

A META-ANALYSIS OF SOCIAL CAPITAL AND HEALTH

by

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BACKGROUND: Social capital is the term used to describe the results of social relationships formed by reciprocal exchanges among members of social networks such as religious, political, and other kinds of organizations. Research about this complex, widely debated concept has focused on cognitive and structural measures formed around several broad constructs: sense of community; trust and reciprocity; social support; social networks; participation; and collective efficacy. These constructs can be analyzed using individual, ecological, and multilevel analyses. However, the social capital literature provides little evidence about the relationship between social capital and health or the causes and consequences of this relationship. This lack can be attributed to definition and measurement issues within the literature, which also sustain the question of what the health benefits are from social capital.

METHODS: Using a meta-analysis to examine the breadth of the social capital literature, I seek to characterize the literature and provide an overall estimated effect size that statistically describes the relationship between social capital and health.

RESULTS: Meta-analysis of studies cited in the literature shows a modest positive relationship between social capital and self-reported health, social capital and all-cause mortality, and also significant, previously unexamined differences among the studies themselves: first, whether they reported an effect size or if an effect size was estimated; and second, there was a marginal difference in whether they focused on self-reported health or all-cause mortality.

CONCLUSIONS: There is a modest positive association between social capital and health which suggests unexplained factors that drive the relationship between social capital and health.

PUBLIC HEALTH SIGNIFICANCE: The results of this study indicate a need for social capital research to clearly define its constructs and measures and to provide more evidence about the relationship between social capital and health. Future research should identify micro- to macro-level factors that can influence this relationship. Such evidence can guide the design of future studies that seek to increase the stock of social capital for individuals and communities.

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1.0 INTRODUCTION

1.1 SOCIAL CAPITAL AND HEALTH

Social capital, a complex phenomenon, is the term used to describe the results of social relationships formed by reciprocal exchanges between members of social, religious, and political organizations, or other social networks. It is broadly conceptualized as how people feel and what people do, which of course are recognized as interconnected. Social capital can provide benefits that may be private and individual, such as social support, and group benefits such as public services. Its focus on strengthening existing social ties and forming new ones demonstrates the human need to understand both social inclusion and social exclusionary practices.

Social relationships, which are the foundation of social capital, can be analyzed using individual, ecological, or multilevel models. Each level of analysis enriches the social capital literature but can also complicate it. By contrast, social capital can be examined according to three themes: community integration, public participation, and power relations (Wakefield & Poland, 2005). This focus shifts attention to an asset model of community and calls attention to horizontal and vertical social relationships (Labonte, 2004). Because of its pervasive presence in human society and its wide applicability, social capital has captured the attention of a wide variety of academic disciplines including public health, sociology, cultural studies, and economics.

Since the early 1990s, the working definition of social capital has included concepts such as social support, social networks, social cohesion, norms of reciprocity, values, and trust. The wide appeal of social capital as a subject of study has important implications for research into social relations that span the continuum of human experience—i.e. people’s investment in social capital and the returns it can supply to individuals, families, neighborhoods, states, and countries. For public health researchers and practitioners, interest in social capital may result in more funding from both government and nonprofit sources. Scholarly research by public health scholars who have an interest in social capital have already shown benefits to human health such as reduced mortality (Kawachi, 1999; Kawachi, Kennedy, & Glass, 1999; Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997), safer neighborhoods (Kennedy, Kawachi, Prothrow-Stith, Lochner, & Gupta, 1998), and more socially cohesive communities (Boneham & Sixsmith, 2006; Cattel, 2001).

The array of social capital perspectives, applications, and measures makes social capital a concept so difficult to study that further inquiry may languish in obscurity. For example, some scholars debate whether social capital is an individual or ecologic concept, a question that stems from the mix of psychosocial measures, such as trust and norms of reciprocity, and structural constructs such as social support, social networks, and community participation. This lack of conceptual clarity and consensus, while risky, also presents many challenges and opportunities. The challenges stem from the profusion of social capital’s definitions and concepts, and the difficulties of measuring it precisely. Opportunities abound in the conceptual and methodological fortitude to clarify what and how social capital aids health promotion activities. Social capital captures many inter-related social phenomena that conceptualize what people do, how they behave, and what resources they use to get by in life. The author of this dissertation is

particularly interested in the effects of social capital's constructs on self-reported health measures and all-cause mortality. This study is a meta-analysis whose research questions are:

- What is the association between social capital's constructs and self-reported health and all-cause mortality measures?
- How does the level of measurement influence the association between social capital and self-reported health and all-cause mortality measures?
- What is the effect of moderators on the association between social capital, self-reported health and all-cause mortality measures?

1.2 FOCUS OF STUDY

This study on social capital and health focuses on a critique of the social capital literature. Specifically, the study examines social capital theory, definitions, and its measurement by discussing:

- The predominant definitions and conceptualizations of social capital (Chapter 3);
- The common social capital mechanisms (constructs) that appear in the theoretical and empirical literature (Chapter 3);
- The three forms of social capital: bonding, bridging, and linking (Chapter 3);
- Past research (Chapter 3), measurement issues (Chapters 3 and 4), limitations, community development approaches to social capital, opportunities, and the public health significance of the social capital literature (Chapter 4); and
- The rationale for using a meta-analysis to address the theory and measurement issues in the social capital literature (Chapter 5), study results (Chapter 6) and implications of these results, and recommendations for future research that examines social capital (Chapter 7).

2.0 LITERATURE REVIEW

2.1 WHAT IS SOCIAL CAPITAL? WHAT DOES IT MEAN FOR HEALTH PROMOTION?

Pierre Bourdieu (1985), James Coleman (1988, 1990), and Robert Putnam (1993, 2000) shaped the current discussion of social capital, although definitions of social capital appeared as early as 1920 (Hanifan, 1920). A broader range of social capital definitions is shown in Table 1, including dominant social capital definitions used in the empirical literature and a sense of how these definitions have evolved. Bourdieu (1985) defines social capital as “the aggregate of the actual or potential resources, which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition” (p. 248). Individuals are able to accrue resources as a result of their memberships in social networks. Some of Bourdieu’s work on social capital suggests that people with more material resources have greater potential to use their social capital to maintain their power, which indicates that social capital is both inclusive and exclusive and is concerned with the inequitable distribution of resources. Bourdieu’s work investigated the interplay of economic capital, cultural capital, and social capital, with an emphasis on their fungibility and their relative unequal distribution among groups and individuals (Moore, Shiell, Hawe, & Haines, 2005).

As James Coleman (1988) suggests:

Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure and they facilitate certain actions of the individuals who are within the structure. Like all forms of capital, social capital is productive, making possible the attainment of certain ends that would not be possible in its absence. Like physical and human capital, social capital is not completely fungible with respect to certain activities. A given form of social capital that is valuable in facilitating actions may be useless or even harmful for others. Unlike other forms of capital, social capital inheres in the structure of relations between persons and among persons. It is lodged neither in individuals nor in physical impairments of production (p. S98).

Coleman's work on the social capital associated with families and education informs us that social capital is a means for families to provide for their children and create opportunities for their children's success. This function furthers dialogue about the social reproduction of material and cultural advantage. Coleman's definition alludes to the importance of contexts, possibly geographic or situational, that could result in negative effects of social capital. Bourdieu (1985) and Coleman's (1988) work use individuals or small groups as the primary units of analysis. There is agreement across definitions on the benefits individuals or families receive from their social ties with others (Portes, 2000).

Putnam (2000) embraces the idea that social capital is applicable to individuals and groups, by suggesting that social capital includes "the features of social life—networks, norms, trust—that enable participants to act together more effectively to pursue shared objectives (p. 19). He suggests that at times, individuals will be the sole beneficiaries of their investment in social capital; however, there are also times when individuals will not bear the entire cost and benefit of social connections. Social capital is therefore both a private and a public good.

Putnam's work, referred to as the communitarian approach, became one of the dominant public health approaches to social capital (Putnam, 1993). It is discussed in more detail in sections 3.5, 3.6 and Chapter 4. His initial work explained how social capital in Italy was used to

explain the relationship between citizen participation and local government performance. The emphasis on citizen engagement, participation, and government action directed research on social capital to explore social ties and social integration within communities and neighborhoods. Less attention has been paid to vertical relationships, the second focus of Putnam's work (Putnam, 2007). Most definitions of social capital are framed in terms of the benefits accrued from trust, norms, reciprocity, networks, and participation; however, social capital also stems from identity. Forming trusting relationships either by becoming a part of an organization, club, or religious congregation comes with the expectation that one's investment into forming relationships will be returned or reciprocated and the investment accrues value as the benefits of membership for individuals include better health, deeper satisfaction with their lives, and engagement in healthier behaviors. Social capital should be distinguished in several ways; not only is its relational element nested in individuals' membership in social organizations, it possesses a material element suggesting that there are benefits to membership (Hawe & Shiell, 2000).

Table 1. Definitions of Social Capital

<i>Author</i>	<i>Definition</i>
Hanifan (1920)	In the use of the phrase ‘social capital’ no reference here is made to the usual acceptance of the term ‘capital,’ except in a figurative sense. We refer not to real estate or to personal property or to cash, but rather to that in life which tends to make those tangible substances count for most in the lives of people: namely good will, fellowship, sympathy, and social intercourse among the individuals and family that make up a social unit...The community as a whole will benefit by the cooperation of all its parts, while the individual will find in his associations the advantages of help, the sympathy, and fellowship of his neighbors. First then, there must be an accumulation of community social capital (p.130-131).
Bourdieu (1985)	The aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition (p.298).
Coleman (1988)	Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure and they facilitate certain actions of the individuals who are within the structure. Like all forms of capital, social capital is productive, making possible the attainment of certain ends that would not be possible in its absence. Like physical and human capital, social capital is not completely fungible with respect to certain activities. A given form of social capital that is valuable in facilitating actions may be useless or even harmful for others. Unlike other forms of capital, social capital inheres in the structure of relations between persons and among persons. It is lodged neither in individuals nor in physical impairments of production (p.S98).
Putnam (1996)	The features of social life—networks, norms, trust—that enable participants to act together more effectively to pursue shared objectives (p.35-36).
Lochner, Kawachi, & Kennedy (1999)	...social capital is a collective dimension of society external to the individual. Social capital is a feature of the social structure, not of the individual actors within the social structure; it is an ecologic characteristic. In this way, social capital can be distinguished from the concepts of social networks and support, which are attributes of individuals (p.260).

2.2 SOCIAL CAPITAL THEORY

2.2.1 Roots of Social Capital Theory

Several theories form the foundation of current social capital research. The earliest was proposed by sociologist Émile Durkheim (1897), whose work on social integration, alienation, and anomie began to shape our understanding of how social relationships and cohesion influence mortality (Berkman & Glass, 2000). His goal was to explain individual pathology as a function of social dynamics.

Other theorists such as John Bowlby (1988) articulated attachment theory, which contends that secure attachment provides the opportunity for affectional bonds and security within a larger system. In childhood, these bonds are formed between mother and child; in adulthood, marriage becomes the equivalent. An individual's need for secure attachment fosters relationships that provide love, reliability, and a safe haven. Attachment early in life encourages a sense of security and self-esteem that promotes lasting, loving relationships in adult life. According to Bowlby (1988), the ability to achieve mature adult relationships results from a series of complex cyclical processes of attachment, loss, and reattachment.

The study of social networks per se began in the 1950s as way to analyze social ties across boundaries of traditional kinship, residential and class groups (Barnes, 1954; Bott, 1957). Social ties were used to explicate access to jobs, political activity, and marital roles, whereas the study of social networks allowed the observation of the structural properties of human relationships. Yet, there were few expectations that such relationships occurred only among bounded groups defined *a priori*, or that relationships had to be defined as networks in which one is a member by birth or due to work or religious affiliations.

A conversation about capital is primarily couched in the economic literature. However, as it relates to social capital, perhaps Bourdieu was the first to identify various forms of capital (e.g., economic, human, cultural capital) such that the social sciences began to accept these forms of capital as valuable to sociological discourse. Preceding Bourdieu, social capital was deeply rooted in the general theories labeled social exchange theory (Cook & Whitmeyer, 1992). Emerson (1976) refers to exchange theory as a frame of reference and network analysis, applicable at micro or macro levels, defined by their function, and contingent on rewards to and from others, all of which implies (at least) two-sided transactions and exchanges.

The convergence of a broad sociological and anthropological literature allowed Emerson (1976) to contend that the analytical concepts of social capital are: resources, reward, reinforcement, cost, utility, opportunity, profit, outcome, transaction, payoff, etc. Micro-level analysis of exchange theory is concerned with psychosocial analysis, whereas macro-level societal analysis deals with issues of structural-functionalism and conflict theory, forms of exchange and power analysis, and finally, inter-organizational research.

Cook and Whitmeyer's (1992) combined theoretical approach to explain social structure incorporates exchange theory and network analysis. These authors suggest that exchange theory involves explicit consideration of social structure as a configuration of social relations among actors, either individual or corporate. Social structure, characterized as a configuration of social relations and positions, is viewed as the substratum underlying all of social life and history, and also as a multidimensional space of differentiated social positions of people in society or other aggregations. Social structure thus becomes both a product and a constraint, in the form of network relations.

Social structure in network analysis is more precisely defined as patterns of connections among actors in networks of exchangeable relations (Cook & Whitmeyer, 1992). Here, network analysis is described as patterns of interaction among many actors that can be classified as networks, which may be analyzed by range, centrality, and density. Cook and Whitmeyer (ibid.) reconcile the motivations of actors; both individual and collective (organizations), by suggesting that organizations can act autonomously and seek to maximize profit, whereas humans are motivated to pursue their own class interests. This view is less altruistic, as much of the social capital literature has suggested, but still reflects the goals of building an inter-generational ‘stock’ of benefits, which, in the case of public health, lead to better health outcomes such as educational opportunities, safe environments, and financial stability.

2.3 THEORETICAL CONSTRUCTS AND MECHANISMS OF SOCIAL CAPITAL

The tendency of many researchers to expediently characterize social capital as an important concept has led to very little theoretical development, few primary data studies, and frequent use of secondary data analysis. Table 2 shows the diversity in social capital studies, with self-reported health and mortality as designated health outcomes. This table also highlights the multiple constructs assessed in the social capital literature. Woolcock and Narayan (2000) suggest that measures now being developed to assess social capital should be society-specific and cover a broad range of dimensions, as social capital’s constructs are shaped by sociohistorical contexts and change over time. If public health is to continue to utilize social capital as an essential contribution to health promotion, research will eventually begin to focus on how to use social capital as a mechanism for decision making about public health

interventions, and how to facilitate self-help for communities to work together to solve collective health problems (Kawachi & Kennedy, 2002).

Public health research recommends that social capital should be separated into structural and cognitive forms because these have different relationships with health outcomes (Harpham, 2008; Harpham, Grant, & Thomas, 2002). Structural social capital refers to what people do—associational links, density of social networks, or patterns of civic engagement that can be verified objectively. Coleman (1988) conceptualizes social capital as a resource that originates from the structure of social relationships that facilitate achievement of specific goals. It is important to separate formal networks from informal networks each have different relationships with health outcomes. Also, it is important to note that all relationships can provide value, benefits, and stress.

Cognitive social capital refers to what people feel, or their values or perceptions, and is more subjective. Cognitive social capital is measured at the micro level and is considered to shape behaviors, through control of risk behavior, providing mutual aid and support, and informal means of informational exchange (Cullen & Whiteford, 2001). Cognitive and structural forms of social capital are interrelated: how people feel influences how they act, and how people behave can influence how they feel. The constructs of social capital characterize both structural and cognitive social capital.

The constructs listed in Table 3 emerged from the empirical literature that is the focus of this dissertation. They are focused more on horizontal relationships among neighbors or community members (Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997) and less on the vertical relationships among individuals, communities, neighborhoods, organizations, and sources of power. Bourdieu's (1985) concept of social capital addresses issues of resources and

access. The Putnam model of social capital directly address neither the relevance of actual or potential resources inherent within social networks that may be used for personal or collective action, nor power dynamics, nor how people access (or may be denied access) to network-based resources (Carpiano, 2008; Wakefield & Poland, 2005).

