may trigger negative responses among people who are economically less secured and socially ill-connected (Persell, Green, & Gurevich, 2001), leading to a series of psychosocial effects. In this situation, in-group homogeneity may function as a protective factor that protects individuals from a diverse or "chaotic" social environment.

In sum, East Asian people who have diverse networks and have high levels of trust in family, friends and colleagues are more likely to have better self-rated health, while involvement in community and neighborhood activities produces limited and mixed results. Apart from pointing to some new directions for further research on East Asian level, these findings also provide a broad social and cultural context for the understanding of the interaction between social capital and health in China, which will be discussed in the following section.

6.1.3 Social capital and health in China: a longitudinal perspective

Using five waves of CFPS data, the two sets of multilevel models produced some intriguing results concerning the long-term interplay between social capital elements and health outcomes among Chinese people. After controlling for the baseline health status and demographic indicators, not only do social capital elements in earlier life stages have significant impacts on Chinese adults' health outcomes in later life, but the accumulation of some social capital elements over time are also found to be significantly connected with later health outcomes.

Longitudinal models. Findings of the first set of models highlight some key aspects of the long-term impacts of social capital on Chinese people's physical and mental health. First, and most importantly, the findings confirm that there exists a long-lasting relationship between social capital and health outcomes. Elements of social capital, especially those related to social support, can have a profound influence on both psychological and physical health even after controlling for the baseline health status. As mentioned in the literature review, social support is a key social capital element that has been proved to have significant and positive influence on individual health by numerous studies. A high level of social support not only reflects the availability of practical help, but is also a good indicator of strong emotional support. The link between social support and health outcomes also holds in a Chinese context; middle-aged and older adults with more diverse and higher levels of social support are more likely than their counterparts to have better health behaviors and outcomes (Chao, 2011; Xiao, Wu, & Zeng, 2019). Therefore, it is not surprising that the same relation is discovered over a period of eight years.

However, one feature of the current model that cannot be fully explained by previous studies is the mixed directions of the effects of social support. Having someone to turn to, a measurement of practical support, is associated with a lower likelihood of having a worse self-rated health in later life; similar connection between availability of practical support and better health is also reported by other researchers (Han, 2013). On the contrary, measurements of emotional support – having someone

to talk to when worried and having someone to tell everything – are associated with higher likelihoods of being diagnosed with chronic disease and having a worse self-rated health in later life. This negative relation between emotional social support and health in later life may suggest that, involving in an intense supportive relationship – whether on the giving end or the receiving end – can become a psychological and even physiological burden longitudinally.

The constant significance of needing and receiving help in predicting health outcomes also deserves better attention. Needing help with various issues (including job hunting, school hunting for children, visiting doctors, and so on) is by itself an indicator of lacking social capital in an individual's own social network. The strong and significant connection between having the experience of needing and receiving help and worse health outcomes in later life is, therefore, a perfect indicator of the long-term, negative impact of (the lack of) social capital on health. Even for people who have received help and thus presumably resolved the problem, experience "social capital strain" in earlier life stages may impact their life trajectories and eventually contribute to accumulative disadvantage in later life. Viewing from a *guanxi* perspective, although giving and receiving help are favor-exchanging behaviors and thus can be considered as necessary for the maintenance of *guanxi*, they also symbolize the persistence of a sense of indebtedness (Li, Du, & Van de Bunt, 2016). This sense of obligation, together with the fair amount of calculation required for maintaining *guanxi* balance, may eventually cause harm to the psychological and

physical well-being of Chinese adults. Compared with receiving help, giving help to other people reflects the possession of a certain amount of social capital and requires relatively small effort in exploring and expanding the existing social network, which may be an explanation of its lack of long-term association with health among Chinese people.

Moreover, despite the positive effects of neighborhood and community social capital reported by previous researchers, measurements of neighborhood/community level social capital demonstrate a very limited impact on health in the long run. This finding is consistent with the results reported by the East Asian models, in which social capital factors measuring neighborhood and community involvement show minor to no significant correlation with East Asian people's self-rated health. Previous studies conducted in Chinese background actually produced mixed results: some report negative connections between neighborhood or community level participation and health outcomes (e.g. Lin, Lu, Guo, & Liu, 2019), while the others report positive links between the two (e.g. Dan, 2015). The current analysis offers more evidence for the former argument. The transition from a socialist planned economy to a socialist market economy in the past four decades has dramatically changed the neighborhood and community structures in China. Work-unit-based communities are replaced by commodity housing communities in urban areas; people who were used to neighbor their colleagues are now forced to neighbor strangers with various social backgrounds. Meanwhile, as a consequence of the economic development, rural villages are

impacted by the large number of rural-urban migrants, which weakens the kinship-based interpersonal relationship that forms the foundation of villagers' social networks. These social-structural changes on neighborhood and community levels, together with the absence of a strong civic society, contribute to the relatively weak local social ties and therefore the insignificant role of neighborhood and community participation in improving individual health in the long run (Li, Zhu, & Li, 2012; Meng & Chen, 2014).