Table 2. U.S. Social Capital Studies: Self-Reported Health Outcome

	Citation	Sample Sizes	Sample Sources	CoVariates	IV Measured	IV Conceptualized	DV Measured	DV Conceptualized	Level of Analysis	Pathway
1	Blakely, Kennedy, Kawachi (2001)	279,066	1990, '92, '94, '96 Current Population Study	RE, A, I, G	V	S	SR Poor Health	IN	ML	IN>S>>IN>IN
2	Franzini, Caughey, Spears, Esquer (2005)	3203	Community Survey Questionnaire of PHDCN	RE, A, SES, G	SS, SN, CE, SC, T, H, ISC, Collective Socialization, SC:T, R	A N	SR H	IN	G	IN>AN>>IN>IN
3	Greiner, et al (2004)	4601	Kansas BRFSS	RE, A, E, I, G	P, SoC	A N	SR H	IN	ML	IN>AN>>IN>IN
4	Kim & Kawachi (2006)	24,835	2000 Social Capital Benchmark Survey	RE, A, E, I, G, MS	T, SN, G, V, P, E Pol Partic, Non-E Pol P	I N, A C	SR H	IN	ML	1) IN>IN>>IN>IN 2)IN>AC>>IN>IN
5	Kim, Subramanian, Kawachi (2006)	40 communities	2000 Social Capital Benchmark Survey	RE, A, E, I, M	SS, T, SN, formal/informal bonding, formal/informal bridging	A C	SR H	IN	ML	IN>AC>>IN>IN
6	Kim & Kawachi (2007)	48 States	2001 BRFSS, 1974 - '94GSS, 1994 -'98 DDB needham Life Style Archive, 1990, 2000US Census	RE, A, E, I, G, MS	Social Capital Index	S	SRP Poor Health	IN	ML	IN>S>>IN>IN

Table 2. (continued)

	Citation	Sample Sizes	Sample Sources	CoVariates	IV Measured	IV Conceptualized	DV Measured	DV Conceptualized	Level of Analysis	Pathway
7	Mellor & Milyo (2005)	48 States	Current Population Study	RE, E, I, G	Social Capital Index, T,P	S	SRH	S	G	IN>S>>S>S
8	Pollack, von den Knesebeck (2004)	US: 608; Germany : 682	Social Status and Health among the Aged in 2 Welfare Systems	A, E, I, M, F, Ho using tenure	SocCap, R, CT, P, ESS, SN,	National	SRH	National	OR, R, CS	IN>N>>IN>N
9	Subramanian, Kawachi, Kennedy (2001)	49 States, 144,692	1993-'94 BRFSS,1986-'90 General Sociaal Survey	RE, A, I	MT	S	SRP oor Health	IN	ML	IN>S>>IN>IN

Table 2. (continued)

	Citation	Sample Sizes	Sample Sources	CoVariates	IV Measured	IV Conceptualized	DV Measured	DV Conceptualized	Level of Analysis	Pathway
10	Subramanian, Kim, Kawachi (2002)	8,782	90 Decennial Census, '94-95 Project on Human Development in Chicago Neighborhoods-Community Survey, '91-'00 Metropolitan Chicago Information Center Metro Survey	A, M, F, R	CE, R, SN, SC, ISC	A N	SRH	AN	C	IN>AN>>IN >AN

LEGEND:

Covariates: RE=race/ethnicity, A=age, E=education, I=income, G=Gender, M=male, F=female, MS=marital status

Social Capital Variables: T=trust, MT=mistrust, V=volunteer, P=participation, CE=collective efficacy, SN=social network,

SS=social support, R=reciprocity, SE=self-efficacy, SoC=Sense of Community, EP=electoral participation, ISC=informal social control,

SCT=social cohesion &trust, CT=community trust, **Levels of Aggregation:** IN=individual, AC=aggregated community,

AN=aggregated neighborhood, AH=aggregated household, IN=individual neighborhood, N=Nation, C=County, S=state;

Levels of Analysis: IN=individual, G=group (community, neighborhood, state, national),

ML=multilevel

Table 3. U.S. Social Capital Studies: Mortality Outcome

	Citation	Sample Sizes	Sample Sources	Co Variates	IV Measured	IV Conceptualized	DV Measured	DV Conceptualized	Level of Analysis	Pathway
1	Bolin et al (2003)	3800	Swedish Survey of Living Conditions	A, E, I, G	IN	IN	IN	IN	IN	IN>IN>> IN>IN
2	Folland (2007)	48 States	1975-'98 DDB Life Style Database		IN	S	N	N	G	IN>N>> N>N
3	Kawachi, Kennedy, Lochner, Prothrow-Smith (1997)	68-76,000	Current Population Survey, US Centers for Disease Control, US, Bureau of Labor of Statistics, US Census Bureau	R, E, M, F, MS, E, I	P, T	AN	AN	AN	G	I>AN>> AN>AN
4	Lochner, Kawachi, Brennan, Buka (2003)	342 neighborhoods	1995 Project on Human Development in Chicago Neighborhoods, '94-'96 IL Dept of PH	RE, G	R, T, P	AN	AN	AN	G	I>AN>> AN>AN
5	Mellor & Milyo (2005)	48 States	Current Population Study	RE, E, I, G	Social Capital Index, T, P	S	SR H	S	G	IN>S>>>S >S
6	Weaver & Rivello (2006)	48 States	US National Center for Health Statistics	RE, I	Social Capital Index: P, EP, V, SS, T	AC	IN	IN	IN	IN>IN>> IN>IN

LEGEND:

Covariates: RE=race/ethnicity, A=age, E=education, I=income, G=Gender, M=male, F=female, MS=marital status

Social Capital Variables: T=trust, MT=mistrust, V=volunteer, P=participation, CE=collective efficacy, SN=social network,

SS=social support, R=reciprocity, SE=self-efficacy, SoC=Sense of Community, EP=electoral participation, ISC=informal social control,

SCT=social cohesion & trust, CT=community trust, **Levels of Aggregation:** IN=individual, AC=aggregated community,

AN=aggregated neighborhood, AH=aggregated household, IN=individual neighborhood, N=Nation, C=County, S=state;

Levels of Analysis: IN=individual, G=group (community, neighborhood, state, national), ML=multilevel

Table 4. International Social Capital Studies: Self-Reported Health Outcome

	Citation	Sample Sizes	Sample Sources	CoVariates	IV Measured	IV Conceptualized	DV Measured	DV Conceptualized	Level of Analysis	Pathway
1	Carlson (2004)	10,236	World Values Survey (1995-1997)	A, E, M, F	T, P	N	SRH	N	ML	IN>N>>I N>N
2	Drukker et al (2005)	CHI:801, Neth:533	PHDCN, Maastricht Quality of Life	RE, A, I, M, F	ISC, SCT	1) A, N, 2) N	SRPoorH	IN	ML	1)IN>AN >>IN>IN , 2)IN>N> >IN>IN
3	Hyppa & Maki (2001)	2,000	Societal Insurance Institution of Finland	A, E, G, MS	T, R, P, SS	IN	SRGoodH	IN	IN	IN>IN>> IN>IN
4	Hyppa & Maki (2003)	2,000	Finnish Survey of Living Conditions, Mobile Clinic Health Exam survey, Swedish Culture	Language, type of residence	SN, P, T, R	IN	SRGoodH	IN	IN	IN>IN>> IN>IN
5	Kavangh, Turell, Subramanian (2006)	15112	Tasmanian Health Communities Survey	A, E, I, MS	T, Safety, Pol P, TinPI	A C	SRPoorH	IN	ML	IN>AC> >IN>AC
6	Lindstrom, Moghaddasi, Merlo (2004)	3,861, 75 neighborhoods	1994 Public Health Survey	A, E, M, F, Country of Origin	P	IN :P	SRH	AN: SRH	G	IN>IN>> IN>AN

Table 4. (continued)

	Citation	Sample Sizes	Sample Sources	Co Variates	IV Measured	IV Conceptualized	DV Measured	DV Conceptualized	Level of Analysis	Pathway
7	Liukkonen (2004)	6028	Temporaries in Municipal Jobs Study	A, G, MS	SS, SN	IN	SRPoorH	IN	IN	IN>IN>> IN>IN
8	Mohseni & Lindstrom 07	27,963	2004 Public Health survey of Scania	A, E	T	IN	SRPoorH	IN	IN	IN>IN>> IN>IN
9	Pollack, von dem Knesbeck (2004)	682	Social Status & Health Among the Aged	A, E, I, G	R, T, P, SS	A N	SRPoorH	IN	G	IN>AN> >IN>IN
10	Poortinga (2006a)	7,394, 4332 households	2002, '02 Health Survey for England	A, I, G	SS, T, P	A N	SRPoorH	IN	G	1)IN>AN >>IN>IN ;2)IN>IN >>IN>IN
11	Poortinga (2006b)	7,394	2002 Health Survey for England	A, I, G	SS, T, P, R	IN , A C	SRPoorH	IN	G	1)IN>IN >>IN>IN ;2)IN>A C>>IN>I N
12	Poortinga (2006c)	22 Countries, 42,358	European Social Survey	A, E, I, G	T, P	IN , N	SRGoodH	IN	ML	1)IN>IN >>IN>IN ;2)IN>N >>IN>IN

Table 4. (continued)

	Citation	Sample Sizes	Sample Sources	CoVariates	IV Measured	IV Conceptualized	DV Measured	DV Conceptualized	Level of Analysis	Pathway
13	Rose (2000)	1,904	1998 New Russian Barometer survey	A, E, I, F	SN, P, T	IN	SRPoorH	IN	IN	IN>IN>> IN>IN
14	Sundquist & Yang (2006)	11,175	Swedish Annual Level of Living Survey	A, E, I, G, MS	EP	A N	SRPoorH	AN	ML	IN>AN> >IN>AN
15	Taylor et al (2006)	802	Kilburn, Blair, Athol Community Survey	A, E, I, G	P, SS	IN	SRPoorH	IN	IN	IN>IN>> IN>IN
16	Veenstra et al (2005a)	1,504	Canadian National Population Health Survey (30 health districts)	I, M, F, A	SC index: P	A N	SRPoorH	AN	ML	IN>AN> IN>AN
17	Veenstra et al (2005a)	1,435	2002 British Columbia Survey	A, G, E, I	T, P	IN ,A C	SRPoorH	IN	ML	IN>AC> >IN>IN

LEGEND:

Covariates: RE=race/ethnicity, A=age, E=education, I=income, G=Gender, M=male, F=female, MS=marital status

Social Capital Variables: T=trust, MT=mistrust, V=volunteer, P=participation, CE=collective efficacy, SN=social network,

SS=social support, R=reciprocity, SE=self-efficacy, SoC=Sense of Community, EP=electoral participation, ISC=informal social control,

SCT=social cohesion & trust, CT=community trust, **Levels of Aggregation:** IN=individual, AC=aggregated community,

AN=aggregated neighborhood, AH=aggregated household, IN=individual neighborhood, N=Nation, C=County, S=state;

Levels of Analysis: IN=individual, G=group (community, neighborhood, state, national), ML=multilevel

Table 5. International Social Capital Studies: Mortality Outcome

	Citation	Sample Sizes	Sample Sources	CoVariates	IV Measured	IV Conceptualized	DV Measured	DV Conceptualized	Level of Analysis	Pathway
1	Blakely et al (2006)	73 regional areas, 1,683 census units	1996 Census of New Zealand	E, A, E, I, G	V, R, P	AN	N	N	ML	IN>AN>>N>N
2	Hyppaa et al (2007)	7217	Mini Finland Survey	A, E, I, G, MS	T, SS, SN, P	IN	IN	IN	IN	IN>IN>>I N>IN
3	Kelleher, Timoney, Friel, McKeown (2002)		All Russian Center for public opinion		P, T, SC	AC (region)	N	N	G	IN>AC>>N>N
4	Lindstrom & Lindstrom (2006)	23 Nations	World Values Survey		T	N	N	N	G	IN>N>>N >N
5	Mohan, Twigg, Barnard, Jones (2005)	7,578	Health & Lifestyle Surveys (HALS), General Household Survey (GHS), Survey of English Households (SHE)	A, I, M, F	V, P, R, Voting, Blood Donation	AC	AC	AC	ML	1)IN>AC>>AC>AC

Table 5. (continued)

	Citation	Sample Sizes	Sample Sources	CoVariates	IV Measured	IV Conceptualized	DV Measured	DV Conceptualized	Level of Analysis	Pathway
6	Skrabski, Kapp, Kawachi (2003)	12,643	The Hungarostudy II	M, F	T, R	AC	C	C	G	I>AC>>A C>AC
7	Skrabski, Kapp, Kawachi (2004)	12,643	2002 Hungarostudy	A, E, I, G	T, R, P	AC	AC	AC	G	IN>AC>> AC>AC
8	Turell, Kavanagh, Subramanian (2006)	41 Areas, 15, 112	Tasmanian Health Communities Survey (HCS), 1998	M, F	PP, T, SC	AN	AN	AN	ML	IN>AN>> AN>AN
9	Veenstra (2000)	534	1986-90 GSS, National Center for Health Statistics (1981-1991)	I, E, F, M	T	S	S	S	G	I>S>>S>S
10	Veenstra (2002)	29 Districts	District Health Board	I, G	Social Capital Index: T, P		AC	AC	G	IN>AC>> IN>AC

LEGEND:

Covariates: RE=race/ethnicity, A=age, E=education, I=income, G=Gender, M=male, F=female, MS=marital status

Social Capital Variables: T=trust, MT=mistrust, V=volunteer, P=participation, CE=collective efficacy, SN=social network,

SS=social support, R=reciprocity, SE=self-efficacy, SoC=Sense of Community, EP=electoral participation, ISC=informal social control,

SCT=social cohesion & trust, CT=community trust, **Levels of Aggregation:** IN=individual, AC=aggregated community,

AN=aggregated neighborhood, AH=aggregated household, IN=individual neighborhood, N=Nation, C=County, S=state;

Levels of Analysis: IN=individual, G=group (community, neighborhood, state, national), ML=multilevel

2.4 MECHANISMS OF SOCIAL CAPITAL: CONSTRUCTS OF SOCIAL CAPITAL THEORY

2.4.1 Sense of Community

The larger goals of social capital are to promote social ties within and between communities and to promote civic engagement (Putnam, 1993). Without a sense of community, it is impossible to understand how to measure and promote the building of social ties within and among communities. Sense of community is characterized by a high level of concern for community issues; having respect for, showing generosity toward, giving service to others; having a sense of connection with places and people; and finding need fulfillment through membership (Goodman et al., 1998).

Sense of community is a cognitive form of social capital measured by asking individuals how they perceive the social bonds within their neighborhoods, communities of identity, organizations, social institutions, clubs, and other associations in which they participate. How individuals perceive their community is affected by the physical, social, and economic characteristics of that community, which also influence the amount of social capital within it (Baum & Ziersch, 2003). Organizational networks can play a critical role in allocating resources and can influence trust and caring through processes of cooperation. This does not suggest a romantic sense of “community,” wherein everyone cooperates and conflict is nonexistent. To

the contrary, conflict can help establish social relationships if individuals feel empowered to express their views, including oppositional ones.

Harpham (2008) considers sense of community, or more specifically “sense of belonging,” as an intermediate variable between social capital and health. Sense of community is included here as a key social capital measure because of its centrality to social ties, community development approaches to social capital and health promotion, and because of its prominence in the current social capital literature.

2.4.2 Trust

According to Baum and Ziersch (2003), trust is essential to understanding social capital and relates to the cognitive side of social capital. At least three forms of trust exist within the literature:

- (1) Trust of familiars – the presence of trust within established networks;
- (2) Generalized or social trust – trust that is extended to strangers;
- (3) Institutional trust – the basic forms of trust in the formal institutions of governances (p. 321).

According to Harpham (2008), trust can be viewed as a predisposing factor for social capital rather than as a part of social capital. Social capital scholars include trust as part of social capital and often describe it as a necessary component to developing social capital. However, many of the measures of trust lack a reference area. This suggests that these measures are broadly defined rather than specific to a geographic location or particular community of identity. It is important to distinguish between trust of individuals (social trust) and institutional, civic, and political trust.

2.4.3 Reciprocity

Reciprocity directly implies a two-way relationship. It is the willingness to help others, with the expectation that when needed, they will help you in return. Reciprocity is a “cognitive element of social capital and refers to the provision of resources by an additional individual or group to another individual or group, and the repayment of resources of equivalent value by these recipients to the original provider” (Baum & Ziersch 2003, p. 321). Because social networks foster norms of reciprocity that encourage attention to the welfare of others, any assessment of trends in social capital must include an examination of trends in volunteering, philanthropy, and altruism (Putnam, 2000). Additionally, values influence the norms of reciprocity (Goodman et al., 1998).

2.4.4 Social Support and Social Networks

Social support and social networks are concepts describing the structure, processes, and functions of social relationships. Enhancing social networks and the exchange of social support can increase a community’s capability to secure resources and solve problems (Heaney & Israel, 2002). Individuals and organizations can cooperate to support each other for either mutual or one-sided gain. There is an expectation that individuals or organizations will give or receive help when needed (Warrick, Culica, Quill, Spears, & Vojvodic, 2005). Social networks embody the actions that individuals take to form linkages (structural social capital). Social support embodies the perceptions of individuals as a result of their relationships with family, friends, co-workers, fellow congregants, and co-participants in organizations and clubs (cognitive social

capital). Social support can also be characterized by the resources provided, which implies more of a structural form of social capital.

Social support is a key psychosocial protective factor that plays a nonspecific role in the etiology of disease. There are four types of social support:

(a) emotional – empathy, love, trust, caring;

(b) instrumental – tangible aid and services that assist those in need;

(c) informational advice, suggestions and information;

(d) appraisal – information that is useful for self-evaluation purposes, such as constructive feedback, affirmation, and social comparison (Heaney & Israel, 2002).

Social networks often refer to the web of social relationships surrounding individuals. They also link people who can or cannot provide social support and may serve functions other than providing support (Heaney & Israel, 2002). Baum and Ziersch (2003) suggest that social networks are the “ties between individuals or groups and can be considered the ‘structural’ element of social capital” (p. 321). Such networks can be formal, such as those developed through formal organizations, like volunteer groups and associations. Alternatively, social networks can be informal, such as friendships, family ties, acquaintances with neighbors, and work-related ties. All of these networks can provide social support. The breadth and depth of social networks can be determined by structural characteristics, such as size or number of linkages; and the relationships among network members, such as the frequency and intensity of their contacts; the benefits that members receive from their network ties, such as emotional or tangible support and access to social contacts; and the extent to which these networks are open or closed (Baum & Ziersch, 2003). Social networks are further characterized by bonding, bridging and linking (see discussion below).

Heaney & Israel (2002) cite three advantages to social network approaches to health:

- (1) It incorporates functions or characteristics of social relationships other than social support;
- (2) It can examine how changes in one social relationship will affect other relationships;
- (3) It can facilitate investigation of the effects of structural and interactional network characteristics that influence the quantity and quality of social support (p. 188).

Social and inter-organizational networks are characterized by reciprocal linkages throughout the overall network, frequent supportive interactions, overlap with other community networks, the ability to form new associations, and reliance on cooperative decision making (Goodman et al., 1998).

Concluding that “there is considerable evidence suggesting an association between the characteristics of social networks and health status” (p. 268), Goodman and colleagues contend that the extent of internal and external ties among neighborhood residents are affected by opportunities for regular contact that foster cooperation among them. Because interpersonal relationships and subsequent social networks are developed and maintained within the context of community organizations (or mediating entities) such as churches, social clubs, and work settings, the extent of neighborhood connectedness—and therefore a community’s social capital—is affected by the presence of community and neighborhood organizations.