Among all collective level measurements, only the rural-urban measurement demonstrates significant correlation with the individual level of depression: compared with rural residents, urban residents are less likely to have a high level of depression in the long run. While it is widely believed that the process of urbanization is accompanied by an increasing prevalence of depression, the protective effect of urban residency in the current analysis can be understood from two perspectives. On the one hand, as a developing country with a significant rural-urban gap, living in urban areas means having access to resources that can be mobilized for coping with depression symptoms; on the other hand, mentally and physically healthier people are more likely to migrate to urban areas, leaving their less healthy counterparts behind in rural areas (Wang, Xue, Liu, Chen, & Qiu, 2018).

Another interesting finding is the mixed connections between perceived network importance and health outcomes. It is possible that treasuring social networks will lead to the active accumulation of social capital and then to better self-rated health

in later life. However, this emphasis on networking can take its toll. The time and energy required for expanding and maintaining one's social network may well be a psychological burden for some people, which overpowers the benefit of a well-established social network and results in worse psychological health in later life. This finding actually points to a new direction for the research on *guanxi*, the Chinese variation of social capital. *Guanxi* as an alternative to formal, institutional connections has long been considered as a cause and result of corruption (Herrmann-Pillath, 2009); while recent scholars start to notice its positive and instrumental use (Lin & Si, 2010), *guanxi*'s negative effects on individual level – especially on health – has not yet been examined. Considering that social network and *guanxi* are often used interchangeably in Chinese context, it is highly possible that an emphasis on the role of *guanxi* in personal success – a mentality that requires continuous relationship maintenance (Qi, 2013), negotiation and calculation – will negatively influence one's psychological well-being in the long run.

Some other correlations between individual traits and health outcomes are worth noticing as well. For instance, Chinese residents with rural household registration are less likely than their urban counterparts to have worse self-rated health; they are also less likely to be diagnosed with chronic disease. Given the fact that there are more abundant medical resources in urban areas, this lower possibility of being diagnosed with chronic disease among rural dwellers is probably a consequence of lack of both awareness of one's own medical condition and availability of medical

resources. In addition, although a higher level of education is related to a higher likelihood of having a worse self-rated health, more educated Chinese people are less likely to have a high level of depression, just like their married counterparts. Last but not least, being female, as repeatedly noted in public health literature, is a significant risk factor for all three health outcomes. The persistent associations between social capital elements and health outcomes in later life even after controlling for these major demographic measurements further confirm the hypothesis that social capital in earlier life stages can significantly influence individual health in later life.

Accumulation models. In addition to the longitudinal impact of social capital on Chinese adults' health outcomes, the positive effect of social capital's accumulation over time is also partly confirmed by a second set of multilevel models. When other individual and family level variables are held constant, the accumulation of several social capital elements over periods of four to eight years significantly contribute to Chinese adults' health outcomes in later life.

Although other measurements of social capital vary by year, membership difference, the only persistent social capital element, significantly predict health outcomes across all accumulation models. Joining more social/political groups is correlated with a higher level of depression and a higher possibility of being diagnosed with chronic diseases over four-, six- and eight-year periods; nevertheless, it is also correlated with a lower possibility of having a worse self-rated health on an eight-year basis. On the one hand, this finding is consistent with the relationship between

network heterogeneity and self-rated health reported by the East Asian model. Belonging to more organizations naturally leads to the expansion of one's social network, which provide more potential resources that can be mobilized for the purpose of health-promotion. Although organization membership fails to significantly predict health outcomes in later life in the longitudinal models, its accumulation over time – a reflection of the accumulation of network broadness or diversity – is proved to be a protective factor against health deterioration over time.

On the other hand, while the cumulative benefit of organization membership is in line with previous research on civic participation and health (Bennett, 2005; Yip et al., 2007; Kumar et al., 2012; Kim, Kim, & You, 2015), its negative impact on psychological well-being and chronic conditions requires a different interpretation. Compared with their socially less-active counterparts, people who joined more organizations within the past few years may shoulder more and heavier responsibilities such as more frequent contacts with other people and higher levels of perceived stress, which are responsible for their worse psychological health and higher likelihood of having chronic diseases. This finding also complements the finding on the longitudinal impact of one's perception of network importance on health: while the perceived importance of networking is hypothesized to negatively influence one's health in a more indirect, subtle way, the link between direct civic participation and worse health outcomes further confirms social capital's "dark side" as a potential psychological and chronic risk factor. Previous studies on the effectiveness of subjective and objective

health measurements produce mixed results (Cleary, 1997; Butrick et al., 2012), it is possible that different measurements of health capture distinct aspects of one's health status and therefore are linked to social capital through different mechanisms, leading to results of different directions as reported in the current analysis. Interestingly enough, the accumulated perception of network importance fails to significantly predict health outcomes in later life in the current models. The difference between the effects of civic participation behavior and perception of network importance may reflect the different mechanisms functioning behind structural and cognitive social capital respectively, which deserves a more detailed exploration.

Social trust, another core indicator of social capital, also demonstrates cumulative effects on health outcomes in later life. Over a four- to six-year period, people who become more trusting are less likely to experience a decrease in self-rated health, to have a higher level of depression, and, to a lesser extent, to be diagnosed with chronic diseases.

This finding adds an accumulation element to the connection between high levels of cognitive social capital and positive health outcomes that has been well documented in Chinese context (e.g. Yip et al., 2007). It also further strengthens the claim that there is a continuous and positive correlation between generalized trust and self-rated health (Campos-Matos, Subramanian, & Kawachi, 2015). As a relational property, sense of trust in East Asian societies is developed through intimate interaction with specific groups of people (Choi & Han, 2011; Glanville, Andersson,

& Paxton, 2013), meaning that trust, just like interpersonal interaction, requires a process to be created and accumulated. Previous studies focusing on the cross-sectional linkage between trust and health outcomes are thus not able to account for this delayed timeframe for the accumulated trust to take effect. In contrast, the accumulation models suggest that regardless of people's baseline trust level, accumulating more trust in the general population will protect them from health deterioration. This conclusion also echoes the finding of a longitudinal study conducted in the U.K., in which the researchers find that a decreased level of trust is associated with a decrease in self-rated health (Giordano & Lindstrom, 2010). Moreover, the cumulative effect of social trust also provides new evidence for understanding the role of trust in shaping East Asian people's health outcomes. When measured independently and longitudinally, social trust may have profound impact on people's psychological and physiological health; this hypothesis, nevertheless, is still open to tests using longitudinal data from other East Asian societies.

Over a four-year period, two less frequently measured social capital elements – individual popularity and level of connectedness with family – both show accumulated influences on Chinese adults' health outcomes in later life. People who become more popular over the four years are less likely than the others to suffer from a high level of depression, and are also less likely to experience a decrease in self-rated health. Although the majority of research in social network measure level of connectedness with the actual number of contacts and the frequency of interaction (e.g. Levula,

Harré, & Wilson, 2018), self-rated popularity may be considered as a proxy of one's actual social ties and therefore can be used to evaluate the influence of social capital. Besides, in Harpham and colleagues' (2002) summary of social capital measurements in health research, emotional support is listed as a key indicator of cognitive social capital because it enables people to "feel" things related to their social network and embedded resources. In this case, although an individual's popularity is a subjective perception of their level of connectedness, it may also represent a generalized form of support from one's entire social network. This feeling of being welcomed and supported thus functions as a buffer against depression and health deterioration.

However, having dinner with family more frequently, another indicator of social support and strong ties, leads to a higher likelihood of having a decreased self-rated health. Two possible theories can be used for understanding this negative connection. According to the relational strain theory (Due et al., 1999), family as a close and highly integrated group unites its members with strong and intimate social ties, which may generate excessive pressure and anxiety that eventually lead to health deterioration. Meanwhile, spending more time with one's family means that less time can be used for social eating and other forms of interaction with people from their extensive social network. Considering the significance of social eating in building up *guanxi* in the Chinese context (Bian, 2017), it is understandable that being confined to one's family reduces their capability for developing diverse social network, which may contribute to their worse self-rated health in later life.

Major demographic measurements – gender, household registration, education level, and marital status – show similar connections to health outcomes in the accumulation models as they do in the longitudinal models. Urban residency again functions as a protective factor against depression and chronic diseases, which further confirms the previous hypotheses on resources availability and migration related to the rural-urban gap in China. Taken together, the two sets of multilevel models provide solid evidence for the thesis that there exists a longitudinal association between social capital and Chinese residents' health outcomes; some elements of social capital can influence people's health in later life, while the others have cumulative impact on Chinese adults' health outcomes. Nevertheless, the current study is not without limitation. In the following section, limitations of the current analysis will be discussed, together with some implications for future research in the discipline of social determinants of health.