Social support and social networks are not theories per se, according to Heaney and Israel (2002), but rather are concepts that describe the structure, process and functions of social relationships, which in turn can be explicated by exchange theory, attachment theory, and

symbolic interactionism. Whereas social networks refer to the web of social relationships surrounding individuals, social support is defined by its function in social relationships. The linkages within social networks cannot necessarily provide social support (Heaney & Israel, 2002).

2.4.5 Participation and Membership in Organizations

The powerful role of participation in social capital involves the individual's understanding of his or her capacity or opportunity for involvement, which may indicate good or poor health. Individuals who connect with others in either homogeneous or heterogeneous social networks may also experience social support. As a result of the formation of trusting relationships, participation becomes a natural activity. Several definitions of participation will be discussed in this section.

Citizen participation is characterized by a strong participant base and diverse networks that enable individuals with many different kinds of interests to take collective action. When individuals understand that the benefits of participation for their group or community override its costs to them personally, they become involved. An emphasis on participation and citizen involvement in health promotion increases the potential of collaboration in issue identification and developing community-based solutions (Goodman et al., 1998). Citizen involvement may also include non-group activities such as voting. Similar non-group activities that characterize citizen participation can include registering people to vote, petition signing, or attending a local school board or city council meeting (Harpham, 2008).

The WHO Ottawa Charter for Health Promotion defines participation as a means of collective action illustrated by collective community efforts directed toward sufficient

community empowerment to improve health by gaining control over the determinants of health (Nutbeam, 1998). The Ottawa Charter further emphasizes that

health promotion works through concrete and effective community action in setting priorities, making decisions, planning strategies and implementing them to achieve better health. At the heart of this process is the empowerment of communities - their ownership and control of their own endeavors and destinies. Community development draws on existing human and material resources in the community to enhance self-help and social support, and to develop flexible systems for strengthening public participation in and direction of health matters. This requires full and continuous access to information, learning opportunities for health, as well as funding support (World Health Organization, p. 3).

The Ottawa Charter seeks to establish a global focus on participation, from which health promotion initiatives will focus on a continuum of efforts to empower individuals, organizations, and communities. Participation within empowered communities creates opportunities for individuals and organizations to provide social support for health, to address conflict within communities, and to increase their influence on and control of the social determinants of health (Nutbeam, 1998; World Health Organization, 1986). The emphasis of public health policies on a communitarian approach to social capital reflects the Ottawa Charter's promotion of both individual participation and community efforts to improve health. Empowered individuals seek greater power and authority to affect change within their neighborhoods and communities. Their organized action leads to developing sources of social capital that can address future community needs—including health issues.

According to Baum and Ziersch (2003), participation can range from consultation to structural participation, in which lay persons are the driving force. The latter is crucial to social capital in a civil society. However, concern emerges from a policy perspective (perhaps germane to the growing body of research linking social capital and public policy) about the extent of institutional support (e.g. state, nation) that is essential to maintain a civil society. One must

wonder how much encouragement toward citizen participation state or national institutions can reasonably undertake.

As with all of the mechanisms discussed, participation occurs within a community's particular social, political and economic contexts, which may promote or discourage it. Therefore it is critical to be able to examine what people participate in, the depth of their involvement, the frequency of their involvement, the geographic location of their involvement (within the neighborhood, at a public meeting, etc.), and with whom they act out their involvement (family, friends, or another community of identity). The benefits, values, opportunities, and stressors of participatory action must also be considered in measuring participation.

2.4.6 Collective Efficacy

The social capital literature contains several definitions of collective efficacy. Informal social control refers to how groups of residents can effectively achieve public order. Collective efficacy is the neighborhood counterpart to informal social control or individual efficacy. Collective efficacy is rooted in social psychology and its many definitions agree that group members believe in the ability and capacity of the collective to act effectively (Lochner, Kawachi, & Kennedy, 1999). It is often defined as a form of collective competence among individuals who utilize their collective resources and respond to current and future demands (Lochner et al., 1999, p. 260).

Collective efficacy has been defined by Sampson et al. (1999) as a task-specific construct referring to the shared expectations and mutual engagement of residents in local social control. Both individuals and neighborhoods vary in their respective capacities to achieve common goals.

This variability suggests a focus on mechanisms of social control without necessarily requiring strong social ties or associations. Collective efficacy is undermined by the concentration of economic disadvantage, racial segregation, family disruption, and residential instability (Sampson, Morenoff, & Earls, 1999; Sampson, Raudenbush, & Earls, 1997).

Sampson et al. (1999) have operationally defined collective efficacy within the social capital literature. They argue that both individuals and neighborhoods vary in their capacity to achieve common goals and therefore suggest that socially involved groups share a focus on mechanisms for social control without requiring strong social ties or associations between members.

Collective efficacy is about converting social relationships formed within a group into actions that are beneficial to everyone (Cagney & Wen, 2008). Neighborhood collective efficacy can influence health outcomes by exercising informal social control over deviant behaviors as well as by increasing the ability of residents to acquire and utilize resources; to respond to threats to public services, such as closing health clinics; and to manage physical and environmental hazards (Cagney & Wen, 2008; Kawachi & Berkman, 2000). Indicators of collective efficacy combine informal social control and neighborhood social cohesion (Kawachi, Subramanian, & Kim, 2008).

2.4.7 Forms of Social Capital

The roles of horizontal and vertical linkages across the social ecology are important to social capital research and development. These linkages shape both form and function of social ties that form, strengthen and diminish among individuals and communities. Within interpersonal

relationships and bonds that are formed in social networks, every member of the network is a necessary stakeholder.

Social capital scholars have begun to distinguish three functions of social capital according to their context and function: bonding, bridging, and linking.. These categories are reformulations of network structures that provide ways to place embedded individuals or organizations within communities or neighborhoods. Szreter and Woolcock (2004) suggest that bonding social capital refers to trusting and cooperative relationships, bridging social capital refers to relationships of respect and mutuality, and linking social capital comprises norms of respect and trusting relationships. Such operational definitions also indicate that these constructs can be applied to more than one form of social capital. All three forms characterize the types of networks that individuals and groups use to confer benefits and resources upon members:

- The focus of bonding social capital is to understand the composition and function of homogenous networks, mainly at a micro or individual level. These relationships may be comprised of family members, close friends, neighbors and/or co-workers. These social relationships may provide emotional and instrumental forms of social support. Bonding social capital represents horizontal, intra-group or community ties, which may be exclusionary and may not act to produce positive societal benefits.
 - Examples of constructs include sense of community, trust, reciprocity, and social support.
- The focus of bridging social capital emphasizes the need to examine social ties at individual (micro) and meso (organizational) levels. These social ties may provide all the necessary forms of social support to access resources outside of one's neighborhood or immediate social network. Both horizontal and vertical social ties operate within bridging social capital.
 - Examples of constructs include reciprocity, social networks, and political or civic participation.
- Linking social capital is a subset of bridging social capital that is distinguished by its sole focus on vertical interactions across formal and institutionalized power or authority structures in society (Poortinga, 2006c; Szreter & Woolcock, 2004).

Linking social capital is a macro-level concept that displays the ability of communities and organizations to influence powerful others. Such relationships can also be examined conversely, from the perspective of powerful others and their relationships to or opinions of communities, neighborhoods, and the functions of organizations.

- Examples of constructs include: trust in political institutions, political or civic participation, and social networks.

These forms of social capital are receiving considerable attention in current literature because they fundamentally shape the mechanisms of social capital and explain the kinds of interactions individuals have within groups of mutual identity.

2.5 RESEARCH ON SOCIAL CAPITAL: APPROACHES, MEASUREMENT AND PAST RESEARCH

2.5.1 Approaches to Social Capital Research

Since the late 1980s, social capital research has blossomed into a rich literature that nonetheless lacks theoretical rigor, resulting in imprecise measurement of social capital constructs. It is difficult to know how or if each social capital variable will differentially influence health outcomes without consistent measurement.

Discussions about whether social capital is an individual or collective concept tend to be muddled because the term “being” often refers to individual or private benefits that are accessed through social connections. However, at other times social capital is mentioned as a result of access to public benefits that are available to the collective (Kawachi, Kim, Coutts, & Subramanian, 2004). This contrast echoes the bonding, bridging, and linking discussion initiated

by Szreter and Woolcock (2004). Their argument about social capital recognizes the benefits individuals can draw upon through social support, and also postulates the need to understand the roles of state-society relationships in refining the theory and definition of social capital.

Although most social capital research hypothesizes it as a resource or determinant of health (Szreter & Woolcock, 2004), others argue that social capital may be determined by health (Halpern, 2005). In general, social capital research is characterized as a mechanism to improve health and the causal path cannot be determined from secondary data analysis. More research is needed to identify and understand the pathways by which social capital operates. Social capital research has developed according to the level it scrutinizes: individual, ecological, network, and multilevel. Each of these types of analysis will be described below.

2.5.2 Measuring Social Capital

Because social capital has implications for broad application across many health conditions and populations, a focus on social capital measurement is critical to its advancement as an important contributor to health promotion activities. The social capital literature cited in this review illustrates important developments as they relate to public health. Tables 2 and 3, which contain examples of how each social capital construct has been measured, thereby provide a snapshot of other studies shaping the discourse of social capital theory development, measurement, and application (Table 2). This review does not purport to discuss every study listed in Table 2 or to include every social capital study there.

A considerable amount of attention has been expended in the literature to explore *individual-level* (Hyyppa & Maki, 2001; Johnell, Lindstrom, Sundquist, Eriksson, & Merlo, 2006; Poortinga, 2006b, 2006c; Veenstra, 2000) and *ecologic-level* (Forrest & Kearns, 2001;

Kawachi, 1999; Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997; Lochner, Kawachi, Brennan, & Buka, 2003; Lochner et al., 1999; Ziersch, Baum, MacDougall, & Putland, 2005) associations between social capital and health.

2.5.2.1 Individual-Level Analysis

Individual-level analysis studies use participants as the unit of analysis and gather social capital (independent variable) and health status indicators (dependent variable) as individual attributes. Because it is unclear which configuration, components, and constructs of social capital are most productive per context (Gaag & Webber, 2008), studies are called for that examine the constructs of social capital and the contexts that influence its presence or absence. Even now, however, individual-level studies can raise policy questions about the distribution of social capital to the general population by more precisely identifying advantaged and disadvantaged groups. Individual-level social capital studies presume that individuals well equipped with social capital more successfully attain their goals and that those who are ill-equipped have fewer opportunities to succeed. Thus they highlight the presence and significance of inequality within social capital research.

In response to questions of inequality, Van der Gaag and Webber (2008) propose four functions by which to measure individual-level social capital: “(a) social networks are beneficial because they add to an individual’s personal resources, culture, human material, and political capital; (b) social networks provide unique resources that can’t be produced or purchased to satisfaction individually; (c) social networks actively provide help without asking; and (d) social networks form the identity of one’s social network to the ‘outside world,’ which may help advertise for an individual” (pp. 30-31).

2.5.2.2 Ecological-Level Analysis

As leaders in social capital research, Lochner et al. (1999) promote the ecological conceptualization of social capital by suggesting that it is a public good rather than an individual, private benefit. In this way, social capital can be distinguished from social networks and social support, which are attributes of individuals and not features of individual function but rather the aggregation of individual action and function.

However, as these researchers adhere to a community or ecologic definition of social capital, they also aggregate individual measures to explain the benefits of social capital for health outcomes. (These scholars are not alone—ecological studies also examine health status measures at an aggregate level.) Halpern (2005) asserts, “If community—or meso-level—social capital affects physical health, then we should see variations in community health that are not reducible to individual characteristics” (p. 92).

The majority of community-level social capital research is contained within existing surveys, according to a common practice of aggregating individual responses at community levels. This approach is limited because differences in social capital between communities may be confounded by the characteristics of individuals who inhabit them. The recent increase in social capital research suggests a greater need to separate structural and cognitive social capital research due to their different relationships with health outcomes. Yet structural and cognitive forms of social capital are linked, because what people do affects how people feel and how people feel affects what they do, and how often they do it. An important part of understanding the connection between human feeling and activity is to consider issues of inequality (a core subject of Pierre Bourdieu’s work). Social capital’s focus on inequality is affirmed by evidence

that the amount and quality of network-based resources are linked to the socioeconomic conditions of where people live (Wacquant & Wilson, 1989). Evidence is lacking, however, about social capital as a mediator of health and what factors confound or moderate the relationship between social capital and health. Therefore, at this time there is a dearth of research examining inequality in the social capital literature.

Community-level social capital research lacks a definition of “community” that is consistently meaningful to research participants. As a result, geographical measures of community dominate (e.g., neighborhood-based questions about social trust asking, “can people be trusted in your neighborhood”). More attention should be paid to the significance of non-spatial communities to evaluate the effects of social capital outside of individuals’ immediate surroundings, and more emphasis should be placed on communities of identity such as work, school, religious, and family (Harpham, 2008). The current lack of culture-specific indicators of social capital limits comparability and does not represent a collective measure of social relationships within a community.

2.5.2.3 Multilevel Analysis

Multilevel analysis is a statistical technique that allows researchers to analyze health of people in their context (Leyland & Groenewegen, 2003). Because social capital’s constructs cut across micro-, meso-, and macro-levels of measurement, multilevel analyses are common. A multilevel framework implies that health outcomes are determined by individual risk and protective factors as well as by community risk and resilience factors (Kawachi, Subramanian, & Kim, 2008). Diez-Roux (2000) further defines multilevel analysis as

An analytical approach that is appropriate for data with nested sources of variability—that is, involving units at a lower level or micro units (for example, individuals) nested within units at a higher level or macro units (for example, groups such as schools or neighbourhoods)... Multilevel analysis also allows the examination of both between group and within group variability as well as how group level and individual level variables are related to variability at both levels [...] Multilevel analysis thus allows researchers to deal with the micro-level of individuals and the macro-level of groups or contexts simultaneously (p. 173).

The definitions of social capital also include multilevel approaches as briefly mentioned above. Bourdieu (1985) and Coleman (1988) offer more micro-level definitions of social capital. In his discussions of institutions that reinforce social controls, Coleman uses a meso-level approach to conceptualizing social capital. A macro-level approach is exemplified by Robert Putnam, who focuses on the decline of social capital and its effects on democracy. His focus on participation in civic organizations also demonstrates a meso-level approach.

Multilevel analyses focus on data analysis with a nested structure (Islam, Merlo, Kawachi, Lindstrom, & Gerdtham, 2006). They allow the contextual effects of social capital variables at state, community, and neighborhood levels on lower-level outcomes to be modeled. Some researchers may also control for individual-level social capital in analyses of area-level social capital variables, such as overall civic participation or trust levels, or a group- or area-level construct such as the number of voluntary organizations in a specific area (Islam et al., 2006).

2.5.2.4 Network Approaches

Social capital is often defined by the resources it comprises, such as social support, information channels, and social credentials. These resources are embedded within an individual's social networks. This perspective suggests that social capital is inherent to social relationships, the resources they hold, and the social networks they comprise (Lakon, Godette, & Hipp, 2008). There are two network measurement perspectives: egocentric and sociometric network measures.

Egocentric networks are defined from the point of view of one focal individual, referred to as the “ego.” This network form does not include all relationships but only the relationships that fulfill certain roles for the focal individual (e.g. a pastor or five closest friends). Measures of egocentric networks seek to analyze their size and density with an emphasis on specific ties (function) or relationships among the ties (structure). These individual-level measures describe the resources, information, or influence a particular social tie provides. For more precise measurement and theoretical consistency, which measures are important for the outcomes of interest should be determined (Lakon, Godette, & Hipp, 2008). To measure resources provided by egocentric networks, tie strength (the amount of time, emotional intensity, intimacy, and reciprocal services that characterize the tie) must be considered (Granovetter, 1973). Network heterogeneity can be evaluated by the gender, age, and race/ethnicity composition of an individual’s networks. Compositional quality, which refers to the number of network members who have characteristics of interest to the focal individual, can facilitate the examination of both horizontal and vertical social ties. Network size is the number of individuals in someone’s network. Larger networks posit that any one network member has diverse resources that the ego may need.

Sociometric networks are characterized by the information on all respondents within a social system with that defined boundaries (e.g. schools, a specific diabetic population). Some boundaries may be hard to determine because the nature of the population may not lend itself to network analysis. For example, injection-drug user populations and homeless populations are transient, so physically locating them presents a challenge to researchers; they also experience transience in membership. A sociometric approach allows for measurement at individual and group levels.

Examining an entire network requires relational data that describes a system which includes all members of the network. *Network constraint* (i.e. how much network members impede the ego) can be conceptualized as an indicator of network homogeneity, or how closely connected network members to each other or to a central member. Similarly, *homophily* is a measure of the extent to which individuals choose network members similar to themselves (bonding social capital). *Measures of centralization* examine the entire network in terms of how much influence a single member has on the entire network. This central network member's level of influence can have advantages or disadvantages, depending on the size of the network. For example, the flow of information within diffuse networks may take longer than in a network that has fewer, more closely tied members. *Social cohesion* measures both the social capital of subgroups within larger networks, and connectivity by determining the minimum number of actors who, if removed from the group, disconnect it.

Network approaches to social capital, which can focus on both its structural and cognitive elements. can influence health behaviors by promoting the diffusion of health-related information through social support networks (Lin, 2001a, 2001b). These forms of support can not only help maintain existing social networks, they can also encourage individuals and organizations to seek opportunities to become connected to other health-enhancing social networks.