6.2 Social Capital and Health: Towards a Contextual and Cumulative Perspective

Several limitations regarding the data and analytic strategies employed in the current study limite the exploratory power of its results. First, although the EASS2012 data provides a relatively comprehensive measurement of social capital, the questions included in the survey are designed mostly according to previous theories and findings based on Western societies. In other words, although a major argument of the current study is that social capital as a highly contextual concept should be understood and

measured via a framework that is both generalizable and culture- and social-sensitive, the measurements used in the current study may already be biased toward Western social structures and cultural traditions. As a consequence, some social capital elements that are key to East Asian culture may already be missing from the questions, resulting in the failure to capture the whole picture of social capital in East Asia societies. Measurements of social capital in the CFPS longitudinal and accumulation models are also not without problem. Despite being a longitudinal research project, each wave of CFPS asks slightly different questions on individual as well as collective social capital; this, together with the very limited number of social capital measurements, makes the interpretation of the longitudinal interaction between social capital and health outcomes extremely difficult.

Some other major limitations are related to the analytic strategy employed in my study. Although the EFA model reported meaningful social capital factor structures for the East Asian sample as well as for each society, the factor structure may be biased by the uneven distribution of the four societies' respective sample size. For instance, as mentioned in the discussion section, the correlation between the social tolerance factor and East Asian people's self-rated health is very likely the result of a big Chinese sample. Further analysis using the same dataset should consider weighting the data to further even the influence of sample size for more accurate estimations. Using structural equation models to explore the structural relations between social capital measurements and East Asian resident's self-rated health is also recommended.

Furthermore, in order to focus exclusively on the relationship between social capital factors and health, my linear regression models did not factor in any potential confounders such as gender, age or education. The exclusion of confounders means that only a small part of the social determinants of health in East Asian societies were captured by my models, leaving a majority of them open to further exploration.

In addition, although my construction and interpretation of the longitudinal and accumulation models using CFPS data were largely informed by the analytic results of my East Asian social capital models, the two parts of my analysis employed different data sets, which makes it impossible to compare the two directly. The limited timeframes – four years, six years and eight years, respectively – adopted by the accumulation models may also raise some concerns regarding the generalizability of the cumulative effects of social capital elements on health outcomes. Without a longer time period and a set of uniform measurements of social capital over time, it is hard to completely rule out the possibility that the changes in social capital and their correlations with health outcomes in later life are simply results of demographic change rather than substantial connections. What is more, while both my East Asian models and some previous studies reported significant associations between different types of trust and health outcomes (e.g. Meng & Chen, 2014), only one single measurement of social trust was included in the accumulation models, which may lead to a weakened exploratory power regarding the relationship between accumulated trust and health outcomes among Chinese adults.

In order to provide a more accurate measurement of social capital that is both specific enough to be applied to East Asian societies and general enough for inter-society comparison, future researchers are expected to incorporate more indigenous measurements of social capital together with the universal social capital indicators in their survey. For example, informal social ties and networks, an element of social capital that is key to the mobilization of social resources in East Asian societies (Chua & Wellman, 2015), is inadequately measured in the EASS2012. Including more culture-specific indicators of social capital like *guanxi* (as in China) or *yongo* (as in South Korea) will greatly contribute to our understanding of the mechanisms linking social resources to other social behaviors. Also, topics like the role of resident-defined neighborhood and community boundaries in health research (Weiss, Ompad, Galea, & Vlahov, 2007) have been attracting increasing scholarly attention; the influence of local sociocultural environment is gaining importance in the examination of social determinants of health. A uniform measurement of social capital is also a must-have for comparative research including diverse cultures.

However, this is not to suggest that researchers should employ completely society-specific measurements in their research. Instead, a comprehensive understanding of social capital as a theory and a measurement is impossible to be achieved until a set of core social capital measurements that is generalizable to most of the cultures is identified. These measurements should include questions about both individual and neighborhood/community level social capital that capture cognitive,

network and structural aspects of social capital. Researchers would also benefit from longitudinal surveys or repeatedly measured cross-sectional survey using the same social capital measurements.

Beyond more carefully designed measurements and analytic strategies, future scholars interested in the connections between social capital and health in various sociocultural backgrounds should also pay more attention to the following aspects. First of all, a detailed examination of the correlation between social capital and health outcomes in various subpopulations is required for advancing our knowledge about the interaction between social capital, health and other social mechanisms. Researchers have reported that the linkage between social capital and health outcomes is patterned by gender (Moore & Carpiano, 2019), urbanization (Norstrand & Xu, 2011) and immigration status (Huang et al., 2012); a set of test models using CFPS data also suggested that the longitudinal and cumulative connections between social capital elements and health outcomes are different among elderly and people who live alone than among the general Chinese population. Given the drastic changes in demographic and family structure in East Asia (Yeung & Cheung, 2015) as well as on a global scale, an extensive examination of social capital's roles in shaping a variety of subpopulations' health is expected in the near future.