Table 6. Indicators of Social Capital Measures

<p>Sense of Community</p>	<ul style="list-style-type: none"> ▪ Do people in the neighborhood know/like each other? ▪ People on this block generally do/don't get along ▪ Is it difficult to make good friends here? ▪ Are most friends in community here to stay?
<p>Trust</p>	<ul style="list-style-type: none"> ▪ Do you trust people in your club/organization? ▪ Do you trust politicians? ▪ Do you trust family members? ▪ Do you trust in government? ▪ Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people? ▪ Do you think most people would try to take advantage of you if they got the chance, or would they try to be fair?
<p>Norms of Reciprocity</p>	<ul style="list-style-type: none"> ▪ Can people depend on each other? ▪ Are people willing to help? ▪ How often have you helped someone in the past six months? ▪ Generally speaking, would you say that you can't be too careful in dealing with people or that most people can be trusted? ▪ Would you say that most of the time people are just looking out for themselves, or are they trying to be helpful? ▪ Do you think that most people would try to take advantage, or would they try to be fair?

Table 6. (continued)

Social Support	<ul style="list-style-type: none">▪ Do you agree that: I can always depend on someone to talk to; there are people in community other than my friends who really care about me?▪ Can you use friends for information?▪ If you need help, is there anyone you could count on for a small loan, help with a problem?▪ In the last week, month, etc., did anyone talk to you about your feelings?▪ There are people I know—among my family or friends—who: do things to make me happy; make me feel loved; can be relied upon no matter what happens; would see that I'm taken care of if I needed to be; accept me just as I am; make me feel an important part of their lives; give me support and encouragement
Social Networks	<ul style="list-style-type: none">▪ Can you identify the number of neighbors you know by first name or recognize?▪ Are you visited by neighbors frequently?▪ Do you visit neighbors frequently?▪ How many people do you know well enough to visit?▪ Do you agree that the friends in your community are part of your everyday activities?

Table 6. (continued)

Participation and Memberships	<ul style="list-style-type: none">▪ Do you participate in churches or local organizations (e.g. PTA, youth groups, business/civic groups)?▪ Do you have a sense of civic duty?▪ Do you desire to have organizational participation?▪ In your community/neighborhood, is it generally expected that people will volunteer or help in community activities?▪ Do you think most people in your community/neighborhood make a fair contribution?▪ On average how often do you volunteer in community activities?▪ How many times have you attended a town meeting?▪ Did you vote in the most recent election?▪ Here is a list of various organizations. Could you tell me whether or not you are a member of each type?
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2.5.3 Social Capital Research

Current social capital and health promotion research interests stem from the motivation to define mechanisms that help explain the association of income distribution with mortality. Such mechanisms must be psychosocial and operate at an ecologic level (Moore, Haines, Hawe, & Shiell, 2006). Social capital has become a useful way to describe how social relationships can increase human capital (Coleman, 1988). The psychosocial mechanisms needed to explain the income-mortality gradient are found in Durkheim's (1897) study of suicide, which associates higher rates of suicide with higher levels of individualism; higher rates of suicide were found in less socially cohesive communities. Wilson (1996) argues that as societies reach a certain threshold, health status becomes determined more by social disadvantage than by material

scarcity. Although social capital has become an accepted determinant of social disadvantage at multiple levels, social capital researchers have acknowledged the difficulty of defining, measuring, and interpreting social capital as a single explanatory variable (Kawachi & Berkman, 2000; Kawachi, Kennedy, & Glass, 1999; Kennedy et al., 1998).

Social capital combines many core concepts of social relationships; this package is used by public health to examine associations between particular social elements and related health outcomes. However, the indicators of social capital used in public health literature (Table 3) are not consistently based on any one major theoretical tradition (Macinko & Starfield, 2001). Moreover, the literature does not speculate why one conceptualization of social capital is or should be preferred over others. Such preferences result from secondary data analyses in which social capital is not the primary focus. The diversity of ways to measure social capital also limits comparability between studies. Table 3 summarizes the variety of possible measures, their relative similarities across constructs, and their directions. The items in Table 3 include individual-level measures and a few that assess ecological characteristics.

Social capital literature is similarly unclear about how certain social elements (herein referred to as social capital constructs) individually and collectively estimate health outcomes. A more comprehensive, quantitative study of the ability of social capital constructs to better estimate health outcomes will be useful in shaping our understanding of the psychosocial forces that help improve health. Table 2 provides a brief overview of the social capital literature. Kawachi, Subramanian, and Kim (2008), Islam et al. (2006), and Kawachi, Kim, Coutts, and Subramanian (2004) provide more detailed reviews of the social capital literature, not limited to studies in which self-reported health and mortality are the outcomes. Outcomes of the studies in Tables 2-5 include disease-specific, mental health, and health behaviors.

Veenstra (2000) performed an individual-level analysis of social capital and self-rated health in Canada to determine if there was a relationship between individual variation in self-rated health and individual measures of trust, civic norms, participation, and social engagement. He created a social capital index comprised of civic participation, trust in government and neighbors, and sense of identity. In his findings, measures such as social engagement were significantly related to self-rated health status but neither trust nor civic participation were correlated with self-rated health. His overall conclusion was that this study of social capital was not significantly associated with health in Canada. Rose (2000) used a Russian population to show that social capital (measured in terms of self-efficacy, trust, inclusion or exclusion from formal and informal networks, social support, and social integration) is associated with self-reported good health, both physical and emotional.

A study of 343 Chicago neighborhoods supported the idea that social capital is a contextual factor (Subramanian, Lochner, & Kawachi, 2003). Individual-level analysis of the Community Survey Project on Human Development showed that levels of trust varied by demographics such as age, race, marital status, and socioeconomic position. In addition, neighborhood variability in levels of trust were found and accounted for by differences in residents' characteristics. Evidence also showed significant differences in neighborhood variability of aggregated measures of trust.

Kim and Kawachi (2006) analyzed the relationship between health and social capital in terms of social trust, informal social interactions, formal group involvement, religious group involvement, giving and volunteering, diversity of friendship networks, electoral political participation, and non-electoral political participation. These measures were found to promote a modest relationship between social capital and self-rated health by lowering self-reports of poor

health by 4–9%. A high rating on all social capital variables lowered reports of poor self-reported health by 18%. When demographic variables were added, the model attenuates two out of three community social capital associations with other variables, which suggests a possible protective health effect. Social capital measures such as formal religious group involvement, giving and volunteering, social trust, and electoral participation showed strong inverse associations with fair/poor health. Blakely, Kennedy, and Kawachi (2001) found that individuals who live in American states with lower voter turnout had improved odds of fair or poor self-rated health.

Kim, Subramanian, Gortmaker, and Kawachi (2006) found modest protective effects exerted by social capital in state-level programs that address obesity and leisure-time physical inactivity. They found less convincing effects at the county level. A high rating on state- or county-level social capital scales was associated with 7% and 14% lower relative odds of obesity and physical inactivity, respectively. State-level measures of formal civic and political participation and social capital were less strongly associated with positive outcomes than measures of attitudes, informal socializing, and formal group participation. The researchers conclude that social capital may work more through local mechanisms than statewide policy implementation.

Kavanagh, Turrell, and Subramanian (2006)'s investigation of whether linked social capital can reconcile health inequalities found that social trust and political participation reduce self-reported poor health. Their analysis showed that linking social capital, measured by levels of trust in public and private institutions, had no effect on increasing the probability of self-reporting poor health.

Last, Veenstra (2005) states that gender, education, trust in community members, and participation in voluntary associations are not significant predictors of long-term illness; however, household income and political trust were found to be important predictors of long-term illness at the individual level. In general, the quality of self-rated health overall was predicted by age, political trust, and income. At the community level, trust in community members, household income, age, and political trust were found to be predictors of depressive symptoms but individuals' breadth of participation in networks of voluntary organizations did not show significant relationships to health. This author suggests more research into the compositional effects of social capital and health.

2.5.4 Bonding, Bridging and Linking Social Capital Research

Research has shown that bonding social capital (measured by personal levels of social networks and support, social trust, and civic participation) collectively affect people's self-ratings of health (Poortinga, 2006c). Community bonding and the community bridging effect of social capital were found to have moderately beneficial effects (Kim, Subramanian, Gortmaker, & Kawachi, 2006). Finally, qualitative results show the importance of bonding social capital to health behaviors and health outcomes, and the potential of bridging social capital to help group members access health care better (Boneham & Sixsmith, 2006).

Because social capital is a multilevel concept, consideration of bonding social capital is advantageous because it promotes better conceptualization and measurement of micro-level social capital (i.e. a better understanding of the relationships based on mutual trust and ability to cooperate that bring together individuals with similar identities). Specific benefits that selected groups and organizations provide for their members can be similarly examined. Higher bonding

social capital (measured by formal group involvement, level of trust in members' own races/ethnicities, diversity of friendships, and frequency of visits to homes of people of other races/ethnicities) along with bridging social capital, have reduced poor self-rated health reports by 14% and 5%, respectively (Kim et al., 2006). As a result, these scholars recommended the use of public health interventions and policies that leverage community bonding and bridging forms of social capital to improve health.

Bridging social capital can illuminate inter-organizational relationships and networks and relationships between individuals in different communities, neighborhoods, and across SES status. Bridging social capital is best understood through its effects of connecting organizations, individuals, or groups who do not share identities; and the benefits or consequences such relationships confer upon those organizations, individuals, or groups. Relevant examples would include how coalitions engage their constituent communities, how coalitions engage each other, or how organizations seek to partner with each other.

The inclusion/exclusion practices of the linking form of social capital offer a more rounded view of social capital. Much inclusion and exclusion take place around access to resources; clearly, many differences in access result from the marginalization of certain groups. Linking social capital operates at the macro level where communities work with states or state representatives, such as politicians or police, to affect change in their community. The work of many organizations during the modern Civil Rights Movement exemplifies the operation of linking social capital.

Interest in linking social capital has recently increased. Two studies using very large samples of 2.8 million people (Sundquist & Yang, 2006, 2007), and one qualitative study of 33 community residents frame recent research on the linking form of social capital (Talbot &

Walker, 2007). Sundquist and Yang conceptualized linking social capital by a measure called neighborhood linking social capital (the ratio of individuals who voted to those who were eligible to vote). Talbot and Walker measured social capital linkage by the direct and indirect effects of policy on everyday relationships between people in rural communities and the outside world, in terms of access to health care services.

Results of these studies show that men and women with the highest risk of coronary heart disease (CHD) lived in neighborhoods with low linking social capital (Sundquist & Yang, 2006), which suggests that increases in civic engagement through voter participation may augment linking social capital in low-participation neighborhoods, as well as provide safer places for participation to occur.

The diversity in social capital measurement is productive in the sense of showing the range of social capital measures, but becomes detrimental in the sense that it provides imprecise measurement across the literature. More comprehensive, systematic study of the constructs of social capital may yield fuller explanations of how a multilevel analysis of social capital can advance the study of social capital's benefits for health promotion. The studies cited above attempt to provide evidence of social capital's compositional effects. The effect of context (e.g. geographical area) has important implications for public health initiatives such as policy interventions to improve the quality of life within a neighborhood. The level of analysis also furthers understanding of the compositional effects of social capital. A multilevel analysis cannot be appropriately implemented until it is clear what is being measured. One remedy for the lack of clarity of social capital is meta-analysis, which can combine all the indicators of social capital and compare their effects on health outcomes.

2.6 OPPORTUNITIES FOR HEALTH PROMOTION

The public health significance of social capital is largely influenced by the ongoing discussion of broader public health goals, particularly building healthier communities. Social capital is referenced in the community development literature (Kreuter & Lezin, 2002; Minkler, 1997), but has not materialized into precise measures and practices that can help advance the study of community development approaches. A useful multilevel strategy that reflects the interplay between individual and place should heed Wakefield and Poland's (2005) conclusion that "a construction of social capital which explicitly endorses the importance of transformative social engagement, while at the same time recognizing the potential negative consequences of social capital development, could help community organizers build communities in ways that truly promote health" (p. 2829).

Research interests in social capital and health promotion stem from strong motivation to discover a mechanism to help explain the association of income distribution with mortality, psychosocial mechanisms, and a particular psychosocial mechanism that specifically operates at an ecologic level (Moore, et al., 2006). The connection to social ties and the income-mortality gradient are germane to the discussion of social capital. Kaplan et al. (1996) stated that social capital is a possible mediating variable between income inequality and social indicators such as unemployment, incarceration rates, educational achievement, and social expenditures and furthermore that these are indicators of how social capital is developed. Social capital has become useful to explain how social relationships can increase human capital (Coleman, 1988); however, a possible gradient effect rather than a threshold effect may indicate that one's social positioning along various social and economic hierarchies affects income as well as health

(Marmot and Feeney 1997). Others have suggested that income inequality can lead to increased mortality by causing individuals to disinvest in social capital (Kawachi, et al., 1997).

2.6.1 Community Development Approaches to Social Capital

One goal of the Ottawa Charter is to help develop an agenda for health promotion that restores and enhances extra-familial social relations and community capacity. This approach, which is central to health promotion practices, embodies and operationalizes participation, empowerment, and collective action (Wakefield & Poland, 2005). Social capital embraces all the social, collective, economic and cultural resources to which a community has access. This combination represents a community's potential to engage in cooperative action, address local problems, and provide support for its members.

Lomas (1998) states that the way we organize our society, the extent to which we encourage interaction, and the degree to which we trust each other are probably the most important determinants of health. Social capital is seen as an important facilitator of community self-help (Kawachi, 2002) and an outcome of community development, because it helps communities work more easily to solve collective health and social problems (Wakefield & Poland, 2005). The Putnam model of social capital incorporates community networks, civic engagement, local identity, a sense of solidarity and equity with other community members, trust, and reciprocal help and support. Putnam promotes community engagement as the primary mechanism for building better-educated, healthier, more politically involved communities, which in turn produce a more democratic society.

The discourse of social capital and public health is dominated by the communitarian approach, at whose core is the construct of participation. In many ways, participation is the

driving force behind the role of social capital in public health. Participation involves building trusting relationships within one's neighborhood, community, congregation, voluntary association, or civic or educational group. Coleman (1988) suggests that participation in voluntary associations engages participants in processes that form new social ties and strengthen existing ones; these ties in turn provide the contexts for social support to operate and for social networks to form or strengthen.

For many scholars, conducting social capital research presents an opportunity to examine the effects of neighborhoods on health (Caughey, O'Campo, & Muntaner, 2003; Lindstrom, Moghaddassi, & Merlo, 2004; Lochner, Kawachi, Brennan, & Buka, 2003; Wen, Browning, & Cagney, 2003). Understanding the mechanisms and effects of social capital are critical to understanding the effects of social, political, and environmental characteristics that make neighborhoods more or less at risk for disease. However, social capital research does not take into account the changing demographics of a neighborhood or larger community, nor has it considered definitions of community that extend beyond one's neighborhood. For example, many people attend houses of worship beyond their residential community's geographic boundaries. Nonetheless, their participation in religious activities shapes their norms, beliefs, attitudes, and behavior, which can promote positive social ties and, possibly, improved health.

As a community seeks to develop social capital, it must first become competent (i.e., it must contain actively involved members), and second it must build capacity. According to Cottrell (1976), in a competent community "the various component parts are able to collaborate effectively on identifying the problems and needs of the community; can achieve a working consensus on goals and priorities; can agree on ways and means to implement the agreed upon goals; [and] can collaborate effectively in the required actions" (p. 198). Like social capital,

community competence has been challenged by issues of measurement. Minkler and Wallerstein (1997) have stated that assessment must move beyond aggregating measures of individuals or service providers. Heaney and Israel (2002) have called for the application of what we know about social networks and social support; this simple prescription may indeed further our understanding of community competence, capacity, and social capital. Social networks create opportunities to map social ties, which can be used as points of analysis to identify leaders (natural, lay, or formal) and their networks, networks of high-risk groups, and to empower all of these to participate in strengthening networks within communities (geographic or non-geographic).

Competent communities develop by working in partnership within communities, for example sharing power and building skills around particular issues that can provide benefits in terms of other issues (Hawe & Shiell, 2000). Relationships forged to solve problems then become readily accessible “capital” for future neighborhood or community issues, such as building playgrounds, establishing a neighborhood watch program, getting streets repaved, or obtaining grants for church or synagogue developments for projects of community interest. Therefore, community capacity can be viewed as a building block of social capital, an emergent property in the processes of creating healthier communities.

Goodman et al. (1998) define capacity as: 1) the characteristics of communities that affect their ability to identify, mobilize, and address social and public health problems; and 2) the cultivation and use of transferable knowledge, skills, systems, and resources that affect community and individual-level changes consistent with public health-related goals and objectives (p. 259). The Colorado Trust states that community capacity becomes “the currency that residents bring to the table when they are inspired (or threatened) by an issue that speaks

directly to their collective well-being (Easterling, Gallagher, Drisko, & Johnson, 1998, p. 12). Goodman et al. (1998) identified ten dimensions of capacity: leadership, citizen participation, skills, networks, resources, sense of community, community power, understanding community history, values, and critical reflection. These dimensions can become mechanisms by which to determine if a community or neighborhood has social capital, and to better determine what the context and structure of social capital is for that community or neighborhood. These dimensions allow more accurate characterization of communities and help social capital researchers characterize communities or neighborhoods that have varying levels of social capital. The ten dimensions of capacity imply a variety of methods for measuring the social assets of communities and community agents of change, and provide tools to examine how capacity influences the work of community organizations (Lempa, Goodman, Rice, & Becker, 2006).

Competent communities build and enrich their capacity, which fosters the development of their social capital. Social capital can be developed by strengthening community organizations so that they become sources of capital that assist in identifying and solving community problems. Also, social capital can be developed by strengthening, expanding, and building reciprocal social networks within and among communities, which reduces crime, improves health outcomes, and increases a neighborhood's or community's ability to influence powerful others.

As a result of urbanization, neighborhoods and communities have changed over time (Forrest & Kearns, 2001). Both geographic locations and communities of identity must reconstitute competence, capacity, and social capital to meet the needs of new members and the changing needs of existing members. These dynamic changes imply that there is not a linear relationship among competence, capacity, and social capital, but rather a cyclical relationship.