Another factor that has not yet been thoroughly studied but is key to the understanding of social capital and health is the power structure in a given society (Carpiano & Moore, 2020). The Marxist tradition of analyzing the power structure and

class conflicts in a given society has been gradually replaced by more evidence-oriented methods like network analysis, but the analysis of macro-level power inequality can reveal some structural constraints that are largely invisible on the individual level, which may facilitate our understanding of groups' and communities' efforts of mobilizing scarce social resources to improve their health (Campbell, 2020). For example, in China, the available types of social and health insurance are largely dependent on individuals' place of residency, i.e. whether they are urban or rural residents. In a recent study, Wang and colleagues (2018) found that Chinese people's use of healthcare services is significantly correlated with the type of social health insurance available to them. In this case, the urban-rural structural gap determines the (un)availability of effective health insurance, which further leads to different health behaviors and potentially different ways of mobilizing one's social capital for better health outcomes. From a longitudinal perspective, temporal structural inequality in social capital can reproduce itself overtime on the individual level, leading to a "cumulative inequality" or "cumulative disadvantage" (DiPrete & Eirich, 2006) in social capital throughout one's life course, which may exhibit significant impact on one's health status as revealed by the longitudinal models in the current study.

The relationship between social capital and health outcomes has been examined using a variety of quantitative methods including resource, position, name generators and many other techniques (Carpiano & Moore, 2020). Nevertheless, it is the sociocultural context of a given society that determines what specific elements of

social capital will be mobilized by an individual and how they mobilize them. Therefore, developing quantitative research exploring the "context in which social capital emerges, accumulates, and/or is eventually mobilized" (Carpiano & Moore, 2020) is a critical next step for research on social capital and health. A good example of qualitative examination of the health-social-capital connection would be the study of patients' utilization of *guanxi* in dealing with the Chinese health care system. Ethnographic works suggests that, on the one hand, the use of *guanxi* in China poses significant ethical challenge upon professional boundaries and patient-physician relationship; on the other hand, the mobilization of *guanxi* reflects patients' proactive role in negotiating for better medical resources when such resources are unevenly distributed alone social structure (Munro, Duckett, Hunt, & Sutton, 2013; Zou, Cheng, & Nie, 2018). Given the unique structure of social capital in East Asian societies, qualitative research focusing on the sociocultural-specific mechanisms linking social capital to health outcomes should be particularly productive.

Despite the abovementioned limitations, the current study produced some interesting findings on social capital and its connection with health in East Asian societies. The final chapter will provide a brief summary of the key findings; some suggestions for future research and policy making will also be included.

Chapter 7

CONCLUSION

Social capital theory has been used by numerous scholars throughout the world to analyze its effects on health outcomes. However, most of the previous studies examining social capital and health adopt Western sociocultural contexts as the default baseline, which overlooks the contextual nature of social capital as well as the sociocultural specific mechanisms linking social capital to health outcomes. Using two large scale, representative data sets collected from East Asian societies and Mainland China, the current study intends to explore the structure of social capital in East Asian societies, its correlation with East Asian residents' self-rated health, and the longitudinal interaction between social capital and health outcomes in China.

The data analysis indicates that, despite some minor inter-society variation, social capital in East Asia is structurally slightly different than in Western society, featuring a narrow trust radius, an emphasis on network heterogeneity, and a less important role of neighborhood and community participation. Some key elements of social capital proposed in Western societies are either structured differently (e.g. civic participation, general trust) or are less significant (e.g. social support, community and neighborhood participation) in East Asian societies. On the East Asian level, network heterogeneity and intimate trust are the two most significant predictors of self-rated

health, while the influence of neighborhood and community involvement is minor. Further analysis of the longitudinal Chinese data suggests that, after controlling for baseline health status and demographic factors, individual level social capital elements such as social support and perceived network importance can have long term impact on Chinese adults' health outcomes in later life, while neighborhood and community level social capital measurements fail to predict health outcomes in later life. In addition, organization membership, social trust, perceived popularity and level of connectedness with family all show cumulative effects on health outcomes in later life over periods of four to eight years. In sum, the current study confirms that social capital is connected with self-rated health in East Asia in a structurally distinctive way, and that social capital elements have longitudinal and cumulative impact on psychological as well as physiological health among Chinese adults.

The current study contributes to the existing literature on social determinants of health from several perspectives. Theoretically, the discovery of an East Asia social capital structure points to the urgent need for a more generalizable yet sociocultural-sensitive social capital theory and measurement. On the one hand, the wide application of the concept of social capital on a global scale requires an adaptive and comprehensive theory that fits into diverse sociocultural contexts and makes comparative study possible. Findings of the current study suggest that, when surveyed with measurements developed on the basis of the Western conceptualization of social capital, East Asian residents map them in ways different from their Western

counterparts. First, civic participation is understood as an indicator of network heterogeneity rather than a measurement of norms of reciprocity in East Asian societies. Second, East Asian residents have narrow trust radius and layered trust structure, while general trust and social trust – the two major measurements of trust in Western societies – do not necessarily fit into their trust structure. Third, East Asian residents conceptualize neighborhood and community differently; neighborhood and community social capital may not be as crucial as they are in Western societies. Lastly, although kinship is at the center of East Asian residents' social networks, measurement of the frequency of daily interaction with family members does not fit into their social capital structure.

Based on the Western-Eastern comparison, at least two elements – intimate trust and network heterogeneity – can be identified as core social capital elements that are shared by societies in both Eastern and Western worlds. Future researchers may also want to revise the core measurements of social capital to: 1) include independent measurements of network heterogeneity – such as name and position generators – in addition to measurements of civic participation; 2) employ more comprehensive measurements of trust to cover both general and specific trusts; 3) construct measurements of neighborhood and community social capital on the collective level that are based on resident-identified neighborhoods and communities, rather than simply aggregating individual level measurements to the collective level; 4) use event-based measurements to examine the availability of social support and help. These

measurements should be able to contextualize social capital at least on the neighborhood/community level; they can also offer a relatively comprehensive and succinct estimation of both one's social network structure and the potentially mobilizable resources embedded in one's network, making the cross-culture comparison of social capital possible.

On the other hand, the measurements of social capital need to include flexible items that can be used to measure the culture-specific social relations, such as *guanxi* in China and *blat* in Russia. Previous research suggests that, although Western social capital scales demonstrate satisfying validity in the Chinese context, their predictive power is lower than that of the restructured scales using the same measurements but rearranged according to *guanxi* dimensions (Avery et al., 2014). In other words, the significant correlations between Western social capital measurements and outcome variables in Chinese contexts may be essentially partial or even superficial; indigenous and contextualized measurements are therefore required for a localized social capital theory. For instance, both social eating (Bian & Ikeda, 2014) and friend-visiting during Chinese Spring Festival (Bian, 2008) are proved to be significant predictors of people's social capital that are unique to Chinese (and East Asian) culture. Apart from the core social capital measurements mentioned above, indigenous social capital measurements that reflect sociocultural nuances should also be added to the scale to enhance its flexibility and adaptability.

The cumulative and context-specific features of social capital are acknowledged by many scholars (Moore & Carpiano, 2020), yet rarely have scholars studied the longitudinal and cumulative impact of social capital elements on health outcomes. Although the current study is far from extensive, it does contribute to a relatively novel perspective of understanding the relationship between health and social capital. Elements like civic participation, social support and general trust have the potentiality to be accumulated over time on individual level; the accumulated social capital can then significantly affect individuals' physical and psychological well-being over time, regardless of their baseline health conditions. With this better understanding of the long-term impact of social capital on health, future researchers should acknowledge the limitation of treating social capital as a "point estimation" instead of a "process estimation" and take the cumulative effects of "social capital inequality" into consideration when examining population health inequality. Scholars can also start to incorporate social capital as a new trajectory perspective into research on topics like cumulative inequality, childhood disadvantage, and aging. The cumulative effect of social capital elements sheds some light on the design and implementation of dynamic social capital intervention programs as well (Shiell, Hawe, & Kavanagh, 2018), shifting the attention from temporary measurements of social capital and health to an interactive and cumulative process.

Policy makers can also benefit from findings of the current study. The role of social capital in health promotion has been recognized by many Western governments.

For instance, in the Healthy People 2020 project in the U.S., civic participation and social cohesion – two important elements of social capital – are included in the "place-based" framework proposed by the Office of Disease Prevention and Health Promotion (Office of Disease Prevention and Health Promotion, 2020). In Canada, the benefits of social capital have been realized and promoted by the government since 2006 (Government of Canada, 2006). In their "Health Profile for England: 2018" report, researchers in the U.K. dedicated a section to the salient influence of community social capital on health (Government of the United Kingdom, 2018); similarly, Australian government discussed the crucial role of social determinants – social capital included – in shaping population health in a chapter of their "Australian's Health 2016" report (Australian Institute of Health and Welfare, 2016).

In contrast, the importance of social capital in health promotion seems to attract less attention in East Asian societies. A preliminary search of policy and government reports related to social capital and health in East Asian societies returned no result, suggesting a relatively insignificant role of social capital in the policymaking processes in these societies. Despite neighborhood and community involvement's minor significance in the current study, policy makers in East Asian societies should probably take the cultivation of social capital on collective level into consideration. Societies like Japan and South Korea with relatively well-established social participation traditions may consider designing more focused intervention programs to facilitate the transformation from social capital to health outcomes.