Social ties, which also express in dynamic relationships, require longitudinal analysis of how they form, disband, and reform. Of particular interest would how social ties within neighborhoods change over time. For example, if a neighborhood loses its sense of community and cohesiveness, its residents may become subject to governmental policies that place it at greater risk for health hazards, or vulnerable to individuals or groups that do not cherish its best interest (e.g. developers or absentee landlords). Such situations affirm Labonte's (2004) suggestion that social capital research should focus on the cultural history and political economy that determine social capital.

Paxton (1999) disagrees with Putnam's assertion that social capital has declined in America, and observes that the lack of agreement about the real or perceived decline in social capital in America stems from six causes. These are: (a) gaps between the concept of social capital and its measurement; (b) reliance upon single indicators of social capital; (c) lack of strong ties between social capital indicators and theory; (d) the use of measures from different sources, which presents contrary images of health and social capital; (e) varied sources of social capital, which limit comparability in sampling designs and question wording; and (f) the use of single observed variables, for which researchers cannot explain measurement errors.

According to Navarro (2002), the communitarian approach predominant in the United States does not require state-level intervention and is often used to mask discrimination and further marginalize powerless groups. Bourdieu (1985) and other scholars also address the "darker side" of social capital by pointing out its downsides. Their main argument is that if social capital's resources are available through social networks, the ones that some individuals are able to utilize exist at the expense of others (Portes & Landolt, 1996). Baum and Ziersch (2003), who refer to the "darker side" as social "exclusion/inclusion and equity" argue that these

problems are relevant because they link the social elements of exclusion to material deprivation and poverty and emphasize the processes of marginalization, providing further evidence that individuals' and communities' access to elements of social capital can vary according to characteristics such as race, gender, and socioeconomic status.

Social epidemiologists, like sociologists, have long been interested in the ways that social organization and disorganization influence the health of populations (Kunitz, 2004). Social organization and disorganization can further be understood from research and practice that examine how individuals and groups share and use skills, knowledge, attitudes, and beliefs to improve health outcomes. Researchers should also be interested in how a sense of community shapes the environments in which individuals reside, as well as how it affects the development and mobilization of communities. Health disparities or inequalities, which are prominent on the public health agenda, are shaped not only by social support but also by structures that can inhibit or promote positive health outcomes.

Finally, there is a policy or state responsibility for the health of citizens. Communities that successfully garner support and resources will more successfully influence policy makers' decisions. The results of such community input can be safer neighborhoods, improved working conditions, increased and more widely varied employment opportunities, and educational options.

2.7 LIMITATIONS OF SOCIAL CAPITAL RESEARCH

Social capital research as an approach to health promotion contains several limitations that can be broadly described as a lack of conceptual development in theory and measurement. Because

social capital research lacks clear distinctions between social capital as an attribute of a geographic space or as an individual attribute, it also suffers from the problematic operation of variables and offers limited theoretical exploration of causal linkages (Carlson & Chamberlain, 2003).

There is little evidence of a causative link between social capital and poor health outcomes, independently of the material conditions that inform day-to-day experience. Although the dominant focus of social capital research is horizontal relationships, issues of power and vertical relationships between communities and the outside world are ignored; in addition, objective research may be compromised by victim-blaming (for example, the idea that communities would be healthier if they would just “get it together”) and minimized by a lack of belief in credible evidence about how long social capital takes to develop naturally or change through planned interventions.

Halpern (2005) challenges the strongly reported association between “size and quality of people’s social networks and their health, with people who are less socially isolated and more involved in social and civic activities tending to have better health” (p. 75) and states that such results are subject to respondent bias. He illustrates the latter point by contending that someone suffering from depression is likely to report more depressive symptoms and to perceive almost any level of support as lower than someone without depression would. Also, people whose outlooks on life are more generally positive will report better relationships and health than others whose outlook is negative. Results of this kind may lead to misleading positive associations in cross-sectional data, especially when the data includes self-reports of health and relationships. Halpern (2005) also takes issue with the direction of causality, which raises important questions. At the individual level, if personal relationships can protect health, can health affect

relationships? At the meso level, does participating in religious activity, voluntary associations, civic organizations, etc. have a positive impact on health? And last, at the macro level, are more culturally inclusive, democratic, egalitarian societies inherently healthier?

At best, social capital may be an essential but not a sufficient ingredient for health improvement (Lochner et al., 2003). This conclusion is drawn from both the extensive limitations of and opportunities for social capital development in the field of public health. To determine if social capital is necessary and sufficient, researchers will need to better understand how the constructs of social capital singularly and collectively impact the health of individuals and communities.

3.0 METHODS

3.1 RESEARCH RATIONALE

Social capital research has examined the effects of social capital on health behaviors, health outcomes such as mortality and self-rated health, and sexually transmitted diseases. Past social capital research can be largely characterized as a mismatch between theory and measurement, as demonstrated by moderate and inconsistent findings about the association between social capital and physical and mental health outcomes. Currently the social capital literature is expanding, but with no clear direction. The lack of clarity has led me to engage in a systematic study of social capital measures, to better understand how social capital's constructs are related to health outcomes. My research questions are broad in scope because they are intended to serve as guides through the literature and social capital data necessary for a meta-analysis.

Conducting a meta-analysis is desirable, because it will minimize the problematic operationalization of variables and the limitations of theoretical development. It will also allow me to test the effects of social capital's constructs on general health outcomes such as self-reported health, as well as to test the theoretical concept of social capital's three forms (bonding, bridging and linking) and their effects on the quality of self-reported health. My ability to generate a quantitative synthesis of the association between social capital and health may

eventually help direct primary data collection and assist in developing interventions to increase the stock of social capital in communities that lack it.

3.2 META-ANALYSIS

3.2.1 Defining Meta-Analysis

One strategy to address the large gap in social capital research is to use a meta-analysis, in this case of self-reported health and mortality data. Meta-analysis is defined as a method of combining information from single investigations to obtain or address conclusions that could not be drawn from the individual investigations. A meta-analysis can help resolve conflicts between study results and enhance results that do not provide confident answers about the benefits of social capital for health promotion. It can turn the heterogeneity of discordant investigations into an advantage.

Riegelman (2000) characterizes meta-analysis into two styles: hypothesis-based and exploratory. Hypothesis-based analyses are driven by explicit questions that determine the selection of studies to include. An exploratory meta-analysis is derived from a question or broad issue and includes all studies related to that issue. The results of an exploratory meta-analysis must be interpreted differently from those of a hypothesis-driven analysis.

The original goal for this meta-analysis was to begin it as exploratory-driven and develop it into hypothesis-driven. After an iterative review of the social capital literature, several research questions emerged (listed below), but I did not generate specific hypotheses for each of them. Instead, I allowed the data from the meta-analysis to provide the context in which several

levels of association between social capital constructs and physical health measures and mortality could be explained. Therefore, the organization of this meta-analysis is more reflective of how social capital data are reported within the literature. In addition, it seeks to provide context for how social capital is currently characterized in the literature as well as suggestions about how future social capital research can further refine both theory and measurement.

3.2.2 Advantages of Meta-Analysis

Meta analysis can be a powerful tool for the guidance of future directions of social capital research toward better theoretical development. It can provide evidence on the most effective strategies for social capital development and interventions by examining the association between social capital's constructs and a broad health outcome, such as self-reported health.

The advantages of using a meta-analysis approach include:

- ✓ Aid in decision making for treatments and interventions;
- ✓ Provision of a coherent view of reality of multifarious and often discordant findings;
- ✓ Combination of the results of multiple studies without the need to carry out a larger study to examine the same differences;
- ✓ Synthesis of differing results or the identification of moderating and mediating variables that account for irreconcilable differences, thereby making it possible to identify precise areas in which future research is needed; and
- ✓ Identification of implications for social policy (Hunt, 1997).

The use of meta-analysis allows a researcher to exceed what traditional literature reviews can accomplish. That is, traditional reviews are often criticized for not using a systematic method of integrating the relationships among variables across different studies and reconciling differences in the results. The fundamental problem a meta-analysis seeks to rectify is how to produce an

overall quantitative finding representing what the studies show when they are synthesized into one larger study (Hunt, 1997).

3.2.3 Limitations and Critiques of Meta-Analysis

Meta-analysis is limited by the initial researchers' study population and sample size, resulting in the following critiques:

- (1) Logical conclusions cannot be drawn by comparing and aggregating dissimilar studies that include different measuring techniques, definitions of variables (e.g. treatments, outcomes), and subjects;
- (2) Results of meta-analyses are un-interpretable because results from poorly designed studies are included along with results from well-designed studies;
- (3) Published research is biased in favor of significant findings because non-significant findings are rarely published (publication bias), which leads to biased meta-analysis results; and
- (4) Multiple results from the same study are often used, which may bias or invalidate the meta-analysis and make the results appear more reliable than they really are, because they are not independent (Wolf, 1986).

The first critique is often referred to as the “apples and oranges problem” because a large diversity of studies can make comparing results cumbersome or even impossible. To alleviate this concern, coding the different characteristics for each study and statistically determining whether the differences are related to the meta-analytic results (moderation analysis) is desirable. The second criticism can be addressed by using moderation analysis, by coding the quality of the design employed by each study, and by examining how the design of the original study affects the meta-analysis results.

The third criticism about publication bias can be minimized by a couple of strategies. One is to compare results found in books, dissertations, and unpublished papers presented at conferences to results that appear in published articles. Another is to estimate the number of

additional studies with non-significant results that would be required to reduce the overall effect size estimate to a non-significant ($>.05$) level, which would supply an estimate of the robustness and validity of the results.

The fourth critique of meta-analysis addresses how multiple results are compared across studies. However, the meta-analysis literature suggests that some meta-analysts perform separate analyses for each outcome, others lump the different dependent variables together into the same analysis, and still others average all of the results from the same study. The approach of yet other analysts--is to limit the number of outcomes to a fixed number.

This meta-analysis will analyze only self-reported health and all-cause mortality as the dependent variables, will combine these two outcomes to derive overall effects, and will examine whether or not the association of these variables with social capital differ significantly from one another.

3.3 DATA COLLECTION

3.3.1 Systematic Review

The data collection methodology used in this study was a systematic review of the published literature on social capital, using electronic databases. This process echoes the exploratory literature review that was used to identify the meta-analysis study sample. The initial search strategy for this meta-analysis involved a qualitative review of the literature by searching, reading, and framing the social capital literature according to emerging themes, sensitizing concepts, and issues of measurement. The qualitative process provided the search terms and

guided the organization of the research methodology. After careful review of the literature, a considerable amount of uncertainty arose about whether or not social capital benefits health was clear. Because of this uncertainty, a meta-analysis became the method for this dissertation. The following research questions resulted from an iterative process of searching the literature and revising questions that would provide greater clarity to the study of social capital.

3.4 RESEARCH QUESTIONS

- ✚ What is the association between social capital's constructs and self-reported health and all-cause mortality measures?
- ✚ How does the level of measurement influence the association between social capital and self-reported health and all-cause mortality measures?
- ✚ What is the effect of moderators on the association between social capital and self-reported health and all-cause mortality measures?

3.5 SEARCH STRATEGY

A detailed search between October 2007 and March 2008, using MEDLINE (via Pub Med, OVID), Sociological Abstracts, The Cochrane Database of Systematic Reviews, The Cochrane Library, the ISI Web of Knowledge, and PsycInfo. The searches were conducted using the following search terms: "social capital," "health," "self-reported health, and "mortality." Limitations included "English only."

3.5.1 Inclusion Criteria

Studies included in this meta-analysis tested the association between at least one of the social capital constructs and self-reported health and/or all-cause mortality. The search included studies in which all-cause mortality, or self-report health measures were the outcome variables (e.g., self-reported health and/or a self-reported general sense of well-being). Additionally, studies had to have conducted a statistical test of the social capital variables and the outcome variables of interest. More than 500 articles were initially identified as potentially fitting the description of the selection criteria. After examining the titles and abstracts of these 500 articles, 158 closely fit the inclusion criteria. After reviewing these 158 articles, 39 studies fit the inclusion criteria exactly.

The larger independent literatures associated with each of the social capital measures described above were excluded. Future meta-analyses may examine these independent literatures on the social capital measures; their results could be used to improve the ways that social capital researchers measure social capital. Other studies were excluded because they did not test the associations between social capital variables and the outcome variable(s) or they were review articles that included data that did not contain the outcome variable(s) of interest.

3.5.2 General Practices for Meta-Analysis

Within the practice of meta-analysis, methodological rigor means that sufficient information is provided about coding procedures for the studies included, in particular detailed information about how to approach the location, retrieval, and coding of studies (Wolf, 1986). In the first

meta-analysis text, Glass, McGaw, and Smith (1981), suggest five general procedures for meta-analysis:

- ✓ Formulate the problem by identifying the questions to be answered in the meta-analysis and examining what kinds of evidence exist;
- ✓ Collect data by searching for relevant studies;
- ✓ Evaluate data by asking which of the collected or reported data are valid and usable and eliminating studies that do not meet the criteria;
- ✓ Synthesize the data using statistical methods for reconciling and aggregating disparate studies;
- ✓ Present the findings by reporting the resulting “analysis of analysis” with details, data, and the methods used.

The statistics used in meta-analyses provide a measure of estimation, inference, or adjustment (Riegelman, 2000). Estimation statistics measure the effect size, the strength of the association, or the magnitude of a difference. The most common measures of effect size are odds ratios, difference in probabilities, or the number needed to be treated. Estimating the effect size can present a limitation because many studies may not report the same measure of the effect size and because it is difficult to convert one measure into another. Meta-analysis increases the sample’s size by combining studies, a procedure that has the potential to increase statistical power. Although this potential improves the probability of demonstrating statistical significance, one weakness of this strategy is that small but real differences may be found to be statistically significant but not to have clinical or public health importance or relevance for interventions.

Measures of inference or statistical significance are often easy to provide if the study lists the test of significance used, the number of individuals in each group, and the p-value. These results must be interpreted with caution because the combined results of many studies will very often produce statistically significant results. Therefore, according to Riegelman (2000), it is important to distinguish between statistically significant results and what is clinically important or, in my investigation, what might be important for health promotion activities.

3.5.3 Coding Strategy

Each study that was selected for meta-analysis review was entered into Comprehensive Meta-Analysis (version 2) by Biostat, developed by researchers at the National Institutes of Health. The coding strategy involved several examinations of the studies to be included. Each study was reviewed for:

- (1) operational definition(s) of social capital;
- (2) co-variables reported;
- (3) how the independent variables (social capital variables) were measured (e.g. at the individual, neighborhood, community, state, or national levels);
- (4) how the independent variables (social capital variables) were conceptualized or tested (e.g. at the individual, neighborhood, community, state, or national levels);
- (5) how the dependent variables (e.g. self-reported health measures and/or mortality) were measured (e.g. at the individual, neighborhood, community, state, or national levels);
- (6) how the dependent variables (e.g. self-reported health measures and/or mortality) were conceptualized or tested;
- (7) what are the theoretical and measurement pathways (see section 4.5.3.1);
- (8) what statistical tests were used to test the association between the independent and dependent variables; and
- (9) how each independent and dependent variable was coded and reported, and the effect size direction (see section 4.5.3.2).

Initial coding began with the examination of: (1) independent variables; (2) outcome variables; (3) country in which the study took place; and (4) if the study reported data by gender. The operational social capital definition, independent variables, dependent variables, gender, country, and theoretical-measurement pathway served as moderators.

3.5.3.1 Theory-Measurement Pathways

Varied results may appear in the relationships between social capital and health because of how each study is theoretically organized. In this meta-analysis, “theory-measurement pathway” was used to describe how each study conceptualized the etiology of social capital (e.g., individual-versus community-level theory) and how these conceptualizations were linked to the level of statistical analysis in each study. For example, an individual-level statistical analysis of health might use individuals’ self-reported health as an outcome variable, whereas a group-level analysis might use a single community-level variable (e.g., county-wide mortality rates) to describe the health of all individuals within a larger group. The theory-measurement pathways were first defined by examining the independent (social capital) and dependent (self-reported health and all-cause mortality) variables within each study and coding them according to the authors’ descriptions of how these data were measured. Whether these data were collected at an individual, community, neighborhood, state, or national level was taken into consideration. Second, each social capital and outcome measure was coded according to how the authors described the conceptualization of these data, again at individual, community, neighborhood, state, or national levels. Each study was assigned at least one pathway. More pathways were assigned and coded depending on how many social capital and outcome variables were included in each study and if the study reported measuring social capital variables at multiple levels.

3.5.3.2 Directionality of Independent and Dependent Variables

Within the social capital literature, I found a lack of consistency in how social capital variables were measured, conceptualized, coded, analyzed, and reported. For example, some studies operationalized the social capital variable as the “presence” of social capital, assigning those with little to no social capital a score of “0” and those with higher levels of social capital a score of “1.” But another set of studies operationalized the social capital variable as the “absence” of social capital, coding their data in the opposite direction. The same problem occurred with the health variables: some studies measured the presence of health and others measured its absence. Because one effect of these discrepancies was that studies with the same results appeared to generate opposite conclusions, I paid particularly careful attention to the coding of the independent and dependent variables. Keeping in mind that one of the goals of a meta-analysis is to provide an overall effect size for the entire sample of studies. All data were re-coded as necessary to reflect and report the relationship between the presence of social capital and its relationship to the presence of health.

This approach allowed for the comparison of all self-reported health and mortality studies together, in order to show one effect size of the social capital literature and health. An analysis of the self-reported health and mortality studies will determine their independent effects on health.

3.6 SOCIAL CAPITAL META-ANALYSIS STRATEGY

Analyses of these data were tested for differences in how each social capital construct was measured and their association with self-reported health measures and all-cause mortality. Additional analyses include testing the effect of moderators.