Mainland China, a society that is still fostering its own rigorous civic society, may start with the establishment and regulation of neighborhood- or community-based social organizations to enhance neighborhood level social interaction. Regardless of their focuses, policy makers are expected to adopt a grounded methodology, creating intervention strategies in relation to their culture-specific connection between social capital and health outcomes.

Moreover, policy makers should encourage the cooperation among medical practitioners, social organizations, and researchers from multiple disciplines. This multifaceted collaboration may function as a diverse network consisting of bridging and linking ties that are capable of spreading information regarding the critical nexus between social capital and health in heterogenous social groups, hence can be viewed as a type of social capital by itself. Consequently, this type of collaboration can promote the public awareness of competencies like health literacy or cultural health capital, which, as key abilities required for patient-physician interaction, will eventually contribute to the maximum use of health-related social resources. In societies characterized by weak formal institutions, the government-promoted multi-party collaboration can also mobilize social resources possessed by different social classes in a top-down fashion, which not only breaks the resource barriers established by dominant social groups, but also connects individual participants to a broader social network full of health-related connections and resources that are otherwise unavailable.

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Appendix A

DESCRIPTIVE STATISTICS OF EAST ASIAN SOCIAL SURVEY 2012 SOCIAL CAPITAL VARIABLES FOR EXPLORATORY FACTOR ANALYSES

Variable	Min.	Max.
Number of organization actively participated in past 12 months	0	8
Has foreign contact	0	1
Network heterogeneity	0	10
Job search network	0	6
People to ask help: emotional/psychological problems	0	3
People to ask help: health problems	0	3
People to ask help: household chores/cares	0	3
People to ask help: financial problems	0	3
People to ask help: at emergency or natural disaster	0	3
Number of family members and relatives interact in an ordinary day	1	8
Number of other people interact in an ordinary day	1	8
Social characteristics of non-kin contacts socialize on an ordinary day	1	3
Frequency of eating out with non-kin others	1	5
Number of neighbors greeting	1	5
Number of neighbors asking for a favor	1	5
Social tolerance to people have equal social status	1	4
Social tolerance to people have higher social status	1	4
Social tolerance to people have lower social status	1	4
Frequency of community meeting for environmental issues	1	4

Appendix A continued

Frequency of community meeting for educational issues	1	4
Frequency of community meeting for safety issues	1	4
Frequency of community meeting for consumer issues	1	4
Volunteered in past 12 months	0	1
Agree or disagree: community cooperation at natural disaster	1	7
Agree or disagree: wish to contribute towards society	1	7
Neighborhood environment: mutually concerned for each other	1	7
Neighborhood environment: willing to provide assistance	1	7
Trust in relatives	1	4
Trust in friends	1	4
Trust in neighbors	1	4
Trust in work colleagues	1	4
Trust in strangers	1	4
Trust in physicians	1	4
Trust in banking staff	1	4
Trust in company executives	1	4
Trust in journalists	1	4
Trust in NGO/NPO leaders	1	4
Trust in teachers	1	4
Trust in local government officials	1	4
Trust in central government officials	1	4
Trust in police officers	1	4
Trust in military officers	1	4
Trust in judges	1	4
Estimation of human nature	1	7
Social trust	1	4
Power to make important decisions to change life	1	4

Appendix B

FACTOR LOADING OF THE SEVEN-FACTOR STRUCTURE OF EAST ASIAN SOCIAL CAPITAL (N=8,546)

Items	Factor Loadings						
	Trust in Professionals	**Neighborhood Networks & Collective Efficacy**	**Intimate Trust**	**Community Participation**	**Network Heterogeneity**	**Social Support**	**Social Tolerance**
Number of organization actively participated in past 12 months					0.56		
Has foreign contact					0.68		
Network heterogeneity					0.55		
Job search network					0.42		
People to ask help: emotional/psychological problems						0.69	
People to ask help: health problems						0.71	
People to ask help: household chores/cares						0.81	

Appendix B continued

People to ask help: financial problems				0.77	
People to ask help: at emergency or natural disaster				0.73	
Number of other people interact in an ordinary day			0.49		
Frequency of eating out with non-kin others			0.65		
Number of neighbors greeting	-0.66				
Number of neighbors asking for a favor	-0.68				
Social tolerance to people have equal social status					0.87
Social tolerance to people have higher social status					0.70
Social tolerance to people have lower social status					0.80