Moderator testing examines whether or not there are differences in the overall effects across levels of several theoretical and methodological variables including: (a) how social capital is operationalized; (b) if there are any differences between studies that report effect sizes by gender; (c) if there are differences in the way that social capital is measured internationally and domestically, and; (d) how each study carries out its conceptualization of measurement (“theory-measurement pathways”). The “independent variable,” “dependent variable,” “measured,” “conceptualized,” and “pathway” columns in Tables 2-5 identify the level of measurement (e.g. individual, neighborhood, community, state, national) at which each independent variable and each dependent variable are measured (collected) and statistically tested.

Table 7. Social Capital Meta-Analysis Descriptive Statistics by Study

Study	Outcome	#of Social Capital Constructs	# of Effects	Odds Ratio
Blakely 01	SRH	1	2	1.261
Blakely 06	Mortality	2	15	1.000
Bolin 03/80	SRH	1	1	1.258
Bolin 03/88	SRH	1	1	1.156
Bolin 03/96	SRH	1	1	1.258
Carlson 04	SRH	3	5	1.253
Drukker 05	SRH	2	6	1.300
Folland 07	Mortality	1	1	9.762
Greiner 04	SRH	2	2	1.291
Hyppa & Maki 01	SRH	3	24	1.503
Hyppa &Maki 03	SRH	2	4	1.190
Hyppa 07	Mortality	2	4	1.131
Kavanagh 06	SRH	3	6	1.019
Kim 06a	SRH	3	9	1.189
Kim 07	SRH	1	4	1.120
Kim 06b	SRH	1	7	1.079
Lindstrom &Lindstrom 06	Mortality	1	1	0.349
Liukkonen et al 04	SRH	3	14	1.023
Lochner 03	Mortality	3	12	1.572
Mellor 05	Both	3	6	3.181
Mohan 05	Mortality	5	36	1.122
Mohseni	SRH	3	8	1.628
Muntaner et al 02	Both	4	44	0.984
Pollack 04	SRH	4	6	1.728
Poortinga 06a/00	SRH	3	7	1.451
Poortinga 06a/02	SRH	3	7	1.491
Poortinga 06b	SRH	4	6	1.399
Poortinga 06c	SRH	2	5	1.364
Rose 00	SRH	5	7	0.932
Skrabski 04	Mortality	4	9	1.143
Subramanian 01	SRH	1	1	1.011
Subramanian 02	SRH	1	2	1.706
Sundquist 06	SRH	1	2	1.173
Taylor 06	SRH	1	3	1.890
Turrell 06	Mortality	3	6	1.000
Veenstra 00	SRH	2	3	2.208
Veenstra 02	Mortality	1	1	1.091
Veenstra 05a	SRH	1	7	1.216
Veenstra 05b	SRH	2	3	1.177
Total		89	288	
Average # Per Study		2	7	
Total # of Studies Analyzed			39	
Effect Size Range			0.349-9.762	

4.0 RESULTS

4.1 DESCRIPTIVE ANALYSIS

Table 7 contains descriptive statistics of the total sample of studies included in this meta-analysis and reports the overall effect size for each study. A total sample of **39** studies met the inclusion criteria outlined in Chapter 5. These 39 studies yielded **288** effect size estimates. The average number of effect size estimates tested within each study was **7**. Self-reported health was an outcome in **28** social capital studies and mortality was the outcome in **9** studies. These studies measured the constructs of social capital (outlined in Chapter 3) using **102** different indicators (specific measures) across social capital constructs. Each of the 288 effect sizes were coded with a social capital construct from Chapter 3 according to how they were operationally defined within their respective studies. The average number of social capital constructs per study was **2**.

4.2 DATA ANALYSIS

The effect sizes for this meta-analysis are reported as odds ratios measured at the 95% confidence level. Other statistical tests provide evidence about differences between the social capital studies included in this analysis, including tests of heterogeneity. Heterogeneity tests determined whether or not significant variability in effect sizes existed across studies. If

significant heterogeneity is not found, the effect sizes are all presumed to be approximately the same and the need to test to see if effect sizes are associated with theoretical moderators is obviated. Significant heterogeneity can indicate the presence of other factors producing excess variability in effect sizes (e.g. moderators). Tests for moderators can be based on a theoretical or *a priori* assumption even if effect sizes are not shown to be statistically significant. Last, a sensitivity test is a diagnostic tool that can provide further evidence of outliers. This test, which is performed by removing one study at a time and re-estimating the overall effect size, may identify if a particular study is a meaningful outlier.

4.3 OVERALL EFFECT SIZE ESTIMATES

The overall weighted effect size estimates and methodological characteristics for each study are presented in Table 7 and Figure 1. Results showed that an estimate for the overall weighted effect size for the relationship between social capital and health is **OR=1.27** (95% confidence interval [CI] 1.21-1.34) and is significantly different than zero ($p=0.0001$). The mean effect size within each study estimate ranged from **OR=0.35** (95% CI=0.07-1.83) to **9.76** (95% CI=2.80-37.13). The two largest effect sizes were omitted because both were almost three times larger than the next-largest effect and were therefore considered to be outliers. These results suggest that on average, a one-unit increase in social capital increases the odds of having good health by **27%**.

When the overall effect was recalculated for a sensitivity analysis, with each study removed, all of the overall tests of significance remained significant ($p's < 0.05$). Cochran's Q-test showed that the effects were significantly heterogeneous ($Q=862.2$, $df=38$, $p=0.0001$). As a

result of the significant difference of effect sizes across studies (having significant variability), moderation was tested.

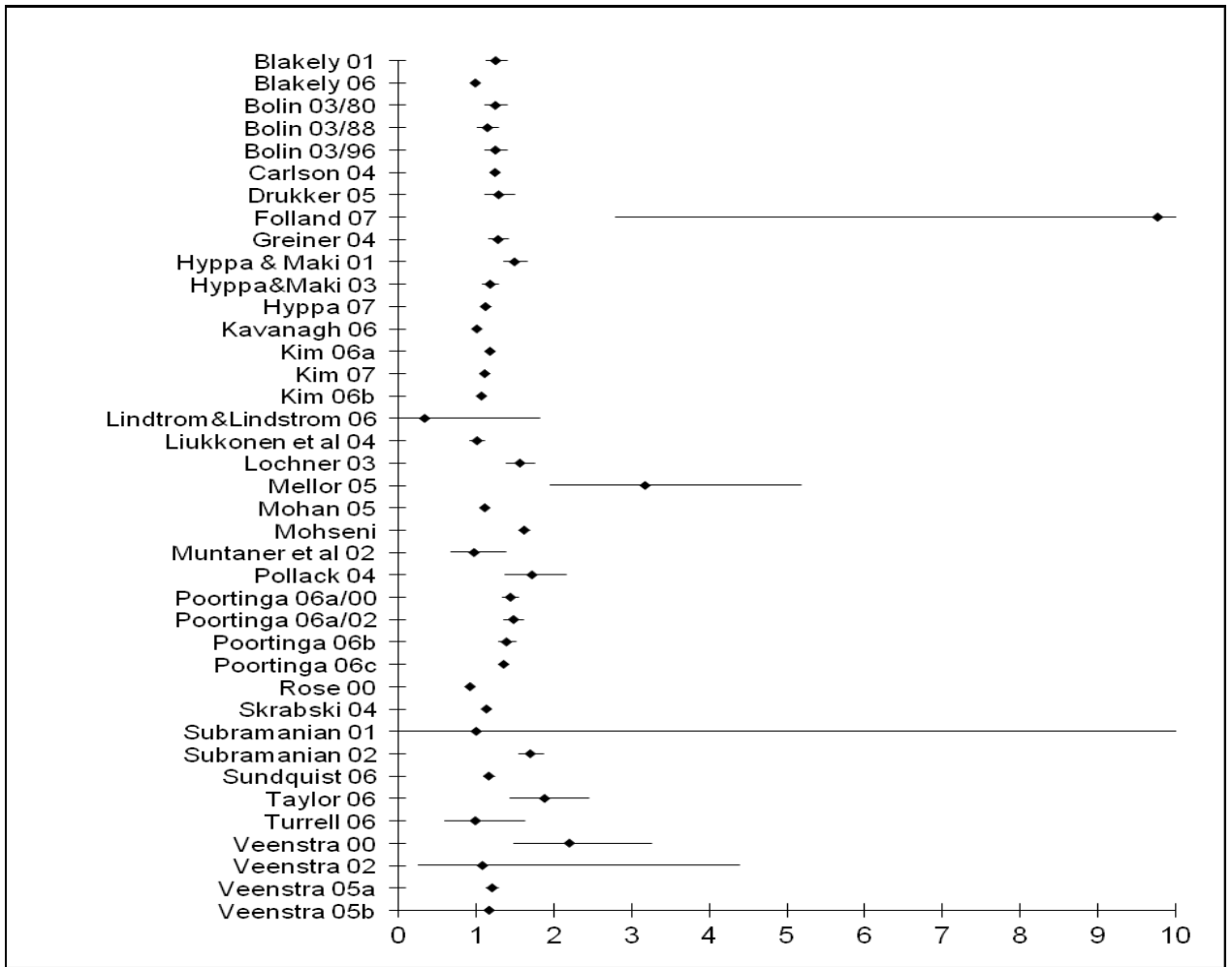


Figure 1. Distribution of Effect Sizes by Study

4.4 MODERATOR ANALYSIS

The social capital studies used in this meta-analysis were characterized for analysis and these data were stratified by levels of: (1) Bonding Social Capital, (2) Bridging Social Capital, (3) Linking Social Capital, (4) Country, (5) Efficacy, (6) Level of Analysis, (7) Data entry formats, (8) Participation, (9) Reciprocity, (10) Sense of Community, (11) Social Capital Survey Methods, (12) Social Capital Index, (13) Social Support Systems, and (14) Trust. The social capital constructs could not be tested as moderators because of the non-independence of effects. Instead, the overall effect estimate for each social capital construct was calculated and described to determine its influence on effect size variability. This meta-analysis cannot determine if the independent effects on health of these constructs differ significantly from each other. Data entry formats, Country, Level of Analysis, Outcome and Social Capital survey methods are the only categories that met the criteria of effects dependency and were tested as moderators. The results from the tests of moderation are presented in Table 8 and Figure 2. Figure 2 shows that all moderators influenced the relationship between social capital and health and that all effect sizes are estimated with high levels of confidence.

4.4.1 Relationship between Social Capital and Self-Reported Health and All-Cause Mortality

Nine studies examined the relationship between social capital and mortality outcomes and 28 tested the association between social capital and self-reported health. A moderator test showed that the relationship between social capital and self-reported health and the relationship between social capital and mortality were marginally different from one another ($Q=3.55$, $df=1$, $p=0.0597$). Because of this marginal difference, results for each set of studies are reported separately below.

The overall weighted effect size for mortality studies was found to be **OR=1.17** (95%CI=1.20-1.33) and for self reported health **OR=1.29** (95%CI=1.21-1.37). These results indicate that an average one-unit increase in social capital will increase the odds of survival by **17%** and increase the odds of reporting good health by **29%**. The range of effects for studies in which mortality is an outcome was **OR=0.349** (95%CI=0.07-1.83) to **OR=9.73** (95%CI=2.72-37.13) and self-reported health was **OR=0.932** (95%CI=0.877-0.992) to **OR=2.21** (95%CI=1.4-3.27). These ranges may indicate that other factors contribute to the marginal differences between these two health outcomes. Sensitivity tests showed that no one study in either set of outcome studies significantly influenced the overall effect estimate. Regardless of which study was removed for self-reported health studies, the overall estimated effect size range was **OR=1.27-1.30** and for mortality studies **OR=1.12 - 1.15**.

4.4.2 Methodological Levels of Analysis

The purpose of this analysis was to test whether or not the effect size variability across studies is influenced by the conceptual level and statistical analysis of social capital (e.g., individual versus community/ecological). Thirty-nine studies were analyzed at three different levels of analysis: individual (n=12), group or ecological (n=16), and multilevel (n=11). Studies were characterized by level of analysis according to how each analyzed the relationship between social capital and health (Section 3.5.2). Cochran's Q-test for moderation showed that the effects were not significantly different across these subgroups of studies (Q=4.48, df= 2, p=0.11). This finding indicates that the three average effect sizes estimated for each level of analysis (e.g. individual, ecological, or multilevel) were not statistically different from each other. Group studies, or studies measured at the ecological level, had a higher **OR=1.36** (95%CI=1.26-1.47); followed by social capital studies measured using individual analyses, **OR=1.25** (95%CI=1.11-1.40); the lowest overall effect size estimate was for multilevel analyses, **OR=1.20** (95%CI=1.11-1.31).

These results indicate that, on average, studies that examine communities, neighborhoods, states, and nations show that a one-unit increase in social capital increases the odds of having good health by **36%**. Studies that examine social capital at the individual level show that a one-unit increase in social capital increases the odds for good health by **25%**. Finally, studies that examine social capital using a multilevel framework show that a one-unit increase in social capital increases the odds of good health by **20%**. Sensitivity tests show that no one study in any of these sets of outcome studies significantly influences the overall effect estimate. Regardless of which study was removed, for individual-level studies the overall estimated effect size range was **OR=1.14-1.28**, for ecological studies **OR=1.23-1.28**, and for multilevel studies **OR=1.09-1.17**.

4.4.3 Country

Data were categorized according to each study's country of origin. Three categories emerged: International (n=24), Multinational (n=5), and United States (n=10). International studies capture social capital research conducted in non-U.S. countries; studies given a multinational code were conducted in more than one country. Results showed that Country was not a significant moderator ($Q=1.69$, $df=2$, $p=0.430$). Estimates for the overall weighted effect size for the relationship between social capital and health as moderated by country were **OR=1.24** (95%CI=1.16-1.33), **1.31** (95%CI=1.12-1.50), and **1.35** (95%CI=1.22-1.50), respectively for international, multinational, and U.S. studies. The U.S. studies' effect size estimate is larger but not statistically different than the international and multinational effect size estimates. On average, studies that examined the relationship between social capital and health in one international data found that a one-unit increase in social capital increases the odds of having good health by **24%**. Studies that examined the relationship between social capital and health with data based in multiple countries found that a one-unit increase in social capital increases the odds of having good health by **31%**. Studies examining the relationship between social capital and health with data based in the United States showed that with every one-unit increase in social capital the odds of having good health increased by **35%**. Regardless of which study was removed for international studies, the overall estimated effect size range was **OR=1.14-1.23**, for U.S. studies **OR=1.14-1.23**, and for multinational studies **OR=1.16-1.68**.

4.4.4 Computer Estimated Effect Sizes v. Study Author Estimated Effect Sizes

Sixteen studies that met the inclusion criteria reported data that could not be entered into the Comprehensive Meta-Analysis program. To include these studies in this meta-analysis, a reported effect size, such as a p-value and sample size were used. Eighty-one or about 28% of the total effect sizes were derived this way. This moderation test assessed significant differences in the effect sizes of the qualifying studies by comparing p-value and sample size to the effect sizes that were entered, using more complete data (e.g., ORs, means, and standard deviations). Cochran's Q-statistic showed that the method that was used to enter the effect sizes into the data analysis program was a significant moderator ($Q=9.28$, $df=1$, $p=0.0023$). The overall effect size estimate was **OR=1.32** (95% CI=1.25-1.40) for studies whose values were compatible with the Comprehensive Meta-Analysis program and an overall effect size estimate of **OR=1.15** (95% CI=1.08-1.23) for studies that used a more limited estimate of the effect size (p-value and sample size). Sensitivity results indicated that, regardless of which study was removed for each form of data entry, no one study influenced the results in either direction. My analysis showed a modest impact on the overall results according to how the data were entered and calculated.

4.4.5 Social Capital Survey Methods

This analysis investigated differences between the ways social capital was measured by studies that solely focused on social capital (here operationally defined as social behavior studies $n=20$) and studies that extracted social capital variables from existing surveys (secondary data analysis $n=17$). The overall estimated effect size for studies that focused on social behaviors and health was an **OR=1.26** (95% CI=1.17-1.37) and **OR=1.27** (95% CI=1.18-1.37) for studies that used

secondary data analysis methods. Cochran's Q-statistic for the test of moderation showed these results to be non-significant ($Q=0.020$, $df=1$, $p=0.0887$).

On average, studies in which social behavior (social capital) was the primary focus showed that every one unit-increase in social capital yielded a **26%** better chance of having good health, compared to a **27%** chance in studies in which social capital was a secondary focus. Sensitivity analysis did not signal that any one study when removed was a significant outlier or that the removal of any one study would either increase or decrease the overall estimated effect size in any direction. Regardless of which study that primarily focused on social capital was removed, the overall estimated effect size range was **OR=1.26-1.27**. For studies in which social capital was not the primary focus, the range of overall estimated effect sizes was **OR=1.27-1.28**.

4.5 EFFECTS OF SOCIAL CAPITAL CONSTRUCTS AND HEALTH

4.5.1 Efficacy

Four studies and 17 effect sizes tested the effects of the social capital construct of "efficacy" and health. These studies comprise two social capital indicators: self-efficacy (e.g., measured by individuals' level of control over their lives) and collective efficacy (e.g. measured by informal social control). Collapsing these social capital constructs into one proffered one group for comparison, for which the fixed-effects model was an appropriate test of heterogeneity. Cochran's Q-test for fixed effects showed that these effects were significantly heterogeneous ($Q= 13.4$, $df=3$, $p= 0.004$), whereas the overall effect size was **OR=0.995** (95% CI=0.82-1.20), n.s., not significantly different than zero. These results indicated that on average, people with

high levels of efficacy had odds of reporting poor health almost equal to people with lower levels of efficacy. Of the four studies that reported effects of the social capital construct efficacy, two were not significant at the $p < 0.05$ level, one study had a p-value of 0.05, and one had a p-value of < 0.05 . Sensitivity analysis showed that the overall effect size estimate did not change significantly with each study removed. When Skrasbski (2004) and Rose (2000) were individually removed, the overall estimated effect size increased slightly above **OR=1.00**; however, this non-significant finding suggests that neither study was a significant outlier. The range of estimated effect sizes, regardless of what study was removed, was **OR=0.969-1.02**.