Appendix B continued

Frequency of community meeting for environmental issues			0.83	
Frequency of community meeting for educational issues			0.86	
Frequency of community meeting for safety issues			0.89	
Frequency of community meeting for consumer issues			0.90	
Volunteered in past 12 months				0.50
Agree or disagree: community cooperation at natural disaster	0.44			
Agree or disagree: wish to contribute towards society	0.36			
Neighborhood environment: mutually concerned for each other	0.85			

Appendix B continued

Neighborhood environment: willing to provide assistance		0.88	
Trust in relatives			0.66
Trust in friends			0.87
Trust in neighbors			0.56
Trust in work colleagues			0.58
Trust in physicians	0.53		
Trust in banking staff	0.58		
Trust in company executives	0.50		
Trust in journalists	0.56		
Trust in NGO/NPO leaders	0.45		
Trust in teachers	0.61		
Trust in local government officials	0.76		
Trust in central government officials	0.76		
Trust in police officers	0.87		
Trust in military officers	0.84		
Trust in judges	0.89		

Appendix B continued

Power to make important decisions to change life	0.37

Appendix C

DESCRIPTIVE STATISTICS – CHINA FAMILY PANEL SURVEY 2010 AND 2018 VARIABLES FOR MULTILEVEL MODELS

	Variable	Min.	Max.	Mean
Dependent Variables	2010-2018 Health difference	0	1	0.78
	Depression index	8	32	15.50
	Diagnosed with chronic disease within past 6 months	0	1	0.20
Independent Variables Individual Level (N=14,465)	Self-rated health in 2010	1	5	4.24
	Age	21	94	52.08
	Female	0	1	0.50
	Rural *Hukou*	0	1	0.75
	Education	1	8	2.67
	Marital Status	0	1	0.87
	Organization membership	0	3	0.48
	Gave help	0	1	0.32
	Received help	0	1	0.45
	Has someone to talk to when worried	0	2	1.73
	Has someone to turn to when in trouble	0	2	1.51
	Has someone to turn to when sick	0	2	1.88
	Has someone to tell everything	0	2	0.74
	Importance of network	1	5	3.54
	Childhood migration	0	1	0.06

Appendix C continued

Family Level (N=8,017)	Family income (log)	1.61	14.53	9.97
	Family size	1	26	4.26
	Family gap	1	5	2.32
	Frequency of interaction with neighbors	0	4	1.36
	Frequency of interaction with friends/relatives	0	4	1.35
	Number of friends visiting during Spring Festival	0	200	9.93
Community Level (N=611)	Urban area	0	1	0.41
	Has medical facilities in community	0	1	0.90
	Has elderly care facilities in community	0	1	0.51
	Percentage of floating population	10.39	100	89.15
	Percentage of voters	1	100	79.09

Appendix D

DESCRIPTIVE STATISTICS – CHINA FAMILY PANEL SURVEY 2010, 2012, 2014 AND 2018 VARIABLES FOR MULTILEVEL MODELS

	Variable	Min.	Max.	Mean
Dependent Variables	2010-2018 Health difference	0	1	0.78
	2012-2018 Health difference	0	1	0.29
	2014-2018 Health difference	0	1	0.33
	2018 Depression index	8	32	15.50
	2018 Diagnosed with chronic disease within past 6 months	0	1	0.20
		2010-2018 Independent Variables		
Individual Level (N=16,970)	Age	20	94	51.48
	Female	0	1	0.52
	Rural *Hukou*	0	1	0.72
	Education level	1	7	2.60
	Marital status	0	1	0.86
	More membership	0	1	0.14
	Network more important	0	1	0.27
Family Level (N=10,423)	Family size	1	21	4.06
	Family income (log)	1.10	14.73	10.40
	Urban area	0	1	0.51
		2012-2018 Independent Variables		
Individual Level	Age	20	94	50.86

Appendix D continued

(N=17,374)	Female	0	1	0.53
	Rural *Hukou*	0	1	0.74
	Education level	1	7	2.56
	Marital status	0	1	0.87
	More membership	0	1	0.17
	More trustful	0	1	0.19
Family Level	Family size	1	21	4.20
(N=9,780)	Family income (log)	1.10	14.73	10.40
	Urban area	0	1	0.48
	2014-2018 Independent Variables			
Individual Level	Age	20	94	50.19
(N=16,820)	Female	0	1	0.54
	Rural *Hukou*	0	1	0.74
	Education level	1	7	2.59
	Marital status	0	1	0.89
	More membership	0	1	0.17
	More trustful	0	1	0.19
	More popular	0	1	0.33
	More dinner with family	0	1	0.13
Family Level	Family size	1	21	4.36
(N=9,027)	Family income (log)	1.61	15.20	10.45
	Urban area	0	1	0.48