4.5.2 Participation

The overall estimated effect size for participation was calculated from 124 effect sizes that yielded 51 different indicators of participation in 26 studies. These measures of participation included whether individuals had associational memberships, belonged to organizations, attended church, or volunteered. Cochran's Q-test for fixed effects showed these effects to be significantly heterogeneous ($Q = 124.2$, $df = 25$, $p < 0.05$). The overall weighted effect size was **OR=1.20** (95%CI=1.25-1.41), with a range of **OR=0.309** (95%CI=0.092-1.04) to **OR=3.35** (95%CI=8.10). With every one-unit increase in participation, the odds of having good health increases by **20%**. Results remained significant after sensitivity tests. The overall effect size range was **OR=1.18-1.21**, regardless of which study was removed.

4.5.3 Reciprocity

Five studies reported measures of reciprocity (with a total of 12 effect sizes) and five indicators were used to measure reciprocity (e.g., willingness to help others in certain situations, altruistic activity, and giving). Using the fixed-effects model, Cochran's Q-statistic showed these results to be significantly heterogeneous ($Q = 24.1$, $df=4$, $p<0.05$). These results are significantly different than zero ($p<0.05$). The overall effect size estimate was **OR=1.39** (95%CI=1.21-1.6). With every one-unit increase of engagement in reciprocal activities, the odds of having good health increased by **39%**. Sensitivity tests showed that regardless of which study was removed for reciprocity studies, the overall estimated effect size range was **OR=1.31-1.39**.

4.5.4 Sense of Community

Six studies measured sense of community, using 19 indicators such as individuals' perceptions of neighborhood safety, social cohesion, and friendliness of neighbors. A total of 21 effect sizes were derived. Using the fixed-effects model, Cochran's Q-statistic showed these results to be significantly heterogeneous ($Q = 47.17$, $df=5$, $p<0.05$). They are significantly different than zero ($p = 0.001$). The overall effect size estimate was **OR=1.28** (95%CI=1.10-1.49). With every one-unit increase in a positive sense of community, the odds of having good health increases by **28%**. Sensitivity test showed that regardless of which study was removed, these results remain significant, with an overall estimated effect size of **OR=1.21-1.55**.

4.5.5 Social Capital Indices

Social capital indices were captured by various composites of social capital measures such as trust, participation, collective efficacy, and reciprocity. Trust and participation were the two predominant social capital measures, included across 11 studies. Using the fixed-effects model, Cochran's Q-statistic showed these results to be significantly heterogeneous ($Q=154.28$, $df=10$, $p<0.05$). They are significantly different than zero ($p<0.05$). The overall effect size estimate was **OR=1.27** (95%CI=1.12-1.43). With every one-unit increase in a composite measure including multiple indicators of social capital, the odds of having good health increases by **27%**. Sensitivity test showed that regardless of which study was removed, these results remained significant, with overall estimated effect sizes ranging **OR=1.16-1.32**.

4.5.6 Social Support System

The social support system analysis was compiled by aggregating social support and social network effect sizes. Measures of social support included having someone to rely on when ill and a sense of support from family, friends, and co-workers. Social network measures included the diversity of friendship networks, having a friend of another race or ethnicity, and the frequency of individuals meeting locals in their areas. There were a total of 38 effect sizes, 22 indicators of social support systems, and 10 studies reporting social support system measures. Using the fixed-effects model, Cochran's Q-statistic showed these results to be significantly heterogeneous ($Q=139.29$, $df=9$, $p<0.05$). The overall effect size estimate was **OR=1.30** (95%CI=1.13-1.50). With every one-unit increase in social support, the odds of having good

health increases by **30%**. Regardless of which study was removed, sensitivity tests showed the range of overall estimated effect sizes regardless of which study is removed was **OR=1.24-1.35**.

4.5.7 Trust

Twenty-two studies reported measures of trust, as measured by 20 different indicators, yielding 58 effect sizes. Using the fixed-effects model, Cochran's Q-statistic showed these results to be significantly heterogeneous ($Q= 447.07$, $df=21$, $p<0.05$). These results were significantly different than zero ($p<0.05$). The overall effect size estimate for trust measures was **OR=1.32** ($95\%CI=1.19-1.46$). With every one-unit increase in trust, the odds of having good health increases by **32%**. Sensitivity tests showed no significant outliers regardless of which study was removed, providing a range of effect sizes **OR=1.29-1.36**.

Table 8. Results from Moderator, Construct, and Forms of Social Capital Analyses

MODERATOR, CONSTRUCTS, AND FORMS OF SOCIAL CAPITAL ANALYSES	N	# OF EFFECT SIZES	OVERALL EFFECT SIZE ESTIMATE	EFFECT SIZE RANGE
Country: INTL, MULTI^a, US	INTL: 24	288	INTL:1.24	INTL: 0.93-2.21
	MULTI: 5		MULTI:1.31	MULTI: 0.35-1.73
	US: 10		US:1.35	US: 1.01-9.76
Social Capital as Focus of Study	Yes ¹ : 17	288	Yes: 1.26	Yes: 1.26-1.27
	No ¹ : 20		No: 1.27	No: 1.27-1.28
Efficacy	4	17	0.995	0.63-1.33
Forms of Social Capital: Bonding, Bridging, Linking	BOND: 37	BOND: 279	BOND: 1.30	BOND: 0.95-9.76
	BRIDG: 11	BRIDG: 26	BRIDG: 1.18	BRIDG: 0.85-2.99
	LINK: 14	LINK:14	LINK: 1.10	LINK: 0.31-1.75
Level of Analysis	INDV: 12	288	INDV: 1.25	INDV: 0.93-2.21
	GRP: 16		GRP: 1.36	GRP: 0.35-9.762
	MULTI ^b : 11		MULTI: 1.20	MULTI: 1.00-1.71
Outcome	SRH: 28	288	SRH:1.29	SRH: 0.93-2.21
	MORT: 9		MORT:1.17	MORT: 0.35-9.76
Participation	26	124	1.12	0.31-3.35
Reciprocity	5	12	1.39	1.17-2.16
Sense of Community	6	21	1.28	1.02-3.24
Social Capital Index	11	23	1.27	1.03-9.76
Social Support Systems	10	38	1.13	0.95-2.34
Trust	22	58	1.319	1.19-1.46

MULTI^a=Multinational, INTL=International, US=United States
 Yes=Study included measured social capital directly,
 No=Study did not measure social capital directly
 INDV=Individual, GRP=Group, MULTI^b=Multilevel
 SRH=Self Reported Health, MORT=Mortality

4.6 SOCIAL CAPITAL FORMS

Each social capital measure was coded to represent one of the three forms of social capital: bonding (constructs such as participation, trust, and reciprocity), bridging (constructs such as social networks, political or electoral participation) or linking (measures such as voting and trust in legal, political, or government institutions).

4.6.1.1 Bonding

Thirty-seven studies and 249 of the 288 total effect sizes captured bonding social capital. Using the fixed-effects model, Cochran's Q-statistic showed these results to be significantly heterogeneous ($Q=718.43$, $df=36$, $p<0.05$). These results are significantly different than zero ($p<0.05$). The overall effect size estimate for trust measures was **OR=1.30** (95%CI=1.22-1.37). With every one-unit increase for those with horizontal or homogenous social capital sources, the odds of having good health increases by **30%**. Sensitivity tests showed that regardless of which study was removed there were not any significant outliers and a range of effect sizes **OR=1.27-1.31**.

4.6.1.2 Bridging

Eleven studies and 26 effect sizes captured bridging social capital. Using the fixed-effects model, Cochran's Q-statistic showed these results to be significantly heterogeneous ($Q=196.36$, $df=10$, $p<0.05$). These results are significantly different than zero ($p=0.007$). The overall effect size estimate for trust measures was **OR=1.18** (95%CI=1.05-1.34). With every one-unit increase in both horizontal and vertical social networks, the odds of having good health increases by

18%. Sensitivity tests showed that regardless of which study was removed, no one study was a significant outlier, and an overall effect size range of **OR=1.23-1.21**.

4.6.1.3 Linking

Fourteen effect sizes and 8 studies reported measures of linking social capital such as electoral and political participation, as well as trust in institutions such as government, the legal system, or other political institutions. Using the fixed-effects model, Cochran's Q-statistic showed these results to be significantly heterogeneous ($Q= 84.63$, $df=7$, $p<0.05$). However, these results are not significantly different than zero ($p=0.14$). The overall effect size estimate was **OR=1.10** (95%CI=0.97-1.24). With every one-unit increase for those with high levels of linking social capital, the odds of having good health increased by **10%**. Sensitivity tests showed that no one study was a significant outlier and provided an overall estimated effect size of **OR=1.05-1.14**.

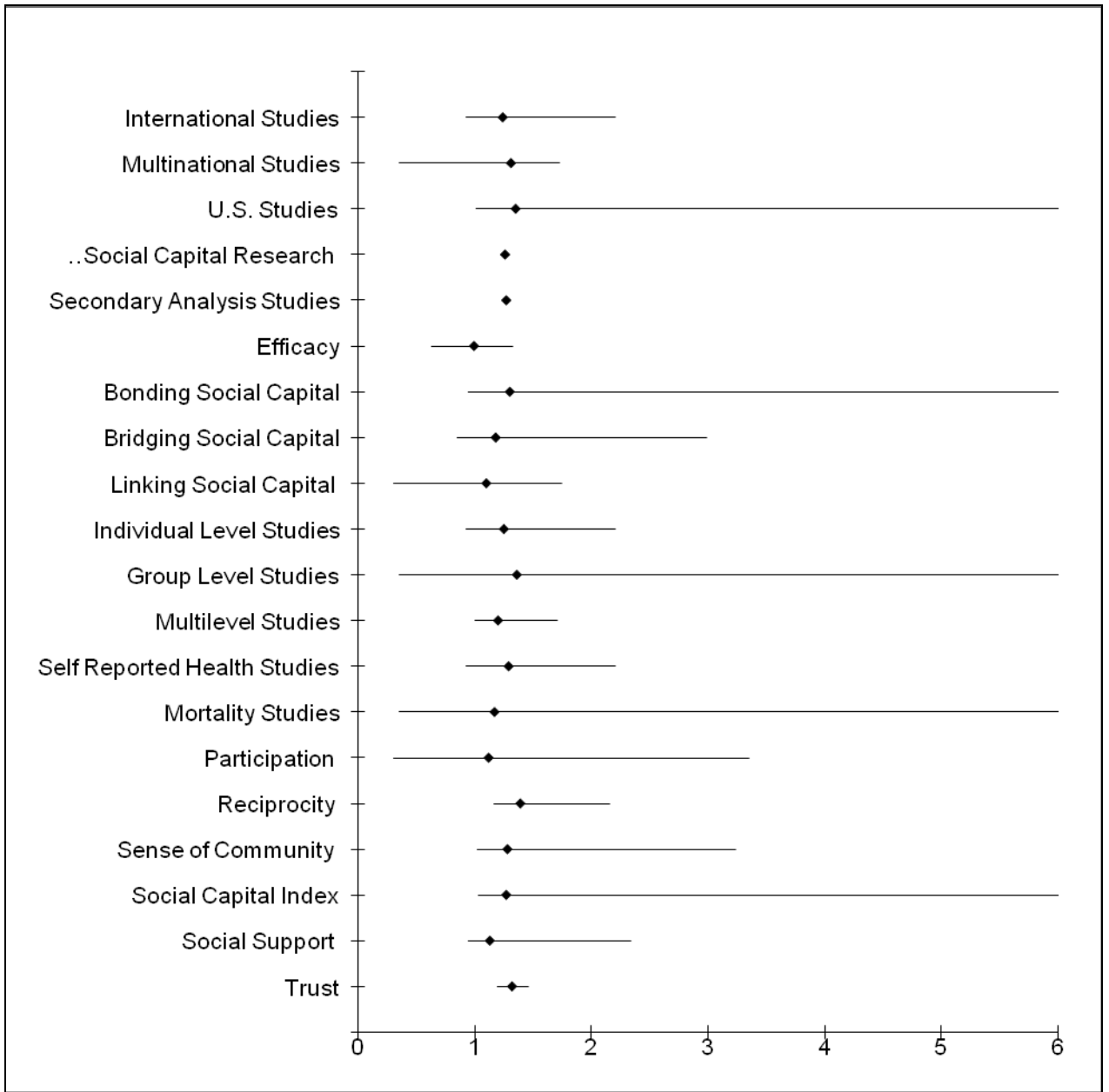


Figure 2. Distribution of Effect Sizes by Social Capital Constructs, Moderators, and Forms of Social Capital

4.7 CONCLUSIONS

The results of this meta-analysis provide evidence that social capital has a modest positive relationship to health (OR=1.27; 95%CI=1.21-1.34) as defined by self-reported health and mortality. This study also shows that the relationship between social capital and self-reported health is stronger for mortality. Specifically, each social capital construct and form of social capital shows an overall positive relationship to health, with only one exception: in the case of the social capital construct of efficacy (OR=0.995 (95%CI=0.82-1.20)). This meta-analysis was unable to compare the individual and combined effects of each social capital construct in order to determine if they differ significantly from each other. Reciprocity had the largest effect size (OR=1.39 95%CI=1.21-1.6), followed by trust (OR=1.32 95%CI=1.19-1.46). These results show a marginal level of significance for differences in the location of the social capital studies, and no significant differences in the level of analysis for social capital research overall. More moderation analyses are needed to identify the factors that positively influence the relationship between social capital and health. The limitations of this meta-analysis reflect many of the limitations found within the social capital literature (as discussed in section 3.8).

5.0 DISCUSSION

The results of this meta-analysis suggest a modest positive relationship between social capital and health as measured by self-reported health and mortality. Social capital, a complex phenomenon, is a result of social relationships based upon reciprocal exchanges between residents of the same neighborhood or members of social, religious, or political organizations. Other social networks may be the result of individuals having a shared identity or having organized themselves formally or informally to exchange ideas, discuss books, or even consider how best to negotiate with local business owners, developers, and politicians about getting a grocery store into their neighborhood. These are examples of how the sources of social capital can be used to effect social change.

This meta-analysis aimed to compile the social capital literature to determine whether social capital has a positive relationship with health. The results from this meta-analysis do not provide evidence of a strong positive relationship between social capital and health. The weak association presented in this meta-analysis is a result of several factors, discussed below, that have long plagued the social capital literature. The author emphasizes these methodological issues and further recommends a careful consideration of the future of social capital research.

Social capital researchers should direct their efforts towards identifying the mechanisms by which social capital operates and should strive to identify a causal direction between social

capital and health. Interventions should also be developed that will increase the stock of social capital, which may help determine if social capital can greatly improve health status.

The heterogeneity tests from this meta-analysis showed that certain factors do account for the previously unexplained differences among the targeted studies. Testing for moderators became a function of how best to categorize or combine the social capital literature based on both theoretical and *a priori* assumptions. Upon careful review of the literature, 14 categories emerged as possible moderators. However, not every social capital construct could be tested as a potential moderator because of the non-independence of effects. Thus, the ability of this meta-analysis to test the significance between social capital constructs, bonding, bridging and linking forms of social capital was limited. Arguably, one possible reason that the overall effect size estimate between social capital and health is not larger may be a lack of social capital studies that identify mediators, confounders, and moderators. The inability of these studies to systematically discuss the possible influence of mediators, confounders, and moderators is a major limitation within the literature that reduces the capacity not only of this meta-analysis but also of future meta-analyses. This analysis was unable to adequately test for moderation stratified by race/ethnicity, gender, age, income, education, or to test each of the social capital constructs and the interaction effects among them.

The long debate about whether social capital is a characteristic of individuals or a feature of groups or geographic locations was tested in the level of analysis. Ecological or group analyses provided the largest overall effect estimate, but were not statistically different than the other two levels of analysis. Measures at the aggregate level may generate different consequences, depending on the goal (Sampson et al., 1999). The studies in this meta-analysis examined the relationship between health and community, neighborhood, state, and national

social capital to confirm the ecological nature of social capital. Multinational studies were examined for relationship of social capital and health across countries.

The lack of significant differences in the country-moderator analysis may suggest unclear goals per level of aggregation; these goals do exist and are closely similar, or even a closer relationship between the variables measured and the methods used. Most studies examined in this meta-analysis included aggregated responses to social capital, self-reported health, and mortality. Harpham (2008) argues that this is an appropriate method to measure social capital at an ecological level. However, this method does not capture the potential influence of social capital on health from organizations and policy. These results mainly capture a sense of the relationship between social capital and health at an individual, neighborhood or geographical community level.

Although the results of this meta-analysis are not statistically significant, they do indicate real differences among individual, group or ecological and multilevel analyses such as differences between the contextual and compositional effects of social capital. Social capital operates differently for different people and in different kinds of communities (e.g., communities of identity and geographic communities). For example, in a comparison of the effects of social capital in neighborhoods in Mississippi and neighborhoods in Maine, one would expect to see differences at all levels: race/ethnicity, gender, age, income, education, state, local, and neighborhood. In this sample, these differences and interactions were not accounted for, even in my comparison of the countries of study origin. However, the marginal level of significance confirms, if conservatively, that national differences in social capital do exist.

If these studies had tested the interactions between social capital and geographic location (nation), the results would probably have suggested more significant differences. In any case,

the results of the country of research test indicate that more research should examine the effects and interactions between social capital and geographic location and, arguably, among communities of identity as well. Often, the necessary tests cannot be conducted based upon data available from secondary data analyses, similarly to the analytical limitations of this meta-analysis.

Social capital's relationship to health is marginally higher (about 10%) for self-reported health than for mortality. However, these results must be interpreted cautiously in light of the fact that 30 studies used self-reported health as an outcome, 9 studies used mortality as the outcome, and 2 studies used both outcomes. Possibly, the number of effect sizes used to estimate the relationship between social capital and self-reported health are skewed toward a larger effect. The subjective measure of self-reported health, compared to the objective measure of mortality may be more closely related to social capital. The social capital literature has shown a correlation to health, but not causality.

Social capital measures of what people do and how they feel are also interrelated. Results from this meta-analysis imply that research about the relationship between health and social capital (what people do and how people feel) might be better assessed by self-reported health measures. The practice of using self-reported health to predict future health status and mortality, as many social capital studies do, may also be a function of secondary data analyses in which self-reported health appears as an available health outcome in many health studies.

Another goal of this meta-analysis was to examine the relationship of each social capital construct with health. Its results show that the construct of reciprocity has the largest effect on health, followed by trust. The lowest effect size found was for efficacy. This meta-analysis cannot determine if these effect size estimates are significantly different. Upon review of the

sensitivity analyses of reciprocity and the removal of the social capital study with the largest effect size (OR=2.52), the overall effect size estimate is reduced by about 0.16, which suggests that the study with the largest effect size did not individually increase the overall effect size estimate of this social capital construct. This result indicates that the study with the largest effect size was not a significant outlier, nor did it drive the effect size of reciprocity higher than the other social capital constructs.

Most of the studies in this meta-analysis included participation (n=26) and trust (n=22) in their examination of social capital and health. The wide variation in measures of participation and trust suggests a need for further characterizing the measures for both of these constructs. For example, participation can be measured by asking if someone belongs to certain categories of organizations, clubs, and associations, or by asking them the number of organizations, clubs, and associations to which they belong. Studies that report categorical participation may also, arguably, examine participation from a contextual perspective by tapping into the specific types of organizations in which people in their sample are involved. This is a substantively different way to assess levels of participation than simply asking how many organizations someone belongs to.

Categories may have been derived from pilot-testing surveys to find out what people are involved in, or from qualitative research that provided information about areas of active engagement. To access more detail about the contexts of participation, future studies should inquire about the number of organizations, clubs, and associations in a range of categories (civic, faith, neighborhood, etc.) to which people belong. Future studies should also include time references that indicate individuals' period of involvement. This measure is as important as beginning to measure individuals' frequency and depth of participation in organizations and

communities. More specific measurements of social capital at all levels of analysis will enrich future research and enable future meta-analyses to better understand the health benefits of social capital.

The effects of bonding, bridging and linking social capital and health could not be compared in this analysis because of the independence of effects. The overall effect size estimate of bonding social capital was higher than anticipated, possibly as a result of estimating bonding social capital according to 279 different effect sizes compared to 26 for bridging and 14 for linking. This discrepancy also demonstrates the paucity of research about the relationships of bridging and linking forms of social capital. This lack of research does not support the consensus in the literature that all three forms of social capital are important (Kim & Kawachi, 2006; Kim et al., 2006; Putnam, 2000; Woolcock & Narayan, 2000). They further point to the dearth of social capital studies examining the effects of vertical relationships and health.

One of the untapped benefits of organizing measures and studies according to bonding, bridging, and linking social capital is that this organization provides a lens through which to characterize the types of social capital networks. Bonding mainly focuses on horizontal or homogenous social ties; bridging is a composite of both horizontal and vertical or homogenous and heterogeneous social ties; and linking focuses on vertical or heterogeneous social ties. Additional research is needed to more fully conceptualize each of these forms of social capital. With better measurement of bonding, bridging, and linking social capital, future studies can serve as useful theoretical guides for interventions that focus on increasing social capital.

The social capital literature does not have consistent measures for each construct or for bonding, bridging, and linking social capital. A review shows that many of the measures used to assess reciprocity, trust, sense of community, and some subsets of participation are used

interchangeably. For example, a measure that asks, “In general, are people willing to help in certain situations?” can be labeled as both reciprocity and sense of community. This inconsistency in measures may lead to different interpretations of the overall relationship of these constructs to health. For example, the literature has shown social capital constructs to be correlated.

The majority of studies in this meta-analysis tested the correlation between each of their social capital variables; however, social capital studies do not often test the differences between and within groups. For example, the literature cannot suggest why, how, or if social capital for African Americans is different than for Whites, Hispanics, women, children, or older adults. The lack of assessing differences among groups also limits the ability of this and future meta-analyses to characterize the literature and compare those results. This meta-analysis also cannot make any statements about the individual efficacy of these measures and their relationship to health.

5.1 IMPLICATIONS FOR FUTURE RESEARCH

Labonte (2004) recommends that future studies of social capital examine the cultural history and political economy of nations and communities, to better understand the determinants of social capital, and forego the work on better theorization and operationalization of social capital. Perhaps a synthesis is best: future research on social capital should embody the forged and maintained social ties that build cultural values, make history, and shape better and more productive political economies. Five broadly related questions may help guide the direction of future research:

- (1) What are the contexts, structures, and functions of individuals' social networks that affect health behavior?
- (2) What are the community characteristics that affect health status?
- (3) What are the interactions between what people do and how people feel, and in what contexts?
- (4) What is the causal direction of social capital? and
- (5) What are the micro-level to macro-level factors that are either influenced by social capital or show social capital as a social determinant of health affects?

These questions address many of the critiques of social capital research. Finding answers to these questions, and others, requires research that identifies ways to increase social capital for individuals, communities, neighborhoods, organizations, states, and nations.

Social capital can be examined according to three themes: community integration, public participation, and power relations; such emphases shift attention to an asset model of community and ways to examine horizontal and vertical social relationships (Putnam, 2007; Wakefield & Poland, 2005). Social capital can provide public benefits, such as those from public services, or private/individual benefits from other sources of social support. Social capital's focus on strengthening existing social ties and forming newer ones implies the need to better understand social inclusion and social exclusionary practices (Labonte, 2004). Social capital in the public health literature overall has ignored the significance of social exclusion, which occurs as a result of many factors such as policy decisions that marginalize certain segments of the population. Income, education, and race/ethnicity are other factors that may segregate society and place certain citizens at greater risk for disease.

If one is to determine whether social capital is a social determinant of health, it is necessary to understand how it operates from a micro-to-macro level. At the micro level, exploration could utilize biological samples or behavioral surveys to understand whether social capital can reduce stress. However, at another level, it is unclear how social capital operates across socioeconomic status. Perhaps higher socioeconomic groups are healthier as a result of their connections to better health care, social support networks, and social networks that provide useful health information. At this time the social capital literature provides very little insight into this question, and nor does it provide evidence about whether socioeconomic status is the main driving force for how individuals become part of social networks. The income inequality and health literature clearly show that a lower income segregates certain segments of the population and relegates them to geographical environments in which there is a greater risk for disease. It is plausible that social capital may mediate this relationship between income and health, which suggests that increasing social capital in low-income neighborhoods and communities, improves health status. However, exploration of that hypothesis will require further and more explicit study of SES and social capital.

Socioeconomic status may limit the ability of those with lower incomes and less educational experience to interact with others who have higher incomes and more extensive education. Within the context of social capital, the underlying assumptions are that greater income and education reduce the risk for disease for those in higher education and SES strata, and that resource-rich social networks may introduce members to healthy behaviors and/or reinforce current practices. The lack of attention to social exclusion partly explains why social capital is not a part of the health inequalities or health disparities literature (Carlson & Chamberlain, 2003).

One strategy for correcting this imbalance is to re-examine the social capital literature to identify studies that show socioeconomic status as a confounder and calculate an overall estimated effect size for those studies. They can then be compared to studies that do not show socioeconomic status as a significant predictor. If socioeconomic status is found to be a significant confounder, this does not imply a causal relationship (MacKinnon, Krull, & Lockwood, 2000). A second strategy involves qualitatively and quantitatively characterizing the variety of networks, associations, and types of participation. Such assessment can also provide necessary evidence about benefits and negative consequences individuals across income levels receive from these connections.

Social capital is broadly conceptualized as “how people feel” and “what people do,” which are interconnected. This connection, however, raises a methodological question about the causal direction of social capital. This meta-analysis, for example, cannot answer the question of causality or determine whether healthy people are more active and therefore have higher levels of social capital, whether active people are healthier as a result of their engagement in activities that can position them in social networks which reinforce healthy behaviors, or whether such social networks can provide them with opportunities for educational, economic, and political advancement/empowerment. A critical question about causality is whether people who experience significant negative health outcomes are less able to actively participate in social and community life and whether, therefore, poor health negatively impacts social capital. Perhaps people who are ill view their social networks and sources of social support in a negative light (reverse causation).

Poortinga (2006a) attempted to find a causal pathway between social capital and health, hypothesizing that health behavior may mediate the relationship between social capital and

health. He found that controlling for smoking, alcohol intake, and fruit/vegetable consumption did not affect the association between social capital and self-rated health. His results concluded that social capital and support are important determinants of self-rated health and health behaviors, but determined no causal direction.

The social capital literature has not been able to distinguish a causal direction for social capital in part because most studies are designed to examine only the relationships between social capital and any health outcome. Whether there is a causal relationship between social capital and health, or if social capital is a proxy measure for unobserved individual or contextual factors, which hide the real statistical relationship, remains unknown (Anderson & Mellor, 2008). Many social capital studies rely on secondary data analyses from studies that were not designed to directly measure social capital.

One statistical solution to this problem would be for social capital researchers to test for mediators, confounders, and moderators within each study. This practice would endow the social capital literature with the capacity to explain differences in social capital within and between groups of race, ethnicity, gender, and age, as well as to show differences across neighborhoods, states, and nations, and within different contexts such as schools, churches, youth organizations, and support groups. Such expanded focus would provide opportunities to examine vertical social ties and the negative effects of social capital; for example, how social capital does or does not aid a population of injection drug users, or a population of gay African American men. Without this type of data, researchers struggle to provide a general sense of the influence of social capital on health without a level of detail sufficient for the design of behavioral, community, or policy interventions that might increase the stock of social capital in communities of identity or various geographic locations.

Research that can produce evidence of the micro-to-macro-level factors that influence social capital and health can also increase knowledge about how social capital measures can be used to empower individuals and communities to increase community control, political efficacy, and improve their qualities of life and social justice. Currently, few studies test for differences in race, ethnicity, gender, and/or sexual orientation. Thus the social capital literature has not obviously contributed to the understanding of health disparities, although we substantively know that it does (Carlson & Chamberlain, 2003). There is a great need to understand if and how social capital can eliminate health disparities, but empirical data must first be derived that supports the design of public health solutions to eliminate these disparities.

More studies are needed that solely examine the relationship of social capital and health, as well as how social capital changes over time, especially within specific geographical locations. A possible retrospective study of time-linked changes in social capital might evaluate the health status of cohesive neighborhoods or communities before government interventions to, for example, replace public housing with mixed-income housing, and then examine the cohesiveness of these neighborhoods after the construction. Or the effects of gentrification over the past decade could be viewed across cities. These topics could significantly enhance the understanding of how policy decisions can disaggregate existing social networks, as well as provide opportunities for social capital researchers to understand how social networks are affected by policy decisions.

Increasing social capital will require the ability to effectively improve social relationships and ties within and across all levels of the social ecology. The communitarian approach to social capital in public health centers the attention primarily on what people do; accordingly, the social capital literature is dominated by studies focused on what people do or the

activities in which people are engaged, rather than on how people feel about their participation. Some studies do examine how people feel in addition to their individual actions but often they leave structural and cognitive forms disconnected. To gain insight about whether social capital is an experimentally malleable phenomenon, either by natural experiments or randomization, the structural and cognitive forms of social capital must be connected. Such connections will provide evidence about how to increase social capital where it is deficient and how to provide coping strategies when sources of social capital have deleterious effects on health.

The need to focus scholarly attention on the benefits and negative consequences derived from individual participation and from various social support systems is also growing. The literature continues to suggest a correlation between how people feel and what people do, but how the two operate together to build social capital, or even how social capital promotes the adoption of healthy behaviors, is still not clearly understood.

Many studies in the social capital literature utilize multilevel modeling to examine the effects of aggregate and individual-level measures of social capital and health (Subramanian, Kim, & Kawachi, 2002; Subramanian et al., 2003). Many of the measures of social capital they employ are aggregated at a neighborhood or community level. For some, aggregation is considered an appropriate method of conceptualizing an ecological concept (Harpham, 2008), while others suggest that aggregation is not an appropriate way to capture ecological-levels of social capital (Anderson & Mellor, 2008) because it does not provide comparative information about social capital's contextual and compositional factors.

One way of using a longitudinal, multilevel design study to examine the long-term effects of social capital would be to randomize elementary-, middle-, and high-schools across several U.S. cities into a program that provides classroom curricula which focus on the ten dimensions

of capacity identified by Goodman et al. (1998): leadership, citizen participation, skills, networks, resources, sense of community, community power, understanding community history, values, critical reflection, and engagement in healthy behaviors. These ten dimensions interrelate with the constructs of social capital.

Social capital's constructs are part of the processes and outcomes of building capacity. For example, building trusting relationships between schools and neighborhoods can lead to a social network that can be used to help lobby local politicians for sidewalk and street repairs/improvements. This study hypothesizes that building capacity and social capital will improve health status by making skills and tools for leading a healthy lifestyle available. Participants in such initiatives will gain the necessary skills, tools, and resources for healthy living; strategies to reduce environmental health risks; and networking skills that can lead to future educational attainment and economic stability. This study design allows a participatory process in which schools and neighborhoods can develop mutually beneficial relationships and produce curricula, programs, and activities that will be meaningful to all participants.

In such a study, a list of schools would meet criteria based on each school's size and diversity, average family income of the student body, and urban/rural geographic location. Schools would next undergo a school (organizational) readiness survey to determine which ones will participate in the intervention. Part of the readiness survey would identify the strengths of each school and neighborhood that could be used to customize the intervention. The readiness survey would also characterize each school, in order to find representative schools that embody the diversity of the United States. The readiness survey would be based on capacity-for-research readiness surveys such as those developed and used by Lempa et al. (2006). Surveys would be completed by a selection of administrators, teachers, parents, and neighborhood residents.

Control schools would receive periodic information about local opportunities for involving their school communities in larger community development.

One major critique of the social capital literature is that it is dichotomized into individual-level and ecological-level studies. The design outlined above would examine social capital at several levels of the social ecology. Each component of the program is relevant to each of its target groups: administrators, teachers, parents, children, and neighborhood citizens. The program would aim to provide training and programming to repeatedly expose the community of administrators, teachers, children, parents, and members of the surrounding neighborhood to the core domains of capacity building and social capital development: leadership, networking, social support, trust, reciprocity, community engagement (participation), self-efficacy, collective efficacy, social cohesion, and sense of community.

Another aim would be to build multiple communities that engage in healthy behaviors, much like work-site interventions that seek to improve the health of employees. Building active communities requires citizens to be individually and collectively engaged in solving community problems and working toward being active in their respective organizations, volunteer associations, and religious institutions. An important factor in social capital development is the belief that active communities are ready sources of not only problem solving, but of prevention. Still another aim of this intervention would be to assess the formal and informal networks and social support systems that emerge, as well as their benefits and negative consequences.

Each school would maintain its own programming and each individual enrolled in the study would be asked to respond to a social capital and health survey. Individual health status will be measured by self-reporting and from questions about health behaviors. All surveys would be pilot-tested for age-appropriateness. Each of the groups involved in the study (e.g.

administrators, teachers, parents, neighborhood residents and students) would receive surveys appropriate to their level of involvement in the study.

Measures would be developed using the themes of the ten dimensions of capacity and the constructs of social capital. Thus, data collected about capacity and social capital would provide indicators of their development (e.g. at individual, organizational, and neighborhood levels). Data from qualitative assessments would provide information about the initiative's overall development and implementation. All participants would receive behavioral surveys about nutrition, physical activity, life stressors, life satisfaction, and health status. Collecting behavioral data would allow researchers to triangulate health status results with data about the program and with indicators for capacity and social capital. These data would also provide evidence about the active involvement of a culturally tailored school and neighborhood intervention to raise the capacity of a community and to enhance its sources of social capital.

Health indicators would be measured at individual and ecological levels but not aggregated. These data would help determine if capacity and social capital can be enhanced at both individual and ecological levels. Such data would also indicate what health benefits, if any, emerge as a result of increasing capacity and social capital.

A community advisory board would be formed to represent each school and neighborhood, comprised of school administrators, teachers, staff, students, parents, and neighborhood residents, and each board would have regulatory functions at its respective site. These key stakeholders would provide direction on program development, implementation, maintenance, and evaluation. In-depth interviews and focus groups including key stakeholders and participants would be used to continuously make program adjustments (e.g. mid-course corrections), check for programmatic efficacy, and to assess the program's impact.

Finally, health, capacity, and social capital would be examined according to several units of analysis: school environment, surrounding neighborhood, and individual health of children, parents, teachers, and administrators. Data collected from this hypothesized study could produce solid evidence about causal directions between social capital and health. These results could also produce evidence about the effect of the relationship between social capital and socioeconomic status and health across groups. Implementing the intervention through public schools would yield a sample of mixed incomes in addition to diversity of gender, race, ethnicity, and geographic location.

Unlocking the potential of social capital will require greater focus on measurement precision, theory application to public health problems, and development of culturally tailored policy and behavioral interventions to increase social capital. Understanding the mechanisms by which social capital operates will help to determine if it is causally linked to good health, and will also further inform the science and practice of research into social capital and health. As social capital research advances, evidence will mount that clarifies the strength of the relationship between social capital and health; in turn, this relationship may indicate methods and approaches to improve the quality of life for all, but in particular for marginalized groups across the globe.

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